PEAT RESOURCE MANAGEMENT IN PENINSULAR MALAYSIA:
CONNECTIONS BETWEEN POLICY AND PRACTICE

A Dissertation Presented in Partial Fulfillment of the Requirements
for the Degree of Doctorate of Philosophy
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Faculty of Engineering, Health, Science and the Environment
Charles Darwin University

by Sasikala (Shashi) Kumaran

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Main Supervisor: Professor Stephen Garnett
ABSTRACT

Scientists and conservation organisations have raised concerns that the clearing and conversion of peatlands in Peninsular Malaysia affect the rate of emission of greenhouse gases and lead to biodiversity loss. It has also given rise to recurrent annual haze, which has had serious implications on the health of the people and the economy of the region. This thesis analyses the impacts of policy on the utilisation of peatlands in Peninsular Malaysia. It examines policies to assess if they are functioning as intended and explores why some appear to be failing to fulfil their objectives. Influenced by the Public Policy Analysis and the Institutional Resource Regime frameworks, the thesis describes the main uses, the users and actors of peatland management in Peninsular Malaysia and the related policies (as well as regulations). It also discusses the implementation of the resource regime, using the North Selangor Peat Swamp Forest, the Southeast Pahang Peat Swamp Forest and the Ayer Hitam Forest Reserve in Johor as three case study sites. Key ecosystem services provided by peatlands and peat swamp forests in Peninsular Malaysia and their rivalries are highlighted, as well as gaps in policy for peatland management. Attempts that have been made to regulate the rivalries and gaps, and institutional mechanisms set up for collaborative cooperation are also discussed. My results suggest that the public policy implementation modalities of peatland management in Peninsular Malaysia and their effect on sustainability is dependent on the relations between the Federal State and the federated states, as well as on the weak endowment in action resources of politico-administrative actors in charge of policy implementation. It also concludes that peatland management in Peninsular Malaysia is a simple regime where a limited number of the goods and services provided by peatlands and peat swamp forests are regulated in a coordinated way. However this has meant that many of the actual uses are unregulated, leaving a large scope of manoeuvre for individual exploitation and the avoidance of the constraints needed if policy is to be implemented successfully.
This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying online via the University’s Open Access repository eSpace.

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Sasikala (Shashi) Kumaran

Date: 9/12/2014
This thesis is dedicated to two women who inspired me…

To my late mother, Ambiga Rao, who taught me courage by bravely enduring treatment for cancer during the entire period of my research and who succumbed on 11 January 2014, and

To my late sister, Sobhana Kumaran, who taught me to always reach for the stars!
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“I’ve learnt that people will forget what you said, people will forget what you did, but people will never forget how you made them feel.”

Maya Angelou

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<td>Action plan</td>
</tr>
<tr>
<td>APFP</td>
<td>ASEAN Peatland Forests Project</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>AUSAID</td>
<td>Australian Agency for International Development</td>
</tr>
<tr>
<td>CBD</td>
<td>Convention on Biological Diversity</td>
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<tr>
<td>CBO</td>
<td>Community-based organisations</td>
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<td>CFS</td>
<td>Central Forest Spine</td>
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<td>CITES</td>
<td>Convention on International Trade in Endangered Species of Wild Fauna and Flora</td>
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<td>CO₂</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>CKPP</td>
<td>Central Kalimantan Peatlands Project</td>
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<tr>
<td>CPR</td>
<td>Common pool resource</td>
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<tr>
<td>DANCED</td>
<td>Danish Cooperation for Environment and Development</td>
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<td>DANIDA</td>
<td>Danish International Development Assistance</td>
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<tr>
<td>DID</td>
<td>Department of Drainage and Irrigation</td>
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<td>DoA</td>
<td>Department of Agriculture</td>
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<tr>
<td>DoE</td>
<td>Department of Environment</td>
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<tr>
<td>DTCP</td>
<td>Department of Town and Country Planning</td>
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<td>DWNP</td>
<td>Department of Wildlife and National Parks</td>
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<td>ECER</td>
<td>East Coast Economic Region</td>
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<td>EIA</td>
<td>Environmental impact assessment</td>
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<td>ESA</td>
<td>Environmentally Sensitive Area</td>
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<td>ETP</td>
<td>Economic Transformation Programme</td>
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<td>EU</td>
<td>European Union</td>
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<td>Food and Agriculture Organisation</td>
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<td>FD</td>
<td>Department of Forestry</td>
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<tr>
<td>Fisheries</td>
<td>Department of Fisheries</td>
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<td>FMU</td>
<td>Forest Management Unit</td>
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<td>FR</td>
<td>Forest Reserve</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<td>FRIM</td>
<td>Forest Research Institute of Malaysia</td>
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<td>FELDA</td>
<td>Federal Land Development Authority</td>
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<td>GACCC</td>
<td>German Advisory Council on Climate Change</td>
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<td>GEC</td>
<td>Global Environment Centre</td>
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<td>GEF</td>
<td>Global Environment Facility</td>
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<td>GHG</td>
<td>Greenhouse gas</td>
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<td>HORAS</td>
<td>Hybrid Off River Augmentation Scheme</td>
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<td>IAD</td>
<td>Institutional Analysis and Development</td>
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<td>IADA</td>
<td>Integrated Agriculture Development Area</td>
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<td>IDHEAP</td>
<td>Swiss Graduate School of Public Administration</td>
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<td>IFAD</td>
<td>International Fund for Agriculture Development</td>
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<td>IFRI</td>
<td>International Forestry Resources and Institutions</td>
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<td>IMG</td>
<td>International Mire Conservation Group</td>
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<td>IPCC</td>
<td>Inter-governmental Panel on Climate Change</td>
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<tr>
<td>IPS</td>
<td>International Peat Society</td>
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<tr>
<td>IR</td>
<td>Institution regime</td>
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<td>IRR</td>
<td>Institutional Resource Regime</td>
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<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<td>JKOA</td>
<td>Orang Asli Development Department</td>
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<td>KLIA</td>
<td>Kuala Lumpur International Airport</td>
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<td>KPI</td>
<td>Key Performance Index</td>
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<td>LRA</td>
<td>Local Regulatory Arrangement</td>
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<td>MA</td>
<td>Millennium Ecosystem Assessment</td>
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<td>MC&amp;I</td>
<td>Malaysian Criteria and Indicators</td>
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<td>MDA</td>
<td>Multi-disciplinary assessment</td>
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<tr>
<td>MOSTE</td>
<td>Ministry of Science, Technology and Environment</td>
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<td>MOSTI</td>
<td>Ministry of Science, Technology and Innovation</td>
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<td>MTCC</td>
<td>Malaysian Timber Certification Council</td>
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<tr>
<td>MTCS</td>
<td>Malaysian Timber Certification Scheme</td>
</tr>
<tr>
<td>MTR</td>
<td>Mid-Term Review</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<td>---------</td>
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</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
</tr>
<tr>
<td>NAP</td>
<td>National Action Plan for Peatlands</td>
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<tr>
<td>NFA</td>
<td>National Forestry Act</td>
</tr>
<tr>
<td>NKEA</td>
<td>National Key Economic Areas</td>
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<td>NKRA</td>
<td>National Key Results Area</td>
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<td>NPP</td>
<td>National Physical Plan</td>
</tr>
<tr>
<td>NTFP</td>
<td>Non-timber forest products</td>
</tr>
<tr>
<td>ODA</td>
<td>Overseas Development Administration</td>
</tr>
<tr>
<td>OPP</td>
<td>Outline Perspective Plan</td>
</tr>
<tr>
<td>PAA</td>
<td>Political-administrative arrangements</td>
</tr>
<tr>
<td>PAP</td>
<td>Political -administrative programme</td>
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<tr>
<td>PD</td>
<td>Political definition</td>
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<tr>
<td>PES</td>
<td>Payment for environmental services</td>
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<td>PFE</td>
<td>Permanent Forest Estate</td>
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<td>PKPS</td>
<td>Selangor Agriculture Development Authority</td>
</tr>
<tr>
<td>PP</td>
<td>Public policy</td>
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<td>PPA</td>
<td>Public Policy Analysis</td>
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<tr>
<td>PR</td>
<td>Property rights</td>
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<tr>
<td>PRF</td>
<td>Permanent Reserved Forest</td>
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<tr>
<td>Ramsar</td>
<td>Ramsar Convention on the Conservation of Wetlands of International Importance especially as Waterfowl Habitat</td>
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<td>REDD</td>
<td>Reduced Emissions from Deforestation and Degradation</td>
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<td>RFS</td>
<td>Renewable Fuels Standard</td>
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<td>RIL</td>
<td>Reduced Impact Logging</td>
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<td>RSPO</td>
<td>Roundtable on Sustainable Palm Oil</td>
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<td>SFM</td>
<td>Sustainable Forest Management</td>
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<td>SMS</td>
<td>Sustainable Management System</td>
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<td>SSFD</td>
<td>Selangor State Forestry Department</td>
</tr>
<tr>
<td>TPA</td>
<td>Totally Protected Area</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Name</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Organization for Education, Science and Culture</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>USAID</td>
<td>U.S. Agency for International Development</td>
</tr>
<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
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Chapter 1  Introduction

1.1  Background

This thesis describes how the policies of the Malaysian Government consider peatlands in Peninsular Malaysia. Peatlands are important locally, nationally and internationally. To understand the importance of peatland policy, therefore, it is necessary to understand the physical context to which the policy debate pertains. In this Chapter I first explain how peat is currently defined, describe the significance of tropical peatlands then summarise knowledge of the distribution of tropical peatlands, particularly those in Peninsular Malaysia. I then outline the nature of the problem that I aim to explore in this thesis and end by listing the research questions the thesis aims to answer using qualitative research based primarily on in-depth interviews with a wide range of stakeholders with interests in peat policy in Peninsular Malaysia.

1.1.1  Definition of Peat and Peatlands

While the words ‘peat’ and ‘peatlands’ appear in legislation and policy, there is a lack of a standard definition of peat and peatlands globally. In 2008, the International Peat Society (IPS) and the International Mire Conservation Group (IMCG) formed a Peat and Peatland Terminology Group to work on defining the terms peat, mire and peatlands. This lack of a standard definition could be related to the changing use of peat over time (Andriesse, 1988). In the past, chemists and geologists studied peat (i.e. the substance) for its potential for industrial and energy purposes while horticulturalists and gardeners used peat as a soil for agriculture. Peat swamps (i.e. the physiological unit) have long been studied by biologists and scientists from a
biological science viewpoint. However, the study of peat from a land management perspective (i.e. peatlands) is relatively new.

The IPS and the IMCG (2002) define peat as “sedentarily accumulated material consisting of at least 30% (dry weight) of dead organic material;” while peatland is defined “as an area with or without vegetation with a naturally accumulated peat layer at the surface." The United States Department of Agriculture (USDA, 1975) Soil Taxonomy, on the other hand, defines peat soil as an organic soil which contains at least 65% organic matter (dry weight) (less than 35% mineral material), and is at least 0.5 m in depth and 1.0 ha in areal extent. Swamp and peat swamp forest was defined by Parish et al. (2008) as being usually forested peatlands with dense tree canopy.

According to Paramananthan and Omar (2008), the definitions and classifications of peat for soil mapping are different for Peninsular Malaysia, Sabah and Sarawak. In Sabah, the map of the ‘Soils of Sabah’ (Acres et al., 1975) was based on the draft Soil Map of the World (FAO, 1976) using the definition of histosols (i.e. soils which have an organic horizon of 40cm or more). For Sarawak, Tie (1990) revised the classification using definitions from USDA Soil Taxonomy and the FAO/ UNESCO Soil Map of the World with modifications to suit local conditions, such as subdividing them according to the thickness of peat and the underlying nature of mineral material. The initial classification for organic soil in Peninsular Malaysia was based on Coulter (1957) who classified organic soil according to its fertility status (eutrophic, oligotrophic and mesotrophic). This was revised in 1966 where a new criterion on the loss of ignition properties was adopted. For mapping the depth of peat was classified as shallow peat (less than 60cm), moderately deep peat (60 to 150cm) and deep peat (more than 150cm). Paramananthan and Omar (2008) put forward a unified soil classification system for the whole of Malaysia. Called the
Unified Classification of Organic Soils of Malaysia, it has now been accepted and is being used as a new system across Malaysia. Under this definition peat is a type of soil that has “organic materials in more than half of the upper 100cm or more than half of the total thickness of the soil layer if it is less than 100cm.”

1.1.2 The Significance of Tropical Peatlands

Peatlands and peat swamps forests are natural ecosystems that have developed over thousands of years (Dommain et al., 2011). They provide many benefits, both locally and globally. Tropical peatlands in Southeast Asia have a unique biodiversity and a high economic value due to their abundance of resources, being a source of high quality timber (Parish, 2002), fish (Dennis and Aldhous, 2004) and peatland plants such as rattan and sedge used for weaving mats and baskets (Kumaran, 2007). They also provide a range of important environmental services including water storage, moderation of river flows, prevention of tidal flooding near coastal areas and storage of carbon (Bennett et al., 1996; Parish et al., 2008; Hooijer et al., 2010).

Tropical peat swamp forests in Southeast Asia have a relatively high diversity of tree species, many of which are restricted to this type of habitat (Whitmore, 1984). This includes the commercially valuable tree Ramin Gonystylus bancanus (Sawal, 2003). More than 300 tree species have been recorded in the peat swamp forests of Sumatra, Indonesia (Giesen, 1991) while 242 tree species were recorded growing on the peats of the state of Sarawak alone (Anderson, 1963). In Peninsular Malaysia, 132 tree species were recorded in a 5 ha plot in Pekan Forest Reserve, Pahang (Ibrahim, 1995) and 107 tree species have been recorded in North Selangor Peat Swamp Forest (Appanah et al., 1999). Ibrahim (1995) confirmed that close to 75% of the tree species found in peat swamp forests in Peninsular Malaysia are not
found in other habitat types and many species have a relatively restricted geographical distribution.

Peat swamp forests are also home to a range of fauna. For example, they host the largest remaining populations of the Orang Utan *Pongo pygmaeus* (Meijaard, 1995) and are used by rare and endangered animals such as the Tiger *Panthera tigris sumatranus*, Sun Bear *Helarctos malayanus*, Asian Elephant *Elephas maximus* and the Proboscis Monkey *Nasalis larvatus*; although these species are not restricted to the peat swamps alone. Many areas of peat swamp forests also support diverse bird communities (Prentice and Aikanathan, 1989) and the endangered freshwater crocodile, the False Gharial *Tomistoma schlegeli*, is also endemic to peat swamp forests in Peninsula Malaysia, Sumatra and Borneo.

Peatlands are also one of the few mature ecosystems that can actively accumulate carbon in the long term (carbon sink) and offset some carbon emissions from fossil fuel (Parish *et al.*, 2008; Davies, 2011). They also store a large amount of the world’s carbon; tropical peatlands store c. 2,000-6,000 tonnes C/ha compared to the average of 270 tonnes C/ha in the global forest ecosystems (Parish *et al.*, 2008; Parish, 2002; GACCC 1998). This function of carbon sink and store makes peatlands important in the global carbon balance. Disturbance to peatlands can cause carbon to be released to the atmosphere as carbon dioxide (Silvius and Giesen, 1996). This role of peatlands has caused them to become an important part of discussions on climate change.

### 1.1.3 Tropical Peatlands Overview

Peatlands cover an area of about 4 million km² globally (about three per cent of the world’s land surface). Tropical peatlands occur mostly in Southeast Asia, but are
also found in Africa, Central and South America and elsewhere around the Pacific Ocean. Overall they occur in more than 180 countries and represent a third of the world’s wetland resources (Parish et al., 2008).

About 60 per cent of the world’s tropical peatlands are located in Southeast Asia (Andriesse, 1988; Davies, 2011; Table 1.1). Most of the region’s peatlands are naturally forested and are found in Indonesia, Malaysia, Brunei Darussalam, Philippines, Thailand and Vietnam (Lo and Parish, 2013). The estimates of the extent of peatlands in Malaysia vary with the source; e.g. Rieley et al. (1996) gave an estimate of 2.25 - 2.73 million ha of undisturbed peatlands, Tie (1990) suggested 2.56 million ha and Wetlands International (2010) estimated the total lowland peat area to be 2.46 million ha. While the figures vary, Malaysia has the second largest area of peatlands in the Southeast Asian region (Table 1.2) following Indonesia.

Table 1.1: Global distribution and area of tropical peatlands

<table>
<thead>
<tr>
<th>Region</th>
<th>Area (million ha)</th>
</tr>
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<tbody>
<tr>
<td>Central America</td>
<td>2.28 – 2.60</td>
</tr>
<tr>
<td>South America</td>
<td>4.04</td>
</tr>
<tr>
<td>Africa</td>
<td>3.00</td>
</tr>
<tr>
<td>The Pacific</td>
<td>0.02</td>
</tr>
<tr>
<td>Asia (Mainland excluding Southeast)</td>
<td>1.10 – 3.10</td>
</tr>
<tr>
<td>Asia (Southeast)</td>
<td>20.21 – 33.21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30.63 – 45.96</strong></td>
</tr>
</tbody>
</table>

*Source: Davies, 2011*
Table 1.2: Estimates of total lowland peatland area in Southeast Asia

<table>
<thead>
<tr>
<th>Country</th>
<th>Peatland Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>20,695,000</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2,588,900</td>
</tr>
<tr>
<td>Myanmar</td>
<td>122,800</td>
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<td>Brunei Darussalam</td>
<td>90,900</td>
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<td>Philippines</td>
<td>64,500</td>
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<td>Thailand</td>
<td>63,800</td>
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<td>Vietnam</td>
<td>53,300</td>
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<td>Lao PDR</td>
<td>19,100</td>
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<td>Cambodia</td>
<td>4,580</td>
</tr>
<tr>
<td>Singapore</td>
<td>50</td>
</tr>
</tbody>
</table>

*Source: Lo and Parish, 2013*

1.1.4 Peatlands in Malaysia

In Malaysia, peatlands are found mostly on the coastal plains and cover about 8% of the country (Parish, 2002; Government of Malaysia, 2011). The largest area of about 1.7 million ha of peatlands is found in Sarawak on the island of Borneo (Melling et al., 1999; Wong, 2003; Paramananthan, 2008; Wetlands International, 2010 and ASEAN Secretariat and Global Environment Centre, 2011). Peatlands also occur in the states of Johor, Kelantan, Negeri Sembilan, Pahang, Perak, Selangor and Terengganu in Peninsular Malaysia; and there are also small areas of peat in Sabah (Table 1.3 and Figure 1.1).

Table 1.3: The area of peat soil in Malaysia

<table>
<thead>
<tr>
<th>Region</th>
<th>Area (ha)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarawak</td>
<td>1,697,847</td>
<td>69.1</td>
</tr>
<tr>
<td>Peninsular Malaysia</td>
<td>642,918</td>
<td>26.2</td>
</tr>
<tr>
<td>Sabah</td>
<td>116,965</td>
<td>4.8</td>
</tr>
</tbody>
</table>
Figure 1.1: Major peat areas in Peninsular Malaysia
(Wetlands International, 2010)

Wetlands International (2010) provided a breakdown of the total area of peatland (using the USDA definition of peat as being more than 65% organic soil at 50cm depth) by state in Peninsular Malaysia (Table 1.4).
Table 1.4: Extent and proportion of peatlands in each state of Peninsular Malaysia

<table>
<thead>
<tr>
<th>State</th>
<th>Total Land Area (ha)</th>
<th>Extent of Organic Soils Area (ha)</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pahang</td>
<td>3,584,758</td>
<td>164,113</td>
<td>4.6</td>
</tr>
<tr>
<td>Selangor</td>
<td>840,315</td>
<td>164,708</td>
<td>19.6</td>
</tr>
<tr>
<td>Johor</td>
<td>1,909,886</td>
<td>143,974</td>
<td>7.5</td>
</tr>
<tr>
<td>Terengganu</td>
<td>1,289,944</td>
<td>84,693</td>
<td>6.6</td>
</tr>
<tr>
<td>Perak</td>
<td>2,090,827</td>
<td>69,597</td>
<td>3.3</td>
</tr>
<tr>
<td>Kelantan</td>
<td>1,497,351</td>
<td>9,146</td>
<td>0.6</td>
</tr>
<tr>
<td>Negeri Sembilan</td>
<td>663,730</td>
<td>6,245</td>
<td>0.9</td>
</tr>
<tr>
<td>Federal Territory</td>
<td>29,200</td>
<td>381</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,906,011</strong></td>
<td><strong>642,857</strong></td>
<td><strong>5.4</strong></td>
</tr>
</tbody>
</table>


Peat swamp forest cover in Malaysia is restricted to small areas in northern and south-eastern Selangor, Tasek Bera (southern Pahang), a large complex in south-eastern Pahang, the Klias Peninsula in Sabah, the inland reaches of the Baram River and the periphery of Loagan Bunut in Sarawak. The peat swamp forest in Southeast Pahang is believed to be the largest, least disturbed peat swamp forest in mainland Asia remaining as a single, nearly contiguous forest complex (UNDP, 2006).

1.2 Statement of the Problem

Concerns have been raised by scientists and conservation organisations over the last few years about the management and use of peatlands in Southeast Asia, especially those undergoing rapid conversion in Indonesia and Malaysia (Miettinen et al., 2011; Koh et al., 2011, Sarvision, 2011; Dommain et al., 2014). It has been estimated that about 12 million ha of peatlands in Southeast Asia have been cleared.
and/or drained (Hooijer et al., 2006; Koh et al., 2011), with an estimated 80% of the total peatland area being affected by land conversion or land use changes. Several studies have recently shown that conversion of tropical peat swamp ecosystems have also led to biodiversity loss (Yule, 2010, Posa et al., 2011).

Although there may be immediate gains from converting, degrading and over-exploiting peat swamp forests, peat ecosystems also play a role in maintaining the productivity of other sectors, add value to their output, and help to avoid costs, losses and damages (Emerton and Yan (2013) showed that there were considerable economic benefits to be gained from investing in forest conservation and sustainable use to retain ecosystem services provided by the forests.

Scientists and conservation organisations have also highlighted that the unsustainable management of peatlands might have severe consequences on the rate of emission of greenhouse gases, especially of carbon dioxide (Fargione et al., 2008; Couwenberg et al., 2010; Hooijer et al., 2010; Page et al., 2011; Dommain et al., 2014). Indonesia, which has approximately 50% of the world's total tropical peatlands (ASEAN Secretariat and Global Environment Centre, 2011), is responsible for the third highest emissions of carbon dioxide worldwide, mainly as a result of peatland degradation, deforestation and fires (Silvius et al., 2006; Hooijer et al., 2006; Silvius and Diemont, 2007). Although the International Panel on Climate Change stated that “most of the emissions of carbon dioxide over the past 20 years are due to fossil fuel burning”, it identified forest loss and degradation as the second largest anthropogenic source of carbon dioxide to the atmosphere after fossil fuel (IPCC, 2001). Tropical deforestation, forest degradation and fires burning in tropical peatland areas were estimated to contribute approximately 23% of carbon emissions globally (van der Werff et al., 2010). Dommain et al. (2014) found that annual losses of carbon from peat drainage and fires in Indonesia were significantly
higher than pre-disturbance rates, implying that peatlands have switched from being a net carbon sink to a significant source of atmospheric carbon.

Peat fires, which are mostly caused by human disturbance of peat areas (Bechteler and Siegert, 2004; Siegert et al., 2004), have also given rise to haze (smoke combined with fine particles of soot) which has blanketed parts of Southeast Asia during dry spells over the last few decades, and had serious implications on the health of the people and the economy of the region (Schweithelm, 1999; Page et al., 2002; Hooijer et al., 2006). Fires in peat occur both above and below ground and contribute large amounts of carbon and other chemicals to the atmosphere. In the peat fires of 1997/98, 2.2 million ha of peatlands in Southeast Asia were burnt, contributing 6% of the world’s carbon dioxide emission in that year (Page et al., 2002; Tacconi, 2003; Hooijer et al., 2006). These fires are also suspected to be the cause of the high value of atmospheric carbon dioxide recorded in 1998, at that time the highest since 1957 (IPCC, 2001).

The haze experienced in Peninsular Malaysia in the past mostly originated in Sumatra and was then pushed by wind towards Peninsular Malaysia, which suffered low air quality standards. However localised haze can also result from peat fires occurring in Peninsular Malaysia (The Malay Mail, 2014). This has become such an important issue in the country that one of the Key Performance Indicators for the Minister of Natural Resources and Environment is the number of clean air days or days free of local haze (Pemandu, 2012).

On the other hand, the extent of clearance and drainage of peatlands and peat swamp forests attests to the benefits, even if possibly short term, that can be gained from conversion to other uses. Oil palm plantations (including plantations on peat)
are able to produce up to ten times more volume per hectare than other oil producing crops (MPOB, 2014). As a result of this high yield (and relatively low labour costs in Southeast Asia) palm oil is currently the most inexpensive vegetable oil in the market. Global production of palm oil has doubled since 2000 (FAO, 2013), there is a substantial market for palm oil in biodiesel fuel and it has potential to expand further.

Thus, while there are concerns that development of these unique ecosystems will upset their hydrological balance and give rise to an assortment of challenges mentioned above, there are substantial development pressures on the State and Federal Governments in Malaysia. They argue that an increasing population and a scarcity of land for development exert pressures to convert peat areas for agriculture and infrastructure, as part of efforts to eradicate poverty and generate income for the rural poor (Paramananthan & Omar, 2008). How then do the policies relating to peat resource management in Peninsular Malaysia currently address the sustainable management of peatlands and peat swamp forests?

1.3 The Purpose of this Study

The goal of this study is to analyse the policies related to the management of peatlands in Peninsular Malaysia. The analysis and evaluation of peatland policy pursues three main objectives:

i. to analyse the policies relating to the management of peatlands in Peninsular Malaysia (i.e. all the public law dispositions which regulate the uses of this resource);

ii. an analysis of the main implementation issues linked to the management of the resource in three specific perimeters in Peninsular Malaysia; and
iii. an evaluation of their effects in terms of sustainable management.

This thesis describes research based on documentary analysis and information from interviews with key informants. It is intended to inform the current science-policy debate in Peninsular Malaysia on the sustainable use of peatlands and peat swamp forests.

1.4 Research Questions

Research questions for this study were developed and classified into four categories i.e. contextual (Q1 and Q2), diagnostic (Q3), evaluative (Q4) and strategic (Q5) (Ritchie and Spencer, 2002). These research questions helped me to gain a comprehensive understanding of peat governance in Peninsular Malaysia.

Table 1.5: Categories and goals of research questions

<table>
<thead>
<tr>
<th>Category</th>
<th>Goal</th>
<th>Research Question</th>
</tr>
</thead>
</table>
| Contextual | Identify the form and nature of what exists | 1. What are the current uses for peatlands in Peninsular Malaysia and what is the current status of peatland management in the country?  
2. What are the current policies governing peatland management in Peninsular Malaysia and the institutional arrangements to support the implementation of these policies? |
| Diagnostic | Examining the reasons for what exists      | 3. How do the peat policies relate to the needs/ key issues of peatland management in Peninsular Malaysia? |
| Evaluative | Appraising the effectiveness of what exists | 4. How effective are the peat policies in addressing the key issues in peatland management in Peninsular Malaysia? |
| Strategic  | Identifying new theories, policies, plans or actions | 5. Can the involvement of multiple actors support integrated peatland management in Peninsular |
Based on the questions above, more specific research questions were developed as follows:

1. What are the current uses for peatlands/ peat swamp forests in Peninsular Malaysia and what is the current status of their management in the country?
   i. For what are peatlands and peat swamp forests in Peninsular Malaysia currently being used?
   ii. Which are the main groups of people who use, have influence on or benefit from peatlands/ peat swamp forests in Peninsular Malaysia?
   iii. Who is managing the peatlands/ peat swamp forests and how is this being done?
   iv. What are the most important issues raised by stakeholders relating to peatland/ peat swamp forest management in Peninsular Malaysia?

2. What are the current policies governing peatlands/ peat swamp forests management in Peninsular Malaysia and the institutional arrangements to support implementation of these policies?
   i. Which policies do stakeholders consider relate to peatlands/ peat swamp forests management in Peninsular Malaysia, especially those that relate to their work?
   ii. Which institutions/ agencies are involved in the implementation of these policies at national, state and provincial levels?
   iii. Which other policies do stakeholders think might indirectly influence peatland/ peat swamp forest management in Peninsular Malaysia and, if so, what are they?
   iv. Which institutions/ agencies are involved in the implementation of these indirect policies at national, state and provincial levels?
v. What are the current peatland/peat swamp forest management policies which relate to enforcement, incentives and penalties?

vi. Which government agency(ies) is/are involved with enforcement of the peatland/peat swamp forest management policy?

vii. Are there any mechanisms outside the government institutions for peatland/peat swamp forest management and, if so, what are they?

3. How do the peat policies relate to the needs/key issues of peatland/peat swamp forest management in Peninsular Malaysia?

   i. Do stakeholders think peatland/peat swamp forest management is an important area in Peninsular Malaysia and, if yes, why?

   ii. In the stakeholders’ opinion, what factors influence whether peat related policies are implemented or not?

   iii. What reasons do stakeholders give to explain the importance of different factors?

4. How effective are the peat policies in addressing the key issues in peatland/peat swamp forest management in Peninsular Malaysia?

   i. In the opinion of stakeholders, are the policies relating to peatland/peat swamp forest management adequate to address the main issues arising from peatland/peat swamp forest management and what gaps, if any, can they identify?

   ii. What other specific requirements (structure, procedures or skills) are needed for implementing the policies related to peatland/peat swamp forest management?

   iii. What are the benefits and challenges to implementing the current peat related policies?

5. Would the involvement of multiple actors be useful for peatland/peat swamp forest management?
i. Should more actors be involved in peatland/peat swamp forest management to make it more effective and, if so, which?

ii. How will the involvement of these actors assist in resolving the key issues related to peatland/peat swamp forest management in Peninsular Malaysia?

iii. How could involvement of these key actors become part of existing institutional arrangements and mechanisms for peatland/peat swamp forest management in Peninsular Malaysia?

iv. Are there any changes that need to be made to the present arrangements and if so, what are these changes?

v. How can this be achieved in Peninsular Malaysia?

These questions can also be seen in the context of the steps used in policy-making - namely problem identification and initiation, policy formulation, policy implementation, evaluation and review.

The first public policy question is how and by whom is the public policy formulated? That is, how and by whom is a public policy issue identified (management of peatlands, in this case) and put on the government's agenda? This is raised by questions 1.(ii), 1.(iv), 2.(i), 2.(iii), and 3.(i). The initiation of public policy can vary considerably. In this case, short-term, dramatic events (such as the severe haze episode in 1997) provoked a government response, especially because it involved public health and affected other states. Resolving this issue, however, requires long-term and major policy implementation. Longer-term, contested policy needs (for e.g. balancing development against conservation) present governments with the need to make more complex and difficult policy responses over time.

Once initiated, the next stage, the government response to policy initiation, involves the formulation of public policy. This involves discussion and debate, consultation,
expert advice, representations by those who will be affected by the policy, legal and administrative issues, etc. Again, although this is supposed to be a rational process that results in an authoritative formulation of the best public policy, the formulation of policy is the outcome of different combinations of ‘expert’ (rational) considerations, political processes within government (the political executive, political party platforms, etc.) and from outside government which may include public opinion (for example, expressed through the media, opinion polls, election outcomes), representations by those affected by the public policy issue, organised sectoral and private interests, and external as well as domestic political interests. These are raised in Question 2(i). Public policy is initiated and formulated in the context of a broader political system. In the Peninsular Malaysian case the critical context is that this is a federal political system operating under a (limited) multiparty, representative democracy.

The third stage, policy implementation is not simply a rational process. Policy implementation may be influenced by the model of governance in operation, the capacity of government agencies and instrumentalities, and the effectiveness of the regulatory regime, Governments may accept the need to formulate a policy but lack the political will (or sometimes, the capacity) to implement it. Policy implementation involves the commitment of financial and human resources. The budget assigned to implement the policy is a key indicator of how government sees the importance (and political significance) of addressing the policy issue. Policy implementation is raised by questions 2. (ii), 2. (iv), 2. (v), 2. (vi), 2. (vii), 3. (ii), 4. (ii), 5. (i), 5. (ii), and 5. (iii).

The fourth stage of the policy process consists of evaluation and review of the policy, the testing of the outcomes and consideration of reformulation or a different method of implementation. This is raised by questions 4. (i), 4. (iii), 5. (iv), and 5. (v).
1.5 Conclusions

The research questions were the basis of extended interviews with a wide range of stakeholders. The conceptual framework within which the research was conceived is described in Chapter 2 and the methodology in Chapter 3. Chapters 4, 5, 6, 7 and 8 analyse the results of the interviews based on the resource use, the resource users, the regulation mode and implementation of the regime. Chapter 9 tests the hypotheses based on the findings by analysing case study sites. A final chapter summarises the main findings from the research and presents some key areas of study for the future.
Chapter 2  Conceptual Frameworks

2.1  Review of Conceptual Frameworks for Peat Policy Analysis

The concept of managing peatlands sustainably has been gaining political recognition in the ASEAN region, including Malaysia, for the past two decades. Policies and regulations have been established to support the integrated management of peatlands in Malaysia but recurrent problems surrounding their use remains an important concern in the country (ASEAN Secretariat and Global Environment Centre, 2011). This study aims to understand how this situation can be explained in the case of Peninsular Malaysia. The research has three key elements – definition of the resource (i.e. peatlands) and its uses; identification of the users and actors; and analysis of the policies and regulations relating to peatlands. Analysis of how these three elements interact is then undertaken to understand the linkages between policy and its implementation.

There are several conceptual frameworks within which to position this study, of which three are considered potentially applicable to the situation for Malaysian peatlands. The first is a conceptual framework for public policy analysis (PPA) by Knoepfel et al. (2007 and 2011). The second is an institutional approach to public policy analysis as described by Ostrom (2011) called the Institutional Analysis and Development (IAD) Framework. The third is called the Institutional Resource Regime (IRR) framework (Gerber et al., 2009), which combines approaches from public policy analysis and institutional economics to identify the regulatory dimensions of a system’s resource use sustainability. In this chapter, given the importance of adopting the conceptual framework most appropriate for analysing peat policy in Peninsular Malaysia, I discuss in some detail the merits of each approach and outline the reasons for my selection.
2.2. Public Policy Analysis (PPA) Framework

2.2.1 Theoretical Basis of the PPA Framework

Public policy is defined by Knoepfel et al. (2007, 2011) as a set of decisions and activities taken by a group of actors with the aim of resolving a public problem and whose behaviour is influenced by the resources at their disposal, the general institutional rules (rules concerning the overall functioning of the political system) and specific institutional rules (rules specific to the area of intervention under scrutiny). Knoepfel et al. (2007, 2011) also explain the constituent elements of a public policy to comprise the following: (i) a solution to a public problem; (ii) the existence of target groups at the root of a public problem; (iii) intentional coherence – i.e. the assumption that the decisions or actions taken are connected to resolving the problem; (iv) the existence of several decisions and activities; (v) an intervention programme; (vi) the key role of public actors; (vii) the existence of formalised measures; and (viii) decisions and activities that impose constraints.

There are several definitions of public policy analysis. Meny and Thoenig (1989) described policy analysis as consisting of the “study of the action of public authorities within society” and by that definition, public policy analysis is connected with a number of academic sectors such as economics, sociology, political science, public administration and law. However, Draelants and Maroy (2007) suggest that policy analysis is an applied field where the contents of the policy address a problem at a particular time and whatever appears appropriate to the circumstances; and is not necessarily confined by disciplinary boundaries (Dunn, 1981; Jenkins-Smith, 1990).
Generally literature concerning the creation of a policy discusses the steps involved in terms of a policy cycle, and suggests that it should not be seen as a linear process but one that involves a continuous flow of decisions and procedures (Lasswell, 1951; Muller and Surel, 1998; Bridgman and Davis, 2000; Howlett and Ramesh, 2003; Sabbatier, 2007). The policy cycle starts with the emergence of problems and progresses to the evaluation of the results obtained (Figure 2.1). These stages can be compared to the stages of problem solving (Howlett and Ramesh, 2003; Table 2.1).

Figure 2.1: The policy cycle (adapted from Knoepfel et al., 2011)
Table 2.1: Similarities between the policy cycle and the stages of problem solving

<table>
<thead>
<tr>
<th>Stage</th>
<th>Problem Solving</th>
<th>Public Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Problem recognition</td>
<td>Agenda setting</td>
</tr>
<tr>
<td>2</td>
<td>Proposal of solution</td>
<td>Policy formulation</td>
</tr>
<tr>
<td>3</td>
<td>Choice of solution</td>
<td>Decision making</td>
</tr>
<tr>
<td>4</td>
<td>Putting solution into effect</td>
<td>Policy implementation</td>
</tr>
<tr>
<td>5</td>
<td>Monitoring results</td>
<td>Policy evaluation</td>
</tr>
</tbody>
</table>

Source: Howlett and Ramesh, 2003

Various Currents and Approaches in Policy Analysis: The present trends in public policy analysis can be divided into three main categories based on their focus on specific fields of analysis (Draelants and Maroy, 2007; Knoepfel et al.; 2011), as follows:

(i) public policy analyses focusing on theories of the State (Meny and Thoenig, 1989; Duran, 1996; Muller and Surel, 1998), which has emerged from the field of political science;

(ii) explanations of how public policy works (Lasswell, 1951; Anderson, 1975, Dye, 1976; Dunn, 1981), where the dominant academic approaches come from administrative science, economics and information science, among others; and

(iii) assessing the impact of policies (Patton and Sawicki, 1993; Lindbloom and Woodhouse, 1993; Parsons, 1995; Althaus et al., 2007; Sabbatier, 2007), where policy evaluation has become a field in its own right but other fields such as socio-economics and public administration are also considered.

The first approach associates policy analysis with the theory of the State, which is the concept that the State is the institution exercising ultimate legislative power in a
territory (Bothamley, 2002). This trend in policy analysis is related to concepts explaining the origin of the State, why states arose where they did, and why some failed to arise elsewhere. Policy analysis according to this approach is a means of explaining “the actual essence of public action because policies are interpreted as revealing its nature” (Knoepfel et al., 2011) and it attempts to link the policy approach with political philosophy and questions concerning the theory of the State. It does not focus on the policy itself but seeks to understand the role of the public sector and how its role changes over time, why policy is introduced and how the policy action interfaces with the organisation of the public sector.

The second trend that explains the way public action works tends to see the state “no longer considered as a single actor but as a complex and heterogeneous political-administrative system whose workings need to be understood to enable the formulation of predictions and recommendations” (Knoepfel et al., 2011). It involves understanding the operational mode or the logic of policy-making, what factors influence the decision making process, and how decisions are made. There are several connecting discussions with this approach such as the tools and instruments of public intervention (for example economic approaches to addressing the problem being discussed) and the structures, procedures and institutional forms of public administration that are involved in the implementation of the intervention. The focus in this approach is identifying the general rules of functioning that are specific to certain public actions, and how this is carried out between the State and the public authorities.

The third category looks at the reasons why public action achieves its results and the effect of these actions on society, both in terms of meeting the objectives of the policy (i.e. the problem it tries to resolve) and its indirect or undesirable effects. This approach is more evaluative than explanatory. The main concerns are the difficulty
in selecting the appropriate evaluation methods, and the process of evaluation and implementation for improving public management and influencing decision making (which has led to concepts such as multi-criteria analysis, cost-benefit analysis and so on).

### 2.2.2 Description of the PPA Framework

The analysis model as explained by Knoepfel et al. (2011) borrows from all three currents described earlier and includes the three key elements – i.e. the resources, the actors and the institutional rules (Figure 2.2). There is a fourth element in this model, which is the substantive and institutional content of policy actions; these are the result of the direct and indirect games played by the actors, and may ultimately lead to either the reinforcement or undermining of the effectiveness of a public policy. Knoepfel et al. (2011) asserts that these factors should be included as they directly influence the various stages of the policy cycle.

Using this model enables an investigation into the factors that explain the “good and bad functioning of public policies” and ultimately describes, understands and explains the workings of the political-administrative system as a whole. It can also describe how the political-administrative authorities interact with the private or social actors involved in the problem that the public action seeks to address.

The possible relationships between the actors, the resources and the institutions provide the framework for the fundamental questions to be explored in research on public policy analysis: How can we recognise and define the different groups of public policy actors? What resources are available to the actors that they can use to affect the content and development of a policy? Which general or specific
institutional rules guide the actions of the actors to resolve a particular problem and in the implementation and evaluation of the policy?

Based on the stages of the policy cycle described earlier, Knoepfel et al. (2011) described six types of products of policy analysis that can be considered in any study (Figure 2.3), as follows:

i. The political definition (PD) of the public problem: this includes the decision on the action to be taken by the public actor and the scope of the public problem to be addressed, as well as the identification of the probable causes by the public actors.

ii. The political-administrative programme (PAP): this includes the decisions taken by both public actors and public bodies, in terms of
formulating legislation and regulations, to make it possible for the policy to be implemented.

iii. The political-administrative arrangements (PAAs): this outlines the responsibilities of the public actors and the resources at their disposal to carry out the identified action for addressing a public problem.

iv. The action plans (APs): these are shorter-term plans for immediate implementation according to an agreed time-scale and also prioritises geographical location for implementation of certain actions.

v. The formal implementation acts (outputs): Outputs cover all activities and administrative decisions related to the action that has been recommended.

vi. The evaluative statements on the changes in target group behaviour (impacts) and on the effects achieved in terms of the resolution of the problem.

The types of policy products described above are used in Knoepfel's analysis model to develop the conceptual framework for the research.
2.2.3 Application of the PPA Framework

The PPA framework described here is best used for an analysis of the impact of a public policy or when policy analysts are commissioned to carry out an expert evaluation of policies by legislative or executive bodies. For example, in the area of legislation to counteract pollution (such as atmospheric pollution), this framework can be used to analyse the efficacy of a policy for imposing restrictive instruments such as emission limit values. Here the framework will ensure that the analysis includes links to the end beneficiaries (for example, the neighbours of a polluting factory) and to the definition of clear objectives and evaluative criteria (for example, air quality that prevailed in 1960 to be defined as the target).

It can also be applied for a comparative analysis where the implementation of the policy by different public authorities is to be evaluated. The features of the framework make it possible to evaluate the efficiency of public administration
offering similar services, and for evaluating the efficacy of policy implementation and administration. In the case of direct agricultural payments, for example, the framework can be used to evaluate which would be the most appropriate body to be responsible for the distribution of payments – whether it is the agriculture ministry with whom the farmers already enjoy a privileged relationship or the environment ministry which may be opposed to the short-term interests of farmers.

In addition, the framework also benefits from a research tradition that is both synchronic (relating to geographical location or space) and diachronic (relating to time) and can be applied to identify the main factors behind the success and failure of policies. In this regard, the framework can be used to explain the evolution of policy, and which situations led to the various changes in policy over a period of time. For example, the PPA framework can be used for analysing the evolution of policies to explain situations that led to the Malaysian government implementing a certain policy and the outputs, outcomes and impacts that the policy had on a certain social issue or problem (G. de Buren pers. comm., 2012).

2.2.4 Strengths and Weaknesses of the PPA Framework

The PPA framework provides a comprehensive means and a clear approach for a general analysis of public policy, narrowing the complex issue down to four key elements. It explains the key elements that need to be considered in public policy analysis and the interaction between these elements. The framework can be applied in the context of a broad range of conceptualisations and interpretations of the state and its actions. Attention is given to the interaction among the stages of the policy cycle and can be applied regardless of the phase of the public policy being considered, whether it is policy development, implementation or evaluation. This examination under the same lens allows for the formal and informal links in the
decision-making process to be identified in the policy cycle. The framework, therefore, allows for aspects that are heuristic, where the analyst makes his/her own discoveries from investigations, as well as analytical-causal, which suggests the causal links between the products observed and the actors. The framework also considers situations where administrative units manage more than one policy - the cases where administrative units manage only one policy is rare - by examining the administrative context as an important institutional dimension of the political-administrative arrangements (PAA) as one of the products of the policy cycle.

However, because of its broad scope, the framework does not provide sufficient detail on specific situations to address a research issue, such as in cases where policies are inter-connected (where two or more policies relate to a public action) or when there is very rapid policy change. These situations highlight issues about the policy process, particularly about power and how it is used, and need further attention. The framework is also limited in how it tackles the property relationships between the actors. For example, there are no details on how to consider the institutional economics aspects such as property rights, including use and access rights, as explanatory variables for the unsustainable use of a natural resource. The political economy of public policy is the way policy actually distributes scarce public resources between competing interests. Some actors have greater leverage than others in the formulation and implementation of public policy and, of course, this constitutes a key question for the way Malaysia manages its peatlands. The allocation or recognition of property rights by the state is always a central political issue.

Traditional environmental policies, which are based on wide-ranging sectoral protection regulation, generally make no explicit reference to property and use rights. Additionally, use or protection regulations related to a natural resource have a
direct influence on the impact of property and use rights, by legally protecting certain kinds of interests (or certain actors) at the cost of others. Thus, changes in regulations concerning a natural resource can alter the use rights enjoyed by the policy actors. It is important to consider these issues in the context of the current study to gain a true understanding of the situation of peat governance in Malaysia.

In the case of Peninsular Malaysia, for example, the land rights of the Orang Asli (the Indigenous peoples) need to be considered in any study of peat policy, particularly the interaction between policy, land rights and land tenure.

Studies of environmental policies clearly document the important role that property rights have on land (both use and access rights) and for policy implementation. In many cases the ecological condition of natural resources depends as much on the effect of an increasing number of non-environmental policies intended to regulate other activities that affect the quality and sustainability of natural resources; e.g. agriculture, transport and investment policies, as on specific environmental protection policies. Use policies often render specific environmental policy efforts ineffective. Policy analysis must, therefore, include the regulation of the competitive uses of natural resources and take into account both protection and use policies which are usually developed without explicit regard for the associated implications for nature. These issues also include property rights, which are not explicitly addressed in the framework.

The framework also does not specifically address the issue of sustainability of the resource to be managed, especially in terms of the uses of the resource. Sustainability is a higher-order social goal consisting of inter-connected issues and problems; it is normally poorly understood and involves contested values (Dovers, 2005). For this reason, it is to be expected that there is substantial debate concerning the sustainability of a resource (and therefore its use). This debate on
the contested values of the resource will need to be included while framing the problem to be addressed but Knoepfel’s framework gives little guidance on how to do so. Dovers (2005), for example, identified seven steps before the policy problem can be defined (i.e. discussion and identification of relevant social goals; identification and monitoring of public concern regarding the problem; understanding the natural and human systems and their interactions; identification of the environmental problem; isolation of underlying causes of change; assessment of risk; and the assessment of existing policy and institutional settings). Any recommendation for change or improvement in the effectiveness of policy can only benefit from such a comprehensive discussion of the problem being addressed. The discussion of ‘relevant social goals’ engages questions of rights and needs, the normative dimension of the use of natural resources not only in terms of sustainability but in terms of the public good. The PPA framework doesn’t seem to specifically incorporate this dimension of public policy.

The PPA framework also does not allow research questions to be addressed to understand the complexity and interconnectedness of factors affecting policy processes and outcomes. It provides little theory to explain the basis for causal linkages, the testable hypotheses, and the means to aggregate knowledge across individual studies of different policy sectors using different disciplinary approaches, which will need a more carefully constructed approach (Koontz, 2003).

2.3 Institutional Analysis and Development (IAD) Framework

2.3.1 Theoretical Basis of the IAD Framework

The Institutional Analysis and Development Framework (Ostrom, 2011) is nested in theories that attempt to explain collective action and has gone through several
revisions for policy analysis. The conventional theory is that collective action would not occur under normal circumstances and assumes self-interested rationality, where each individual is expected to choose the action associated with the best payoff individually based on expectations of what the other actors will do. The conventional theory is associated with three basic theories: (i) the tragedy of the commons (Hardin, 1968), (ii) the Prisoner’s Dilemma (Rapoport and Chammah, 1965), and (iii) the logic of collective action (and the problem of free-riding) (Olson, 1965).

The Tragedy of the Commons and the Theory of Property Rights: The tragedy of the commons is a dilemma arising from the situation in which individuals, acting independently and rationally on the basis of their own self-interest, will ultimately deplete a shared limited resource, even when it is clear that it is not in anyone's long-term interest for this to happen (Hardin, 1968). The tragedy of the commons was consistent with the economic theory of property rights pertaining at the time it was developed with suggestions that the sustainability of resource use can be determined based on the extent individuals bear the costs and enjoy the fruits of their actions (Demsetz 1967; Alchian and Demsetz 1973; North and Robert, 1973). Rights were categorised into private, state or communal. Private property was equated with situations in which individuals held the full set of rights over a resource. State property was assumed to involve state control over a resource, but generally without the right of alienation. Communal rights were understood to be where the use of the property in question is shared and where there are rights of access and withdrawal but the rights of exclusion are absent (Demsetz 1967; North and Robert, 1973). From this perspective, inefficient use leading to degradation or depletion of a resource appeared inevitable for resources that remained communal property.
The Prisoner's Dilemma and Non-cooperative Game Theory: Game theory used formal models to analyse interactions between two or more individuals in situations of mutual interdependence, where outcomes depend on the actions of all actors. These situations are depicted as games; each game involves a set of actors and a set of possible choices for each actor, and defines a set of payoffs for each actor for each logically possible combination of actions (Poteete et al., 2009) based on self-interested rationality. There are a variety of game structures and the Prisoner's Dilemma (PD) has proven to be a particularly popular model for harvesting from a common-pool resource (Dasgupta and Heal, 1979; Ridley, 1998; Richards, 2001). For example, game theory predicts that fishermen facing incentives (such as the players of a PD) will both harvest the maximum amount of fish, and both will be worse off than if they had solved the social dilemma they faced.

The term ‘social dilemma’ is described as settings where actions are inspired by the individual’s attempt to maximise benefits for themselves and where their actions cause lower joint outcomes for all. Thus, the reason that such games are dilemmas is that at least one outcome can yield higher returns for all participants, but participants who try to maximise short-term material benefits make choices that are not predicted to achieve this outcome (Poteete et al., 2009). Social dilemmas thus involve a conflict between the individual rationale and optimal outcomes for a group (Schelling, 1978; Lichbach, 1996; Vatn, 2005).

The Logic of Collective Action: Olson (1965) analysed the problems facing citizens who wished to achieve public good through collective action in overcoming a social dilemma. Where Hardin's analysis focused on the benefits from using a shared resource, Olson was concerned with contributions to the provision of collective goods. Hardin notes that individuals enjoy the full benefits of additional extraction of resources while the costs are shared among all; in Olson's analysis, collective action
is a problem because the costs of contributing are concentrated while the benefits are diffused. The fundamental problem in both situations is the same: “individually beneficial action results in socially sub-optimal outcomes” (Poteete et al., 2009). People who pursue individual self-interest are free-riders in that they enjoy the benefit of others’ restraint in using shared resources.

Olson’s logic of collective action is important for the study of natural resources, and for the general understanding of human relationships because many objectives that individuals have are influenced by the actions of others, whether or not a particular actor contributes. If many individuals decide to free ride on the actions of others, the others may stop contributing to the collective good until eventually no one contributes (Poteete et al.; 2009). What might be of mutual benefit turns out to be the absence of a joint benefit or, even worse, a joint dis-benefit. In the case of natural resources, the joint dis-benefit is overharvesting or dumping pollutants, both of which may destroy the resource. Similarly, self-organised groups generally do not exist in conventional theory. The theory predicts that natural resources will be grossly mismanaged if used by many actors, and other benefits achievable through collective action will not be attained if there were no externally imposed regulations.

Policymakers have tended to accept Hardin’s and Olson’s approaches and the implications of non-cooperative game theory and have not necessarily checked whether there were rules of their own that users had imposed. For this reason, governments imposed rules on the users of many natural resources, which also led to government ownership or privatization schemes to prevent these resources from being completely depleted.

2.3.2 Description of the IAD Framework
The IAD framework focuses the analyst’s attention on individuals who make decisions over a course of action. Policy processes and outcomes are assumed to be affected, to some degree, by four types of variables external to individuals: (i) attributes of the physical world, (ii) attributes of the community within which actors are embedded, (iii) rules that create incentives and constraints for certain actions, and (iv) interactions with other individuals (Ostrom, 2011). Upon further review, the framework also identified an action arena (which includes a set of actors in an action situation), patterns of interactions and outcomes, and an evaluation of these outcomes for a particular action situation (Figure 2.4).

![Figure 2.4: A framework for institutional analysis (Ostrom, 2011)](image)

An action situation is structured by seven broad attributes including: (i) the set of participants (actors) confronting a collective-action problem; (ii) the sets of positions
or roles participants fill in the context of this situation; (iii) the set of allowable actions for participants in each role or position; (iv) the potential outcomes associated with each possible combination of actions; (v) the level of control that an individual or group has over an action; (vi) the amount of information available to actors; and (vii) the costs and benefits associated with each possible actions and outcomes (Figure 2.5).

Each actor in an action arena is characterised by four clusters of variables: (i) the way actors acquire, process, retain and use information and knowledge about contingencies; (ii) the preferences of an actor related to actions and outcomes; (iii) the conscious or unconscious processes actors use for selection of particular courses of action; and (iv) the resources that the actor bring to the situation.

Figure 2.5: The internal structure of an action situation (Ostrom, 2011)
The framework provides the links for the characteristics of a physical world (such as forests) with those of the general cultural setting (like the villages and harvesters that use forests); the specific rules that affect the incentives individuals face in particular situations (how forest products can be harvested, utilised and maintained); the outcomes of these interactions (regeneration or deforestation) and the evaluative criteria applied to these patterns and outcomes (efficiency, equity, sustainability).

The first step in using the IAD is to identify a conceptual unit (i.e. the action arena) that can be used to analyse, predict, and explain behaviour within institutional arrangements (Figure 2.5). For example, in an analysis of problems of overharvesting from a common-pool resource situation, researchers need to find answers to the following questions about the attributes of the action situation:

- The set of participants: Who and how many individuals withdraw resource units (e.g., fish, water, fodder) from this resource system?
- The positions: What positions exist (e.g., members of an irrigation association, water distributors-guards, an association’s chair)?
- The set of allowable actions: What types of harvesting technologies can be used? (for e.g. Are chainsaws allowed for harvesting timber? Are there open and closed seasons? Must fishers return captured fish smaller than some limit to the water?)
- The potential outcomes: What geographic location and what events in that location are affected by participants in these positions? What chain of events links actions to outcomes?
- The level of control over choice: Do appropriators take the above actions on their own initiative or do they confer with others? (for e.g.
before entering the forest to cut fodder, does an appropriator need to obtain a permit?)

- The information available: How much information do appropriators have about the condition of the resource itself, about other appropriators’ cost and benefit functions, and about how their actions cumulate into joint outcomes?

- The costs and benefits of actions and outcomes: How costly are various actions to each type of appropriator, and what kinds of benefits can be achieved as a result of various group outcomes?

The next step is to study the factors that affect the structure of an action arena - the action arena is viewed as a set of variables dependent upon other contextual variables including: (i) the structure of the resource system involved (size, complexity, predictability), (ii) the rules used by participants to order their relationships, and (iii) the structure of the more general community within which any particular arena is placed. Then the research can move outward from action arenas to consider methods for explaining complex structures that link sequential and simultaneous action arenas to one another (as in the left side of Figure 2-5).

2.3.3 Application of the IAD Framework

The IAD framework has been an underlying foundation for several empirical studies of common-pool resources and common-property regimes (Polski and Ostrom, 1999). Unlike public goods (such as national defence where the individual’s consumption of the good is not affected by his or her contribution to producing the good and where it does not exclude others from consuming the good itself), common pool resource is one for which one person's use subtracts from the resources available to others. One line of inquiry that has been pursued over time
using this framework is the study of long-lasting resource systems that are user- 
governed or community-based resource management, such as irrigation systems, 
mountain grazing lands and inshore fisheries.

Another example of the use of the IAD framework is the International Forestry 
Resources and Institutions (IFRI) research program based in the United States of 
America, whose central purpose was to gather and analyse data systematically to 
understand how various kinds of governance arrangements affect the performance 
of forest management. This program was designed to address knowledge and 
information gaps about how institutions affect the incentives of forest users and 
result in substantial levels of deforestation in some locations while forest conditions 
are improving in other locations. Through the program, the late Elinor Ostrom and 
others developed a set of core instruments to incorporate social and natural science 
data from local forest communities. Affiliated IFRI scientists around the world have 
used these instruments to study local forest governance, management, and 
institutions. The survey instruments include data about local institutions and socio-
economic and demographic variables, combined with forest mensuration techniques 
for a sample of 1-, 3-, and 10-meter radius forest plots for each forest. Following the 
IAD framework, the data focused on the “institutional, socio-economic and 
demographic, and physical factors that affect human incentives and behaviour, and 
the impact of this behaviour on local forest ecologies” (Gibson et al., 2000). An 
underlying assumption is that forest conditions and human use of forests are 
determined largely at the local level, as local institutions filter the external factors 
such as national policies and global markets.

2.3.4 Strengths and Weaknesses of the IAD Framework
What is distinctive about the IAD framework, especially when compared to a single scientific discipline, is that all situations are viewed as being composed of the same set of elements. For example, while harvesting or marketing timber or thatch differs in many important ways, these diverse situations can be described by identifying and analysing how particular elements constituting the situations under analysis lead to the patterns observed. The framework is able to identify these elements, which are relatively complex, and provides the structure where many different action situations can be constructed from them. The IAD framework identifies the universal working parts; it enables the analyst to examine unique combinations of these parts. The array of potential outcomes that can be analysed and evaluative criteria (such as equity, efficiency, sustainability and adaptability) is also very broad.

The framework makes it possible to address research questions and understand the complexity and interconnectedness of factors affecting policy processes and outcomes. It provides the theories and models for explaining the basis for causal linkages, testable hypotheses, and a means to aggregate knowledge across individual studies of different policy sectors using different disciplinary approaches. However, the IAD framework assumes that responsibilities for policy are well recognised and property rights are well defined and that it is clear to whom responsibilities should be assigned. This is not always the case. Dovers (2005) has explained that many environmental and especially sustainability problems cut across existing policy sectors, jurisdictions, professional and disciplinary domains and land tenures that were defined before these problems emerged and there is often confusion over who should be responsible. The IAD framework does not specify how it will deal with informal elements of the institutional dimensions - these include informal arrangements resulting from weak or incoherent formal regulations, or informal factors (such as social norms) that might explain the discrepancies between actual use rights and formal property rights (Aubin, 2008; Schweizer et al., 2013).
Institutional economics perspectives in this framework make an important contribution to the analysis of resource management in drawing attention to the function of property rights – i.e. the legal definition of property. However, it would appear to be difficult to apply these to the “joint use” situations (situations concerning the use of multiple goods and/or services provided by a resource which is used by multiple users) that characterise some resource uses (Gerber et al., 2009). Many of the institutional economics analyses that this framework addresses are based on the assumption of a homogenous demand for local goods and services (i.e. use of a single good/service). The IAD framework is limited in its ability to analyse broader action situations, which limits its application for policy analysis of natural resource management. For example, the framework does not allow the examination of recurrent structures of (action) situations and compels the researcher to find ways of separating one situation from another for the purpose of analysis (Gerber et al., 2009).

2.4 Institutional Resource Regime (IRR) Framework

2.4.1 Description of the IRR Framework

The Institutional Resource Regime (IRR) is a conceptual framework that uses a combination of approaches from political science (i.e. policy analysis) and institutional economics (and the theory of property rights) to identify the regulatory dimensions to analyse the sustainability of resource use. It assumes that these two dimensions are complementary and that both must be considered to better understand the actual uses of the goods and services provided by a resource.
Similar to Knoepfel’s PPA framework, the IRR considers the three elements mentioned earlier – i.e. the resources, the actors and the institutional rules – and it takes a resource-wide approach to sustainability to consider the resource uses in the social, economic and political context. The framework includes the necessary dimensions for the analysis of the regulation of environmental resource uses, and identifies the characteristics of the resource system, the distinction between the different users of the resource in question and the institutions which guide their actions.

The framework analyses the formal elements of the institutional dimensions (e.g. policies and civil codes) and also enables the indirect highlighting of informal ones, because the existence of powerful informal arrangements is often the result of weak or incoherent formal regulations (Aubin, 2008; Gerber et al., 2009; de Buren and Knoepfel, 2011; Schweizer et al., 2013). Additionally, discrepancies between actual use rights and formal property rights (or policy norms) often constitute a clear sign that the definition of use rights is influenced by other informal factors (such as social norms).

Resource Unit or Perimeter: The IRR sets the perimeter of a resource unit by listing the goods and services extracted or produced by a natural resource system, the uses made, the users and the rules that regulate these uses (Figure 2.6).

The overall regulation of a resource leads to sustainability if the uses of individual goods or services are not carried out at the expense of other uses and if all uses considered in total do not deplete the stock of the resource. This means that there must be a clear distinction between the sustainability of a resource (system) and the ecological, economic and social sustainability of the uses of the different goods and services it provides. Sustainability is achievable if all users jointly ensure that the
quantities they extract from a resource do not reach the limit of the reproductive capacity of the resource system. The framework theorises that policies need to go beyond the logic of the control and restriction of pollutant emissions (i.e. management and internalization of externalities) to one that is based on the balanced management of the stocks and reproductive capacity of the resource system – i.e. move from problem-centred policies to resource-centred policies.
Figure 2.6: Regulation model of the Institutional Resource Regime

(adapted from Gerber et al., 2009)
**Resource Users:** The consumption of goods and services provided by a resource relates back to different use configurations which differ from each other in terms of the number of actors (users) involved and the homogeneous (use of a single good or service) or heterogeneous (use of multiple goods and/or services) nature of the uses they make of the resource in question. The IRR framework is able to inform understanding of heterogeneous use situations by simultaneously taking into account all of the regulations that actors mobilise to defend their particular uses of the resource.

**Institutional Rules:** The IRR framework focuses on formal rules because they impact strongly and directly on the behaviour of resource users and owners; they contribute to the structuring of the conditions governing the emergence, development or redefinition of (existing) informal rules (local arrangements); and they are by far the clearest expression of the collective will relating to the management of natural resources within a given society. The IRR distinguishes between institutional approaches centred on the role played by state-run public institutions (as in the public policy analysis framework) and those highlighting the institutional capacity of civil society to self-organise (as in the IAD framework). It recognises that resource uses are regulated by policies governing both use and protection of the resource and therefore legal protection might appear scattered throughout different bodies of public law, which complicates the coordination of the different actors in charge and the regulation of the resource.

### 2.4.2 Theoretical Basis of the IRR Framework

**Public policy vs. property rights:** The IRR framework explains the distinction between public law, private law and property rights. Public law deals with the relationships between persons and the state, including regulatory statutes, penal law
and other laws that affect public order whereas private law constitutes the part of the legal system that deals with relationships between individuals (law of contracts, property law, family law etc.). The concept of private law in a common law country (such as Malaysia) is broader, in that it also encompasses relationships between governments and private individuals or other entities that are not considered to be within the scope of public law.

Property rights, on the other hand, are the legal expression of the guarantee of access to a benefit and can only apply to a material object (a thing). Property rights (i.e. by way of a property-right title) are distinguished from use rights because they last much longer and are far more stable. Related to property rights are disposal rights (the terms under which the formal property title is transferred) and access rights (which is a specific category of use rights).

*Regulation modes:* The IRR framework also identifies four main ways of regulating the uses of a resource: (i) regulation through policies with no impact on the content of property rights – involves the implementation of incentive-based instruments that do not impact on the content of the property and use rights; (ii) regulation through policy with an impact on the value and content of property rights – implementation of policy instruments with impacts on the disposal and/or use rights of actors by means of the clarification of the content of these rights; (iii) regulation through the re-definition of the institution of property rights – different types of modifications that will have an impact on the scope and content of the disposal and use rights of all holders of such rights; and (iv) regulation through the re-definition of the structure of the re-distribution of property rights – may consist of an intervention as radical as privatisation or nationalisation.
The extent and coherence in IRRs: The framework explains the concepts of extent and coherence in relation to regulations affecting the goods and services provided by the resource. The **extent** refers to the total number of goods and services in use that are actually regulated by the regime at any given time; while the **coherence** describes the degree of coordination of the various user-actors within the regime. The criterion of coherence depends on the content and connection of the different regulations established by the regime.

Related to the theory of coherence, Gerber et al. (2009) describes three types of incoherence as follows:

i. **The internal (in)coherence of the property-rights system** describes the degree of precision of the definition of the property rights or the use rights arising from them. For example, there may be more claimants for a single resource than units available.

ii. **The internal (in)coherence of the public policies** describes the degree of coordination between policies governing the use and protection of natural resources. Incoherent policies usually produce use regulations that are incompatible with each other.

iii. **External (in)coherence** describes the mode of connection between the two components of an IRR. It particularly depends on the correspondence between target groups of the public policy and the holders of rights in accordance with the property rights system. For example, there is (external) incoherence when policies address target groups that do not have use rights and whose changes in behaviour do not have any real effect on the actual uses of the resource.
**IRR typology:** One of the major contributions of the IRR framework is its ability to describe the different configurations of regimes; there are four types of regime according to their relative extent and (external) coherence (Figure 2.7).

**Figure 2.7: Typology of the IRR according to their extent and coherence**  
(Gerber et al., 2009)

i. Non-existent regime – the situation where the resource does not have any kind of property right associated with it, or where the goods and services are not subject to any kind of regulation.

ii. Simple regime – the situation where a limited number of goods and services are regulated in a coherent way; the coherence may result from the low number of regulations in force.

iii. Complex regime – the situation where the majority of the goods and services used are regulated but in a way that is incoherent, at least in part. Complex regimes are the outcome of political mobilization which
deals with problems surrounding resource rivalry and reproduction, the resolution of which lies in the introduction of more regulations governing the goods and services of the resource in question.

iv. Integrated regime – the situation where all of the goods and services produced by a resource are regulated in a coherent way. Such regimes, which are very rare, are found where resources are largely in public ownership (e.g. forests) or under the control of a powerful actor (e.g. nature conservation organization or a nature trust).

Gerber et al. (2009) proposed that the field research procedure employing this framework should take the following steps:

i. Definition of the resource: define the physical description of the resource and its perimeter according to physical criteria (not administrative boundaries).

ii. Identification of the uses and users: Identify the actual uses (in terms of goods and services) and users of the resource in the perimeter being studied.

iii. Analysis of the resource regime: Analyse, on the level of each good or service provided by the resource, all the regulations observable in either the relatively stable property-rights system or in changing public policies, for the purpose of identifying existing (or non-existing) use rights attributed to specific user groups. This step also includes the identification of on-going changes of the extent and coherence of the IRR.

iv. Analysis of the implementation of the regime: Analyse the interaction between the various users and the political-administrative actors responsible for the regulation of the resource to highlight attempts to regulate uses and institutional mechanisms for collective cooperation.
v. Analysis of the impacts of the regime on the resource: Analyse the level of the resource sustainability and of the economic, ecological and social sustainability of the uses of the various goods and services.

2.4.3 Application of the IRR Framework

The IRR framework has thus far had restricted use in empirical research projects, most having been conducted in Switzerland since 1999 (water, air, land, forest and landscape — Gerber et al., 2009). The framework is best applied for the analysis of the regulatory measures and resource management practices associated with complex and competitive heterogeneous use situations from the perspective of sustainability.

One example of the use of the IRR framework is from Gerber et al. (2008) who analysed the role of Swiss common pool resource (CPR) institutions in a case study involving Alpine landscape management policy. [CPR institutions are defined as clearly defined groups of individuals who, while defining a set of rules regulating their use of the resource in accordance with local conditions, create a long-enduring local institutional arrangement capable of monitoring the actions of members’ vis-à-vis the resource, resolving conflicts and administering sanctions to offenders.] They describe several goods and services provided by the Swiss Alpine landscape (such as tourism and conservation, which seemed to be in conflict) and resource regimes imposed by the Federal authorities and local CPR institutions which were incoherent. The use of the IRR framework in this case brought to light the importance of integrating landscape issues in development projects and the role of CPR institutions in the management of landscapes.
The IRR framework has also been used empirically in water management projects across Europe (Bressers and Kuks, 2004; Kissling-Näf and Kuks, 2004) and in two other areas in Switzerland mainly dealing with the air, land, water and forests resources in 2007. More recently, the IRR was used to compare the application of payment for environmental services (PES) in forest ecosystems in Switzerland, France and Indonesia (de Buren and Knoepfel, 2011). Using the IRR framework, de Buren and Knoepfel (2011) explained that there is greater potential for PES schemes in Indonesia than in continental Europe because in Indonesia there is far greater scope for manoeuvre within the regulatory system (Section 7.1).

In all these studies, the research procedure was essentially similar: firstly, the actual uses and users of a given resource were described in time and space over a long period of time (sometimes up to a hundred years). Secondly, all regulations observable in either the relatively stable regulatory system or the changing public policies were analysed to identify existing (or non-existing) use rights attributable to specific actor groups. The third step involved analysing the interaction between the various groups of users and the regulating political administrative actors to define mechanisms for collective cooperation. The fourth step was to identify on-going changes to the extent and coherence of the observed regimes while the fifth step allowed the identification of changes from one type of regime to another. The final step, based on data collected from the very beginning of each project, consisted of identifying changes in the level of the resource sustainability and of the economic, ecological and social sustainability of the uses of the various goods and services in question.
2.4.4 Strengths and Weaknesses of the IRR Framework

The IRR framework adopts a comprehensive approach to policy analysis involving the sustainability of natural resource management. It proposes the description of the basic constitutive elements (actors, institutions and resources) of the process involved in the management of natural resources and enables the analysis of the regulation of the complex heterogeneous use of natural resources from a perspective of sustainability.

The main difference between the IRR and other attempts to formalise the relationship between communities and natural resources is that it stresses the importance of formal rules and considers that informal rules emerge in the gaps between the deficits in formal rules; it enables the appraisal of the coherence of the regulatory regime and links it with the sustainability of the resource; and it demonstrates that use rights are mainly the result of combining the regulatory effects of policies and property rights. By doing these, the IRR integrates the lessons of property rights theory into a political science approach.

The framework has been applied for joint use resource situations and therefore overcomes the limits of mainly sectoral policy analysis approaches which often fail to consider the actual influence of non-environmental use policies along with property, disposal and use rights as explanatory variables for the degradation of resources. It assumes that the use rights are rooted in property rights based on private law and in public policies, thereby demonstrating that they are closely linked. The consideration of these dimensions enables the study to bring together scientific and practitioner communities, which normally act very separately.
At the highest level, the IRR framework can be used to propose more coherent regulations to policy makers. For example, regulation based on resource boundaries rather than administrative ones (i.e. a landscape approach), the simultaneous consideration of protection and use policies, resource-wide quotas rather than quotas defined for each good and service provided by the resource, and the importance of use rights based not only on private law, but also public law.

One area where the framework needs further refining is in how it addresses the relationship between local, regional, national and international use regulations, which are built into policies with varying degrees of fragmentation (for e.g. local definition of existing use right titles vs. national or international definitions). Furthermore, the application of the IRR framework in countries with a more recent rule of law (outside of Europe) needs more thorough integration of informal regulations. For example, the IRR has never been applied in countries practicing common law such as Malaysia, where the law is developed through decisions of a court in situations where regulations do not exist. Regulations in these countries are unlike those practicing civil law (i.e. most of Europe), where its core principles are codified into a system that can be referenced and which serves as the primary source of law.

2.5 A Comparison of Three Conceptual Frameworks

A comparison of the conceptual frameworks described earlier was made to determine which framework best suited the purpose of this study based on a set of questions pertinent to the area of study (Table 2.2).
The first issue concerned the object of the study - the object of the study was the impact and effect of the Malaysian policy on peatlands (i.e. one policy), so the PPA framework would be relevant. As discussed earlier, the PPA framework would provide for a broad scope of study for a Malaysian policy on peatlands and would not limit the scope of the study as it looks at the entire policy formulation cycle. However, the object of my study also involves the 'management' of peatlands and peat swamp forests, so the IAD and the IRR frameworks were also considered relevant.

### Table 2.2: A comparison of three conceptual frameworks

<table>
<thead>
<tr>
<th>DOES THE FRAMEWORK …</th>
<th>PPA</th>
<th>IAD</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. … focus on the impact of policy on natural resources</td>
<td>√</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. … focus on the management of a natural resource as the object of study?</td>
<td>X</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>3. … include property rights (user and access rights)?</td>
<td>X</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>4. … establish links between policy processes and outcomes?</td>
<td>X</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>5. … deal with the sustainability of the peat resource?</td>
<td>X</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>6. … provide theory to explain causal linkages?</td>
<td>X</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>7. … allow for it to be used in action situations where there is civil law?</td>
<td>√</td>
<td>X</td>
<td>√</td>
</tr>
<tr>
<td>8. … address formal and informal elements in regulations?</td>
<td>X</td>
<td>X</td>
<td>√</td>
</tr>
<tr>
<td>9. … address multiple goods and users?</td>
<td>X</td>
<td>X</td>
<td>√</td>
</tr>
</tbody>
</table>

The PPA framework is limited in the way it addresses private law such as in situations involving property rights, including user and access rights. The issue of property rights is important in a study of the management of a natural resource (peatlands and peat swamp forests). For example, the rights of the Orang Asli need to be considered to understand the impact of land rights and land tenure in the various states. The issue of property rights is tackled in the IAD and IRR frameworks.
and they provide the theories and models for collective action in the management of common pool resources. These frameworks also allow for the study of the links between policy processes and outcomes to support the causal linkages, for example in terms of the sustainability of the uses of the resource.

The IAD and the IRR frameworks differ on one major point – the importance of state regulation. The IAD framework concerns situations where the institutional environment is a given and where actors influence only the local arrangements. This framework is most relevant in cases where state regulation and public policies (public law) are weak. One of the main limitations of the IAD framework is when cases are examined within the context of civil law and where there is strong public involvement (public law); in such cases, the IAD framework becomes almost irrelevant. The IAD framework also does not address informal elements of regulations such as social norms and other discrepancies between actual use rights and formal property rights. The IRR framework, on the other hand, is able to deal with both the informal and formal regulations.

Additionally, the IAD framework becomes very complex when used in cases with multi-use/ multi-actor systems (Table 2.3). The IRR framework has the capacity to deal with situations which involve multiple goods and services being used by multiple actors; this is referred to in the IRR framework as joint use situations. The IAD framework is not able to deal with joint use situations.

The IRR has the added advantage of enabling the analysis of regulations of the competitive joint use (heterogeneous use) of peatlands (which is the case in Peninsular Malaysia) from the perspective of sustainability. In Peninsular Malaysia, a peat ecosystem can sometimes be divided into sections with a (virgin) forest reserve for protection, forest reserve for production (i.e. replanting and/ or
rehabilitation), and agricultural land or abandoned land with forests used for the collection of non-timber forest products. The IRR conceptual framework is able to incorporate the multiple uses of peatlands into the framework.

Table 2.3: Classification of use situations (based on the example of water) and relevance of the IRR approach (Knoepfel et al, 2001, after Young 1992)

<table>
<thead>
<tr>
<th>Types of uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Homogeneous uses</strong></td>
</tr>
<tr>
<td>Use of a single good or service</td>
</tr>
<tr>
<td><strong>Heterogeneous uses</strong></td>
</tr>
<tr>
<td>Use of multiple goods and/ or service</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of users</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single user (or group of users)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single use: Exclusive use of a stream for the production of drinking water by one single facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple uses: Building of a dyke protecting the community against floods and guaranteeing water reserves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple users (or groups of users)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common use: Sharing of a stream between farmers in the context of an irrigation system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint use: Definition of minimal residual flows to be respected by a hydroelectric plant in order to guarantee the protection of riparian biotopes and drinking water of the same stream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-organised common pool resources (CPR) regime (as described by Ostrom, 2011)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional Resource Regime</td>
<td></td>
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</tbody>
</table>

The theories of the IRR relating to extent and coherence, and the IRR typology of the four regimes which relate to their relative extent and coherence provide an explanation for situations relating to the sustainability of the peatland ecosystem in Peninsular Malaysia. It has the capacity to explain the situation with peatland management in Peninsular Malaysia currently and the characteristics needed to move towards an integrated regime than do the other two typologies.

The focus of this thesis is on the policies relating to the management of peatlands in Peninsular Malaysia, and also aims to describe the effects of these policies in terms
of sustainable peatland management in the peninsular. The analysis therefore incorporates features of the PPA framework and certain elements suggested by the IRR framework, essentially the uses, the use rivalries, the users and other stakeholder configurations, the public policies and their implementation issues. It does not, however, intend to carry out an actual analysis of the property rights of peatlands in Peninsular Malaysia and detailed issues related to the sustainability of this ecosystem. It was therefore concluded that the thesis is closer to an application of a Public Policy Analysis Framework than an actual IRR analysis, but the application of the PPA framework is influenced by several elements of the IRR framework.

2.6 Research Hypotheses

The central hypothesis for the study is influenced by the IRR framework in relation to the causal relationships between institutional regulation (i.e. regime type based on its extent and coherence as explained in Figure 2.7), the sustainability of the uses made of the resource and the reproductive capacity of the resource system. The hypothesis for this thesis was derived as follows:

**Hypothesis**: That the public policy implementation modalities of peatland management in Peninsular Malaysia and their effect on sustainability depend on the relations between the Federal State and the federated states, as well as on the weak endowment in action resources of politico-administrative actors in charge of policy implementation.

Hypothesis 1.1 is based on the idea that the lack of regulation of user behaviour through specific use rights (via policies or/ and property rights at the federal and state levels) risks engendering strategic behaviours that can lead to over-
exploitation of the resource during times of scarcity. Hypothesis 1.2, on the other hand, is based on the idea that gaps and incoherence in the policies or property rights system (internal coherence), and between the two components of the IRR (external coherence), constitute a major cause of the over-exploitation of resources.

- **Hypothesis 1.1**: That effective regulation of peatland-user behaviour through peatland policies clarifying the relations of the Federal Government and the State Government can lead to sustainable use of peatlands.

- **Hypothesis 1.2**: That weak endowment in action resources of politico-administrative actors in charge of policy implementation, as well as the degree of coordination among the various actors/users, can affect integration of the management of peatlands in Peninsular Malaysia.

2.7 Integration and Sustainability

From the discussion on the IRR typology earlier there seemed to be an assumption that if the policies relating to peatlands in Peninsular Malaysia were aligned, the management of peatlands would be sustainable and any problems would be resolved. In reality this is most certainly not the case. Integrated management does not necessarily mean sustainable management. Integrated management involves attempting to manage the group of users and actors who have an impact on the resource to bring about a change in the behaviour of the users and actors towards the resource (Gerber *et al.*, 2009). Integration is especially important when only a small number of stakeholders are involved in management (especially at the state level) and to ensure that all stakeholders have an influence on policy.
Additionally, as society’s relationship with peatlands becomes more complex; and as decisions, interests and value systems become more connected with this changing relationship, there is growing interest in integrated approaches informing policy and decision-making. For the purposes of this study, therefore, integration is seen in socio-economic and socio-cultural terms i.e. where peatland management is linked to relevant policy networks and economic and social systems, so that the chances of a co-operative solution or mitigation strategy are maximised (Brouwer et al., 2003). Integration is observed when all uses influencing the resource are regulated in a way that solves all the rivalries (incompatible uses). However, uses evolve faster than regulation. Any integrated regime is aspirational - in reality, gaps and inconsistencies in regulations exist and actors work around them to circumvent the limitations of their use (P. Knoepfel and G. de Buren, pers comm., 2014).

The overall regulation of a resource leads to sustainability if the uses of individual goods or services are not carried out at the expense of other uses and if all uses considered in total do not deplete the stock of the resource (Ostrom et al., 2011; P. Knoepfel and G. de Buren pers comm., 2014). This means that there must be a clear distinction between the sustainability of a resource (system) and the ecological, economic and social sustainability of the uses of the different goods and services it provides. Sustainability is achievable if all users jointly ensure that the quantities they extract from a resource do not reach the limit of the reproductive capacity of the resource system.
Chapter 3 Research Methodology and the Analytical Process

To analyse the policies impacting peatlands in Peninsular Malaysia is an inquiry into the processes and procedures affecting peatlands, their utilisation and management, I opted to conduct qualitative analysis in my research using a case study approach. Given the complexity of the situation and the nature of the players in policy and their interactions, I decided that qualitative research would be better able than quantitative methods to explain the complex policy environment within which peatland management in Peninsular Malaysia is situated (Miles and Huberman, 1984; Yin, 2013).

3.1 Qualitative Research Design

Linear, unidirectional research starts with problem formulation and goes through a sequence of steps which ends with conclusions or theory. In qualitative research, the design encourages “a reflexive process operating through every stage of a project” (Maxwell, 2005) and the components of the design may be adjusted and reviewed during the study to consider new developments in some other component (Patton, 2002; Yin, 2013).

I have used Maxwell’s key components of qualitative research (2005) as a guide for formulating the research methodology for this thesis. These comprise the research goals and research questions (discussed in Chapter 1), the conceptual framework (Chapter 2) and then a description of research methods and their validity (discussed in this chapter). I have found that Maxwell’s model for research design allows for the flexibility to make changes within the confined sections of the key components. It has ensured that research questions have a clear relationship to the goals of the study and are informed by the theoretical concepts that can be applied to the issue
being researched. The questions were also framed to take the feasibility of the methods into account, as well as the potential seriousness of particular threats to the validity of responses. At the same time, the plausibility and relevance of particular validity threats depended on the questions and the research methods chosen. The research questions, which lie at the heart of Maxwell’s model, were critical in connecting all the components of the design (Figure 3.1).

![Diagram](image)

**Figure 3.1: An interactive model of qualitative research design** (Maxwell, 2005)

### 3.2 Research Method and Case Study

The method for this research is described by Yin (2013) as descriptive case study research involving multiple sites, or single-case designs involving multiple embedded units of analysis (Type 2). The case study method is an empirical method of inquiry that investigates a contemporary phenomenon within its real-life context, especially when the relevant behaviours cannot be manipulated (Yin, 2013). Schwandt (2007) explained that the case study method is “a strategy for doing social inquiry where the case itself is at the centre stage, not variables;” the case
being a person, a group, an episode, a process (which is the case in this study), a community, a society, organisation or any other unit of social life. One of the advantages of the case study method in this research is that it is able to explain the causal links in real-life interventions that might be too complex to investigate using other methods.

The case for this study is the policies on the management of peatlands in Peninsular Malaysia. It has focused on three peatland sites (embedded units of analysis) to draw insights on policies, both at the national and state levels, which influence development and management of the site. These individual case studies have been analysed through the lens of the theories discussed earlier to identify the relationships between the factors influencing peatland management and development, and test the research hypotheses (Colier et al., 2004; Gerring 2004, 2007).

In addition, case studies can also contribute to theory by examining the complex relationship between the social and ecological systems involving peatlands, and provide new insights into the relationship between these systems (Poteete et al., 2009). Yin (2013) further explains that the case study method should not be seen only as a “qualitative method”, even though there are overlaps, but the essence of the case study approach – that of problem definition, design, data collection, data analysis as well as composition and reporting – complements qualitative analysis.

3.2.1 Purposive Sampling

The sampling method for the research is purposive rather than random (Patton, 2002) where particular settings and persons have been deliberately selected for the important information they can provide that cannot be obtained from other choices.
The sites were purposefully selected, based on a set of criteria, to allow for the examination of cases critical to the theories discussed in Chapter 2. Purposive sampling was also used to establish particular comparisons between the sites to illuminate the reasons for similarities and differences in the multiple embedded units. The selection of participants was also made bearing in mind the goals for purposive sampling, which are to achieve representativeness of the context (including the setting, the individuals, and the activities) and to ensure that the heterogeneity in the population is captured (Creswell, 1998; Patton, 2002).

### 3.2.2 Site Selection Criteria

Although the case of sustainable peatland management in Peninsular Malaysia is pre-determined and bounded, I developed selection criteria for selecting the embedded units of analysis (Table 3.1). The specific criteria related to peatlands were the presence of organic soils, peatlands and/or peat swamp forests, identifiable state agency or agencies working in peat areas and finally a sizeable peat area remaining in the state. I also based my final selection on prior knowledge of the likelihood of gaining entry to each site, the ease of access to participants and information and the willingness of key individuals to participate in the study.
Table 3.1: Criteria used to select embedded units

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Site</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Presence of organic soils, peatlands and/or</td>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
<td>N</td>
<td>P</td>
<td>E</td>
<td>A</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>peat swamp forest</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Identifiable state agency or agencies working</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>in peat areas</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sizeable peat area remaining in state</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>3</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-3</td>
<td>-2</td>
<td>-3</td>
<td>-3</td>
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</tbody>
</table>

Entry

<table>
<thead>
<tr>
<th>Entry</th>
<th>Site</th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of access</td>
<td>1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Willingness to participate</td>
<td>1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>


Table 3.2 shows the approach taken for selecting the embedded units, starting with all the states in Peninsular Malaysia and then using the selection criteria to select Johor, Pahang and Selangor as embedded case study units.
Table 3.2: Policy influencing peatland management in Peninsular Malaysia and potential embedded units

<table>
<thead>
<tr>
<th>Case</th>
<th>Potential embedded units</th>
<th>Criteria based sampling</th>
<th>Selected embedded units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy influencing peatland management in Peninsular Malaysia</td>
<td>Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Penang, Perak, Perlis, Selangor, Terengganu</td>
<td>Presence of organic soils, peatlands and/or peat swamp forest, Ease of access, Willingness to participate, Identifiable state agency or agencies working in peat areas, Sizeable peat area remaining in state</td>
<td>Johor, Pahang, Selangor</td>
</tr>
</tbody>
</table>

Based on this reasoning and logic, key peatland sites in the three states selected were chosen as case studies for this research with a focus on one peatland area for each state. The case studies that were finally selected are as follows:

Case study 1: North Selangor Peat Swamp Forest in Selangor, Peninsular Malaysia
Case study 2: Southeast Pahang Peat Swamp Forest in Pahang, Peninsular Malaysia
Case study 3: Ayer Hitam Forest Reserve in Johor, Peninsular Malaysia.

3.2.3 Research Participants

The participants for this research can be classified into five groups as follows:

i. Public servants/ government officers: These are officers from government agencies who have roles related to peatland management such as those in the Economic Planning Unit at federal and state levels, the Natural Resources and Environment Ministry, the Department of Environment and the Forestry Department
at federal and state levels, the Department of Agriculture and others. Other officers implementing peat-related policies on the ground were also included. This group of people provided information on policies and changes over time, including both legislative and regulatory changes in the federal and state authorities. It was expected that they would be aware of policy benefits, the impacts of past policies and issues regarding implementation of these policies.

ii. Officers in government-linked research and development agencies implementing peat-related projects: This group included officers in agencies such as Forest Research Institute of Malaysia (FRIM), Malaysian Agriculture Research and Development Institute (MARDI) and other development authorities responsible for development in areas with peatlands and who have been involved with implementing peat-related policies.

iii. Private sector employees: This included people who worked for timber and oil palm companies in peat areas, or those involved in managing these areas, such as plantation and estate managers, the Roundtable on Sustainable Palm Oil (RSPO), Malaysian Palm Oil Association (MPOA), Malaysian Palm Oil Board (MPOB), Malaysian Palm Oil Corporation (MPOC), Malaysian Timber Certification Council (MTTC) and others.

iv. Peatland scientists and experts from academic institutions: These were scientists and technical staff of research and academic institutions with a deep understanding of peatland ecology and management. Peatland experts were able to provide possible solutions and make recommendations to address the current situation regarding peatlands in Malaysia.
v. Employees of Non-governmental organizations (NGOs) and community-based organisations (CBOs): This group included employees of NGOs/ CBOs with experience working in peatland areas or with communities dependent on peatlands for their livelihoods. The organisations included Wetlands International, the Global Environment Centre, the World Wide Fund for Nature and the Malaysian Nature Society, all of which have made significant contributions to the discussion on integrated peatland management in Malaysia. It also included several community leaders of communities that at least partly depend on peatland resources for their livelihoods.

Details of the relationship between different peatland actors are described in Chapter 5.

3.3 Data Collection

Data collection is a means of acquiring the data needed to answer the research questions discussed in Chapter 1 with the method selected depending on the research situation (Patton, 2002; Yin, 2013). For the purpose of this research, initial data collection involved the collection of secondary information through a literature search of both government and non-government documentation. This was supplemented by the collection of primary data from key informant interviews and from direct observations during field visits. Figure 3.2 summarises the research methodology employed for this research.
Qualitative data are in-depth descriptions of circumstances, people, interactions, observed behaviours, events, attitudes, thoughts and beliefs and direct quotes from people who have experience or are experiencing the research situation being studied (Patton, 2002). Qualitative data is usually in the form of text (i.e. interview transcriptions or organizational documents); however, it may also include non-textual data such as tables, pictures and audio recordings.

Interviews with key informants were conversations between the researcher and the interviewee (Gubrium and Holstein, 2002). These interviews provided an opportunity for detailed investigations of the interviewee’s perspective and understanding for the research topic, which can contribute to a body of knowledge that is conceptual and theoretical. Both unstructured and semi-structured interviews were used for this research. During the process of unstructured interviews, which were conducted mostly during field visits, I took notes while observing and questioning (Crabtree and Miller, 1999; Patton, 2002). Semi-structured interviews relied solely on data collected from open-ended questions which did not limit the participants’ choice of answers. The semi-structured interviews were scheduled in advance at a
designated time and location outside of everyday events. During the interview, other questions emerged from the dialogue with the participant; I then used cues and prompts to help direct the participant into the research topic area, allowing me to gather more in-depth or detailed data. Semi-structured in-depth interviews were conducted once for an individual or group (not more than 3 people in this case) and took between 45 minutes to several hours to complete (Creswell, 1998; Gubrium and Holstein, 2002; Patton, 2002).

I collected primary data on each site using face-to-face interviews with key informants. When the informants lived in a different town, the interviews were sometimes carried out using the communications software Skype. A total of 67 key informants were interviewed, mainly through semi-structured interviews. On most occasions, the questions were sent to the key informants beforehand so they could prepare their responses. The exceptions were when a potential informant unexpectedly became available, making it impossible to send the information beforehand. A Plain Language Statement was also sent to the informants before the interview to explain the purpose of the research, and all informants signed a Consent Form as part of the ethical procedures approved for this research.

The interviews were transcribed verbatim when recordings were made, and when recordings were not available (on occasions when the informant declined to be recorded) they were transcribed from notes made during the interview. All transcripts were sent back to the informants for review, and 17 informants responded with comments and recommended changes to the transcripts, which were accepted. These final versions were the ones used in the analysis.

I also visited all three case study sites and made direct observations of the peatland issues on the ground. I visited the North Selangor Peat Swamp Forest on 23
October 2012 with my co-supervisor, Dr Alexander K Sayok, who was the Team Leader for the Mid-Term Review (MTR) of the ASEAN Peatland Forests Project (APFP). The Department of Drainage and Irrigation (DID) also very kindly arranged for me to visit the peatland areas around the Ayer Hitam Forest Reserve on 18 December 2012 and the peatlands surrounding the Pekan Forest Reserve on 26 December 2012. During these visits, the officers highlighted issues of concern and the tasks of the DID in the peat areas surrounding these forest reserves.

I was unable to gain further access to the field and spend time speaking with local villagers as the Department of Forestry was unwilling to grant access to the case study sites. The difficulty in gaining access to the field, the sensitive nature of the data intended for collection (such as those concerning property rights and concessions) and the necessity for long-term observations of autochthonous populations have limited the analysis of the case study sites in this research on the local regulatory arrangements using the IRR framework.

For the collection of secondary information on the three peatland sites, I relied on reviewing documentation, both published and grey literature, such as technical reports (assessment and appraisal reports, workshop presentations, soil maps etc.), integrated and forest management plans, government reports, forest certification audit reports, government policy documents and legislation, etc.

The data collection strategy was also guided by the research matrix as presented in Table 3.3. The strategy was iteratively focused and revised throughout the study to ensure I collected the data needed to answer the research questions and to address any validity threats to the answers.
### Table 3.3: Research Matrix - Methodology for the Research Questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>What data will I need?</th>
<th>Data Collection – How will I get the data?</th>
<th>Data Analysis – How will I analyse the data and answer the questions?</th>
</tr>
</thead>
</table>
| 1. What are the current uses for peatlands/peat swamp forests in Peninsular Malaysia and what is the current status of their management in the country? | • Current uses of peatlands in Peninsular Malaysia  
  • The main stakeholders of peatlands in Peninsular Malaysia  
  • How peatlands in Peninsular Malaysia are currently being managed and who is responsible for this  
  • The key issues in peatland management in Peninsular Malaysia | 1. Existing documents related to peatlands and peat swamp forests in Peninsular Malaysia:  
  i. Reports and journal articles  
  ii. Management plans for wetlands/protected areas/peatland areas  
  iii. Policy and other government documents/reports  
  iv. Other relevant documents | • Descriptive analysis  
  • Stakeholder analysis  
  • Qualitative analysis using the IRR conceptual framework and case study research |
<p>| i. What are peatlands and peat swamp forests in Peninsular Malaysia currently being used for? | | | |
| ii. What are the main groups of people who use, have influence on or benefit from peatlands/peat swamp forests in Peninsular Malaysia? | | | |
| iii. Who is managing the peatlands/peat swamp forests and how is this being done? | | | |
| iv. What do you think is the most important issue relating to peatland/peat swamp forest management in Peninsular Malaysia? | | | |</p>
<table>
<thead>
<tr>
<th>Research Questions</th>
<th>What data will I need?</th>
<th>Data Collection – How will I get the data?</th>
<th>Data Analysis – How will I analyse the data and answer the questions?</th>
</tr>
</thead>
</table>
| 2. What are the current policies governing peatlands/peat swamp forests management in Peninsular Malaysia and the institutional arrangements to support implementation of these policies? | • The current policies related to peatland management in Peninsular Malaysia  
• Institutional arrangements to support the implementation of these policies  
• Mechanisms that exist outside the government institutions for peatland management | 1. Existing documents related to peatlands and peat swamp forests in Peninsular Malaysia:  
i. Reports and journal articles  
ii. Management plans for wetlands/protected areas  
iii. Policy and other government documents/reports  
iv. Other relevant documents | • Qualitative analysis using the IRR conceptual framework and case study research  
• Stakeholder (i.e. institutional) analysis  
• Descriptive analysis |
<p>| i. Can you tell us what policies relate to peatlands/peat swamp forests management in Peninsular Malaysia, especially those that relate to your work? | | | |
| ii. Which institutions/agencies are involved in the implementation of these policies at national, state and provincial levels? | | | |
| iii. Can you think of other policies that might indirectly influence peatland/peat swamp forest management in Peninsular Malaysia? If yes, what are they? | | | |
| iv. Which institutions/agencies are involved in the implementation of these indirect policies at national, state and provincial levels? | | | |
| v. What are the current peatland/peat swamp forest management policies which relate to enforcement, incentives and penalties? | | | |
| vi. Which government agency (ies) is/are involved with enforcement of the peatland/peat swamp forest management policy? | | | |
| vii. Are there any mechanisms outside the government institutions for peatland/peat swamp forest management? If yes, what are they? | | | |</p>
<table>
<thead>
<tr>
<th>Research Questions</th>
<th>What data will I need?</th>
<th>Data Collection – How will I get the data?</th>
<th>Data Analysis – How will I analyse the data and answer the questions?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. How do the peat policies relate to the needs/ key issues of peatland/ peat swamp forest management in Peninsular Malaysia?</td>
<td>• Factors that underlie/ drive peat policy and peatland management in Peninsular Malaysia • Peat-related policies and implementation arrangements</td>
<td>1. Existing documents related to peatlands and peat swamp forests in Peninsular Malaysia: i. Reports and journal articles ii. Management plans for wetlands/ protected areas iii. Policy and other government documents/ reports iv. Other relevant documents</td>
<td>• Qualitative analysis using the framework analysis and case study research • Descriptive analysis</td>
</tr>
<tr>
<td>i. Do you think peatland/ peat swamp forest management is an important area in Peninsular Malaysia? If yes, why do you think so?</td>
<td></td>
<td>2. Interviews with key informants in Peninsular Malaysia</td>
<td></td>
</tr>
<tr>
<td>ii. In your opinion, what factors influence whether peat related policies are implemented or not?</td>
<td></td>
<td>3. Discussions from workshops and meetings involving peatland stakeholders</td>
<td></td>
</tr>
<tr>
<td>iii. Please provide reasons for why you think these factors are important.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Questions</td>
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| 4. How effective are the peat policies in addressing the key issues in peatland/peat swamp forest management in Peninsular Malaysia? | • The state of peatland management in Peninsular Malaysia  
• The structures, procedures or skills for implementing peatland-related policies  
• The benefits and constraints for implementing peat-related policies  
• Current peatland management policies on enforcement, incentives and penalties and government agency (ies) involved | 1. Interviews with key informants in Malaysia  
2. Existing documents related to policy on peatlands and peat swamp forests in Peninsular Malaysia | • Descriptive analysis  
• Qualitative analysis using the IRR conceptual framework, case study research and the framework analysis process |
<p>| i. In your opinion, are the policies relating to peatland/peat swamp forest management adequate to address the main issues arising from peatland/peat swamp forest management? Can you please identify where there are gaps, if any? | | | |
| ii. What other specific requirements (structure, procedures or skills) are needed for implementing the policies related to peatland/peat swamp forest management? | | | |
| iii. What are the benefits and challenges to implementing the current peat related policies? | | | |</p>
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<td>5. Would the involvement of multiple actors be useful for peatland/peat swamp forest management?</td>
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<td>1. Existing documents related to peatlands and peat swamp forests in Peninsular Malaysia, which also provide some indication of future challenges and plans.</td>
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<td>i. Should more actors be involved in peatland/peat swamp forest management to make it more effective? If so who are the key actors who should be involved?</td>
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<td>• Qualitative analysis using the IRR conceptual framework, case study research and the framework analysis process</td>
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<td>ii. How will the involvement of these actors assist in resolving the key issues related to peatland/peat swamp forest management in Peninsular Malaysia?</td>
<td>Stakeholders who should be involved in institutional arrangements for peatland management</td>
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<td>iii. How can we make the involvement of these key actors part of present institutional arrangements and mechanisms for peatland/peat swamp forest management in Peninsular Malaysia?</td>
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<td>iv. Are there any changes that we will need to make to the present arrangements and if so, what are these changes?</td>
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<td>v. How can this be achieved in Peninsular Malaysia?</td>
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3.4 Validity

Qualitative studies generally rely on the integration of data from a variety of methods and sources of information, a general principle known as triangulation (Denzin, 1970). This strategy reduces the risk that conclusions made in the research reflect only the systematic biases or limitations of a specific method, and allows for a better assessment of the validity and generality of the explanations developed. I have relied on three sources of evidence in this study to ensure triangulation of the data collected – documentation, key informant interviews and direct observation during site visits (Yin, 2013).

I also ensured triangulation in terms of participant selection by considering these questions: *Did I interview enough participants? Did I bias the data in selecting interviewees?* I intentionally tried to interview respondents from the five groups identified earlier (Section 3.2.3) to elicit different perspectives and opinions of peatland management in Peninsular Malaysia. I interviewed respondents who were pro-conservation and the preservation of peatlands as well as those from development agencies who were keen for profits to be made from peatland development. I thereby tried to span all views on the debate about the conservation-development of peatlands. I stopped interviewing people when I began to hear the same things repeated and when there was no new information being disclosed.

Maxwell (2005) discussed two broad types of threats to validity in qualitative research; these are researcher bias and reactivity (i.e. the effect of the researcher on the setting or individuals studied). Bias refers to the distortion caused by the researcher’s theory, values or preconceptions during data collection or analysis. The main way I dealt with researcher bias in my study was to ensure integrity in the conduct and conclusions of the study. In terms of reactivity, eliminating the *actual* influence I have on the research is impossible (Hammersley and Atkinson, 2007), and the goal in a qualitative study is not to eliminate this influence but
to understand it and to use it productively, which I have tried to do throughout the course of this research.

There were three other ways I tested the validity of data collected. Respondent validation (or member checks) was used as a means of acquiring feedback about the data and conclusions drawn about the research from some of the people who had participated in the research (Lincoln and Guba, 1989). This was a sure way of ruling out the possibility of misinterpreting the meaning of what participants had said and done, and the perspective they had on what is going on. It was also an important way of identifying my own biases and misunderstandings of what I had observed or heard.

I also considered this question: How do I know what participants say is true and not just what I want to hear? To make the participants comfortable enough to be honest with me, I assured them anonymity and interviewed them in a location of their choosing and at a time of their convenience. As far as possible, I did not give the participants my personal view on issues and matters being discussed. I used my interviews as opportunities for learning and trying to understand what the participants truly felt about the subject matter being discussed. Most of the interviews with the participants were recorded and I transcribed each of these interviews verbatim and shared the transcripts with the participants to ensure it was an accurate account of what they had said. For participants who preferred not to be recorded during the interviews, I ensured that accurate notes were made and these were typed out and shared with the participants thereafter. Many participants expressed their appreciation for this gesture, although only a few provided feedback on the transcripts that were sent to them or had corrections to propose.

Another question on validity that I considered was: How do I know what a participant tells me is true? I substantiated all interview transcripts through triangulation i.e. through comparing
with quotes from other participants, documentation and observations during site visits. These were generally regarded as true unless there were discrepancies in the evidence.

I also compared data interpretation and conclusions drawn from one site with other case study sites for the purpose of assessing validity, as recommended for multi-site studies (Miles and Huberman, 1984).

Soliciting feedback from others was also a useful strategy for identifying validity threats, and my own biases and assumptions, or flaws in my logic or methods. This was done through soliciting feedback from my supervisor, other PhD students and staff at the university. I also corresponded with several experts in policy analysis and peatland management throughout the course of my study to ensure that my findings were consistent with their own experience, and to discuss any differences.

I also visited the IRR Research Team of the Swiss Graduate School of Public Administration (IDHEAP) at the University of Lausanne in Switzerland in May 2014 and discussed the application of the IRR framework in analysing the results of this study. During my discussions with the research team, Prof Knoepfel led discussions on developments of the IRR framework since 2009 and the wider application of its use in other civil law countries, including Indonesia (the legal system in Switzerland and Indonesia are based on civil law). I have worked closely with the research team to triangulate my approach with their standard procedures, as this is a first attempt to use the IRR framework to study natural resource management in a common law county (i.e. the law of Malaysia is mainly based on the common law legal system).

Another key part of testing validity is searching for discrepancies in the evidence and negative cases (Walcott, 1990; Maxwell, 2005). This refers to the instance when a particular explanation or interpretation points to defects in an account; there might also be instances
when the data is not persuasive and when it can be interpreted in several ways. The basic principle I have adopted here was that both the supporting and discrepant data was closely assessed and, if necessary, the conclusion was slightly modified. In some cases, I found that the best way to deal with the data was to report the discrepant evidence and acknowledge that the research was not able to draw any conclusions from it (Wolcott, 1990).

3.5 The Analytical Process

During the analytical process, I used the framework analysis method of data analysis that is aptly suited for applied policy research (Ritchie & Spencer, 2002). It is particularly appropriate for research, such as this, that has specific questions, a limited time frame, a pre-designed sample and \textit{a priori} issues. In the analysis, data was sifted, charted and sorted in accordance with key issues and themes using five steps: familiarization; identification of a thematic framework; indexing; charting; and mapping and interpretation. Framework analysis provided an excellent tool to assess policies and procedures from the very people whom they were affecting; the prime concern was to describe and interpret what was happening in each particular case.

The five steps involved in framework analysis were:

i. \textit{Familiarisation} involved immersion in the data, which meant listening to the recordings, reading transcripts etc. It was a process during which I became familiar with the transcripts of the data collected. Throughout this process I tried to identify the key ideas and become aware of the recurrent themes and made a note of them.

ii. \textit{Thematic framework}: When the selected research material had been reviewed, I returned to the data and attempted to identify the key issues, concepts and themes. This was when the data was allowed to dictate the themes and issues for developing the thematic framework, and it was within the framework that the
data was sifted and sorted. The development of the thematic framework was influenced by the IRR conceptual framework discussed earlier and provided the theory for analysis of the data.

iii. **Indexing:** During this process the thematic framework was applied to the data in their textual form, with the system of categories identified in the thematic framework being applied to the whole data set. This step helped me obtain an overview of the whole data for making comparisons and connections, and was done manually.

iv. **Charting:** This was when pieces of data that were indexed were arranged in charts according to the themes. Summarized and sorted data was displayed in diagrammatic form to identify connections and relationships which were difficult to see in text-based format. The data was then lifted from its original text and placed in the chart, under headings and sub-headings.

v. **Mapping and interpretation:** This was the stage of pulling together key characteristics of the data, to map and interpret the data set as a whole. It was here that I returned to the key objectives and features of qualitative analysis. The basic processes were the same: reviewing the charts and research notes, comparing the data, searching for patterns and connections and seeking explanation for these internally within the data.

The data analysis was carried out using the *framework analysis* method outlined above. The responses from the 67 key informants were analysed using Microsoft Excel™. I was able to code and transfer the data to the Excel spreadsheet using keywords (i.e. in textual form) to compare and connect the data. The data was also arranged into charts and tables for use in the results section. The research questions were analysed according to the steps for field research recommended by Gerber *et al.* (2009) (Section 2.4.2). Table 3.4 illustrates the relevance of the research questions to the IRR field research procedure and how they relate to the chapters in this thesis.
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<tr>
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<td>Chapter 4</td>
<td>1. (i) For what are peatlands and peat swamp forests in Peninsular Malaysia currently being used for?</td>
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| Identification of the users of peatlands and peat swamp forests | Chapter 5 | 1. (ii) Which are the main groups of people who use, have influence on or benefit from peatlands/ peat swamp forests in Peninsular Malaysia?  
2. (ii) Which institutions/ agencies are involved in the implementation of these direct policies at national, state and provincial levels?  
(iv) Which institutions/ agencies are involved in the implementation of these indirect policies at national, state and provincial levels?  
(vi) Which government agency(ies) is/ are involved with enforcement of the peatland/ peat swamp forest management policy?  
5. (i) Should more actors be involved in peatland/ peat swamp forest management to make it more effective and, if so, which? |
| Analysis of the resource regime                 | Chapter 6      | 2. (i) Which policies do stakeholders consider relate to peatlands/ peat swamp forests management in Peninsular Malaysia, especially those that relate to their work?  
(iii) Which other policies do stakeholders think might indirectly influence peatland/ peat swamp forest management in Peninsular Malaysia and, if so, what are they?  
(v) What are the current peatland/ peat swamp forest management policies which relate to enforcement and penalties?  
4. (i) In the opinion of stakeholders, are the policies relating to peatland/ peat swamp forest management adequate to address the main issues arising from peatland/ peat swamp forest management and what gaps, if any, can they identify?  
(ii) What are the benefits and challenges to implementing the current peat related policies? |
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<td>Analysis of the implementation of the regime – the interaction between users and the political-administrative actors</td>
<td>Chapter 7</td>
<td>1. (iii) Who is managing the peatlands/peat swamp forests and how is this being done? (iv) What are the most important issues raised by stakeholders relating to peatland/peat swamp forest management in Peninsular Malaysia? 3. (ii) In the stakeholders’ opinion, what factors influence whether peat related policies are implemented or not? (iii) What reasons do stakeholders give to explain the importance of different factors? 4. (ii) What other specific requirements (structure, procedures or skills) are needed for implementing the policies related to peatland/peat swamp forest management?</td>
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<td>Analysis of the implementation of the regime – attempts to regulate uses and institutional mechanisms for collaborative cooperation.</td>
<td>Chapter 8</td>
<td>2. (v) What are the current peatland/peat swamp forest management policies which relate to incentives? (vii) Are there any mechanisms outside the government institutions for peatland/peat swamp forest management and, if so, what are they? 3. (i) Do stakeholders think peatland/peat swamp forest management is an important area in Peninsular Malaysia and, if yes, why? 5. (ii) How will the involvement of these actors assist in resolving the key issues related to peatland/peat swamp forest management in Peninsular Malaysia? (iii) How could involvement of these key actors become part of existing institutional arrangements and mechanisms for peatland/peat swamp forest management in Peninsular Malaysia? (iv) Are there any changes that need to be made to the present arrangements and if so, what are these changes? (v) How can this be achieved in Peninsular Malaysia?</td>
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<td>Analysis of the impacts of the regime on the resource</td>
<td>Chapter 9</td>
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3.6 Summary

This chapter describes the data collection and analysis methods used through this thesis, which adopts a case study approach analysed using data obtained through interviews with key informants. The four subsequent chapters describe the results obtained using these methods following the steps described in the conceptual framework i.e. identification of the actual uses of peatlands and peat swamp forests, and their users, analysis of the policies governing peatland and peat swamp forest management and analysis of the implementation of the regime in Peninsular Malaysia.
Guided by the IRR conceptual framework (discussed in Chapter 2), in this chapter I analyse the main uses of peatlands and peat swamp forests, in terms of their goods and services. The approach I have taken is to make a comparison between two sources of information, (i) impressions from key informants from interviews and (ii) documentary evidence, to establish the current uses of peatlands and peat swamp forests in Peninsular Malaysia. I first analysed the responses from key informants, then I carried out a literature search to find documentary evidence for the issues that were highlighted by informants. Finally, I made comparisons between the two.

The stakeholders, the policy responses and the implementation of the regime for peatland and peat swamp forest management, which are the other steps involved in applying the IRR, are discussed in subsequent chapters.

4.1 Definition of the Peat Resource: Clarification of the Unit of Analysis

The case study sites for this study are the North Selangor Peat Swamp Forest, the Southeast Pahang Peat Swamp Forest and the Ayer Hitam Forest Reserve, which essentially means the peatlands and peat swamp forests within these areas that have been designated as forest reserves. As proposed by Gerber et al. (2009), the first step in applying the IRR framework in field research procedure is to define the resource unit according to its physical criteria, not its administrative boundaries (Section 2.4.2). Taking an ecosystem approach implies considering activities in the areas adjacent to the forest reserves that have an effect on the peatlands and peat swamp forests (Avishek et al., 2012). In fact, several documents have found that what happens in one part of the peat dome does have an effect on the remaining
parts (UNDP/GEF, 2008b; GEC, 2014b). Therefore, the unit of analysis in this study must include not just the forest reserves of the case study sites but the entire area of peat deposits surrounding them.

Accurate maps of the actual peat swamp area at the case study sites were not available. For the purpose of this study, therefore, the peat swamp area was estimated based on the geographical and topographical features of the area. Maps from the Malaysian Wetland Directory were also used to estimate the actual area of peat swamp forests that existed at the case study sites. The boundaries for the peat swamp around the case study sites were estimated based on rivers and drainage canals around the forest reserves (as peat swamps normally formed between two rivers; Davies, 2011) and excluded mangroves, dryland forests and hill areas.

To help understand the manner in which these peat swamps and peat swamp forests are being used, the services provided by the habitat were categorised using the Millennium Ecosystem Assessment (MA, 2005) classification of ecosystem services (i.e. as “benefits people obtain from ecosystems”):

I. supporting services – these are “ecosystem services that are necessary for the production of all other ecosystem services” such as nutrient dispersal and cycling, seed dispersal, primary production;

II. provisioning services – “products obtained from ecosystems” such as food (including seafood and game), crops, wild foods and spices, water, minerals, pharmaceuticals, biochemical and industrial products and energy (hydropower, biomass fuels);

III. regulating services – “benefits obtained from the regulation of ecosystem processes” such as carbon sequestration and climate regulation, waste decomposition and detoxification, purification of water and air, crop pollination, pest and disease control; and
IV. cultural services – “non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences” such as cultural, intellectual and spiritual inspiration, recreational experiences (including ecotourism) and scientific discovery.
4.2 Description of Case Study Sites

Peat swamp forests are one of the three main types of forest in Peninsular Malaysia; from a management perspective (National Forestry Policy, 1974) forests are classified as dipterocarp, peat swamp and mangrove forests (Figure 4.1).

Figure 4.1: Major forest types and location of case study sites in Peninsular Malaysia
(adapted from Malaysian Timber Council, 2011)
4.2.1 North Selangor Peat Swamp Forest, Selangor

The North Selangor Peat Swamp Forest is located in the north-western part of the State of Selangor. It consists of the Raja Musa (23,486ha) and Sungai Karang (50,106ha) Forest Reserves, and covers a total area of 73,592ha (Selangor State Forestry Department and DANCED, 2001) (Figure 4.2). The State Government is currently considering a proposal to extend the area for the peat swamp forest to include the Sungai Dusun Forest Reserve (4,891 ha) and part of the Bukit Belata Forest Reserve (2,821 ha), which would increase the area to 81,304 ha (GEC, 2014a). The current draft Integrated Management Plan for the area includes these forest reserves.

The area was designated a Permanent Reserved Forest (PRF) in 1990; until then it was classified as Stateland and was intensively logged with little or no control. As a result, the forest is heavily depleted so that about 5% is covered with grass (Figure 4.3) with most of the remaining area covered with forest of medium or low density. There is an area of about 1.3% of the NSPSF located within the forest reserves that is covered with tall forest of high density (Selangor State Forestry Department and DANCED, 2001; GEC, 2014a).

An Environmental Action Plan for North Selangor Peat Swamp Forest (Prentice, 1990) was prepared upon its designation as a forest reserve. Since then the Selangor Forestry Department has worked with DANCED on an Integrated Management Plan for the North Selangor Peat Swamp Forest (2001-2010), which advocated the use of the Selective Management System approach to maintain sustained timber yields. This entails the selective removal of the mature crop in a single operation (Lee et al., 2001) and a management regime that aims to ensure
forest development is biologically, ecologically and environmentally sustainable (Mok, 1992).

Figure 4.2: Major forest types and location of the North Selangor Peat Swamp Forest in the state of Selangor

(Malaysian Timber Certification Council, 2010)
In 2009, the Selangor State Government introduced a moratorium on logging for 25 years in forest reserves (GEC, 2014a). No new harvesting licenses have since been issued for operations within forest reserves in Selangor, including the peat swamp forests in North Selangor (GEC, 2014a). The North Selangor Peat Swamp Forest is significant for the state as it makes up about a third of the total area of forest reserves. A large proportion of the production forest in the State has now been classified as Heritage Park where logging is prohibited. A surveillance audit report for the Selangor Forest Management Unit carried out in 2012 identified an allocation of annual harvesting of 690 ha under the 10th Malaysia Plan (2011-2015), which means that logging is occurring in a small part of the forest reserves in the State, probably the result of previous logging contracts.

Figure 4.3: Exposed peat and other parts covered with grass at the North Selangor Peat Swamp Forest (Kumaran, 2012)
The peat swamp forest provides a habitat for some rare species of blackwater fish such as the genus *Encheloclarias* (Ng *et al.*, 1994), the near threatened Black Panther *Panthera pardus* and the vulnerable Malayan Sun Bear *Helarctos malayanus* (Prentice and Aikanathan, 1989) as well as several endemic tree species (Appanah *et al.*, 1999), although its international importance has been affected by logging activities in the past. More recently, the North Selangor Peat Swamp Forest has been recognised for its global importance as a carbon sink (Parish *et al.*, 2008; Davies, 2011; Prentice, 2011; ASEAN Secretariat and Global Environment Centre, 2011; GEC, 2014a).

In the past, local communities have extracted timber from the forest reserves illegally although no signs of illegal logging have been seen or recorded recently (GEC, 2014a). They also use and benefit from the peat swamp forest through the cultivation of oil palm within the forest reserve (these plantations were initiated before the forest reserve designation and have therefore been allowed to continue). A recent study has shown that the area of oil palm plantation within the Forest Reserve has increased by 240% since 1998 and the area of grassland/ scrub or burnt has increased by 60% in the same time (GEC, 2014a). Fishing in the drainage canals and rivers also takes place (both for consumption and trade by local people and recreational fishing by tourists) and a small number of tourists from neighbouring areas visit the area for bird-watching. A few households in the area were reportedly involved in logging, hunting and collecting medicinal plants in the forest in the past was (SSFD and DANCED, 2001) but there is no recent published information on the status on these activities.

Outside the forest reserve, the peat swamp forest is important for providing water to irrigate the paddy fields (Sg. Karang rice fields) and for domestic use (Tanjung
Karang and Sekinchan) (Figure 4.4). Water is diverted from the peat swamp through two large drains for rice cultivation to the west of the area. Many smallholder farmers and villagers are involved in farming cash crops (vegetables and fruits) outside the forest reserve. Smallholder farmers also rear cattle, goats and poultry on a small scale as a subsidiary source of income.

The local communities have also benefited from sawmills (which depend on logs from the North Selangor Peat Swamp Forest) and other related businesses, which provided employment opportunities for them.

Figure 4.4: Land use at the North Selangor Peat Swamp Forest
(image acquired from Landsat-8 dated 24 March 2014; yellow line denotes unit of analysis)
The Environmental Action Plan also noted that two types of mining activity took place here in the 1990s (Prentice, 1990). Tin mining was carried out by three private companies in the south-eastern corner of the peat swamp. There were also attempts to mine peat in the areas that were used for tin mining where thin surface layers of peat were removed by vacuum-pump harvesters; the peat was then milled and bagged for horticultural use. While tin mining has ceased, peat mining still continues on a small scale. The Local District Plans for Kuala Selangor has designated these mining pools as potential for aquaculture development but this plan has been replaced by the Hybrid Off River Augmentation Scheme (HORAS) for water supply (GEC, 2014a). In the Stateland area adjacent to south-eastern end, degraded peat swamp forests are currently being mined for clay and sand. The Kuala Selangor District Council issued clay mining permits for the peat swamps in the Stateland to private companies being managed by the Selangor Agricultural Development Corporation for an area of 40ha but this was stopped in 2014.

A new township called Bestari Jaya has been developed to the south of the peat swamp forest, and the Kuala Selangor town itself is being further developed, according to local plans that are administered by the Kuala Selangor District Council.

The areas adjacent to the peat swamp (on the east and west) have been designated as Agro-Valley in the Selangor State Structure Plan (2007), and there are plans for the intensification of oil palm and other cash crops here. Land conversion to oil palm plantations by private companies is taking place in areas adjacent to the forest reserves in the north, to the west and towards the south of the peat swamp, including along the Batang Berjuntai-Tanjung Karang road in the south (State Structure Plan, 2007). In the north-western corner of the peat swamp is an area of degraded peat which has been cleared illegally followed by the establishment of
illegal settlements; the future management of this area is still being debated (GEC, 2014a). The Sabak Bernam Local Plan (2007) has now designated a new road to pass through this area, although there are proposals for the road to be re-aligned to prevent fragmentation of the peatland area (GEC, 2014a).

The southern area of the peat swamp also acts as the catchment for the Selangor River which feeds into the Batang Berjuntai Water Treatment Plants; these are major water treatment plants for Selangor, Kuala Lumpur and Putrajaya (Muhammad Aqeel, 2011).

The conservation and rehabilitation of the North Selangor Peat Swamp Forest has also been the focus of several local non-governmental organisations and community-based organisations, such as the Global Environment Centre, Malaysian Nature Society and Friends of North Selangor Peat Swamp Forest. These organisations have been involved in the rehabilitation efforts through the planting of trees, the blocking of drainage canals, the setting up of nurseries among villagers for the supply of saplings, and raising awareness about good agricultural practices among smallholder farmers and villagers (GEC, 2014a). Conservation efforts by these NGOs and CBOs are considered important to the State Forestry Department, the District Council and the Selangor State Government because it helps keep peat fires at abeyance especially during the dry season (GEC, 2014c).

Early scientific research on the NSPSF concentrated on the biodiversity of its avifauna and fish species (Ng, 1992; Nee and Guan, 1993; Ng et al., 1994; Ng and Kottelat, 1994) but more recent studies have focused on forest management (Kumari, 1996; Pradhan et al., 2007), the ecology of the peat swamp and the impact of logging, fires and agriculture conversion on biodiversity and ecosystem function.
(Abdullah et al., 2002; Abdullah and Nakagoshi, 2008; Yule and Gomez, 2009; Yule, 2010; Azhar et al., 2011).

4.2.2 Southeast Pahang Peat Swamp Forest, Pahang

The Southeast Pahang Peat Swamp Forest is located south of the lower reaches of the Pahang River in the eastern state of Pahang (Figure 4.5). It represents the largest block of undisturbed peat swamp forests remaining in Peninsular Malaysia, and was designated as one of the Environmentally Sensitive Areas in the National Physical Plan-2. The total area of the Southeast Pahang Peat Swamp Forest is about 230,600 ha and consists of four forest reserves - the Pekan, Nenasi, Resak and Kedondong Forest Reserves. It includes peat swamp forests as well as dryland forests, and two mangrove forest reserves. The area of peat swamp forest itself is estimated to be about 85,000 ha and these forest reserves form part of a peat ecosystem that extends beyond the boundaries of the reserves (UNDP/GEF, 2008a). It has been estimated that about 41% of the Southeast Pahang Peat Swamp Forest has intact peat swamp forests and 23% is degraded peat swamp forest; the rest has been cleared or is available for agricultural development (UNDP/GEF, 2008a).

The peat swamp forest is a refuge for many species of wildlife; rapid assessments confirmed that about a third of Peninsular Malaysia's avifauna is found here (Glenda, 2004). As a result, the site has been listed as an Important Bird Area for Malaysia (Yeap et al., 2007). The area also hosts 54 fish species (MDA, 2003), 58 species of mammal as well as frogs, turtles, lizards and snakes. It is also important for many plant species restricted to peat swamp habitats including some endemics (Kamaruzaman and Nik Mohamad Shah, 1997; FRIM-UNDP/GEF, 2004,).
Logging in this peat swamp forest began in 2000, is still being carried out by the State Government and being monitored by the State Forestry Department (Pons et al., 1989, DANIDA, 2004, Ismail et al., 2011, Ismail and Ismail, 2011; P9, 2012). Timber extraction is also being carried out by the Orang Asli living in villages close to the peat swamp forest, while timber is being extracted illegally by the local community (Savinder, 2009).

A project by DANIDA in 2004 assisted in assessing the value of the timber resource in the Pekan Forest Reserve and proposed zoning of the forest for logging; reduced impact logging guidelines were subsequently developed by the Forestry Department during the UNDP/GEF Peat Swamp Forest Project as the standard for logging.
activities in the Southeast Pahang Peat Swamp Forest (UNDP/GEF, 2008a). Recent studies have looked at determining the sustainable harvest level of Ramin *Gonystylus bancanus* in the production forests in the Pekan Forest Reserve (Ismail *et al.*, 2011) and the specific need for an optimum harvesting system at the same location (Ismail and Ismail, 2011).

The land surrounding the forest reserves are either Stateland or privately-owned small and large-scale development lands designated for agriculture or industry (UNDP/GEF, 2008a). This land conversion has reached the boundaries of the forest reserves and fragmented them. During the UNDP/GEF Peat Swamp Project, it was agreed that the area of the forest reserves would be extended to include tracts between the four forest reserves to ensure they were connected. The area is also under threat from the effects of existing economic activity, has experienced uncontrolled drainage (and flooding) and annually recurring peat fires (DID, 2010) (Figure 4.6).

Commercial agriculture forms the main economic activity in the catchments of the peat swamp forest (UNDP/GEF, 2008a); oil palm plantations established by private companies and smallholder farmers are predominant in the area (Figure 4.7). Rubber and rice are is also important. Other crops include cocoa, paddy rice, coconut, vegetables and tropical fruits (pineapple, bananas, durians etc.). The Orang Asli cultivate rice and cash crops (vegetables and fruits) close to their villages, in areas within and outside the forest reserves. They also identify with the peat swamp forest as part of their cultural identity (Kamal Solhaimi *et al.*, 2006; Savinder, 2008; Savinder *et al.*, 2009).
Figure 4.6: Flooding in the vicinity of the Southeast Pahang Peat Swamp Forest (Kumaran, 2012)

Fishing is also carried out by the local communities living close to the peat swamps (P1, P4, P5 and P9, 2012). Aquaculture in the form of pond and cage culture is an important economic activity to the east of the peat swamp, particularly by local private companies who exploit the Pahang and Bebar Rivers, as well as the coastal areas for their fish farming enterprises. The Song Cheng eel farm close to Pekan town, which involved investment from a private Korean company, also involves the use of groundwater for the eel culture (UNDP/GEF, 2008a). Freshwater fish culture (including prawns) now dominates the aquaculture activities along the coast in Pekan district.
A total of 19 Orang Asli villages occur in the vicinity of the Southeast Pahang Peat Swamp Forest. A high proportion of these local communities depend on forest resources, mainly for subsistence as there are no eco-tourism activities in the area. Traditionally, the Orang Asli practice shifting cultivation, hunting, collecting forest produce (including medicinal plants) and fishing for their livelihoods (Singh, 2008). Non-timber forest products (NTFPs) and other forest products are collected and
used by the community as well as traded commercially (Kamal Solhaimi et al., 2006; Savinder et al., 2009).

Increased economic activity in the area has also led to the development of local townships in Pekan, Nenasi and Rompin by the respective District Councils, resulting in the provision of better amenities for the local people. Central Rompin district is also expected to build rail transit lines that will cut through the southern end of the Resak Forest Reserve (Rompin District Local Plan, 2007) but discussions during the preparation of the Integrated Management Plan have put plans for development in this area on hold (UNDP/GEF, 2008b; N14, 2012).

Research at this site has focused on issues related to water quality of the river systems that flow through the swamp (Kamaruzaman and Nik Mohamad Shah, 1997; Morse et al., 2007; Gasim et al., 2007; Yule and Gomez, 2009; Yule, 2010; Mohd Ghazali et al., 2013) and the socio-economic aspects of the Orang Asli communities (of the Jakun tribe) who depend on the peat swamp for their livelihoods (Savinder, 2008; Savinder et al., 2009; Harun et al., 2010). Studies have also been undertaken on land management (Parish, 2002; Azhar et al., 2011) and sustainable use of resources (Lim et al., 1999; Jusoff et al., 2007).

4.2.3 Ayer Hitam Forest Reserve, Johor

The Ayer Hitam Forest Reserve is located in the west of the southern State of Johor (Figure 4.8). Rapid conversion of the peat swamp forests in Johor began in 1974 when the Malaysian Government obtained a World Bank loan to develop 148,517 ha of agricultural land in southwest Johor. The Project primarily involved drainage, coastal embankments and supporting agricultural services (World Bank, 1974) in the low-lying areas between Batu Pahat and Pontian. The area was prone to flooding,
water logging and saline intrusion (Zamali and Lee, 1991), so the aim of the project was to alleviate these problems and to increase the economic potential of the land. This was mainly done through the planting of pineapples on a large scale in peat areas with a canning factory located nearby producing canned pineapples for export to other parts of the world.

Figure 4.8: The location of the Ayer Hitam Forest Reserve within Muar District in Johor

A survey of peat areas in Johor in 1997 revealed that 53,764 ha of peat swamp forests remained in the state (Law and Selvadurai, 1968; Abdul Jamil et al., 1989; Wetlands International, 2008). Of this 3,797 ha is in the Ayer Hitam Forest Reserve (Wetlands International, 2010), accounting for about 7% of the previous area of peat swamp forest in Johor (Figure 4.6). About 70% of the Forest Reserve is peat swamp forest, while the remaining area is dry mixed dipterocarp forest. A large part of the Forest Reserve has been logged by the State Forestry Department through the
issuance of logging licenses to private companies but there is still some natural forest left in the area, which is important for biodiversity conservation (UNDP/GEF, 2008a; Howes, 2009). Wetlands International, a local NGO with international connections, has been collaborating with the State Government to enhance the management of the Forest Reserve to ensure that biodiversity conservation is being considered during logging activities (J1, 2012).

Recent surveys (Howes, 2009; Lee, 2010; Lim and Ravinder, 2010; Chee and Cheah, 2013) reveal that the Ayer Hitam Forest Reserve is still important for biodiversity; it houses abundant fish, bird and mammal life including some species listed as endangered on the IUCN Red List (e.g. White-handed Gibbon *Hylobates lar*, and Malayan Tapir *Tapirus indicus*) and some near threatened species (e.g. Dusky Leaf Monkey *Trachypithecus obscurus* and Banded Surili *Presbytis femoralis*, Blue-rumped Parrot *Psittinus cyanurus*, Black Hornbill *Anthracoceros malayanus* and Rhinoceros Hornbill *Buceros rhinoceros*).

The surrounding areas have been converted to agriculture or developed so that the Forest Reserve is isolated and cut off from any other natural habitat (Figure 4.9). Private oil palm plantation companies and smallholder farmers have planted oil palm with some of the smallholder farmers also plant rubber, pineapple, other fruits and vegetables in their land area (Chee and Cheah, 2013). Fruit orchards are being operated by local communities in the area (Lim and Ravinder, 2010).

In terms of land use, there are remnant peat swamp forests owned by smallholders outside the boundaries of the Forest Reserve, which are adjacent to oil palm plantations. The areas immediately around the Forest Reserve are a mixture of hilly areas (laterite soil) with orchards (mainly pineapples), secondary forest, swampy areas (peat swamps), and vegetable farms (Lee, 2010), mostly growing yam. Fish
collection for subsistence and small-scale aquarium trading is also being practiced (Lee, 2010), as is hunting, mainly for wild boar (Lim and Ravinder, 2010).

There is also a high tension power line on pylons that has cut off a thin strip of forest in the south from the main body of the forest (Lim and Ravinder, 2010; Chee and Cheah, 2013). Environmental Impact Assessment reports by the Ministry of Housing and Local Government (2010) suggest that parts of the forest have been targeted for housing development schemes. A ten-year bauxite mining lease within the

Figure 4.9: Land use at the Ayer Hitam Forest Reserve
(image acquired from Landsat-8 dated 17 May 2013; yellow line denotes unit of analysis)
Forest Reserve expired in 2011 but had created a 30-m wide canal in the south-eastern part of the Forest Reserve (Chee and Cheah, 2013).

Most of the Ayer Hitam Forest Reserve falls within the jurisdiction of the Muar District Council but the southern tip of the Forest Reserve lies in the Batu Pahat District. On the south-west corner of the site is abandoned land which has been proposed for further agricultural development, including cattle rearing, as identified in the Muar and Batu Pahat District Local Plans (2007).

4.3 Results

4.3.1 The Main Uses of Peatlands and Peat Swamp Forests in Peninsular Malaysia

The main uses of peatlands and peat swamp forests in Peninsular Malaysia identified by the five key informant groups were agriculture, particularly for oil palm plantations, logging, biodiversity conservation and infrastructure (Table 4.1). A majority of key informants who were interviewed from government agencies, government-linked agencies, private companies, NGOs and academic institutions mentioned agriculture, particularly oil palm plantations, as the main use. Key informants from government agencies, NGOs and academic institutions referred to logging less frequently, though those from government-linked agencies and private companies were more likely to mention this use. Government-linked agencies seemed the most informed about peatland use for biodiversity conservation, while key informants from academic institutions did not see this as important. Many key informants from the NGO group mentioned the use of peatlands and peat swamp forests for infrastructure, but no-one from academic institutions did so.
Table 4.1: The frequency with which selected categories of main uses of peatlands and peat swamp forests in Peninsular Malaysia were mentioned by the key informant groups

<table>
<thead>
<tr>
<th>Selected Main Uses</th>
<th>Government Agency (%)</th>
<th>Government-linked Agency (%)</th>
<th>Private Company (%)</th>
<th>Non-Government Organisation (%)</th>
<th>Academic Institution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>95</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Oil Palm</td>
<td>85</td>
<td>100</td>
<td>94</td>
<td>81</td>
<td>80</td>
</tr>
<tr>
<td>Logging</td>
<td>60</td>
<td>83</td>
<td>81</td>
<td>69</td>
<td>60</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>45</td>
<td>83</td>
<td>41</td>
<td>56</td>
<td>20</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>30</td>
<td>33</td>
<td>38</td>
<td>69</td>
<td>0</td>
</tr>
<tr>
<td>( n )</td>
<td>20</td>
<td>6</td>
<td>16</td>
<td>16</td>
<td>5</td>
</tr>
</tbody>
</table>

The main uses of peatlands and peat swamp forests in Peninsular Malaysia alluded to by the key informants could be categorised as Table 4.2 provisioning services (100%) followed by regulating services (51%) and cultural services (21%). One key informant mentioned the role peat swamps play in soil protection (through soil formation), which I have classified as supporting service. Key informants also noted the importance of peatlands in providing land for infrastructure development (40%), which received the third highest number of mention by informants in terms of category of usage for peatlands. Comments from informants pertained to uses of peatlands and peat swamp forest generally, not just the study sites.
Table 4.2: The frequency with which ecosystem services and infrastructure were mentioned as one of the uses for peatlands and peat swamp forests

(Percentage of 63 key informants who mentioned the relevant service as one of the uses)

<table>
<thead>
<tr>
<th>Main Uses</th>
<th>Details</th>
<th>Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem Services</td>
<td>Provisioning</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regulating</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultural</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

Provisioning services of the peatlands included crop cultivation (for food and energy, including biomass fuels); timber extraction; other non-timber forest produce such as honey, rattan and building materials for roofing, matting and furniture. Other provisioning services mentioned included habitat for biodiversity, medicinal and ornamental resources, minerals, water and food (hunting and fishing) (Table 4.3).

Regulating services mentioned the role of peatlands in climate regulation through acting as carbon sinks and stores; water regulation because peat swamps help control floods; and as dumping grounds for toxic wastes (detoxification). The cultural services highlighted by a smaller number of informants included ecotourism, cultural diversity as well as education and research (Table 4.3).
Table 4.3: The frequency with which various uses of peatlands and peat swamp forests were mentioned by key informants

(Percentage of 63 key informants who mentioned the relevant service as one of the uses)

<table>
<thead>
<tr>
<th>Ecosystem Services</th>
<th>Details</th>
<th>Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provisioning Services</strong></td>
<td>Cropping/ Agriculture</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>Timber/ Logging</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Fishing and aquaculture</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Other non-timber forest products (NTFPs) including medicinal and ornamental resources</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Water supply</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Mineral extraction</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Hunting</td>
<td>10</td>
</tr>
<tr>
<td><strong>Regulating Services</strong></td>
<td>Climate regulation</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Water regulation</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Waste decomposition and detoxification</td>
<td>5</td>
</tr>
<tr>
<td><strong>Cultural Services</strong></td>
<td>Recreation and ecotourism</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Cultural diversity</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Education and research</td>
<td>3</td>
</tr>
<tr>
<td><strong>Supporting Services</strong></td>
<td>Soil protection</td>
<td>2</td>
</tr>
</tbody>
</table>

4.3.1.1 Provisioning Services

4.3.1.1.1 Cropping/ Agriculture

For the category of provisioning services, cropping or agriculture was indicated as the main use of peatlands and peat swamp forests by all the informants except one (98%), an officer at a government agency in Pahang, whose responses were confined to the ecological functions of the peat swamp forests and not peatlands.
Crop is defined by the FAO as any cultivated plant which is harvested during its growth, sometimes grown on a large scale for food, clothing, and other human uses (FAO, 2009).

A senior technical manager from a government agency described how peatlands were first developed for agriculture because they were thought to have no other use:

“In the 1960s and 70s, peatlands were regarded as wastelands. The management science then was to drain the water to rehabilitate the ecosystem and use it for other purposes. That was what we did here too. We drained the peatland and waited for the ecosystem to change; for the peat to decompose so we could use it.” (N2, 2012)

Another informant, a senior technical manager of an NGO, clarified that peatlands were also thought to be difficult to adapt for agriculture:

“For agriculture, peatlands are considered problematic soil and this is similar to old mining areas that have sandy soils that do not hold water and need treatment before they can be used. Peatlands are nutrient poor and water logged areas. They are also prone to fires and are costly to manage.” (S3, 2012)

Agriculturalists now regard peatlands as another medium of growth where the management regime needs to be adapted for planting. According to a senior manager with a private company:

“Peat, water, sand and soil are mediums of growth from the agriculture point of view. You can grow crops in water; it's called hydroponics. You can grow crops in sand, you can grow crops in peat, you can grow crops in mineral soil; it's not a sin to do that, is it? It is then a question of how you manage it.” (N20, 2012)

Another informant, a senior technical manager with a government agency, explained that only highly decomposed peat could be used for planting:

“When land is allocated [for agriculture], it should take into account the soil type, essentially whether it is deep or shallow peat and the state of the peat, decomposed or raw. If it is highly decomposed peat almost to humus, it would be more appropriate to plant something in it.” (N8, 2012)

Of the types of agriculture mentioned, oil palm was named by key informants as the main type of crop for which peatlands were being used. Two informants mentioned that initially there were problems growing oil palm on peat but these were overcome
by research, making oil palm the most lucrative perennial crop currently grown on peat:

“As a result of the interest of establishing plantations on peat, we carried out research mainly on the agronomic aspects and looked at the best practices. These included problems that were encountered when planting oil palm on peat such as palm toppling and leaning, nutrition and how best to develop the area in terms of compaction, water management etc.” (N13, 2012)

“They [oil palm] did not do well on peat in the beginning until research identified the reasons; it was due to the lack of micro-nutrients copper and zinc. When planters fine-tuned these micro-nutrients, the oil palms grew well. Today, it is still the most economically viable crop on peat in the tropics; it provides better returns than any other perennial crop.” (N35, 2012)

A senior manager with a private company indicated that plantation companies did not voluntarily select peat for planting oil palm but peatlands just happened to be part of the land that was allocated to them for agriculture:

“Agriculture is related to productivity; we try to produce something from a plot of land. For small holders and the plantation industry, their land areas happen to also cover peat and we just develop them together. Our involvement in peat is not designed but it’s there and we use it.” (N20, 2012)

A scientist with a private company also argued that replanting forests with oil palm replaced more carbon than alternative crops:

“If we cut down the forest, we need to re-plant. Here we re-plant with oil palm which is another tree and we are putting back about 80% of the carbon. In Europe, when they cut the forest they re-plant with soya bean and rapeseed which puts back 10-20% of the carbon. Additionally, oil palm produces 4.6 tonnes of oil per ha, whereas rapeseed and soya bean produce 0.6 and 0.8 tonnes of oil per ha respectively. So oil palm is more productive.” (N15, 2012)

The reason peatlands and peat swamp forests were being converted to oil palm plantations a senior manager of a private company pointed out was because of a lack of awareness of their values:

“Their [peatlands and peat swamp forests] value in biodiversity, hydrology and types of aquatic life has not been realised, so it is used for conversion to commercial oil palm plantations.” (N30, 2012)
In Selangor, all informants also highlighted oil palm as the main crop planted in peatlands. One informant, an employee of an NGO, alluded to the peatlands in North Selangor Peat Swamp Forests where “most of the Stateland or peatland has been developed for oil palm, both land belonging to the small holders and the big estates” (S6, 2012). In Pahang, an officer with a government agency pointed out that land was being allocated to government-linked companies for planting oil palm:

“Forest reserves and peatlands are for oil palm plantations. Where there is abandoned Stateland and no plans for using the area, the State Government could give that land out to a government-linked company for planting oil palm.” (P8, 2012)

For the peat area in West Johor immediately surrounding the Ayer Hitam Forest Reserve, all four informants cited oil palm as the main crop planted. Two informants described how problems were overcome leading to an increase in the value of the (peat) land:

“The initial problems like palm slanting were overcome by hole-in-hole planting, which is a modification in the way oil palm is planted.” (J4, 2012)

“The value of the land has increased thirty times. In the past, it was unusable and you could buy it for a song. Now they are cultivating oil palm which is the biggest money earner and the price of land has shot up.” (J3, 2012)

Besides oil palm, many informants alluded to peatland areas that were being used for planting pineapple on a large scale. They also named other fruits (bananas, coconut, corn, lime and mangoes), vegetables (ginger, tapioca, cassava and chillies) and other cash crops (like cocoa, coffee and tobacco) that were being planted on peatlands. A senior manager with a government-linked agency described that while the largest use of peatlands was for oil palm, “there are many horticultural crops including vegetables, fruits and pineapple” (J2, 2012). Another informant, a senior officer with a government agency, also described the use of peatlands for a mixture of oil palm as well as fruits, vegetables and cash crops, implying that a failure to use the peatlands for such purposes was to leave them with no work to do:

“They [peatlands] are used widely for agriculture and oil palm plantation. Most areas are used for agriculture; in Johor they are used for oil palm. In Selangor, they use
them for agriculture and the rest is left idle. In Pahang, they also use them for agriculture; peatlands are suitable for legumes that have long roots, and oil palm." (N37, 2012)

A senior manager with a government agency described pineapple canning once a global industry in Johor:

“People had large peat lands and they decided that the only good thing that could be grown on it was pineapples. Pontian became the centre for the pineapple growing and canning industry. Canning was done because the quality of the fruit was not right for the table and the soil didn’t permit it. They set up a canning factory, did the marketing and were world renowned for fresh table fruits. They made a big industry of it, but now it is diminishing, although it still remains an important crop in peat.” (J3, 2012)

Other fruits, vegetables and cash crops were mostly being planted on a smaller scale by people living in close proximity to the peatlands according to many informants. A senior manager with a government-linked agency said that “most of the small holders are planting cash crops like vegetables, bananas and coffee in some areas in Johor. There is also tapioca, cassava and ginger in Kuala Langat South and small-scale vegetable planting” (N13, 2012). In Pahang, a scientist with a private company described how “the local community who live closest to the peat swamp forest are associated with it because they plant their yam and taro there and they have many economic activities that relate to the peat swamp forest” (P2, 2012).

Paddy was another crop cultivated on peatlands mentioned by key informants. Most of the informants referred to the Tanjung Karang rice irrigation project as an example because the project had been operational since the 1970s and rice was still being planted on shallow peat there. Two informants testified to this:

“At one time we were eager to see them [peat swamp forests] cleared for rice, for e.g. in Tanjung Karang [in Selangor], where there was shallow peat that could be used for rice.” (P3, 2012)

“Some of our rice is planted on shallow peat [referring to Tanjung Karang] and it still grows well. We produce 65%-75% of our rice now and are gearing towards 100% self-sufficiency.” (N20, 2012)
A senior technical manager of an NGO explained that only shallow peat, “is converted to paddy fields; while the deeper peat is normally left to supply water.” (S3, 2012)

While informants mentioned rubber as another crop planted on peatlands, in some instances by the Orang Asli (P4, 2012), a senior manager with a government-linked agency described how “at one time, rubber was being planted in peat but it did not do well, so many of the areas were converted to oil palm plantations” (N13, 2012). According to a senior technical employee of an NGO, “In Ayer Hitam FR, they [the State Government] were looking at draining an area for rubber plantations which was not suitable, but the State decided to go ahead.” (J1, 2012)

**Documentary Evidence:** Documents showed that 44% of peatlands in Peninsular Malaysia have been converted to agriculture (Wetlands International, 2010) (Table 4.4). of which 203,455 ha (72% of the cultivated peat area) was being used for oil palm cultivation (Wetlands International, 2010). Since the 1990s more peatlands have been converted to oil palm in Peninsular Malaysia than anywhere else in Southeast Asia- except Indonesia (Koh et al., 2011; Wicke et al., 2011). In Selangor, for example, oil palm expansion was found to be the major contributor to peatland forest fragmentation between 1966 and 1995 (Abdullah and Nakagoshi, 2007).

Other crops planted on peat in Peninsular Malaysia mentioned in documents included rubber, coconut, pineapple, paddy, mixed horticulture and fruits (Abdul Jamil et al., 1989; Ismael, 2007; Davies, 2011). Although the total area of peatlands cultivated for agriculture given by Ismael (2007) varied from figures stated in Wetlands International (2010), he provided a list of the various crops cultivated on peatlands in Peninsular Malaysia (Table 4.5).
Table 4.4: Peatlands developed for agriculture in Peninsular Malaysia

<table>
<thead>
<tr>
<th>State</th>
<th>Total area of peat &gt;65% organic soil at 50cm depth (ha)</th>
<th>Peat soil area under agriculture (ha)</th>
<th>% peat area developed for agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pahang</td>
<td>164,113</td>
<td>20,869</td>
<td>12.7</td>
</tr>
<tr>
<td>Selangor</td>
<td>164,708</td>
<td>59,587</td>
<td>36.2</td>
</tr>
<tr>
<td>Johor</td>
<td>143,974</td>
<td>114,887</td>
<td>79.8</td>
</tr>
<tr>
<td>Terengganu</td>
<td>84,693</td>
<td>16,628</td>
<td>19.6</td>
</tr>
<tr>
<td>Perak</td>
<td>69,597</td>
<td>62,954</td>
<td>90.5</td>
</tr>
<tr>
<td>Kelantan</td>
<td>9,146</td>
<td>2,464</td>
<td>26.9</td>
</tr>
<tr>
<td>Negeri Sembilan</td>
<td>6,245</td>
<td>4,262</td>
<td>68.2</td>
</tr>
<tr>
<td>Federal Territories (Kuala Lumpur and Putrajaya)</td>
<td>381</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>642,857</strong></td>
<td><strong>281,652</strong></td>
<td><strong>43.8</strong></td>
</tr>
</tbody>
</table>


Table 4.5: Types of crop grown on peatlands in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Type of Crop</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Palm</td>
<td>222,057</td>
</tr>
<tr>
<td>Rubber</td>
<td>39,082</td>
</tr>
<tr>
<td>Mixed Farming</td>
<td>13,173</td>
</tr>
<tr>
<td>Coconut</td>
<td>10,591</td>
</tr>
<tr>
<td>Pineapple</td>
<td>6,766</td>
</tr>
<tr>
<td>Mixed Horticulture</td>
<td>6,451</td>
</tr>
<tr>
<td>Rice</td>
<td>6,315</td>
</tr>
<tr>
<td>Orchard</td>
<td>5,244</td>
</tr>
<tr>
<td>Others</td>
<td>2,613</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>312,292</strong></td>
</tr>
</tbody>
</table>

Source: Ismael, 2007
Comparison between Key Informant Impressions and Documentary Evidence:

There was one informant who did not allude to the use of peatlands for agriculture [as pointed out in Section 4.3.1.1 (i)] and of those who did mention agriculture, all informants from the five categories (government agencies, government-linked agencies, non-governmental organisations, private bodies and academic institutions) mentioned oil palm plantations as one of the main uses. There was one informant, an officer with a government agency, who did not allude to oil palm as one of the crops being planted on peat. Of the other types of agriculture, pineapple and other fruits such as bananas, coconut, corn, lime and mangoes were mentioned (by 55% of the informants who answered the question); vegetables like ginger, tapioca, cassava, chillies and other cash crops such as cocoa, coffee, tobacco (38% of the informants); paddy (25%) and rubber (22%).

The impressions of key informants on the main uses of peatlands and peat swamp forests were largely consistent with documentary evidence. Documents pointed to oil palm plantations as the largest area of converted peatlands cultivated for agriculture. Other types of crops planted in peatlands in Peninsular Malaysia mentioned in documents were the same as the ones pointed out by key informants, although none of the key informants mentioned coconut as one of the crops planted while Ismael (2007) estimated the area of peatland in Peninsular Malaysia planted with coconut to be more than 10,000 ha.

4.3.1.1.2 Timber Extraction

Timber extraction from peat swamp forests in Peninsular Malaysia was mentioned by about two-thirds of the informants (66%). A senior technical manager of a private company explained that timber harvesting is carried out in forest reserves classified as production forests:
“Parts of the Pekan FR have been zoned as protected and production forests; those classified as production can be harvested. In Selangor, parts of Sg Karang and Raja Musa reserves are designated as protected and a larger area has been designated as production forest.” (N3, 2012)

Several informants discussed the method used for logging in peat swamp forests, which involved floating the logs down a river or a canal. A senior officer with a government agency described how this was done in the North Selangor Peat Swamp Forest:

“When the area is logged, the timber is brought out to the Tengi River by rail. Logs are then floated down the river to a collection point.” (S11, 2013)

However, several informants who alluded to the use of peat swamp forests for logging questioned if it was sustainable. Two senior managers from separate NGOs were particularly critical of the forestry practices in peat swamp forests:

“There is no such thing as sustainable forestry. I visited the Rimbaka logging site [in Pekan, Southeast Pahang] with the Federal FD. Peat swamp forest is a different ecosystem. The logged area will not regenerate; the trees will die, one by one. Even the undergrowth now has gone. Once the microclimate changes, other changes will occur.” (N4, 2012)

“Forestry is unsustainable because the logging pressure has been too much. All reasonable, harvestable woods have been removed and the vegetation has degraded. The peat areas are drying out. Channels have been dug into many peatlands for removing logs and to bring in machinery and these have drained the peatlands. As a result there’s increasing frequency of fires in Malaysian peatlands.” (N21, 2012)

Even a scientist with a private company wondered whether the 25-year rotation cycle was too short:

“There is a sustainable forest management approach where the State Government logs and there is a 25-year recovery period, but then after 25 years they log it again. I wouldn’t say everything is intact [with logging in peat swamp forests].” (P2, 2012)

This may explain why a higher quota for logging in Pahang had not been met for the last five years:
“Every year, Forestry Department is allowed to log an area of 600 ha but for the last 4.5 years, we have only managed to log 200 ha.” (P9, 2012)

Alternatively, descriptions by a scientist with an academic institution, of the logging method for the Southeast Pahang Peat Swamp Forest suggest that logging is just the first step to swamp alienation:

“They will log the area and then drain the peat swamp by building canals that lead to the main river. They put the logs in the canals and bring them down to the areas where they will be processed.” (P4, 2012)

This was echoed by a scientist with a private company:

“Land clearing always starts with logging when they [the State Government] give out the logging licenses; these areas are then converted to oil palm after logging.” (N15, 2012)

Just such a transition happened in Pahang, as described by a senior technical manager with a private company:

“In the 1970s the State started using peat swamp forests for sustainable production of timber. Pahang realised they had a large area of peat which they used for small-scale forestry operations but not for commercial forestry. So when timber production was not good, they started planting with oil palm.” (P3, 2012)

On the other hand a technical officer of a private company described how interest in post-logging rehabilitation of peat swamp forests is increasing:

“We are looking at research on replanting forests and propagation of peat species. The problem is that ‘Shorea albida’ is the main species that grows in peat forests and it is difficult to understand the silviculture because it takes 20-25 years for the tree to start flowering.” (P4, 2012)

Several informants referred to the logging ban that was imposed by the Selangor State Government. A senior officer with a government agency explained that peat swamp forests were earmarked for logging before the ban was imposed:

“In Hulu Selangor, peat swamp was earmarked for logging between 2003 and 2007, before the State Government decided to have the moratorium on logging. A few areas in peat were being opened up for logging each year.” (S11, 2013)
Another informant, a scientist with a private company, described the local people’s reaction to the ban:

“The local communities were fuming mad. The previous State Government gave them permission to go into the forest and colonise it [to log it and convert it to oil palm]. The new State Government is now saying that you cannot do that [use that land]. Their [the local communities’] argument is that the forest doesn’t function as a peat swamp forest anymore; it is a mono-crop forest because it is all oil palm.” (P2, 2012)

**Documentary Evidence:** Documents show that logging is the most direct use of peat swamp forests in Peninsular Malaysia (Kumari, 1996; Parish, 2002; UNDP, 2006; Ismail et al., 2011; Davies, 2011) as they are a source of good quality timber, especially for the endangered and commercially valuable tree Ramin *Gonystylus bancanus* which is confined to swamp forests (Ibrahim, 1997; Sawal, 2004; Ismail et al., 2011; Davies, 2011). The Southeast Pahang Peat Swamp Forest is the largest source of Ramin timber in Peninsular Malaysia, contributing 94% of the total national production in 2001 (FRIM-UNDP/GEF, 2004). Malaysia is a dominant exporter of Ramin, which has a global trade value worth more than USD$100 million per year (Garrett et al., 2010), so the economic importance of timber from peat swamp forests is significant for the country.

Other valuable timber species found in the peat swamp forests in Peninsular Malaysia include Kempas *Kompassia malaccensis*, Meranti *Shorea spp.*, Kapur paya *Dryobalanops rappa* and Jongkong *Dactylocladus stenostachys* (Ibrahim, 1997; Davies, 2011). Species such as Jelutong *Dyera costulata and D. lowii*, which are also confined to peat swamp forests, have been utilised in Peninsular Malaysia for centuries for its latex (including for making chewing gum, Burkhill, 1966) and for its use in pencil-making (Ng, 1966).

There are several methods used to log peat swamp forests commercially that are mentioned in documents - logging carried out with or without drainage and logging
by clear felling or removing just the valuable commercial species (Davies, 2011). Logging in Peninsular Malaysia follows a selective cutting approach called the Selective Management System (Ismail and Ismail, 2011; Ismail et al., 2011). Originally developed for dry inland forests, the method has been adapted for peat swamp forests since 2005. Zulkifli (2005), Mohd Hizamri (2006) and Ismail (2009) have shown that under the Sustainable Management System (SMS), Reduced Impact Logging (RIL) methods are being practised in the peat swamp forest environment resulting in significant improvements in logging practices. UNDP/GEF (2008) also described the reduced impact harvesting technique which was incorporated into the forest management plans for the Southeast Pahang Peat Swamp Forest which also included aspects such as water and biodiversity conservation, High Conservation Value Forest and social aspects. By reducing residual damage, RIL is able to retain larger stocks of trees for future harvest and prevent the release of CO₂ (Wilcove et al., 2013). In Sabah, Wilcove et al., (2013) found that RIL was able to offer longer-term economic benefits and the possible sale of retained carbon under REDD+. However, RIL did not appear to improve species richness and diversity.

Davies (2011) highlighted that even though selective logging is practised other trees, shrubs and ground cover are damaged when the valuable timber is felled and pulled out of the forest. Habitat for birds, mammals, fish, insects, plants, fungi and microbes is also lost (Whitten et al., 2001). Trees suffer from high mortality due to the opening of the canopy and the drastic change in micro-climatic conditions (Davies, 2011), while regeneration of commercial species following selective logging is difficult (Nurul Huda et al., 2001).

Research on rehabilitation techniques of peat swamp forests in Peninsular Malaysia in the 1990s concentrated solely on the re-planting of valuable timber species such
as Ramin (Shamsudin and Aziah, 1992; Mohd Lokman et al., 1992; Lee et al., 1996; Shamsudin and Ismail, 1999; Ismail and Shamsudin, 1999). In the early 2000s the rehabilitation of other timber species that looked at reforestation in a holistic manner was also investigated (Ismail et al., 2001a; Ismail et al., 2001b). Documents suggest that much still has to be done to improve rehabilitation strategies for peat swamp forests such as raising the water table and reforestation (Davies, 2011) with little information on suitable species for reforestation and the best means of propagating them.

Comparison between Key Informant Impressions and Documentary Evidence:
Impressions from key informants matched information that was derived from documents in terms of the uses of peat swamp forests for timber extraction and the valuable timber species found in peat swamps, although a third of informants did not mention logging as a use at all. Documents also reflected the significant economic contribution to Malaysia of peat swamp forest species like Ramin, which was not clearly apparent from interviews. In terms of logging methods, the views of both key informants and documentary evidence whether Reduced Impact Logging was effective in reducing the damage caused by logging methods in peat swamp forests. Both informants and documents concurred that research in the area of rehabilitation is gaining momentum and there is still much scope for improving rehabilitation techniques and costs involved for such tasks.

4.3.1.1.3 Biodiversity
The importance of peat swamps for biodiversity was also noted by nearly half of the key informants (49%), particularly the endemic and indigenous flora and fauna and conservation efforts to retain them. A senior technical manager of a private company described the various categories of protection that have been accorded to forests in Peninsular Malaysia, some of which include peat swamps:
“We have the Totally Protected Areas like the National Park or Wildlife Reserves. Under the category of Forest Reserves, there are protected forests that are forests set aside as wildlife reserves and protected areas for water conservation; these cannot be exploited.” (N3, 2012)

A senior manager with a private company alluded to the uniqueness of the biodiversity found in peat swamps:

“Peat issues came up in discussions relating to conservation and biodiversity, it’s a unique ecosystem and there are endemic plants; there are also plants for medicinal values, the flora is unique.” (N29, 2012)

Two informants highlighted the unique wildlife in the peat swamp forests in Selangor to elaborate its importance for biodiversity:

“I saw the footprints of the Malayan Sun Bear on the bark of the trees in Kuala Langat South which they were going to turn into oil palm plantations. I put that up on Facebook and people got excited about it.” (S5, 2012)

“Peatlands have some unique species, such as the smaller cats and the freshwater plants. Part of the Sg. Dusun Wildlife Reserve is considered unique because it is peat swamp.” (N27, 2012)

Another informant, a senior technical manager with a government agency, highlighted the need for pristine peatland areas to be preserved for its biodiversity:

“Pristine and intact peat forests and peatland areas should be preserved for biodiversity. If we allow any use of these areas, the conditions of use should be consistent with the ecological functions and services that they provide as a hub for biodiversity.” (N8, 2012)

Documentary Evidence: Peat swamp forests are noted as representing one of the most important wetland types in Peninsular Malaysia in terms of biodiversity; they account for about 20% of the total wetland area in the whole country (including East Malaysia) (Page, 2004). Documents showed that many of the peat swamp forest species are confined to this unique habitat; for example, 75% of the tree species found in peat swamp forests in Peninsular Malaysia is not found in other habitat types and many species have a relatively restricted geographical distribution.
In terms of fauna, peat swamp forests in Peninsular Malaysia provide roaming areas for rare and endangered mammals such as Tiger *Panthera tigris sumatranus*, Sun Bear *Helarctos malayanus* and Asian Elephant *Elephas maximus* (Davies, 2011). Sebastian (2002) found peat swamp forests to be important while assessing the status of mammals and birds in Peninsular Malaysia. Prentice and Aikanathan (1989) recorded 173 species of bird in North Selangor Peat Swamp Forest of which 145 were breeding residents. Among the important bird species recorded from the peat swamp forest were the endangered Storm’s Stork *Ciconia stormi* and the vulnerable species, the Lesser Adjutant *Leptoptilos javanicus* and the Short-toed Coucal *Centropus rectunguis* (Yeap *et al.*, 1999).

There are between 200-300 fish species from the peat swamps in the Indo-Malayan region, (Dennis and Aldhous, 2004) with 65 species recorded from Pekan in Pahang and 47 from North Selangor Peat Swamp Forest (Ng *et al.*, 1992 and 1994). Studies in Peninsular Malaysia have also shown that of all the faunal groups; fish exhibit the highest endemism in peats swamps with up to 33% of freshwater fish associated with the peat swamp blackwater in Peninsular Malaysia found nowhere else (Posa *et al.*; 2011). The endangered fresh water crocodile, the False Gharial *Tomistoma schlegelii* was also reported to be endemic to peat swamp forests in Peninsular Malaysia (Stuebing *et al.*, 2006).

A few studies considered all the non-use values of peat swamp forests in Peninsular Malaysia, including biodiversity. An estimate of the total economic value of the North Selangor Peat Swamp Forest found that when local benefits alone were considered, it was financially profitable to shift from unsustainable to sustainable use options for
timber and non-timber goods and services (Kumari, 1995). Latiff (1997) also observed that “conservation efforts lagged far behind the rapid transformation of peat forests to agriculture and other land uses.” Jens (1999) presented a review of the methods for valuation of natural resources and suggested ways to increase the efficiency of the sustainable forest management approach. Woon et al. (1999) carried out an economic valuation of the protective and productive functions of the North Selangor Peat Swamp Forests and the Southeast Pahang Peat Swamp Forests, and concluded that the best option for enhancing the economic value of the peat swamps was to manage them sustainably for timber (i.e. by increasing the rotation to 60 years) neither totally conserve them nor totally converting them to agriculture. There are few suggestions from these studies that support the conservation of pristine areas in Peninsular Malaysia, as suggested by some key informants.

**Comparison between Key Informant Impressions and Documentary Evidence:**

Impressions from interviews complemented information from documents in terms of the importance of peatlands and peat swamp forests for their unique biodiversity, both for flora and fauna. It was hard to gauge the non-use values of peat swamp forests in Peninsular Malaysia as literature on the issue was scarce, and none of the key informants mentioned any economic values of biodiversity. This lack of information led one of the key informants, a senior officer with a government agency, to suggest that “in the end, the conservation of peat means trying to see how the Government can use it wisely vis-à-vis our development plans” (N11, 2012).

**4.3.1.1.4 Fishing and Aquaculture**

Fishing and aquaculture was referred to by 40% of key informants. Fishing in rivers traversing peat swamp forests and peatlands was described as occurring on a
small-scale, mostly by local communities for their own consumption. A scientist with a private company described the local interest in fishing at Tasek Bera, Pahang:

“The local community at Tasek Bera still uses the peat swamp forest especially for fishing. They love to go fishing and they have many recreational activities there.” (P2, 2012)

However, some local methods for fishing are likely to be destructive, according to a senior technical manager of a private company:

“The water in peat swamp forest itself allowed the local communities to fish. If the peat is underlined with alluvium, they also burn the vegetation to collect fish.” (P3, 2012)

Local people who lived in peat areas close to the coast also appear to sell their catch to middlemen, as explained by a senior technical manager of an NGO:

“Fishing is done both in freshwater and at sea. In Kampung Mercung in Pekan, Southeast Pahang the local people sell fish in tonnes (i.e. 1000 kg). Normally they have their own boat but sometimes they hitch a ride with others. They catch ‘tapah’ fish mostly because they swim in groups and are not solitary. These people are very familiar with the environment. They sell whatever they catch to the Chinese middlemen.” (S3, 2012)

A scientist with an academic institution described how the local people have now adapted their lifestyles to cater to the need to sell fish to middlemen:

“The local people catch fish for subsistence and keep them alive in boxes. They live by the river, usually to extract the resources and build temporary shelters where they stay for 2-3 months. They sell the fish they catch; one fish might sell for RM15/kg and it’s a good price.” (P4, 2012)

Another informant lamented about the problems of over-exploitation created by the cash economy as a result of commercialisation of fishing:

“Extraction used to be for local consumption but now that local people are acting as middle persons for commercial use, you see floating cages along rivers [for fish cultivation] and Jelutong [local hard wood] being cut down. The cash economy creates problems with over-consumption.” (S3, 2012)

The collection of fish species for the aquarium trade, also sold to middlemen, was mentioned by key informants as another popular activity among the local population but it was difficult to track the scale at which this was being done. According to a senior manager with an NGO:
“Normally there is no permit issued to harvest these items from the peat swamp forests. There are no statistics to show how much fish is collected for the aquarium trade; the only way to know how much is harvested is for all users to get permits, which they need to pay for.” (S1, 2012)

Several informants mentioned the use of peatlands and peat swamp forests for aquaculture and highlighted the eel farm in Pekan-Nenasi; this, they said, was being carried out on land under the category of Stateland as the conversion of these lands “is within the power of the State Government” (N32, 2012).

**Documentary Evidence:** Documents showed that, although commercial inland fisheries are an important use of peat swamps, they are not properly documented and fish landing areas are poorly recorded (FRIM/ UNDP-GEF, 2004). However, the abundance of popular commercial fish such as Tapah *Wallago leeri*, Toman *Channa mecropeltes*, Bujuk *Channa lucius* and Baung *Hemibagrus* spp. in some rivers in peat swamps suggests that an inland fishery is viable in these areas (Mazlan et al., 2005). The Pahang Fisheries Department estimated in 2002 that the total fish catch from the associated waterways of the Southeast Pahang Peat Swamp Forest (i.e. rivers, brackish water and man-made canals) amounted to 20,500 metric tonnes (FRIM-UNDP/GEF, 2004).

Documents also highlight that the fish caught in the blackwater rivers by local communities living on the fringes of the peat swamp forests are an important source of their dietary protein (FRIM-UNDP/GEF, 2004). Fish are sometimes sold to middlemen for cash (Mazlan et al., 2005) with Kamal Solhaimi et al. (2006) describing how in one village in the Southeast Pahang Peat Swamp Forest, middlemen provided local fishermen with motorboats while in another village the men had been equipped with weighing scales and storage boxes for keeping their catch.
There was little information on fish being harvested for the aquarium trade in the rivers in peat swamp areas in Peninsular Malaysia, but several popular species such as the Harlequin rasbora *Rasbora heteromorpha*, Tiger barb *Puntius tetrazona*, Glass Catfish *Kryptopterus* spp., Fighting fish *Betta* spp. and Arowana *Scleropages formosus* (Ng and Tan, 1997; Davies, 2011) are found in peat swamps in Peninsular Malaysia, suggesting that peat swamps could be the source of these fish.

There is some evidence that fish farming has replaced peat swamp forests at some locations. For example the Song Cheng eel farm in Pekan, Pahang, which began operations in 1991, cleared more than 2,000 ha of swampland to build 500 ponds to culture eel for making *Kabayaki* (a special spiced-eel) for markets in Japan and South Korea. The continuous extraction of groundwater was affecting the hydrology of the entire area, drying up both land and wells in the neighbouring villages, as well as causing the flooding on the Pekan-Nenasi road (*New Straits Times*, 2 May 1993; UNDP/GEF, 2002).

**Comparison between Key Informant Impressions and Documentary Evidence:**

Impressions from 40% of the key informants who acknowledged fishing as a use of peat swamps and the documents suggest that, while fishing in the blackwaters of peat swamps in the past was initially carried out for local consumption, the attraction of cash payments from middlemen has enticed local communities into extracting fish for trade. There is not much literature on the aquarium trade of fish species from peat swamps although there are indications that popular aquarium fish species are found there and the chances are high that these are being caught and sold to middlemen (Ng and Tan, 1997). The main example of aquaculture relating to peat
swamps is the Song Cheng eel farm in Pekan; not much has been said or documented of the aquaculture practices in the peat swamps of Selangor and Johor.

4.3.1.1.5 Other Non-timber Forest Products (NTFPs)

The collection of other NTFPs was recorded by more than a third of the key informants (37%) as an important activity among the local communities dependent on peat swamps, particularly the collection of plant species such as rattan and tree roots as construction material for houses and for making furniture, tools and other household items. A senior technical manager of a private company, however, highlighted that this was done “to a much lower extent (than logging) by the Orang Asli community” (S2, 2012). In some areas, the local community went into peat swamps to collect these NTFPs after the logging companies had completed their operations, as suggested by a scientist with an academic institution:

“In Kampung Runchang in Southeast Pahang, the local community collect non-timber forest products such as orchids, ferns and wildlife; they collect or catch and sell them. They cut and make furniture from roots. The way they collect rattan is more skilful, they often go in and collect rattan after the timber companies have completed logging.” (P4, 2012)

The Screwpine Pandanus sp. was described by key informants as being harvested by several local communities living around peat areas to make mats and baskets, and other handicraft items for their own use and for local trade. A scientist with a private company explained that “the women use peat swamps to get their supply of Screwpine to make mats and baskets, although some people just buy them from the market these days. In villages with lower socio-economic status, they still make these items” (P2, 2012).

Honey was also mentioned as an item that is collected from peat swamps for trade.
A small number of key informants also made reference to local communities who still relied on peat swamps for their medicinal resources, especially the “tongkat ali Eurycoma longifolia which is traded to give them additional income” (P9, 2012). One informant mentioned the prospect of “bio-harvesting where non-timber forest products are harvested for the pharmaceutical industry” (S1, 2012).

Four informants also alluded to the use of peat swamp forests as sources of ornamental plants such as ferns, wild orchids and the red-stemmed sealing wax palm Cyrtostachys lakka. A senior manager with a private company pointed out that: “people go into peat swamps illegally to look for botanical resources and medicinal plants; some even settle in the periphery of the forest” (N29, 2012).

**Documentary Evidence:** Documents showed that utilisation of NTFPs has mostly been carried out by the local communities and has been either for commercial exploitation or for subsistence consumption (Kamal Solhaimi et al., 2006). The Orang Asli once obtained the bulk of their food for their families from hunting, fishing and trapping of land and aquatic animals (FRIM-UNDP/GEF, 2004). These activities are still pursued today, but less intensively, and most products are sold to middlemen (Davies, 2011). The Orang Asli Jakun in the Southeast Pahang Peat Swamp Forest have been recorded selling NTFPs that are found nearby through setting up roadside stalls, where they sell their catch (birds, fish and sometimes small mammals), ornamental plants such as orchids as well as medicinal plants (Savinder et al., 2009).

Mengkuang and Rasau Pandanus spp. are commonly used to make a wide variety of handicrafts for daily use (e.g. baskets) while the traditional Orang Asli houses used to be constructed wholly using forest products (Savinder et al., 2009; Davies, 2011). Numerous medicinal plants (climbers, herbs, ferns, shrubs and trees) that
can be found in peat swamp forests are commonly believed to be cures for various illnesses, such as *Cratoxylum arborescens* (for chicken pox), *Eugenia paradixa* (for diarrhoea) and *Piper arborescens* (for rheumatism) (Chai *et al.* 1989; Norhayati *et al.*, 1999). Ornamental plants such as wild orchids, wild yams and other creepers found in peat swamps are sought by urban dwellers for decoration and as ornamental garden species, mainly the Pinang rajah or Sealing wax palm *Cyrtostachys lakka* and the Bird nest fern *Asplenium nidus* are important ornamental plants (Parish, 2002; Davies, 2011).

Rattan collection had been estimated to contribute 15% to the income of the residents in peat swamp forests of Southeast Pahang in the past (Shahwahid and Mustapha, 1991; Shahwahid, 1992) and the communities along the Bebar River in Southeast Pahang have claimed more recently that rattan resources have declined (Junaenah *et al.*, 2005; Harun *et al.*, 2010).

**Comparison between Key Informant Impressions and Documentary Evidence:**
The use of peat swamps for the collection of non-timber forest products (including as resources for medicinal and ornamental plants) by the local communities living in the vicinity of peat swamp forests has been documented but noted by fewer than 40% of key informants. There is some documentary evidence of the value of NTFP to the livelihoods of the local community or the impact of logging on NTFP collection in peat swamp forests, but very little research in these areas have been carried out in Peninsular Malaysian peatlands.

**4.3.1.6 Water Supply and Storage**
The role that peat swamps play in providing water was mentioned by 21% key informants most of these being from the state of Selangor where water from the North Selangor Peat Swamp Forest was described as being used to irrigate the
paddy fields in the surrounding Integrated Agriculture Development Area (IADA). A senior technical manager with a government agency described the type of water found in peatlands:

“Many of these peatlands tend to be downstream and in the interior. They are a source of water; very soft water containing humic acids that are dark, tea-coloured but clean.” (N8, 2012)

Another informant, a senior manager with a government agency, explained the roles that peatlands and peat swamp forests play as water stores and how they are connected to the flooding that occurs when they are cleared and developed:

“Most of the development in West Johor is on peat swamps, and they have been drained. Peat swamps are a form of storage for water, and these areas now face problems of flooding. Drainage can lead to subsidence, and then there is a problem with water going out to the sea and the water can be stagnant for weeks.” (N42, 2012)

**Documentary Evidence:** Documents described the hydrology of tropical peat swamp forests and explained that some tropical peatlands can be dome-shaped, which allows them to serve as important reservoirs of water, particularly for the local communities (Rieley, 1992; Bennett et al., 2009). As pointed out by the key informants, the North Selangor Peat Swamp Forest provides water for the nearby paddy fields in Tanjung Karang - the main paddy growing town in Selangor - and for the surrounding farming areas (Prentice and Parish, 1992; Zulkifli et al., 1999; Lim et al., 1999). Documents also describe the ability of peatlands to store large volumes of water, which is released gradually, and thereby evening out flows in rivers and decreasing the velocity of flood waters (Davies, 2011). The peatlands and peat swamp forests also help maintain base flows in rivers that prevent saline water intrusion (Davies, 2011).

**Comparison between Key Informant Impressions and Documentary Evidence:** Impressions from the few key informants who mentioned the role that peatlands and peat swamp forests play as a water source and storage was consistent with
documentary evidence on key functions of these ecosystems. The important role peatlands and peat swamp base flow maintenance was not mentioned by any of the key informants during interviews.

4.3.1.1.7 Mineral Extraction

Just 13% of key informants mentioned that mineral extraction occurred in peat swamp forests and peatlands ted. In Selangor, an officer of a government agency described how they had decided to give permits for clay mining when attempts to make use of the land through oil palm cultivation failed:

“We tried planting with oil palm but the palm trees fell over and there was also fire in some areas. During the rainy season, the area floods and in the dry season, there are fires. Our plan now is to use the area for clay mining. The depth of the peat is 3-4 m, then there is a layer of clay for about 1-1.5 m and after mining the clay, we put the peat back and cover it up.” (S8, 2012)

Another officer with a government agency clarified that the permit issued by the District Office for clay mining was annually renewable, so the operators had to ensure they obeyed all the environmental requirements:

“Clay mining is carried out outside the forest reserve, in the land belonging to the Selangor Agricultural Development Authority. They have sub-contracted it out for clay mining. The area is about 40.46ha (100 acres) and we have given them the permission to do it. The permit is given for the year and they have to renew it annually. They started two years ago and the area developed for clay mining is still relatively small. The clay supplies tile factories in Johor.” (S7, 2012)

A senior technical employee of an NGO described how a piece of land within the Ayer Hitam Forest Reserve in Johor was de-gazetted as a forest reserve when aluminium was discovered in the area:

“In Ayer Hitam, the Mining Department found aluminium right in the middle of the forest land. It was within the forest reserve so the area was taken out for mining purposes. They got approval to de-gazette the area and it’s quite clear from the location that it has been extracted out from the FR.” (J1, 2012)

Two informants also described sand mining activities that were being carried out in rivers traversing peat swamp forests, especially for “housing development” (P6,
A scientist with an academic institution described what he saw on a field visit to the Southeast Pahang Peat Swamp Forest:

“There was a lot of sand moved around, they were mining sand and there were places that had these big holes as a result.” (P4, 2012)

One informant, an employee of an NGO, also described how peat was being used by “factories that use peat soil as fertiliser, where peat moss imported from Holland is mixed with the more woody material from the North Selangor Peat Swamp Forest.” (S6, 2012)

**Documentary Evidence:** Documentary evidence on the mineral extraction activities in peat swamp areas related to studies carried out for the development of the management plans for the three study sites. For example, Prentice (1990) provided information on the tin and peat mining carried out in the North Selangor Peat Swamp Forest while Lee (2010) and Davies (2011) provided details of the areas used for bauxite mining in the Ayer Hitam Forest Reserve, but both operations have now ceased. In 2010, clay mining permits were approved in the land owned by the Selangor Agricultural Development Authority adjacent to the Raja Musa Forest Reserve (Selangor Times, 2012).

There is also documentary evidence of the sand mining which occurs in rivers found at the three case study sites (Muham mad Aqeel et al., 2011), where the sand is extracted for use in land reclaims, coastline stabilization and building construction. Normally, sand mining pits are turned into fish and vegetable farms after use but they are currently being converted for clay mining where appropriate (The Sun, 2010).

**Comparison between Key Informant Impressions and Documentary Evidence:**
Information from interviews on mineral extraction in peatlands and peat swamp
forests was more current then documentary evidence, although few of the informants mentioned it at all. For example, interviews revealed that clay mining operations started in 2010 in the vicinity of the North Selangor Peat Swamp Forests and this was apparent during a visit to the site in October 2012. However, no literature could be found providing details of these operations. Similarly, the interviews revealed that sand mining activities were taking place at the sites in Selangor and Pahang but again no information could be found during literature searches I carried out. One informant also described aluminium extraction in Ayer Hitam Forest Reserve but there was no documentary evidence for this.

4.3.1.1.8 Hunting

About a tenth (10%) of the informants mentioned that the local community hunted in peat swamps for subsistence. Wild animals mentioned as being hunted were mostly birds, snakes and small mammals. A technical officer of a private company pointed out that the area available for hunting, for example in Pahang, was diminishing:

“In Bebar River, they go hunting in the forests for 3-4 weeks and then return to their permanent settlement but the area is getting smaller and this is a serious problem.” (P6, 2012)

**Documentary Evidence:** Documents showed that hunting for subsistence is still widely practised in peat swamp forests in Peninsular Malaysia, but is carried out on a small-scale using traps and nets (Davies, 2011). Some wild animals caught include the wild boar *Sus scrofa*, some deer species *Muntiacus muntjak, Tragulus javanica* and *Tragulus napu* as well as monitor lizards *Varanus* spp. Other wildlife species such as snakes (especially the reticulated python *Python reticulatas*), turtles, terrapins, pig-tailed macaques *Macaca nemestrina* and pangolins *Manis javanica* are also hunted and targeted by hunters in peat swamps (Savinder, 2008).
Villagers living along the Bebar River in the Pekan Forest Reserve claimed that wildlife resources for hunting have been depleted and their harvests are declining (Junaenah et al., 2005; Harun et al., 2010). The studies have cited flooding, conversion of forest to agricultural land and logging activities as the main activities that have affected indigenous hunting.

There have been reports in Peninsular Malaysia of illegal trade involving endangered or threatened wildlife found in and around peat swamp forests, such as leopards, pangolins, tigers, slow lorises, bats and birds. In August 2013, six men were sentenced to a year in jail after being convicted of smuggling 150 pangolins in Peninsular Malaysia (Mongabay, 2013). WWF Malaysia also discovered snares set for tigers in the north of the peninsula, not far from the Belum-Temenggor Forest Complex (Bernama, 2011).

**Comparison between Key Informant Impressions and Documentary Evidence:**

Only one in ten of the key informants mentioned small-scale hunting as an important use of peat swamp forests, by the local community. However, none mentioned the documented illegal peat swamp wildlife trade even though some of the traded species are prohibited from international commercial trade and internal trade is either strictly controlled or prohibited by the Malaysian Government.

### 4.3.1.2 Regulating Services

#### 4.3.1.2.1 Climate Regulation

More than a third of key informants (37%) cited climate regulation as one of the regulating services provided by peatlands and peat swamp forests, particularly their role as carbon stores and sinks, and in mitigating greenhouse gas emissions. Two informants from the same government-linked agency suggested that the issue was becoming more relevant:
“People are interested in climate change; they look at peat swamps as one ecosystem that can help to mitigate climate change.” (P1, 2012)

“Under climate change, peatland management is becoming more important because of the sensitivities and the relationship between peatlands and climate change.” (N12, 2012)

A senior technical manager with a government agency pointed out that the issue was important because “peat can be both a sink and a source, depending on how you manage it” (N8, 2012).

The debate on the usage of degraded peatlands for oil palm plantations dominated much of the discussion relating to this topic. Informants from the NGOs highlighted that the role of peatlands as natural carbon stocks changed to become sources of greenhouse gas emissions through the conversion of peat to oil palm plantations. An employee of an NGO pointed out:

“Peat is an amazing natural carbon sink. We’re spending billions of dollars on artificial carbon sinks and here we’ve got peat, Mother Nature’s most productive carbon sink. We are misusing peat by not ensuring that it doesn’t stay in its original state, which prevents burning and the release of CO2. One of the biggest environmental disasters on the planet must be not preventing the burning of peat.” (S5, 2012)

However, other informants accused the NGOs of changing their arguments for peatland conservation to suit their underlying wish to keep peat swamp forests intact. A scientist of a private company stated:

“Peat is a hot topic in Roundtable on Sustainable Palm Oil as they don’t allow planting of oil palm on peat because of global warming. Our experiments show that the amount of GHG emitted from natural peat swamps is higher than if you plant oil palm. So now the NGOs have changed their debate to C stock. They keep changing the goal posts!” (N15, 2012)

A senior technical manager with a government agency explained that, while the science of the 1970s (i.e. that the best way to use peat is to drain it) might have been proven wrong, there was now a need to decide how to manage drained peatlands at a reasonable cost:

“The climate change debate is that the science of the 1970s has been proven wrong, in terms of emissions. When you drain peatlands, the decomposition rate is enhanced
so more CO$_2$ is emitted. Should peatlands be drained or kept as they are? For a developing country like Malaysia this is a difficult question. We have embarked on draining our peat so it’s difficult to go back and revert to the original state of our peatlands. We would have to close the water canals and look at the hydrology of the area again; that would cost a lot of money.” (N2, 2012)

Research was also needed to understand the management of these peat areas, according to a senior manager of a government-linked agency:

“Statistics show that about 11% of the oil palm plantations occur in peat and we are undertaking studies related to these areas with the primary interest on GHG emissions and life cycle analysis.” (N17, 2012)

**Documentary Evidence:** Documents pointed to the role of peatlands and peat swamp forests as carbon stores and sinks as well as micro-climate formation and stabilization as indirect values or uses of these ecosystems. They are also an important terrestrial store of carbon storing, on average, ten times more carbon per ha than tropical forest on mineral soil (GACCC 1998; Parish et al., 2008; Joosten et al., 2012); one estimate of the carbon stored in Southeast Asia’s peatlands was 42 billion metric tonnes (Hooijer et al., 2010). In their natural condition most tropical peat swamp forests function as carbon sinks and stores, but forest clearance and drainage can convert them rapidly to carbon sources (Page et al.; 2002; Hooijer et al.; 2006; Rieley et al., 2008; Davies, 2011; Joosten et al., 2012; Lim et al., 2012).

Hooijer et al. (2006) found that deforested and drained peatlands in Southeast Asia are a significant source of CO$_2$ emissions and an important consideration for meeting the aim of stabilizing greenhouse gas emissions globally. As a result of their importance in the debate on climate change, the Roundtable on Sustainable Palm Oil has recommended that all new development on peat of oil palm plantations be stopped and that alternative uses for the peat areas being used as plantations be developed (Lim et al., 2012). There is growing interest among researchers to study the role that peatlands play in the regulation of global climate and greenhouse gas emissions (Silvius and Giesen, 1996; GACCC 1998; Parish, 2002; Bechteler and Siegert, 2004; Siegert et al., 2004; Wicke et al., 2011).
Comparison between Key Informant Impressions and Documentary Evidence:

While key informants and documents describe how peatlands can act as carbon sinks and sources depending on how they are managed and utilised, there was little information in documents, especially of the case study sites, to suggest that there was any research in that area in Peninsular Malaysia. Studies to estimate the carbon stocks in peat swamp forests have focused mostly on the East Malaysian states of Sabah and Sarawak (Chin, 2007; Paramananthan, 2011), while only a few studies in Peninsular Malaysia have looked at carbon content in soil (Law and Selvadurai, 1968; Lim, 1989; Lim, 2002). When reviewing the uncertainties and knowledge gaps about carbon storage in tropical peatlands, Page et al. (2007) found that data on peat thickness was much more limited than data on area because the only reliable data was derived from direct measurement in the field, which was time-consuming. Also not much was mentioned in documents or by key informants about the approaches to increase the resilience of both peat ecosystems and human communities to the impacts of climate change or measures to address identified vulnerabilities as a result of climate change.

4.3.1.2.2 Water Regulation

The role that peatlands and peat swamp forests play in the hydrological regime, in mitigating floods by regulating flood peaks, was a regulating service alluded to by just a quarter of the key informants (25%). Severe flooding in 2006/7 in Pahang and Johor brought to light the importance of the role that peatlands and peat swamp forests play, according to a scientist with a private company:

“Currently they [the authorities] are beginning to attach more importance to conservation uses such as flood mitigation. In 2006/7 there was a major flood in Johor and Pahang and several people were killed. It was felt that the peat swamp forest had been compromised. There was a lot of surface runoff and nowhere for the water to be channelled to.” (P2, 2012)
A senior manager with an NGO indicated that it was the clearing of peat swamp forests upstream of the towns that caused regular flooding:

“In areas that have been cleared of peat swamp forests, they tend to get severe flooding. The best example in recent years is the flooding in Johor which many suspect is due to the clearing of peat swamp and upstream forests in the catchment areas.” (N24, 2012)

Informants also alluded to the need for the local communities to be involved with the hydrological management of peatlands that are being used for agriculture. A senior officer with a government agency in Johor cited the example of the local community in Batu Pahat who were involved with government agencies to clear flood waters:

“Peatlands are lowland areas. Farmers are bound to have problems after draining the area and they come to government agencies for help to put in the drainage system to prevent flooding. The Batu Pahat area is generally low-lying and it takes time to drain the water; flooding still occurs but it is for a shorter time.” (J4, 2012)

Success in working with the local community for hydrological management had also been achieved in Selangor, especially in the blocking of canals, according to an employee with an NGO:

“For hydrological management, we block the canals dug by local people to encroach the peat swamp area. The Forestry Department and other government agencies work to block these canals and the hydrological management is carried out by the local communities themselves.” (S6, 2012)

**Documentary Evidence:** Documents showed that peatlands play a role in reducing flood peaks and moderating the flow of rivers associated with peat swamps during dry periods (Derek, 1997). Peatlands have the ability to absorb water during wet periods and release it slowly during dry periods. Therefore, intact peatlands have the potential to prevent damage to infrastructure by reducing flooding downstream of the peatland (Derek, 1997). Davies (2011) and Prentice (2011) warned that if a peatland area undergoes drainage, this function would be severely compromised because the natural hydrological regime of peat swamps is an important issue for maintaining the functions of the peat swamp ecosystem. Wosten *et al.* (2008) provided guidance on water management for major land uses and noted that the
challenge was to strike a balance between a sufficiently high water table to reduce subsidence and thus CO$_2$ emissions, and a water table sufficiently low to permit crop growth and other land uses.

There were some examples (Selangorkini, 2013; ASEAN Secretariat and the Global Environment Centre, 2011) of local community involvement in canal blocking and tree planting to manage the water level in peat areas which are carried out by local NGOs in Peninsular Malaysia. These were part of larger restoration projects which involved building dams to block canals or gullies, assisting with revegetation, forming local fire brigades and improving livelihood practices. The Department of Drainage and Irrigation in Johor adopts a reactionary attitude towards the flooding (DID, 2012) where mitigation measures are carried out when flooding occurs after heavy rains.

**Comparison between Key Informant Impressions and Documentary Evidence:**

Documents complemented impressions from key informants on the role that peatlands and peat swamps play in water regulation, particularly the flood mitigation services provided by peatlands. There were no documented examples in Peninsular Malaysia of the direct connection between peatlands and water regulation, and none that ascribe flooding downstream to cleared peatlands upstream.

### 4.3.1.2.3 Detoxification

Three of the key informants (5%) touched on the role peat swamps play in detoxification and filtering of wastes. They said that peat swamps act as dumping grounds for toxic materials as they are normally isolated areas with limited development, so “unscrupulous developers find them good spots for dumping toxic waste without being caught” (S1, 2012). A senior technical manager at a government agency also described the role that peatlands play as bio-filters:
“They are bio-filters, used for bio-remediation of water. Many of these peatlands tend to be downstream and in the interior. Any residual treatment of the water done by peat before they get to the mangroves should be valued; they act as sediment traps and excess nutrient traps.” (N8, 2012)

**Documentary Evidence:** Derek (1997) described the role that peatlands and peat swamp forests play in the maintenance of minimum flows in rivers in the dry season that can prevent saline water intrusion up rivers. Peat swamps along the coasts in Peninsular Malaysia also acted as buffers between the marine and freshwater systems, maintaining a balance between them and preventing saline intrusion into coastal lands, while protecting off-shore fisheries from land-based sources of pollution (Rieley et al., 1996). Another role is that some peatlands can retain sediment and nutrients and so help to detoxify water by removing pollutants from streams (Parish et al., 2008).

**Comparison between Key Informant Impressions and Documentary Evidence:** Although only a few key informants described the role that peatlands play in waste decomposition, those who were aware of this function described their role very clearly. Explicit examples of peatlands playing this role were difficult to find in literature.

**4.3.1.3 Cultural Services**

**4.3.1.3.1 Ecotourism**

Ecotourism activities have been developed only to a limited extent in many of these peat areas and about a tenth (11%) of the key informants mentioned ecotourism among the uses of peat swamps. A senior technical manager with a government agency explained that recreational use of peat swamp forests formed part of the protection status:
“The protected areas might overlap with environmental recreation areas and environmental conservation areas, which include wildlife conservation areas.” (N8, 2012)

According to another informant, a senior manager at a government agency, this mix of protection and recreational use sometimes posed a problem for ecotourism development:

“We looked at options to open the Sg. Dusun Wildlife Centre to expose people to peat swamps but it involves delicate matters of accessibility. We might end up with more damage to the peat swamps, so careful planning is needed. Some of these areas are out of the tourist belt and will need investment in infrastructure to develop them as eco-sites.” (N27, 2012)

Degraded peat swamps was cited as one of the reasons for the lack of ecotourism in Tasek Bera in Pahang, where the Orang Asli had set up an organisation called Sabot to involve the local community in ecotourism. A scientist with a private company explained:

“At Tasek Bera, some measures for ecotourism were initiated. Sabot and Wetlands International had some collaboration and empowerment activities for 5-6 years. The situation is not good for ecotourism; no matter how much the people are empowered, the ecosystem is so badly degraded because of oil palm.” (P2, 2012)

Community groups had also been formed in other areas to encourage homestay programs and promote ecotourism, but these are at initial stages of development and have had limited success. An employee of an NGO described efforts at the North Selangor Peat Swamp Forest:

“There are plans to develop the homestay program. Currently, it showcases the agriculture practices such as the use of a hoe to plant paddy. The forest is nearby and additional services such as boat rides, kayaking or jungle-trekking can be included. Some of the local people are also very good at freshwater fishing.” (S6, 2012)

There were also attempts by the UNDP/GEF Peat Swamp Project to initiate ecotourism activities in the Southeast Pahang Peat Swamp Forest but these have dwindled since the project ended, according to a scientist with a private company:

“There were many livelihood opportunities but they all flopped as a result of internal and empowerment problems. They were also launched for a short period of time [to have an impact].” (P2, 2012)
**Documentary Evidence:** Peat swamps have limited recognition for recreation and tourism due to the remoteness of their location, difficulty in access, difficulty in viewing wildlife and degraded ecosystems (James, 1991). As a result, most nature-based tourism has taken place within the dryland forests surrounding peat swamps with construction of trails, boardwalks, accommodation, interpretation and education facilities (Davies, 2011). It has been suggested that tourism has the potential to provide a sustainable livelihood for local communities living in peatland areas, or at least supplement local incomes, by providing opportunities for guiding, homestay and catering, land and boat transport, sale of handicrafts and forest produce, and cultural performances (Prentice, 2011). The Department of Wildlife and National Parks coordinates a website describing the various recreational activities at the Tasek Bera Ramsar Site in Pahang as jungle trekking, fishing, bird watching, canoeing in the lake and river system, visiting the herbal garden and the Semelai community. No documented information on the ecotourism activities at the case study sites was found.

**Comparison between Key Informant Impressions and Documentary Evidence:**

Both key informants and documents emphasised the difficulties of establishing ecotourism in peat swamps in Peninsular Malaysia. While assistance is needed, and has been provided, to build the capacity of local people through training programmes, the establishment of facilities and credit, market access for the services and promotion of the sites through tourism agencies for the provision of tourism services, the physical constraints of the habitat limit its tourism potential.

**4.3.1.3.2 Cultural Diversity**

Another use highlighted by several informants (6%) was the cultural diversity that peatlands and peat swamps contributed as a result of their uniqueness. A senior
officer with a government agency described how this concept was discussed at the 
Conference of Parties at the Ramsar Convention:

“The Satoyama Initiative was adopted at the Conference, which is about how humans 
have adapted to the ecosystem in the past. For example when people started living 
around a swampy area, they did not drain the swamp but co-existed with it. They 
planted paddy and their whole lifestyle was based on their natural surroundings, and 
that formed their cultural diversity.” (N11, 2012)

The relationship that the Orang Asli have with the peat swamps was another 
example of cultural identity cited by a senior manager of an NGO:

“The peat forests are biologically diverse and they are one of the richest forests; this is 
where the Orang Asli have lived for a long time. They depend on these forests for their 
livelihood, their subsistence and their cultural identity.” (P5, 2012)

Citing the example of the Semelai community, who live in the peat swamps of Tasek 
Bera, a scientist with an academic institution described how the swamps formed a 
large part of their lifestyle:

“The peat swamp is close to the community land and the place where they get their 
subsistence. The community gets peace and clean water from there. There is a 
culture [among the Semelai] that when they feel that life is too hectic, they have a 
picnic and this is called ‘bebetir’. They spend 2-3 days in the forest away from their 
homes to get some peace and to relax, but at the same time they get food for the 
whole family.” (P7, 2012)

Another scientist with an academic institution echoed similar thoughts:

“The peat swamp is related to their political orientations, their identity, self-esteem and 
social history. The Orang Asli consider the place [Tasek Bera] theirs and they do not 
want to surrender it. Even though it is economically not viable – the fish have all gone 
and ecotourism has failed – but they still care for the place. It is related to their social 
history and their early beginnings, their cultural identity.” (N31, 2012)

Documentary Evidence: Two studies have looked at the social and cultural factors 
that influence how peatlands and peat swamp forests have been used, particularly 
highlighted the Orang Asli Jakun lifestyle, practices, traditional customs and values, 
their views and desires and how these were intertwined with the peat swamps which 
have been home to them for generations. Savinder et al. (2009) elaborated on the 
social dynamics of the Orang Asli Jakun community as peat swamp forest-
dependent people who needed to derive benefits from conservation initiatives. These studies brought to light the importance of the peat swamps in defining the cultural identity of the local communities that depend on them.

**Comparison between Key Informant Impressions and Documentary Evidence:**
The studies carried out by two groups of researchers under the UNDP/GEF Peat swamp Forest Project discussed elaborately the issue of cultural diversity of the Orang Asli Jakun community who live in the fringes of the Southeast Pahang Peat Swamp Forest, and this information was also conveyed by three key informants. However, little is known of other local community groups living in the vicinity of peat swamp forests, and there is little documented information about them.

**4.3.1.3.3 Education and Research**
Only two key informants (3%) alluded to the importance of peat swamps in education and research. One of the informants was from Pahang who was involved with facilitating research in the pristine peat swamps in Pekan and Rompin. The other informant was a senior technical manager at an NGO who talked about “school children and educators [who] use them as part of their education program” (N7, 2012).

**Documentary Evidence:** While the Millennium Ecosystem Assessment described this service as opportunities that peatlands and peat swamp forests provide for formal and informal education and training (MA, 2005), no documents relating to peatlands and peat swamp forests in Peninsular Malaysia mentioned their potential for education. Peatlands and peat swamp forests offer opportunities for research in the areas of climate change in terms of peat soil formation (Joosten *et al.*, 2012), carbon content (Page *et al.*, 2011; Ahmad Shukri *et al.*, 2011; Paramananthan, 2011), and GHG emissions (Melling *et al.*, 2005; Melling *et al.*, 2006; Hooijer *et al.*, 2011).
2006; Hooijer et al., 2010; Murdiyarso et al., 2010; Kimura et al., 2012); the interaction between water and swamp forest and advances in paludiculture (Caffrey et al., 1996; Joosten, 1998; Appanah et al., 1999; FRIM-UNDP/GEF, 2004; Jussoff et al., 2007; Wichtmann and Joosten, 2007; Wichtmann et al., 2010; Schäfer, 2012); the different biological communities that they house such as the Ramin Gonystylus bancanus (Lee et al., 1996; Ismail and Shamsudin, 1999; Ismail, 2009; Ismail et al., 2011; Jans et al., 2012) and blackwater fish assemblages (Beamish et al., 2003) as well as other aquatic life (Ng, 1992; Ng et al., 1994; Lee, 2010; Chee and Cheah, 2013); and radiocarbon dating to trace land formations and changes over a period of time (Haseldonckx, 1977; Idi and Kamarudin, 2012). In terms of the infrastructure, peatlands and peat swamp forest provide options for research dealing with the management of peat subsidence when constructing different infrastructure (Schothorst, 1982; Wösten et al., 1997; Wösten et al., 2008; Harun and Islam, 2008).

Comparison between Key Informant Impressions and Documentary Evidence:
Just two informants mentioned research and education as a service, did so only cited opportunities for showing school children pristine peat swamps. Documents, however, highlighted the importance of peatlands and peat swamp forests to research in a while range of fields.

4.3.1.4 Infrastructure
In addition to the ecosystem services, key informants also alluded to the use of peatlands as land for infrastructure, particularly for the building of housing estates and townships (e.g. Putrajaya and Cyberjaya) and the Kuala Lumpur International Airport (KLIA) in Sepang. Two key informants describe peatland use for water transport (Table 4.6).
Table 4.6: The frequency with which peatlands were mentioned as a use for lands occupied by various infrastructure in Peninsular Malaysia

(Percentage of 63 key informants who alluded to the relevant service as one of the uses for peatlands)

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing and settlements</td>
<td>22</td>
</tr>
<tr>
<td>Industries, townships, roads and other infrastructure</td>
<td>22</td>
</tr>
<tr>
<td>KLIA Airport</td>
<td>10</td>
</tr>
<tr>
<td>Water transport</td>
<td>3</td>
</tr>
</tbody>
</table>

A senior manager with an NGO explained that low-lying peatlands were easier to clear for urban development through the East Coast Economic Region (ECER):

“Peatland forests, because they are lowland forests, are easy to clear and close to urban centres; that is why they are opened up such as through ECER.” (P5, 2012)

Peatland forests are also sometimes declassified as forests to make them easier to be used for development, according to three informants:

“They might also be taken out completely from the normal classification of peatlands and developed, which means the peat is essentially destroyed or filled.” (N8, 2012)

“They are also used by developers. KLIA and the area around it is mostly peatlands; the area was converted for commercial and development purposes.” (N30, 2012)

“Every possible development has also taken place in peatlands - KLIA, infrastructure development such as roads and housing.” (S2, 2012)

In some cases the peatland area needed to be managed for various uses, explained a senior manager with a government agency:

“There is some development that has taken place in peat areas, like in Johan Setia in Klang which has required a drainage system. The area is a combination of agriculture and housing, so the drainage needs to be managed.” (N42, 2012)

However, a senior manager with a government-linked agency pointed out that improper drainage could cause problems with subsidence when building in peat areas:

“Peatlands near urban areas have been cleared and developed for housing and low rise industrial buildings. Improper drainage practices have caused peat soil subsidence and shrinkage resulting in lowering of the soil surface. This may not be
obvious to the authorities, developers and property owners. Localised flooding may occur during prolonged high intensity rain especially when it coincides with high tides. In related development, buildings standing on peatlands may crack, especially at the skirting, which is caused by differential subsidence of peat.” (J2, 2012)

Cracks and bumps were also common problems in roads built in peat areas which required regular maintenance, according to a senior technical manager of an NGO:

“Peatlands are also being used for development projects such as roads and buildings. There is a problem with subsidence, cracks, bumpy roads and these have to be maintained because they can be flooded or burnt. They can also become costly to maintain.” (S3, 2012)

A scientist with a private company recommended that water levels in the fringes of plantations be maintained to avoid subsidence along roads within the plantation areas:

“In peat soil, the roads will start to sink because of irreversible shrinkage. So we recommend to plantations to make floodgates to prevent the water from being overdrained from the fringes, and to maintain a certain level so that subsidence will not occur.” (N26, 2012)

**Documentary Evidence:** Documents show that peatlands that have traditionally been regarded as areas with low land values (Duraisamy et al., 2007). They have also been lost through the development of the built environment, especially in highly populated areas (Davies, 2011). Duraisamy et al. (2007) stressed that marginal tropical peat soil was always likely to come under pressure from developers and town planners, particularly where the area of land suitable for construction decreases around urban areas.

Peatland areas have also been earmarked for development in agricultural schemes (oil palm plantations etc.) and infrastructure development such as roads, industrial and residential development (Joosten et al., 2012; Prentice, 2011; Parish et al., 2008; Hooijer et al., 2006). One example is that the East Coast Economic Region (ECER), which covers more than half of Peninsular Malaysia, and identifies the
peatland areas in the state of Pahang as suitable for agriculture such as high-yield and large-scale commercial farming.

**Comparison between Key Informant Impressions and Documentary Evidence:**
Interviews revealed that peat swamps were being used for development projects such as housing schemes, townships and the Kuala Lumpur International Airport but I could not find any reference in documents that peatlands were being converted for these development projects. Only one of the informants mentioned ECER and the damage being caused to peatlands by this development project, but details were not available in documents. No environmental impact assessment (EIA) report relating to peatland-related developments included discussion of peatlands.

### 4.3.2 Synopsis of Main Results

Over the last fifty years, there has been a shift in the nature of land use in peatlands in Southeast Asia from non-extractive to more extractive activities and the complete alienation of many areas. This intensification of land use has shifted from the extraction of NTFPs to logging (i.e. forestry) to large-scale agriculture through the drainage and clearing of peatlands and, in small areas, infrastructure development. It has been estimated that close to half of peatlands in Southeast Asia have been cleared or drained in the last few decades (Hooijer *et al*., 2006).

There are presently few examples of undisturbed peatlands in Malaysia and less than 5% of peat swamp forests are currently protected (Posa *et al*., 2011). A total area of just 100 ha of peat swamp forests is fully protected in Virgin Jungle.
Reserves (Posa et al., 2011), about 66% is now in Permanent Reserved Forests which is available for logging (UNDP, 2006), the rest is available for conversion to other land uses (Yule, 2010).

The trend in Peninsular Malaysia seems to be consistent with trends in the region with peatlands being used with increasing intensity until they cease to be peatlands at all. Five main categories of land use were identified in a study by Wetlands International for the use of peatlands and peats swamp forest in Peninsular, i.e. agriculture (including oil palm plantations), undisturbed peat swamp forests, logging, infrastructure and as water bodies (Table 4.7).

### Table 4.7: Land use categories for peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Land Use Categories</th>
<th>Area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (including oil palm plantations)</td>
<td>44</td>
</tr>
<tr>
<td>Undisturbed peat swamp forests (more than 70% forest cover)</td>
<td>35</td>
</tr>
<tr>
<td>Logging</td>
<td>18</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>2</td>
</tr>
<tr>
<td>Water bodies</td>
<td>1</td>
</tr>
</tbody>
</table>

*Source: Wetlands International, 2010*

Ismariah et al. (2011) also noted agriculture as the main factor driving land use changes in Peninsular Malaysia, especially after forested lands (including forested wetlands) were logged. Earlier figures have also approximated between 47-49% of peat areas in Johor had been used for agriculture, 28-35% in Selangor and 6-12% in Pahang (Abdul Jamil et al., 1989; Wetlands International, 2010).
The largest area of peatlands cultivated for agriculture has been for oil palm, and studies showed that land clearing for oil palm plantations have been a major cause of peat swamp forest fragmentation in Peninsular Malaysia (Abdullah and Nakagoshi, 2007; Abdullah and Nakagoshi, 2008; Wetlands International, 2010; Koh et al., 2011; Wicke et al., 2011). Although peatlands have been described as “problematic soil” for agriculture because of its high acidity and waterlogged conditions (Singh, 2008), the main factor driving their use for agriculture (and for oil palm in particular) is economics (i.e. palm oil prices in the commodity markets are currently high) and the scarcity of land for development (Paramananthan, 2008; Parish et al., 2008; Davies, 2011). Both key informants and documents agree that planting oil palm on peat requires the management of water and fertiliser use to ensure optimum yields while reducing peat subsidence and emissions of CO$_2$ (Davies, 2011; Lim et al., 2012). Several methods such as hole-in-hole planting (Paramananthan, 2008; Lim et al., 2012) have also been developed to deal with the difficult planting medium in peatlands. On the other hand, peatlands and peat swamp forests in their natural condition function as carbon sinks; drainage and conversion to other land uses can convert them to carbon sources (Joosten et al., 2012; Davies, 2011; Rieley, 2007; Hooijer et al.; 2006; Page et al.; 2002; Lim et al., 2012). It is this intricate balance between peatlands acting as carbon stores and sources that led to RSPO recommendations that new development of oil palm plantations on peat are halted and alternative uses developed (Lim et al., 2012).

Another use of peatlands for agriculture cited by informants and documents was rice cultivation. Rice has been described as the most swamp-adapted food crop (Prentice, 2011) and is being grown successfully in Tanjung Karang in Selangor on shallow peat and the area is one of the eight major granaries in Peninsular Malaysia (Caffrey et al., 1996). There are also examples of failure of rice cultivation on peat
which caused considerable damage to the peat swamp forest environment, such as the Mega Rice Project in Central Kalimantan, Indonesia (Boehm and Siegert, 2001; CKPP Consortium, 2008). This was a project initiated by the Indonesian Government in 1996 to turn one million ha of peat swamp forest into rice paddies to alleviate food shortages. The government made a large investment in the area by constructing irrigation canals and removing trees. However, the project failed leaving large areas of abandoned farmland with bare peat subject to frequent fires (Putra et al., 2008).

Timber extraction was another use of peat swamp forests mentioned, which was being carried out mainly in areas designated as production forests within Permanent Reserved Forests (National Forestry Policy, 2009), especially in Pahang where one informant said that Forestry Department was not able to meet its annual cutting targets in peat swamp forests (P9, 2012). The main issue with timber extraction has been in the method of extraction used where the selective cutting approach is recommended to reduce damage to the peat swamp environments (Mohd Hizamri, 2006; UNDP/GEF, 2008; Ismail, 2009; Ismail and Ismail, 2011). However, this method was originally developed for dry inland forests and is still being adapted to suit the peat swamp forest environment, where other trees, shrubs and ground cover are damaged during extraction (Davies, 2011). Additionally, specific management requirements for peat swamp forests such as water management are not being addressed, especially in the Forest Management Plans for Selangor, Pahang and Johor (World Bank, 1986; Selangor State Forestry Department and DANCED, 2001; UNDP/GEF, 2008a).

Another important use of peatlands and peat swamp forest is for biodiversity conservation; they are one of the most important wetland types in Peninsular Malaysia (Page et al., 2004) and there are unique species who inhabit these areas.
and which have a restricted distribution (Ibrahim 1997, Appanah et al., 1999; Yeap et al., 1999; Sebastian, 2002; Davies, 2011; Posa et al., 2011). While species conservation is a familiar concept that has been practised in conservation planning, the concept of an ecosystem approach for biodiversity conservation in Peninsular Malaysia is less familiar. An ecosystem approach could ensure that management of the land, water and living resources of peatlands and peat swamp forests would be integrated and streamlined into overall development planning (CBD, 2004; Parish et al., 2008).

Peat swamps are used for fishing on a relatively small scale, mostly by the local community who fish for their own consumption but who have more recently been engaged in trading fish they have caught (FRIM-UNDP/GEF, 2004; Kamal Solhaimi et al., 2006; Savinder et al., 2009). Although not much has been documented on the economic value of fishing in peat swamps, or even how much it contributes towards the aquarium industry, fish species that are popular for aquariums are found in these ecosystems (Ng and Tan, 1997; Davies, 2011). There is also little documentary evidence of aquaculture in peatlands or peat swamp forests, the only exception being the Song Cheng eel farm in Pekan, Pahang (UNDP/GEF, 2002). Other NTFPs related to peatlands and peat swamps mentioned by both informants and documents were the collection of Pandanus spp for handicraft items, tree roots and timber for village infrastructure, as well as medicinal and ornamental plants (Kamal Solhaimi et al., 2006; Savinder et al., 2009; Davies, 2011). There are few studies that have investigated the impact of logging and clearing of peatlands and peat swamp forests on the collection of fish and other NTFP among local communities.

Climate regulation was the main regulating service cited for peatlands and peat swamp forests, especially as they are carbon stores and sinks and therefore help stabilise micro-climates (GACCC 1998; Parish et al., 2008; Hooijer et al., 2010;
Joosten et al., 2012). As they are also being drained and cleared for agriculture, the potential for GHG emissions from peatlands and peat swamp forests and the reversal of their role to being net carbon emitters instead of active carbon stores has been discussed internationally (Page et al.; 2002; Hooijer et al.; 2006; Rieley et al., 2008; Davies, 2011; Joosten et al., 2012; Lim et al., 2012), as tropical peatlands are estimated to contain a substantial amount of carbon below ground.

Peatlands and peat swamp forests are also being cleared and used for infrastructure development projects such as ECER (2007-2019) and the building of the Kuala Lumpur International Airport, roads, industrial and residential development. Although documents pointed out that it was difficult to avoid peat soils in development planning as a result of scarcity of land and increased cost of living, there is also the risk of subsidence and flooding which needed to be considered when building infrastructure on peat soils.

4.4 Discussion

Social learning relies on a process that, by combining two kinds of knowledge – personal and theoretical or processed knowledge – yields an understanding greater than either could have produced by itself (Schusler et al., 2003). Similarly, access to information, the type of information that is available and knowledge of informants are critical components of policy implementation because they help practicing managers and decision-makers make policy decisions on the basis of the best available scientific evidence rather than basing policy solely on personal preferences and unsystematic experience (Rousseau, 2006; Carpenter et al., 2009). What policymakers and managers know and how they apply that knowledge can affect the
broader direction of their governments and also their own personal decisions. Unless information is available to policy makers in an accessible form or they have acquired knowledge from previous experience, they are likely to implement policy according to their own limited knowledge (Rousseau, 2006). This would also mean that policy alternatives and options are defined by their level of knowledge.

4.4.1 Nature of Documentary Evidence

4.4.1.1 How Much and How Accessible?
Many uncertainties exist in trying to establish the extent and status of peatlands and peat swamp forests in Peninsular Malaysia (Wetlands International, 2010; Padfield et al., 2014) and there is also considerable uncertainty about Malaysia’s baseline information for peatlands (Padfield et al., 2014). Past studies of peatlands in Malaysia have used “different and interchangeable definitions of peatland or peat soil” (Wetlands International, 2010). Andriesse (1988) explained that this could be the result of the changing use of peatlands and peat swamp forests over time, and peatland areas in the past were mapped according to the applications of the maps. Thus geological studies, horticulture, biological studies and land management all used different definitions of peatlands. As a result, in some reports it was difficult to determine if area estimates were for peat swamp forests, peatlands or peat soils. For instance, DOA (2004) land use maps for Peninsular Malaysia classified peat swamp forest as swamp or forest, not according to canopy cover, so it was hard to estimate the extent of forest cover. Wicke et al. (2011) also found that “the quality and quantity of data on land use change on a national scale in Malaysia over time was low”. The lack of official figures makes comparing between studies a tedious task (Watkins and Parish, 1999).
Large areas of peat are found in Indonesia and Sarawak (Davies, 2011; Page et al., 2011) therefore many of the published studies and literature concerning peatlands and peat swamp forests relate to these areas. Almost 80% of peatlands and peat swamp forests in Southeast Asia is found in Indonesia while Malaysia hosts about 10% (ASEAN Secretariat and Global Environment Centre, 2010; Davies, 2011). Peninsular Malaysia has about 650,000 ha of peat areas left or close to 25% of Malaysia’s peatlands and peat swamp forests, while Sarawak holds about 70% (Wetlands International, 2010). Scientists and researchers naturally look to Indonesia and Sarawak for their studies and research projects on tropical peatlands (Wicke et al., 2011; Koh et al., 2011), instead of Peninsular Malaysia.

4.4.1.2 Quality of Documentary Evidence

Documents and research on tropical peat have generally not kept pace with knowledge development for boreal and temperate peat. Whilst this scenario is changing (Melling et al., 2005; Page et al., 2011), there remains gaps in various aspects of fundamental knowledge in tropical peat, such as in cross-cutting themes like environmental change, ecosystem services as well as conversion, disturbance and degradation (Prentice, 2011; Padfield et al., 2014). The quality of documents concerning tropical peatlands and peat swamp forests is low (Wicke et al., 2011), many of them being grey literature in the form of project documents and reports from technical assessments and scientific expeditions, proceedings of international and national symposiums and conferences, and are not based on long or medium-term research projects.

A majority of the articles on tropical peat swamps in Peninsular Malaysia are not peer-reviewed and there are few articles in international journals. The FRIM-UNDP/GEF Peat Swamp Forest Project compiled the Annotated Biography on Tropical Peat Swamps in Southeast Asia (2005) but of the 197 research papers
listed, none were published in international journals while 14 were published in Malaysian journals namely The Malaysian Forester, Journal of Tropical Forest Science and The Malayan Agriculture Journal. The rest were proceedings of international and national symposiums and conferences, and other short-term project reports. Most of the present research being carried out is uni-sectoral in approach, such as research by FRIM on sustainable logging practices and their impact (Mohd Ghazali et al., 2013; Ismail et al., 2011) and studies by local universities and NGOs on biodiversity (Chee and Cheah, 2013; Yule, 2010). Few researchers have been trained to study cross-cutting themes, such as carbon dynamics or quantifying the economic value of direct uses, functions and future uses (Davies, 2011; Prentice, 2011; Padfield et al., 2014). On the other hand, some Malaysian scientists accuse editors of international journals of being biased in selecting authors for their publications. ["If you try to submit an article on tropical peat to an international journal, they will not consider ours a valid paper. The whole system is controlled by the Europeans, by a cartel. It will take years before we can get a paper published." (N15, 2012)]

4.4.1.3 Issues Omitted from Documentary Evidence

One of the issues pertaining to peatlands and peat swamp forest where information was severely lacking for Peninsular Malaysia was in studies supporting the conservation and protection of pristine areas. This was surprising considering Malaysia is one of the 12 mega-biodiversity countries in the world (Yeap et al.; 2007) and that 35% of Peninsular Malaysia’s peatlands still hold peat swamp forests of more than 70% forest cover (Wetlands International, 2010). Despite their importance for conservation action in Malaysia, peat biodiversity research suffers from a lack of donor interest (Lewis, 2003; Cleary 2006) whether government or aid
agencies. Government agencies fund environmental research into areas of science that are industry-driven and make profits, such as for improvements in understanding of nutrient demand, planting regimes and diseases of oil palm trees (Syahanim et al., 2013; Razik et al., 2013) or management of the commercially viable Ramin Gonystylus bancanus (Ibrahim, 1997; Sawal, 2004; Davies, 2011; Ismail et al., 2011). Many studies related to the protection of peatlands and peat swamp forest in Peninsular Malaysia, therefore, have had to rely on international funding and have normally been carried out by NGOs, CBOs and academic institutions. These organisations find that they are now losing out because environmental aid organisations, such as the Global Environment Facility and its implementing agencies (United Nations Development Programme, United Nations Environment Programme, International Fund for Agriculture Development, AUSAID and USAID), do not target the nations that are most in need of abating local pollution or environmental threats, but instead favour those with whom they have had prior relations (economic and security), nations that are democratic, and nations with unexploited resources (Lewis, 2003). These projects are also normally driven by priorities set by donor agencies, which may not necessarily comply with local needs such as in the areas of protection and threat analysis of resources or the principle drivers of deforestation (Cleary, 2006).

Another area where data was severely lacking was on the importance of peat forests for sustaining the livelihoods of Orang Asli, as well as their cultural identity. While some studies (Kamal Solhaimi et al., 2006, Savinder, 2008 and Savinder et al., 2009) provide insights into the relationship between the Orang Asli Jakun and the Southeast Pahang Peat Swamp Forest, no study has managed to evaluate the livelihoods of the forest-fringe Orang Asli communities who depend on the peat ecosystem. Nowak (2008) found that environmental damage and over-exploitation of fisheries have limited the livelihood options and left the Orang Asli community
living in a coastal area in Peninsular Malaysia with little ability to absorb economic shocks. The provision of assistance of the necessary tools, seedlings, herbicides and fertiliser for in-situ land development to grow cash crops by the Orang Asli Development Department (JKOA) to the Orang Asli in Peninsular also cut the people off from their traditional subsistence resources (Duncan, 2008). These factors are important when considering policies because they can unintentionally impair conservation efforts or the wellbeing of the peat swamp forest-fringe communities. For instance, a policy of no protection would likely result in reduced forest coverage, leading to decreased availability of NTFP and causing a loss of NTFP benefits to local communities (Howell et al., 2010). Alternatively, restricting forest access completely would protect forest species and services but would harm local people whose livelihoods depend on the ability to freely appropriate NTFP. Finally, if clearing activities were restricted yet access for hunting and gathering was allowed, then NTFP services will continue as long as the products themselves are not over-harvested (Howell et al., 2010).

4.4.2 Knowledge of Informants

4.4.2.1 Level of Knowledge Compared to Documents

Overall the knowledge of key informants was largely consistent with documents, although there were strong biases in the nature of informant knowledge. Overall informants were far more likely to mention uses of peatlands that resulted in their destruction or damage than those resulted in their use or conservation (Table 4.8). Informants from all five groups (government agencies, government-linked agencies,
private companies, non-governmental organisations and academic institutions) cited agriculture, logging and infrastructure more frequently than biodiversity, fishing or water supply and storage in listing the uses of peatlands and peat swamp forests (Table 4.8).

In some cases, the key informants were better informed about activities on the ground and of current uses of peat for which documentary evidence was not found. Key informants from Selangor (S6, 2012; S7, 2012; S8, 2012 and S11, 2013), for example, were aware of the clay mining activities that were taking place in peatlands adjacent to the North Selangor Peat Swamp Forest but there was no public document to confirm this. Another activity that was cited by an informant from Johor (J1, 2012), for which no document could be found, was aluminium mining in the vicinity of the Ayer Hitam Forest Reserve.
Table 4.8: Uses of peatlands as identified by each group of respondents

<table>
<thead>
<tr>
<th>Resource use</th>
<th>Informant group</th>
<th>Total</th>
<th>% (of respondents who identified this use)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GA</td>
<td>GLA</td>
<td>PC</td>
</tr>
<tr>
<td>Destructive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>19</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Logging</td>
<td>12</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Mineral extraction</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Hunting</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>14</td>
<td>39</td>
</tr>
<tr>
<td>Retentive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity</td>
<td>9</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Fishing</td>
<td>6</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>NTFP collection</td>
<td>5</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>8</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Water supply and storage</td>
<td>6</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Detoxification</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ecotourism</td>
<td>4</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Cultural diversity</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Education and research</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>Total number of respondents, n</td>
<td>20</td>
<td>6</td>
<td>16</td>
</tr>
</tbody>
</table>

(GA – government agency, GLA – government-linked agency, PC – private company, NGO – non-governmental organisation, AI - academic institution)

Another issue where informants were better informed was on the damage resulting from logging in peat swamp forests. A number of them (N4, 2012; S2, 2012; P1, 2012; P2, 2012; P4, 2012) had visited peat swamp forests in Pahang and had seen the damage on the ground. Studies involving logging methods and their impact in Peninsular Malaysia have mostly been undertaken by government-linked agencies.
(Ibrahim, 1997; Ismail, 2009; Ismail and Ismail, 2011; Mohd Ghazali et al., 2013) and present a more positive view of sustainability of practices than did those who described their personal experiences of how logging is undertaken. Any research involving forest reserves in Peninsular Malaysia requires the permission of the Peninsular Malaysia Forestry Department before it can be undertaken. Access to the forest reserves is restricted to officers of the Forestry Department and visitors have to obtain permission from the department to enter logged areas. It is therefore difficult to carry out an independent analysis of the impact of logging in peat swamp forests in Peninsular Malaysia.

4.4.2.2 Issues Omitted by Informants

A few issues mentioned in documents which related to peatland and peat swamp forest management were omitted by key informants and in some cases, not mentioned by any of them. One of these issues, which related to the ecosystem services provided by peatlands, was the role of peatlands and peat swamp forest in preventing the intrusion of saline water up rivers and freshwater streams (Parish et al., 2008; Davies, 2011; Prentice, 2011). Studies in parts of Peninsular Malaysia show that saline water intrusion is already occurring in some coastal areas (UNDP/GEF, 2002; Igroufa et al., 2010; Mohamad Faizal et al., 2013); including places formerly occupied by peat swamp forests and peatlands. However, no study has managed to make the direct link between the degradation of peatlands and saline water intrusion.

Another issue that was omitted by informants was the impact of logging on the collection of NTFPs by local communities and the Orang Asli. Communities in the Brazilian Amazon found changes in abundance and accessibility of NTFP resources after conventional logging (Menton, 2003) which then caused a decline in fruit and nut harvesting, as well as in hunting. Few studies have been undertaken to
understand how to better integrate the management of timber and NTFP (Gauriguata et al., 2010) in Peninsular Malaysia or the economic value of NTFP. This omission is consistent with the lack of concern about biodiversity shown in documentary evidence.

Mitigation of the impacts of climate change, especially in terms of adaptation to increase the resilience of peat ecosystems and human communities, as well as measures to address vulnerabilities, was another issue that was not mentioned by any of the key informants. Peatlands and peat swamp forests, just like other wetland systems, are vulnerable to changes in the quantity and quality of their water supply and any change in the hydrological regime of peatlands will be realised differently at a catchment or peat dome level (Erwin, 2009). This highlights the importance of specific restoration and management plans for specific ecosystems; peatlands and peat swamp forests have different threats and therefore, specific management and restoration techniques are needed. Such issues were largely absent in discussions with key informants, while focus in terms of climate change issues was in relation to peatland and peat swamp forest sequestration and carbon content. A REDD+ Strategy is being developed in Malaysia, but focuses on the implementation of REDD+ (UNDP, 2012) and does not include mitigation and adaptation strategies.

While a few informants cited peat subsidence and eventual loss as one of the key issues of peatland management resulting from land use changes, there was very little discussion on this issue among other key informants. The irreversible process of subsidence starts as soon as peat swamps are drained, and can only be stopped by waterlogging the peat again (Woosten et al., 1997). The omission may be because most informants had only had short-term involvement with peat and so may not have experienced peat subsidence and loss in their work. Those who did bring this issue up during discussions had been involved with peat for longer so
understand the critical implications of this issue. Some informants from the
government agencies (particularly those from the Department of Forestry as well as
Irrigation and Drainage) whom one might have been expected to be aware of the
occurrence of peat subsidence in West Johor, may have been embarrassed to
mention it during interviews as it could be regarded as the government’s failure in
developing peatlands in Johor; and as the area suffers from annual flooding which
can be attributed to subsidence.

4.4.3 Implications for Policy Implementation

Knowledge of extractive activities of peatlands and peat swamp forests such as
agriculture and logging among informants and in documents was higher than about
non-extractive activities such as biodiversity conservation, climate, water regulation,
and as a symbol of cultural identity. Knowledge of the supporting services provided
by peat swamp forests among informants was particularly low. There was also
dispute in knowledge in the area of oil palm plantations on peat, the sustainability of
current logging methods in peat swamp forests and the cause of flooding resulting
from peat loss. These issues of conflict (i.e. where there is no consensus) and gaps
in knowledge of uses of peatlands and peat swamp forests have an impact on the
way policies are formulated and applied.

Maximizing profit from agricultural production and timber extraction from peat areas
can lead to subsidence, peat fires and haze, as well as the loss of water and climate
regulation services; many of these consequences are the result of management
decisions that overlook a wide set of ecosystem services provided by peatlands and
peat swamp forests such as climate regulation, carbon sequestration, soil fertility,
pollination, filtration of pollutants, provision of clean water and spiritual values (Daily,
1997). Many of these services are not immediately visible to policymakers or they
don’t know about them because there is little incentive to account for their continued provision in decision making.

The pattern of knowledge among informants and in the documents reflects a single-sector approach (as opposed to ecosystem approach). This ignores the multitude of connections among components of natural and social systems, which is often due to a lack of understanding and knowledge, generally fails to provide as a high value to society from the bundle of services that the system is capable of producing as would management that accounted for the complete range of services (Tallis and Polasky, 2009). The connections among services and the links in ecosystem processes are, in the long run, often critical for the maintenance of ecosystem health, human well-being, and the sector of interest itself (MA, 2005).

Philips (1997) pointed out that ecological information is needed by decision-makers and land-owners, who may be contemplating conversion of natural peat swamp ecosystems to other land uses, to ensure appropriate management practice for the wise stewardship and sustainable development of the ecosystem. It was also evident from the interviews that there is a need to learn from practical experience and to disseminate research findings to practitioners (Rand et al., 2010), to ensure that decisions are made based on scientific evidence, especially when considering alternative uses of peatlands and peat swamp forests in Peninsular Malaysia.

4.5 Conclusions

Both documentary evidence and informant interviews both consider that the main uses of peatlands and peat swamp forests in Peninsular Malaysia are for agriculture, particularly oil palm and timber extraction. Other provisioning services such as biodiversity conservation, fishing and aquaculture, the collection of non-
timber forest products (including medicinal and ornamental resources), for water supply, mineral extraction and hunting were acknowledged but to a far lesser degree. Regulation of climate, water flows and quality, recreation, ecotourism, education, research, infrastructure and as a symbol of cultural diversity also had limited recognition. There were differences in emphasis of other uses with government and government linked agencies, private companies and academic institutions saying biodiversity conservation, while NGOs named infrastructure as the one of the main uses.

Overall there was good correspondence between key informants interviewed and the documentary evidence available. However, documentary evidence included more information on ecological services provided by peatlands and peat swamp forests and the threats from development activities than was supplied by the key informants. It was the other way round for issues relating to current development activities taking place in peatlands and peat swamp forests. This part of the investigation nevertheless demonstrates that the key informants were knowledgeable about issues relating to peatlands and peat swamp forests that they considered important and helps to validate their views on issues for which no documentary evidence is available.

The next chapter analyses the stakeholders involved with policy which includes the users, owners and administrators of the peatlands and peat swamp forests in Peninsular Malaysia.
This chapter analyses the stakeholders in peatland and peat swamp forest management in Peninsular Malaysia by identifying their users and the people who benefit from them at the national, state and district levels. It also identifies the institutions and organizations that are involved with peatland and peat swamp forest management.

5.1 Stakeholder Analysis in Peatland and Peat Swamp Forest Management in Peninsular Malaysia

A stakeholder is any individual, group or organization with an interest or stake in a policy under consideration, and who has the potential to influence the actions and aims of an organization, project or policy direction (Mason and Mitroff, 1981; Crosby, 1992, Walt, 1994) or “those who are affected by or can affect a decision” (Freeman, 2010). In this study, the stakeholders are the different categories of actor who intervene in policy – the public and private actors, the non-governmental actors and the local actors.

Stakeholder analysis is not a single tool (Crosby, 1992) but an approach or a range of methodologies used to analyse the position and interests of stakeholders, their involvement in the issue and level of influence (i.e. the hierarchy of authority and power), their ability to join with others to form a coalition of support or opposition, and the impact of the policy on them, to determine their relevance to a policy (Lindenbrg and Crosby, 1981; Freeman, 2004). Brugha and Varvasovszky (2000) found that, by collecting and analysing data on stakeholders, it was possible to understand how decisions were made and identify opportunities for influencing the
process of decision-making. Stakeholder analysis can also be used to understand the power relationships between the stakeholders and shed light on how policies were adopted and implemented, and what political, economic and social factors influenced them (Mason and Mitroff, 1981; Lindenberg and Crosby, 1981; Brugha and Varvasovszky, 2000; Varvasovszky and Brugha, 2000; Reed, 2008). This information can also be useful for developing strategies to manage stakeholders, to understand the policy context and assess the feasibility of future directions of policy (Brugha and Varvasovszky, 2000).

In peatland and peat swamp forest management, stakeholder analysis is particularly relevant to understanding (i) cross-cutting systems and stakeholder interests, where natural peat domes cut across administrative boundaries; (ii) multiple uses and users of the peat resource, where different aspects of the natural resources might be valued by different stakeholders; (iii) impacts that are in part off-site or delayed so that decision makers do not bear the full costs of their actions leading to market distortions; and (iv) untraded products and services, where natural resources might produce multiple products and perform several natural functions and services that are not traded competitively and have no monetary value in the market-place (Grimble, 1998).

The steps involved in carrying out stakeholder analysis for policy analysis that were followed in this research were as follows:

i. The different components of the policy issue or problem were identified, in this context the impact of peat policies on peatland management in Malaysia (Chapter 1).

ii. Secondary sources (published and unpublished documents, reports, policy statements, internal regulations of organizations, etc.) were reviewed to ensure familiarity with the issue and to identify the stakeholders.
iii. Interviews were conducted with selected individuals to finalise the list of stakeholders.

iv. The actors were mapped in relation to the issue, as well as to each other, in terms of their interest, power and influence around the policy issue, based on the interviews and secondary sources of information.

The analysis of the resource users in this Chapter began with Steps ii, iii and iv.

The exercise of stakeholder analysis in this chapter involved mapping the actors in relation to peatland and peat swamp forests in Peninsular Malaysia in terms of their involvement in peatland and peat swamp forest management, their level of interest in policy, their level of influence (power), their position in policy, and the degree to which they were affected by the issue (Varvasovszky and Brugha, 2000).

5.2 Results

5.2.1 Main Users and People Who Benefit from Peatlands and Peat Swamp Forests

The main users and people who benefited from peatlands and peat swamp forests identified by the key informants were the Orang Asli and local communities living in their vicinity, oil palm plantation companies, smallholder farmers, research institutions, logging companies, developers and businessmen, mining companies and aquarium fish dealers (Figure 5.1).
Figure 5.1: Main users and people who benefit from peatland and peat swamp forest in Peninsular Malaysia alluded to by informants

(Percentage of 63 informants who alluded to relevant categories; some informants cited more than one group)

5.2.1.1 Documentary Evidence of Main Users

Information on the main uses of peatlands and peat swamp forests discussed in Chapter 4 was used in this section to identify the main users/actors that corresponded to the main uses (Table 5.1). Based on this analysis, the main users and people who benefited from peatlands and peat swamp forests were, in addition to the groups mentioned by respondents, middlemen who bought fish from local communities, local aquaculture farmers, aquaculture companies, animal traders, tourists, tour operators, students and teachers, non-governmental organisations focusing on conservation, the Malaysian public and the global community.
Table 5.1: The main users and people who benefited in relation to the identified main uses of peatlands and peat swamp forests

<table>
<thead>
<tr>
<th>Identified Main Uses (from Chapter 4)</th>
<th>Corresponding Main Users and People who Benefited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropping/ Agriculture</td>
<td>Smallholder farmers</td>
</tr>
<tr>
<td></td>
<td>Oil palm plantation companies</td>
</tr>
<tr>
<td>Timber/ Logging</td>
<td>Logging companies</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Non-governmental organisations focusing on conservation</td>
</tr>
<tr>
<td></td>
<td>Orang Asli and local communities</td>
</tr>
<tr>
<td></td>
<td>Malaysian public</td>
</tr>
<tr>
<td></td>
<td>Scientists and researchers</td>
</tr>
<tr>
<td></td>
<td>Global community</td>
</tr>
<tr>
<td>Fishing and aquaculture</td>
<td>Orang Asli and local communities</td>
</tr>
<tr>
<td></td>
<td>Middlemen who buy fish from local communities</td>
</tr>
<tr>
<td></td>
<td>Aquaculture companies</td>
</tr>
<tr>
<td></td>
<td>Local aquaculture farmers</td>
</tr>
<tr>
<td></td>
<td>Aquarium fish traders</td>
</tr>
<tr>
<td>Other non-timber forest products (NTFPs) including medicinal and ornamental resources</td>
<td>Orang Asli and local communities</td>
</tr>
<tr>
<td>Water supply</td>
<td>Smallholder farmers</td>
</tr>
<tr>
<td>Mineral extraction</td>
<td>Mining companies (e.g. clay mining companies, aluminium, sand, peat)</td>
</tr>
<tr>
<td>Hunting</td>
<td>Orang Asli and local communities</td>
</tr>
<tr>
<td></td>
<td>Animal traders</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>Malaysian public</td>
</tr>
<tr>
<td></td>
<td>Global community</td>
</tr>
<tr>
<td></td>
<td>Scientists and researchers</td>
</tr>
<tr>
<td>Water regulation</td>
<td>People living in nearby towns and villages</td>
</tr>
<tr>
<td>Waste decomposition and detoxification</td>
<td>People living in nearby towns and villages</td>
</tr>
<tr>
<td>Recreation and ecotourism</td>
<td>Tourists</td>
</tr>
<tr>
<td></td>
<td>Tour operators</td>
</tr>
<tr>
<td></td>
<td>Orang Asli and local communities</td>
</tr>
<tr>
<td>Cultural diversity</td>
<td>Orang Asli and local communities</td>
</tr>
<tr>
<td>Education and research</td>
<td>Scientists and researchers</td>
</tr>
<tr>
<td></td>
<td>Students and teachers</td>
</tr>
<tr>
<td>Soil protection</td>
<td>Malaysian public</td>
</tr>
<tr>
<td></td>
<td>Global community</td>
</tr>
<tr>
<td></td>
<td>Scientists and researchers</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Housing developers</td>
</tr>
<tr>
<td></td>
<td>People living in nearby towns</td>
</tr>
</tbody>
</table>
5.2.1.2 Orang Asli and Local Communities

The Orang Asli and other local communities living in nearby villages were identified by 68% of informants as one of the main users of peatlands and peat swamp forests in Peninsular Malaysia. Two senior technical managers of separate NGOs described their dependence on peatlands and peat swamp forests:

“The local people use peatlands and peat swamp forests and they derive benefits from the forest.” (N6, 2012)

“At the local level, the local communities have their villages either within the peat swamp forest or just outside it.” (N7, 2012)

Parts of the peat swamp were also “roaming areas for the Orang Asli”, according to a senior officer of a government agency (N37, 2012). A senior technical manager of a government agency explained the land rights of the Orang Asli community:

“We don’t have a land tenure system where local communities have ownership of the land. The undeveloped land is under the authority of the State but indigenous groups have access rights to the land. They are free to collect for their own consumption under the indigenous rights.” (N8, 2012)

The Orang Asli have their own ways of managing the use of peat swamps, according to a scientist with an academic institution:

“The peat swamp belongs to the family and the whole community. It is not like this place is mine and that place is yours; we have ‘tuhan lubuk’ (God of the depth) concept which means that the area belongs to the one who first came upon it, everyone else can use the resources in this place, but it belongs to that first person.” (P7, 2012)

Another senior manager of an NGO said that local people depended on the resources of the peat swamp forest, especially if the forest was not disturbed.

“If the forest is not disturbed, the peat swamp will contribute to the subsistence of the local people, and there will be many activities taking place there.” (N4, 2012)

Other informants who referred to the use of peatlands and peat swamp forests by local communities clarified that this was carried out on a small scale, mainly for subsistence. A senior technical manager of a private company explained:

“In Pahang, the Orang Asli use the area for their own livelihood and for building their houses not for commercial conversion. They are not keen on agriculture, so they will not convert the land for agriculture.” (N3, 2012)
According to a scientist with a private company, agriculture was practiced by the local communities for subsistence:

“Local communities don’t go into the swamps; peat swamps are under water and they don’t have the capacity to drain it. They live at the edge of the swamp and are subsistence farmers.” (N15, 2012)

The same respondent also described how conflicts over ownership of the land developed when loggers went in to log the peat swamp forest:

“Sometimes, they [the Orang Asli] claim part of the peat swamp as their land and when the loggers come, there is conflict.” (N15, 2012)

According to a senior manager of an NGO, conflicts over land ownership had been caused by a difference in understanding of the rights of the Orang Asli:

“According to the Government, the Orang Asli don’t have a right in [forest] reserve areas but according to the courts they have common law rights; this is where the conflict lies. The Government cannot just cancel the [gazettel of a] reserve and revert it back to Stateland.” (P5, 2012)

Another issue highlighted by a scientist of a private company was that the Government was issuing land rights to individuals and allowing them to convert forest reserves, jeopardising the rights of the Orang Asli to use them:

“Orang Asli are the main users; local people have been given use permits and have cultivated in the forest reserves even though they are not allowed to go in. Other than the Orang Asli nobody can enter the forest reserve. This was totally disregarded by the previous State Government in Selangor, resulting in illegal squatters in the Kuala Langat South Forest Reserve.” (P2, 2012)

Other informants said that the Orang Asli and local communities were selling produce they obtained from the forests to middlemen (N5, 2012). A senior manager of an NGO explained that while the Orang Asli could harvest NTFP for their own use, it was unclear whether they could sell these NTFPs to others to earn a living:

“Indigenous people can harvest anything in the forest for their own use, they don’t need a permit but it is unclear if this includes harvesting to sell to tourists.” (S1, 2012)
Another informant, a senior technical manager of the same NGO, was of the opinion that the Orang Asli could not trade in NTFP because it was not a common pool resource:

“In Stateland forests, local communities are free to use NTFPs but cannot trade in it; it is not a common pool resource. Public goods must become private goods before they can be traded. This is the contention with the indigenous community because local communities often act as suppliers to Chinese middlemen.” (S3, 2012)

5.2.1.3 Oil Palm Plantation Companies

Another group identified by many key informants (60%) as one of the main users of peatlands and peat swamp forests was the private oil palm plantation companies, who lease peatlands from State Governments and convert them into plantations. A senior manager from an NGO elaborated:

“The big users are those who have commodity crops, the big companies who lease the land from State Governments. These lands with long-term commodity crops have lease titles of 33, 66 or 99 years and will be managed by the plantation companies as land owners [for that period].” (S1, 2012)

Private companies that operated these big plantation areas often developed their own policies for managing peatlands, according to a senior manager of a government agency:

“Certain large estate holdings are big enough to have their own policies. They have so much land that they can choose to do whatever they like with the area covered with peat. They have autonomy there so they will do things related to their policy.” (J3, 2012)

Some of these peatland conversions by plantation companies have involved land used by local people for various purposes, as explained by a scientist from an academic institution:

“These areas are not accessible as other lowland areas and sometimes local people have been squeezed out. There are not many local claims so companies going into these areas find it easier to develop these lands. (N22, 2012)

There was also keen interest to develop more oil palm plantations because of the high price of crude palm oil in the commodity markets. According to a senior technical manager of a private company:
"People want to plant more, especially when it is predicted that the crude palm oil price will go up. It’s a crop that’s here to stay and it will add to the pressures on peatlands." (N14, 2012)

However, planting oil palm on peat has also had problems such as palm slanting due to flooding conditions. As pointed out by an employee of an NGO:

"Along the road to the Raja Musa Forest Reserve there are big palm oil plantations on the right but many of the trees have sunk halfway into the peat. The same has happened in Kuala Langat South where smaller oil palm plantations have trees sunk halfway into the ground." (S5, 2012)

As a result, plantation companies are now looking to establish their plantations on higher grounds, according to a senior officer of a government agency:

"The oil palm estates run by bigger companies were established in the 1950s but there are no new companies now. They have learnt and now choose higher ground for their areas [to plant oil palm]." (J4, 2012)

A senior technical manager of a private company highlighted that it was only when big plantations were established on peatlands that degradation of the area occurred:

"Many areas have been converted for oil palm but there’s a huge area still under forests. Degraded peat has been used for agriculture before. When the industrial scale plantations came in, only then did degradation of the peat occur." (N3, 2012)

A senior manager of a government agency felt that government agencies were now more aware so there would be no new developments of plantations on peatlands:

"In Peninsular Malaysia, there is not much push for converting peatlands to oil palm. We have come a long way and there is awareness that draining peat swamps can lead to haze. There have been many meetings at the Ministry [of Natural Resources and Environment] to combat this issue. So we will not have developers planting on peat in Peninsular Malaysia." (N27, 2012)

Another group that benefited from peatlands and peat swamp forests were the millers, refiners and buyers of palm oil (N10, 2012) because their profits increased in proportion to the oil they could produce from their plantations on peat.

5.2.1.4 Smallholder Farmers

Less than half the key informants (46%) cited smallholder farmers among the main user groups of peatlands and peat swamp forests. Many of these farmers were
involved with planting cash crops. According to a senior technical manager of an NGO:

“There are smallholder farmers who exist by earning their living from peat swamp areas, and some of them are cultivating oil palm in these areas.” (N17, 2012)

A senior officer of a government agency also pointed out that smallholders also planted oil palm as it was traditionally believed that peatlands were good for oil palm:

“Smallholders use peatlands because it was traditionally believed that peatlands were good for oil palm.” (N11, 2012)

In fact, a substantial proportion of Malaysia’s oil palm cultivation was being carried out by smallholders, according to a senior manager of a private company:

“There are oil palm plantations, and smallholders; in Malaysia, about 40% of oil palm cultivation is done by smallholders. There are many smallholders who benefit from planting on peat.” (N35, 2012)

A scientist with a private company alluded to the subsidies provided by the Government that have encouraged smallholders to shift towards planting oil palm in their lands:

“Smallholders who have 10, 15 or 20 acres of land are growing oil palm because they get subsidies from the Government. Many have moved from their farm with a mix of food for themselves and crops to sell, to almost 100% oil palm now.” (N25, 2012)

Two informants pointed out that not all the smallholders who planted around the peat swamps were legal. A scientist with a private company said smallholders who had permits to cultivate sometimes infringed into forested areas that were not earmarked for cultivation:

“Smallholders who have use permits sometimes cultivate in the forest even though they are not allowed to be there.” (P2, 2012)
Some of them were also people from elsewhere who used the abandoned land around peat swamps to make extra cash, according to an employee of an NGO:

“In Raja Musa [in Selangor], there might be smallholders from the city who turn small areas into oil palm plantations to make extra money. They may not be legal but no one checks.” (S5, 2012)

5.2.1.5 Peatland-related Research Institutes

Less than a third of the key informants (30%) alluded to research institutes and universities as important users of peatlands and peat swamp forests. Those that did mentioned the Forest Research Institute of Malaysia (FRIM), the Malaysian Palm Oil Board (MPOB), the Malaysian Agricultural Research and Development Institute (MARDI) and the National Hydraulic Research Institute Malaysia (NAHRIM). Some of these institutes and universities were carrying out research in peatlands and have projects in these areas (N8, 2012). A senior technical manager of an NGO elaborated:

“Peatland-specific research institutions have influence on the way peatlands are used and managed, such as UNIMAS. MARDI was also doing work on peat and FRIM was involved in the UNDP project through their researchers. There are government-aid agency projects such as DANCED [in the North Selangor Peat Swamp Forest], DANIDA [on peatland hydrology], IFAD-GEF [on strengthening national governance, best management practices, case studies etc.] and the UNDP project [which looked at different peatland forest management in forest reserves, national parks and Stateland forests].” (S3, 2012)

According to a senior manager of a government-linked agency, FRIM’s research in peatlands looked at forestry practices but also included aspects of land use:

“FRIM has researchers in the forest division, with the State Government, the Ministry of Natural Resources and Environment and the Ministry of Plantation Industries and Commodities. They research mainly forestry aspects and Forestry Department is their main client but their research involves a broader area which includes agriculture. The GHG inventory, for example, covers all types of lands, including peatlands.” (N12, 2012)

Another employee of an NGO alluded to the supportive role played by FRIM for the Forestry Department:
“FRIM provides scientific support to the Forestry Department but the two departments sometimes are at loggerheads. They are, however, collaborating on a voluntary carbon project in the Southeast Pahang Peat Swamp Forest.” (S5, 2012)

While FRIM provided findings from research related to peatlands and peat swamp forests, it was not involved with implementation of a policy, a senior manager of a government-linked agency pointed out:

“FRIM gives input on research and development; if things need to be strengthened through research input then FRIM’s assistance is sought. FRIM is not involved in the actual implementation of the policy.” (P1, 2012)

According to a senior manager of a government-linked agency, it was the Malaysian Palm Oil Board that was the key agency when it came to the implementation of policies for the palm oil industry:

“For oil palm, the main agency to implement the policies is MPOB. They make sure that all activities for the industry follow the international standards closely. Otherwise it will be difficult to sell our palm oil.” (N13, 2012)

A senior manager with a government agency shared the same views:

“MPOB sets the standard to ensure that our palm oil complies with the standards especially in Europe where they are very stringent about sustainable management practices.” (N27, 2012)

A scientist with an academic institution felt that Malaysia should be setting its own standards and not just trying to comply with international standards:

“MPOB should be the ones advising these oil palm plantations [about sustainable practices]. It is silly for Malaysia to have an international agency telling them what they can and cannot do; they should establish their own standards.” (N22, 2012)

5.2.1.6 Logging Companies

About a quarter of the informants (25%) cited logging companies as another user group of peat swamp forests. A senior manager of an NGO explained that “timber harvesting involves bigger companies” (S1, 2012) and that logging contractors were normally connected to “important people” (P2, 2012). According to a senior manager of a private company, peat swamp forests were still being actively logged:

“Logging in peat swamp forests still occurs. Large areas like the North Selangor Peat Swamp Forest are still actively used for logging.” (N16, 2012)
Stateland forests that have been converted to forest reserves under the category of production forests have also been logged by State Governments, as described by a senior technical employee of an NGO:

“The timber industry benefits in areas that have been converted [from Stateland forests to production forests] and a large portion of peatlands have been converted so that State Governments can benefit from that.” (N6, 2012)

A senior technical manager of a government agency described how logging in the production forests followed guidelines for sustainable harvesting compared to logging in Stateland forests that involved total removal of trees:

“Where peat swamp forests and are classified as production forests, they must be logged by strictly adhering to the logging guidelines for sustainable harvesting. When the land belongs to the State and is not part of the forest reserve, then total removal of trees is allowed.” (N8, 2012)

There were many people connected to the timber industry who benefited from logging activities in the peat swamp forest, according to a scientist of an academic institution:

“In forest management, the concession holders and labourers, and sawmill owners who use downstream materials, timber factories, as well as shipping companies who deal with transport also benefit from the peat swamp.” (N28, 2012)

5.2.1.7 Other Users

Developers: Another group of users mentioned by key informants were the developers of peatlands (16%), mostly for infrastructure such as housing projects and also the Kuala Lumpur International Airport which was built partly on peat swamp (N12, 2012), and those who drove economic development in Peninsular Malaysia (J2, 2012). According to a senior officer of a government agency, development authorities who were involved in peat development had influence:

“There is a group of people who are the authorities for development plans like Tanjung Karang and the Integrated Agricultural Development Authority (IADA); they have huge influence because they are involved in peat areas.” (N11, 2012)

Mining Companies: Mining companies were mentioned as users by a small number of informants (13%). A number of informants cited the government-linked
Selangor Agriculture Development Authority (PKPS) as one of the companies involved in mining. A senior manager of an NGO said:

“PKPS wanted part of the North Selangor Peat Swamp Forest to be developed and the legislation of the forest reserve was changed to accommodate this. The tin mine was also on a patch of peat swamp forest and there was sand mining.” (N1, 2012)

Sand mining was another mining activity that attracted illegal miners, according to a senior manager of a government agency:

“One illegal activity that is common in these areas is sand mining. Given that peat tends to be adjacent to alluvial or river areas, old oxbow lakes that have developed peat have sand underneath the peat in the original deposit from the streams and these attract illegal sand miners.” (N8, 2012)

An officer with a government-linked agency said the company he was working for started clay mining in the land adjacent to the North Selangor Peat swamp Forest after it received approval from the PKPS Board:

“In the PKPS land [around the North Selangor Peat Swamp Forest], only [name of the private company] is involved in clay mining. They made an application to the PKPS Board to carry out clay mining and it was approved.” (S8, 2012)

Aquarium Fish Traders: Several key informants also identified aquarium fish traders (both large and small scale) as another group of users in peatlands and peat swamp forests. A senior manager of an NGO gave an example:

“Endemic fish from peat swamp forests are popular with aquarium fish shops.” (N1, 2012)

Collectors also came from as far as Singapore to secure their fish stock, according to a technical employee of an NGO:

“The aquarium fish collectors extract fish from Ayer Hitam because there are many endemic species and they get nice, big fish. Many of them [the collectors] come from Singapore.” (J1, 2012)

Another senior manager of an NGO pointed out that not all collectors were legal:

“There are also illegal groups such as fishers, biological resource users and casual harvesters for recreational use.” (S1, 2012)
Among other users mentioned by key informants were NGOs who were involved in several conservation projects involving peatlands, and educators who used the area to raise awareness among school children and tourists.

5.2.2 Institutions and Agencies Involved in Peatland and Peat Swamp Forest Management

The main institutions and agencies involved with peatland and peat swamp forest management identified by the key informants were the Department of Forestry, State Governments, District Councils, Ministry of Natural Resources and Environment, Department of Drainage and Irrigation, Department of Environment, Department of Agriculture, Ministry of Plantation Industries and Commodities and related agencies, and Department of Town and Country Planning (Figure 5.2).

![Figure 5.2: Institutions and agencies involved with peatland and peat swamp forest in Peninsular Malaysia alluded to by informants](image-url)
The administration system of Malaysia is three-tiered (Figures 5.3 and 5.4), consisting of the Federal Government, the State Governments (a region is an area situated in two or more states), and local authorities (city, municipal, and district councils). There are 13 states, 11 of which are in Peninsular Malaysia and (as of 2007) 144 local authorities (National Physical Plan 2, 2010).
Figure 5.3: Governance structure at the Federal-State levels in Peninsular Malaysia from a peatland management perspective

(FD - Department of Forestry; DID - Department of Irrigation and Drainage; DoE - Department of Environment; DWNP - Department of Wildlife and National Parks; DoA - Department of Agriculture; Fisheries - Department of Fisheries; DTCP - Department of Town and Country Planning; JKOA - Department of Orang Asli Development)
Figure 5.4: Governance structure at the State-District levels in Peninsular Malaysia from a peatland management perspective

(FD - Department of Forestry; DID - Department of Irrigation and Drainage; DoE - Department of Environment; DWNP - Department of Wildlife and National Parks; DoA - Department of Agriculture; Fisheries - Department of Fisheries; DTCP - Department of Town and Country Planning; JKOA - Department of Orang Asli Development)
5.2.2.1 Documentary Evidence on Institutions Related to Peatland and Peat Swamp Forest Management and their Functions

Information on the main uses relevant to peatlands and peat swamp forests discussed in Chapters 4 was used in this section to identify the main institutions and agencies responsible for the various uses (Table 5.2). The agencies identified were the Department of Agriculture, Ministry of Plantation Industries and Commodities, Department of Forestry, Ministry of Natural Resources and Environment, Department of Environment, Department of Fisheries, Department of Orang Asli Development, Department of Irrigation and Drainage, Ministry of Housing and Local Government and the Economic Planning Unit.

Table 5.2: Agencies relevant to the main uses of peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Main uses</th>
<th>Relevant agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropping/ Agriculture</td>
<td>Department of Agriculture, Ministry of Plantation Industries and Commodities</td>
</tr>
<tr>
<td>Timber/ Logging</td>
<td>Department of Forestry</td>
</tr>
<tr>
<td>Biodiversity Conservation</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>Fishing and aquaculture</td>
<td>Department of Agriculture, Department of Fisheries, Department of Orang Asli</td>
</tr>
<tr>
<td></td>
<td>Development</td>
</tr>
<tr>
<td>Non-timber forest products</td>
<td>Department of Forestry, Ministry of Natural Resources and Environment, Department</td>
</tr>
<tr>
<td></td>
<td>of Wildlife and National Parks</td>
</tr>
<tr>
<td>Water supply and regulation</td>
<td>Department of Forestry, Department of Environment, Department of Irrigation and</td>
</tr>
<tr>
<td></td>
<td>Drainage</td>
</tr>
<tr>
<td>Minerals extraction</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>Hunting</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>Recreation and ecotourism</td>
<td>Ministry of Natural Resources and Environment, Ministry of Tourism and Culture</td>
</tr>
<tr>
<td>Cultural diversity</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>Education and research</td>
<td>Department of Forestry, Department of Environment</td>
</tr>
<tr>
<td>Waste decomposition and detoxification</td>
<td>Ministry of Housing and Local Government, Ministry of Natural Resources and</td>
</tr>
<tr>
<td></td>
<td>Environment, Department of Environment</td>
</tr>
<tr>
<td>Infrastructure development</td>
<td>Economic Planning Unit, Department of Town</td>
</tr>
</tbody>
</table>
The general functions of the ministries, agencies and departments highlighted above were analysed to establish their importance for peatland and peat swamp forest management in Peninsular Malaysia (Table 5.3) from information available on their websites. From the analysis, it can be established that the relevant agencies for peatland and peat swamp forest management are State Governments, District Offices, Ministry of Plantation Industries and Commodities, Ministry of Natural Resources and Environment, Department of Agriculture, Department of Forestry, Department of Environment, Department of Drainage and Irrigation, Department of Town and Country Planning, and Department of Wildlife and National Parks.

Table 5.3: Roles of agencies relevant to peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Ministries, Agencies and Departments</th>
<th>Role in relation to Peatland and Peat Swamp Forest Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal Government</strong></td>
<td>Provides advice and technical assistance to State Governments, and opportunities for training and research</td>
</tr>
<tr>
<td><strong>State Government</strong></td>
<td>Has jurisdiction over land, forests, fishery, agriculture and water resources and their use and allocation</td>
</tr>
<tr>
<td><strong>District Office</strong></td>
<td>Carries out a range of functions including environmental, public, social and developmental; these include functions of maintenance and improvement of the environment within the area of jurisdiction (e.g. collection and disposal of solid wastes and drainage) Development functions include planning and management of land use planning</td>
</tr>
<tr>
<td><strong>Ministry of Rural and Regional Development</strong></td>
<td>Responsible for advancing rural communities throughout Malaysia through strengthening human capital, infrastructure and creating a competitive economy</td>
</tr>
<tr>
<td><strong>Department of Agriculture</strong></td>
<td>Lead agency for soil investigation including fertility management, soil conservation and soil suitability focusing on improving crop production, also custodians of land information</td>
</tr>
<tr>
<td><strong>Department of Forestry</strong></td>
<td>Responsible for the management, planning, protection and development of the Permanent Forest Reserve (PFR) in accordance with the National Forest Policy (1992) and the National Forestry Act (1984) Formulates forestry policies, provides advice and technical support</td>
</tr>
</tbody>
</table>

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support to the State Forestry Departments in planning, management and development of forests
State Forestry Departments administer and control forest harvesting, forest revenue collection and development of the state's forest resources
District Forest Offices administer, monitor forest harvesting, collect forest revenue and enforce forest laws; also responsible for implementing the activities and development of management at forest eco-parks and state parks

<table>
<thead>
<tr>
<th>Department</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Environment</td>
<td>Works to harmonise economic development with environmental goals through stewardship of the environment, conservation of biodiversity, improving the quality of the environment, sustainable use of natural resources and integrated decision-making</td>
</tr>
<tr>
<td>Department of Drainage and Irrigation</td>
<td>Duties encompass river basin management and coastal zone, water resources management and hydrology and flood management</td>
</tr>
<tr>
<td>Department of Town and Country Planning</td>
<td>Functions at federal, state and local levels to advise on planning matters related to the use and development of land, translates national socio-economic policies into physical and spatial strategies, assists State Governments, local authorities and government agencies to prepare Development Plans (i.e. State Structure Plans and District Local Plan) Main advisor to the State Governments in planning matters, including use and development of land Helps with planning, coordination and control of the use of land for development at the local level</td>
</tr>
<tr>
<td>Department of Wildlife and National Parks</td>
<td>Involved with protection, management and preservation of biodiversity including of protected areas for research and education, and economic and ecological purposes Plays a role in enhancement of knowledge and awareness on the important of biodiversity conservation</td>
</tr>
<tr>
<td>Department of Fisheries</td>
<td>To help realise the production of fish through aquaculture and to attain a targeted growth rate for ornamental fish by increasing private investment; also helps target groups earn a minimum income from fisheries</td>
</tr>
<tr>
<td>Department of Orang Asli Development</td>
<td>Entrusted to oversee the affairs of the Orang Asli, especially to eradicate poverty, improve their health, promote education and improve their general livelihood</td>
</tr>
</tbody>
</table>

5.2.2.2 Federal Ministries and Departments

Several federal ministries were mentioned by key informants as being involved in peatland and peat swamp forest management, namely the Ministry of Natural Resources and Environment, the Ministry of Agriculture and Agro-based Industries, the Ministry of Plantation Industries and Commodities and the Ministry of Housing
and Local Government. The Ministry of Rural and Regional Development was considered to have a role through its Department of Orang Asli Development.

5.2.2.2.1 Ministry of Natural Resources and Environment

The Ministry of Natural Resources and Environment was mentioned by more than half the informants (51%) as an institution involved with peatland and peat swamp forest management as “most of the policies relating to them came under the purview” (N18, 2012) of this Ministry. In particular, the National Action Plan for Peatlands was being implemented by the Ministry, according to a scientist of a private company:

“At the national level, the National Peatland Action Plan is being driven by the Natural Resources and Environment Ministry and is parked under them.” (N25, 2012)

Several other policies were being implemented by a range of government departments and agencies under several ministries, according to a senior manager of a government agency:

“Policies provide guidelines for stakeholders to implement an action plan. Although the Biological Diversity Policy originated from the previous Ministry of Science and Technology the action plan for that policy cuts across several ministries; the same thing applies to the Environment and Wetland Policies.” (N23, 2012)

Echoing similar sentiments was a senior technical employee of an NGO, who said:

“The Biological Diversity Policy and the National Wetlands Policy are both federal policies and so the responsibility lies with the Federal Government, being the Ministry of National Resources and Environment.” (N6, 2012)

Another informant, a senior manager of a government agency suggested that this Ministry was the main institution and the agencies within the Ministry were tasked with implementing policies relating to peatlands and peat swamp forests:

“The Ministry of Natural Resources and Environment is presently the main ministry and the major agencies within that will be the involved in peat swamp areas.” (N27, 2012)
A senior technical manager of a private company highlighted that, although the Ministry had several agencies under it, it generally had a poor set-up and therefore was too weak to ensure that implementation of the related policies were effective:

“When it was re-structured, people initially thought it was a powerful ministry because it included the Mapping Department, the Department of Environment, research institutes and many others. But for the last 10 years, it hasn’t produced much. It’s not a high profile Ministry; and all the agencies within it are weak.” (N14, 2012)

An employee of an NGO suggested that the Ministry was concerned with peat to maintain good relations internationally:

“At the Ministry level, their main concern is on peat because of international relations.” (S4, 2012)

Another respondent noted that the Ministry generally lacked capacity for peatland management although individual staff at the Ministry might be interested:

“The Ministry does not have the capacity to be involved. They have no skills. Some of their staff might be interested on a personal basis but the Ministry itself is not championing it.” (P3, 2012)

According to a senior technical manager of a private company, there were challenges in establishing the agency in charge on matters concerning the implementation of the Ramsar Convention on the Conservation of Wetlands of International Importance even when the Ministry of Natural Resources and Environment played a lead role:

“At the national level, the Ministry on Natural Resources and Environment are in charge of implementing the Ramsar Convention. Forests and land are state issues and the Federal Government has little say on how peatlands are managed. They rely on State Governments and there is no one unit in charge of Ramsar. In Johor, the State Parks Corporation implements the Ramsar Convention; while the Wildlife Department implements Ramsar in Pahang but they have very little say.” (S2, 2012)

A senior manager of an NGO pointed out that this was because the Federal Government had many agencies involved peatlands and peat swamp forests and it was not clear if one agency was solely responsible:

“There are multiple roles played by agencies of the Federal Government depending on the use of peatlands and peat swamp forests. They play an advisory role and there is no one clear agency responsible for peatlands.” (S1, 2012)
Within the Ministry of Natural Resources, several departments were named as being involved with peatland and peat swamp forest management, namely the Department of Forestry, Department of Irrigation and Drainage and the Department of Environment. Other agencies that had related responsibilities were the Department of Wildlife and National Parks, as well as the Department of Minerals and Geoscience.

**Department of Forestry:** The key agency involved with peatland and peat swamp forest management cited by more than three-quarters of the informants (78%) was the Department of Forestry, who said that they used and managed peat swamp forests that came under the category of forest reserves:

“Most peat swamps that are classified as forest reserves come under the jurisdiction of the Forestry Department.” (N33, 2012)

For land that was lying outside the boundaries of the forest reserves, a senior officer of a government agency explained that the agency responsible depended on who owned the land:

“Forest reserves will come under the Forestry Department but outside the forest reserves it depends who the owners are. Some peatlands are used by the industry and if there is infrastructure, it can be a situation where individuals are in charge.” (S10, 2013)

Two senior technical managers of separate private companies explained that the federal Forestry Department had offices at the state and district levels:

“The Forestry Department has forest units at the district level and these come under the district forest offices and they implement forest management.” (S2, 2012)

“It is the Forestry Department at state and district levels that are involved; the District Forest Office is powerful and in some matters more powerful than the State Forest Office.” (N3, 2012)

A scientist with a private company also pointed out that Forestry officers managed sites that were being logged and seldom visited other parts of the forest reserves that were not being logged:
“Unless there is logging, the Forestry Department will not visit the area; they are supposed to monitor and just like any other forest reserve, monitoring is strictly their duty, even to maintain the area.” (N15, 2012)

It was also pointed out by a scientist with an academic institution that, although the Forestry Department was in charge, there was no special unit within the Department that was dedicated to peat swamp forest management:

“The management will be under the Government and that would come under the Forestry Department but they don’t seem to know much about peatlands. Although they are recognised as the authority governing forest including peat areas, there is no special unit dedicated to peat swamps.” (P4, 2012)

Peat swamp forests had not been classified under the category of protected forests within forest reserves that were being managed by the Forestry Department, according to a senior technical employee of an NGO:

“There are not many forested areas that have been gazetted for purposes of protection such as for soil protection or water catchments. When they are categorised as production forests, it’s almost a default setting to say this forest is for logging. People assume that the rest is retained for protection but they can be changed to production forests. There are no peat areas that have been legally gazetted as protection forests even within the forest reserves.” (N6, 2012)

Department of Irrigation and Drainage: Another agency involved with peatland and peat swamp forest management mentioned by informants (42%) was the Department of Drainage and Irrigation, that was “involved with managing them” (N8, 2012) as well as “monitoring and enforcement” (N31, 2012). They also described how the Department was “a Federal agency” (S1, 2012) but their functions translated to “state and district level” actions (N11, 2012).

A senior manager of a private company explained that the Department was involved with maintaining water catchment areas and any related facilities:

“The Department of Irrigation and Drainage was involved in maintaining the water catchment area and the related facilities such as the water component, even in the North Selangor area.” (N16, 2012)

It was also involved in hydrological aspects in peat areas, according to a scientist of a private company:
“The Department of Irrigation and Drainage was heavily involved in peat issues in the past, from the angle of hydrology.” (N25, 2012)

According to a senior technical employee of an NGO the Department was involved in projects in peat areas when there were requests from other departments, especially the Department of Agriculture:

“At the district level, the DID will be involved in projects on drainage at the request of the Agriculture Department; that’s when they will drain [an area] for agricultural purposes.” (J1, 2012)

Another informant, a senior manager with a government agency, expressed similar sentiments:

“The Ministry of Agriculture develops policies and most of these peatlands were for agricultural utilisation; they have departments that implement these [agricultural schemes]; the Department of Irrigation and Drainage carried out the drainage because the Ministry told them to do it.” (J3, 2012)

The Department was also involved in making recommendations for the management of water levels in oil palm plantations, according to a senior manager of a government agency:

“The existing areas that have been converted to plantations have come up with their water regimes based on DID recommendations. They have to ensure that these peatlands don’t go dry and start burning.” (N27, 2012)

Standard Operating Procedures for fire-fighting schemes was another issue that the department was involved with, according to an officer of a government agency:

“The Department has been involved with designing the standard operating procedure for the fire-fighting scheme for the agencies involved.” (P8, 2012)

In the West Johor Project, a senior manager of a government-linked agency said that the Department played a crucial role in maintaining low water levels and mitigating flooding conditions but the longer term impact also needed to be studied:

“During the West Johor Project, flooding was the major issue and that job was given to DID. People were trying to influence the engineers not to over-drain and telling them about irreversible drying and subsidence but the engineers kept to their own plans and went ahead; they had to bring the water levels down. The flooding has reduced in that area but it will be interesting to see the real impact of the drainage in that part of the country.” (J2, 2012)
**Department of Environment:** The Department of Environment was another agency within the Ministry of Natural Resources and Environment involved with peatland and peat swamp forest management that many informants cited (40%) especially relating to the open burning policy in peatland areas. A senior manager with a government agency explained:

“The Department of Environment is involved in monitoring open burning [in peatlands]; there is a working group which works in cooperation with Indonesia [to curb open burning].” (N27, 2012)

The issue of open burning was related to haze and it was important enough to warrant the Minister of Natural Resources and Environment’s performance to be tied to the number of clean air days, according to a senior officer of a government agency:

“The number of clean air days is one of the key indices of the Minister’s performance. That is why the Department of Environment has to monitor the situation [with open burning], particularly the haze caused by local actions; we don’t account for transboundary haze [from Indonesia] because that is out of our control.” (N37, 2012)

A scientist with a private company suggested that the no open burning policy was currently being monitored by the Department of Environment:

“In terms of open burning, we can’t do any burning in the forest, especially in the peat swamp forest because of its combustible nature. The Department of Environment monitors the open burning and its impact on health, if there are complaints the Department is involved.” (P2, 2012)

Several informants highlighted that the Department of Environment was responsible to monitor the Environmental Impact Assessment process for approval of any development involving peat areas. A scientist with an academic institution pointed out that this was necessary for development of oil palm plantations, for example:

“There are some restrictions relating to sustainable palm oil and oil palm is not allowed to be planted under certain conditions. In the past, this was not the case. The Department of Environment should be in the picture with any requirements for Environment Impact Assessment.” (P4, 2012)

Developers needed to apply to the Department of Environment for a permit, which involved preparing an EIA report, according to a scientist with a private company:
“There is a moratorium on burning in peat; you have to get permission from DoE if you want to burn in peat. You need to apply for a permit and limit the size. If it is a natural peat swamp, the DoE will be responsible. If you want to clear the peat swamp, you need to go through the EIA process. If you want to clear more than 50ha, you will need to get clearance from DoE and submit an EIA report.” (N15, 2012)

A scientist with a private company suggested though that once the EIA was approved and the project was initiated, there were no checks from any government agency to ensure they were doing their job according to the guidelines:

“Once the EIA has approval and the people start planting with oil palm, nobody comes to check [on them].” (N26, 2012)

5.2.2.2 Ministry of Agriculture and Agro-based Industries

Another Ministry involved with peatland and peat swamp forest management mentioned by the informants (38%) was the Ministry of Agriculture and Agro-based Industries, essentially through the Department of Agriculture, both at the federal and state levels. The Fisheries Department, which comes under the purview of this Ministry, was also mentioned.

**Department of Agriculture:** This was the agency that set the policies with regards to agriculture on peatlands, and provided guidance. According to a senior technical manager of a private company:

“The Agriculture Department is a federal agency that sets policies and provides research and guidance.” (S2, 2012)

Another informant, a scientist with a private company, pointed out that it was difficult for the Department to set the right policy if the areas of deep and shallow peat were not marked clearly on soil maps, which was currently the case for Peninsular Malaysia:

“The District Officer [who monitors implementation] may not know where the Stateland boundary is or the depth of the peat in a certain area. He will not know where the shallow and deep peat areas are.” (N15, 2012)
According to a senior manager of a government-linked agency, the Department was involved with managing peat resource from the perspective of soil suitability for different types of crop:

“The DoA is involved with managing the peat resource for productivity. They have a soil division and their job is to survey the soil and classify the use of different types of soil and that is their management. They indicate when a certain type of soil is not suitable for a crop or if it should be managed a certain way.” (J2, 2012)

A senior technical manager of a private company agreed that the Agriculture Department was involved with experimental sites on peat to research its suitability for various crops but was not involved with peat in other ways:

“The Agriculture Department have experimental sites; the original peat research [in Peninsular Malaysia] was done by the Malaysian Agricultural Research and Development Institute and they still have some sites. They have come up with some research but these stop at being experimental sites only.” (N14, 2012)

A senior manager of a government agency clarified that the Agro-based Policy did not have relevance to peat because it focused on food production:

“The Agro-based Policy does not touch on peat. It focuses on food production and environment, from the perspective of producing safe foods for consumption and certification and the different criteria for certification.” (N39, 2012)

The Department also did not deal with issues relating to land use change, as suggested by a senior manager of a private company:

“Converted peat areas are already drained and will be used for agriculture, so they will come under the Department of Agriculture. At the federal level, the Agriculture Department does not deal with land use change; they deal with issues concerning crop type, funding fertiliser programmes and collecting statistics on agriculture use.” (N16, 2012)

As a result, the oil palm sector relied on good agricultural practices based on their own research to determine the best management for their plantations on peat said a senior manager with a private company:

“The oil palm plantation sector tries to follow what has been laid down by the Agricultural Department and the Malaysian Palm Oil Board. They practice good agricultural practices on various types of soils including peat, and they also follow procedures based on their own research and in-house experiences with peat.” (N35, 2012)
5.2.2.2.3 Ministry of Plantation Industries and Commodities

The Ministry of Plantation Industries and Commodities was also mentioned by a quarter of the informants (25%) as an institution involved with peatland and peat swamp forest management, particularly in overseeing the implementation of the National Timber Industry Policy (N24, 2012) and the National Biofuel Policy (N1, 2012). A senior technical manager of a private company explained that issues related to oil palm plantations came under the purview of the Ministry of Plantation Industries and Commodities, including the rate of levy that was imposed:

“Oil palm comes under the jurisdiction of the Ministry of Plantation Industries and Commodities. The rate of levy for oil palm is decided by MPIC, some portion of this goes to MPOC and MPOB for various purposes.” (S2, 2012)

Another informant, a senior technical employee of an NGO, suggested that the Ministry would be involved, especially in support of expanding oil palm plantations:

“The policies that the plantations industries determine for expanding plantations will have an impact on peatlands. There is a good chance that peatlands will be impacted when plantations get expanded. The MPIC would certainly be a key player.” (N6, 2012)

It was more “in terms of commodities and downstream processing” (N32, 2012) that the Ministry was involved, according to a senior manager of a private company. The Ministry had also assisted oil palm plantations in water management and a senior manager of a government agency stated that “some of these plantations have come up with their own water regimes” (N27, 2012).

The Ministry was also managing a fund that was financing research on managing peatlands for oil palm plantations, as pointed out by a senior technical manager of a government agency:

“MPIC is directly involved as they have now got a huge fund to look at peatland management for oil palm cultivation.” (N2, 2012)
5.2.2.2.4 Ministry of Urban Wellbeing, Housing and Local Government

A department under the Ministry of Housing and Local Government named by informants as being involved with peatland and peat swamp forest management was the Department of Town and Country Planning. The Fire Department, which also comes under the responsibility of this Ministry, was involved in fire-fighting activities.

Department of Town and Country Planning: More than a fifth (22%) of the informants cited the Department of Town and Country Planning as also involved with peatland and peat swamp forest management, as in Peninsular Malaysia (S2, 2012) they “dictate land use changes outside of forest reserves and have jurisdiction around forest reserve areas” (N33, 2012). The Department comes up with the National Physical Plan and state and local physical plans in collaboration with state and district agencies, according to a senior manager of a government agency:

“The Town and Country Planning Department comes up with the state physical plan, and the local authority comes up with the local physical plan, in consultation with the state TCP Department. These departments come under the Housing and Local Government Ministry.” (N23, 2012)

It has been an important agency in terms of land use planning, as pointed out by a senior manager of a government agency:

“The Town and Country Planning Department has more than 20 strategies such as the Central Forest Spine and wetlands and coastal areas and they have come up with an Action Plan and a Master Plan. This is an indigenous model to try to conserve and protect selected areas under protected area status. The land use planning model can be used for the urban and rural areas to plan for development and conservation.” (N27, 2012)

State Structure Plans, which outline the general proposals of the State Authority with respect to development and use of land in that State, are prepared by the department every five years based on the National Physical Plans. A senior technical manager of a private company explained:
A senior manager of an NGO, however, felt that while the National Physical Plan prepared by the Department was a good plan, it was not being promoted and used:

“The National Physical Plan comes under the Town and Country Planning Department. It is a good plan but nobody uses it or looks at it. The Structure Plans are not bad but the Federal and State need to harmonise. If land is classified under Environmentally Sensitive Area Class 1, it is not supposed to be developed. The Federal Government can say that we have a good plan but if the States are doing what they like, it’s no good.” (N4, 2012)

5.2.2.3 State Governments

Another institution cited by a majority of informants (70%) as involved with peatland and peat swamp forest management was the State Government as “land is a state matter and State Governments own the land,” (S1, 2012) and that “most of the peat swamp forests belong to the State Governments,” (N18, 2012). Most informants referred to the State Executive Councils which are headed by the Chief Ministers and which have been making all decisions pertaining to land concessions:

“The state authorities are important because they are the ones giving the licenses for any land concessions.” (N30, 2012)

“The State Assembly meetings make decisions about what the State Government does with the land and the Forestry Department executes the action; it is the State Executive Council that makes the decision.” (S9, 2012)

A senior manager of an NGO said that it was, in fact, the Chief Minister himself who made the decision pertaining to peatlands and peat swamp forests:

“It is the Chief Minister and nobody else [who makes the decision]. He is the head of the State Government. Under the State Executive Council, land and forestry matters come under the Chief Minister. The State Executive Council is supposed to make the decisions, but normally the Chief Minister himself will decide.” (N4, 2012)

States that have peatlands that have been converted to other land uses have benefited from these decisions, according to a senior technical employee of an NGO:

“The State Governments have benefited from conversions, especially in states where a large portion of peatlands have been converted in the past.” (N6, 2012)
“The State Government normally gets a royalty payment from logging,” (N12, 2012) and so decisions were made based on the profit that could be generated for the State Government, according to a senior manager of a government-linked agency.

For that reason, total removal of trees during logging was only practiced on land that belonged to the State Government that has been alienated for other uses, as explained by a senior technical manager of a government agency:

“Total removal of trees will be allowed only in a situation when you have land that belongs to the State, which is not part of the forest reserve or a totally protected area. In this case the State would have already decided to alienate that piece of land for other uses.” (N8, 2012)

A senior manager of a government agency also pointed out that State Governments regarded all land, including peatlands, as a source of revenue:

“Every State will want to increase their economic output; States usually see peatland as a land bank to increase their economic revenue. (N27, 2012)

Another informant, a senior manager of a government-linked agency suggested that several departments were involved in the decision to convert land in the States:

“In Malaysia, there is zoning of land for various uses including for agriculture and that decision is not made by a single department or agency. A number of government agencies come together to decide how to zone and utilise such lands, primarily those at the state and district levels and then it filters down even further.” (N17, 2012)

5.2.2.3.1 State Economic Planning Units

Many informants also pointed to the State Economic Planning Unit “who alienated the land and allocated them” according to directions from the State Government (N20, 2012) as being involved. A senior manager with a government-linked agency elaborated on how the institutions worked together:

“If it is peatland, the owner and the one managing the land will be the State Governments; they will decide which land to open [for development] and where not to open; where to log and where not to log. For [opening land for] agriculture, the agencies will carry out a soil survey [to determine its suitability]. Based on the Structure Plans, the State Government will decide and the State Economic Planning Unit is the one who will have a say.” (N13, 2012)
This was the case when several agencies were involved in making decisions for the Ayer Hitam Forest Reserve, according to a senior technical employee of an NGO:

“Decisions on the development of a site are made by a committee, which comprises people from various government agencies. For Ayer Hitam, the State Economic Planning Unit headed the committee and other agencies were involved; it does not involve the general public or the private sector. The State Economic Planning Unit makes the decision for the State. The Committee makes it easier for people to interact and to discuss any decisions related to natural resource use or land use.” (J1, 2012)

5.2.2.4 District Councils

The relevant District Council was another agency that more than half the informants (51%) said was involved with peatland and peat swamp forest management at the district level. Informants suggested that the District Council was responsible for peat swamps that fell under the category of Stateland as was determined in the Local Plans:

“The Structure Plans are translated into Local Plans at the district level and each district will have a local plan giving details of development planned for the area. Where peat swamp forests are concerned, the States still have to follow the Structure Plans and Local Plans that are gazetted. The responsibility for Stateland falls with the District Councils and the local councils must consider the conservation status.” (N7, 2012)

“At the district level and also in cases where the peat swamp is not under any protection such as under Stateland forests and is not gazetted under any legislation, then it will come under the jurisdiction of the respective district office.” (N24, 2012)

It was the District Council that issued land titles for development projects according to the Local Plans, suggested an officer of a government agency:

“The development is set out by the District Council according to the Local Plan and they issue the land titles.” (S7, 2012)

The District Council also faced the challenge of implementing what was prescribed in a policy into actions on the ground, according to a senior technical manager of a government agency:

“At the state and district levels, it’s more on-the-ground management. It’s difficult to keep roads from crossing peatland areas, for example. The local government’s challenge is to make local regulations and guidelines to keep these types of development in line with the policy decisions on how to manage land.” (N8, 2012)
For this reason, the District Council had set up a task force which met monthly to sort out any issues that arose from development projects, as pointed out by an employee of an NGO:

“Under the district, every month they call for a District Council Action Meeting to discuss problems with new development projects. The meeting is chaired by the District Officer and there are representatives from the government agencies and the local communities; the local politician will also be there. This meeting gives them a platform to discuss issues to find a solution.” (S6, 2012)

5.2.2.4.1 District Land Office

The agency within the District Council that was specifically named as being involved with peatland and peat swamp forest management was the Land Office, explained a senior manager of a private company:

“Land that is outside the forest reserves classified under Stateland will come generally under the Land Office. They also decide on alienated land that is peat and is converted to some other land use. Oil palm, housing, ports, aquaculture such as shrimp or eel farming would also be under the district offices.” (N32, 2012)

A scientist with a private company highlighted that even the Federal Government needed to go through the Land Office if it was interested in acquiring land for its development projects:

“If there is any interest in acquiring land, the Land Office will definitely know about it. If the Federal Government is trying to acquire land to make highways, naturally they have to go through the Land Office, so this office is very important.” (P2, 2012)

An officer with a government-linked agency explained that the Land Office secured feedback from the various government agencies at the district level before it approved any development project:

“The application for clay mining went through the District Land Office and it received feedback from several government departments and when it is approved, there are certain requirements to be fulfilled. The Land Office seeks feedback and if there are no major objections to the project, they will issue the permit. The requirements come mostly from the Department of Environment and have to do with water levels and canals.” (S8, 2012)

5.2.3 Institutions Involved in Enforcement of Legislation
Several government departments were also named by informants as being responsible for the enforcement of legislation pertaining to peatlands and peat swamp forests including the Department of Forestry, Department of Environment, Department of Wildlife and National Parks, Department of Agriculture and the District Office.

5.2.3.1 Duties Relating to Enforcement from Documents

The duties of the departments and agencies mentioned by the key informants were analysed based on the provisions of the legislation relating to the policies that govern them and a list of their duties were summarised (Table 5.4). The legislation that were analysed included the *National Forestry Act 1984*, *Environment Quality Act 1974*, *Local Government Act 1976*, *National Parks Act 1976*, *Pesticides Act 1974*, *Plant Quarantine Act 1976*, *Protection of Wildlife Act 1972*, and *Town and Country Planning Act 1976*. The analysis showed that while the duties of the Forestry Department, Department of Environment and the District Office were directly linked to peatlands and peat swamp forest management, the duties of the Department of Wildlife and National Parks, as well as the Department of Agriculture had little connection with their management.

**Table 5.4: Enforcement duties of several departments and agencies according to related legislation**

<table>
<thead>
<tr>
<th>Departments/Agencies</th>
<th>Enforcement Duties</th>
<th>Related Legislation</th>
</tr>
</thead>
</table>
| Forestry             | • Is empowered to license the taking of forest produce from Permanent Reserved Forests and Stateland  
                       • Instructs licensees to carry out forest management plan, forest harvesting plan  
                       • Director orders licensee to cease operations where there has been a contravention of the National Forestry Act or license and licensee has to pay the State Authority the amount to be incurred to overcome contravention of the National Forestry Act 1984 | *National Forestry Act 1984* |
plan
- Issues use permits for research, education and training, recreation, use of water resources, cultivation of vegetables and crops, but not for taking forest produce
- Director also issues removal license to remove any forest produce from alienated land, land held under temporary occupation license or reserved land; State Authority permits the issuance of license
- State Authority empowered to declare PRF open or closed forest, not Director
- State Authority to consider protection of the forest and needs of the public, not Director
- Director empowered to limit rights of entry into open or closed forest

Environment
- Department specifies the acceptable conditions for emission, discharge or deposit of environmentally hazardous substances, pollutants or wastes and may set aside any area within which the emission, discharge or deposit is prohibited or restricted
- Includes the discharge of odours by virtues of their nature, concentration, volume or extent are obnoxious or offensive
- Open burning on any land not allowed; open burning means any fire, combustion or smouldering that occurs in the open air and which is not directed there through a chimney or stack
- Also provides for exclusions and liabilities for open burning

Wildlife and National Parks
- The State Authority may reserve any land in the State for the purpose of a National Park; the area shall be placed under the control of a National Park Committee
- The Ruler of a State may declare any Stateland to be a wildlife reserve or sanctuary and designate the Director of Wildlife and National Parks to have control over of the reserve and can also declare certain animals and birds as protected or totally protected
- Permits to enter wildlife reserves and sanctuaries require written permission from the Director
- No person except the Orang Asli are permitted to shoot wild animals and birds in the reserves and sanctuaries for the purpose of providing food for his family

District Office
- The Local Authority is the local planning authority for the area of the local authority
- Any area that does not form part of the area of any local authority, the State Town and

Environment Quality Act 1974


Town and Country Planning Act 1976 and Local
Country Planning Director shall be the local authority
- Functions are to regulate, control and plan the development and use of all lands within its area
- The Plant Quarantine Act 1976 provides for the inspection of any land or plant that may be noxious, or if any pests are present and permits the removal of these if diseases of plants might endanger other plants or the treatment of pests to remove them
- The Pesticide Act provides regulation for the control and presence of pesticides, mostly in food and food products

5.2.3.2 Department of Forestry

The Forestry Department played a major role in enforcement of the legislation pertaining to Forest Reserves according to almost half the informants (49%). A senior manager with a government agency clarified that the Forest Department's role was mainly for offences linked to intrusion and encroachment into the forest reserves:

“Enforcement generally comes under the National Forestry Act which considers any intrusion and encroachment into the forest reserve an offence. It does not have species-based provisions and there are no provisions for totally protected or other protected species. (N27, 2012)

Two informants explained the hierarchy in the Forestry Department and said that it was the Forest Rangers' Office that did most of the work on the ground:

“Forest management is being done through the hierarchy: the State Government goes to the Forestry Department at the state level who then refers to the District Forestry Officer and the Assistant District Forestry Officer and finally to the forest rangers. Each district forestry office has its own Forest Rangers’ Office; the ones closest to the communities are the district forest rangers. They carry out road checks for logs that are leaving the forest and weigh them.” (P2, 2012)

“The peat swamp forest is managed by the State Forestry Department and it is left to the District Forestry Offices. For the Pekan district, it is up to the Pekan District Rangers’ Office to manage the area.” (P9, 2012)

A senior technical manager of a private company, however, highlighted that enforcement measures were complicated, especially when district forestry units had different boundaries from administrative units:
“In Peninsular Malaysia, we have districts and sub-districts. Forest Department has forest units at the district level that are managed by the district forest offices but these do not coincide with the boundaries of the administrative districts.” (S2, 2012)

Additionally, Forest Management Plans were often ignored by loggers when logging in reserves, noted a senior manager of an NGO:

“There are also forest classifications under the Forest Management Plan. The Forestry Department is supposed to formulate management prescriptions and then execute what they have prescribed. In actual practice, the logger overwrites everything. It’s difficult for them to enforce.” (N4, 2012)

A senior manager of an NGO indicated that the State Forestry Departments were not blocking drainage canals that were used for logging and this was affecting the peatlands:

“The North Selangor Environmental Action Plan recommended that the area not be drained and drainage canals be blocked. The authorities stopped further drainage but didn’t block the drains; as a result, water from the peatlands drained out, which led to fires and the degradation of peat. The respective State Forestry Departments are in charge of the management of peatlands, but they are not really managing the area.” (N1, 2012)

Highlighting a similar point, a senior manager of a private company said that there was no enforcement once peatlands were converted and no regulations to prevent the oil palm companies from draining the peat:

“Once the peatlands are converted to oil palm, there are few laws that can be enforced. There are no laws preventing developers from putting in a big drain and draining the peat, for example.” (N33, 2012)

Guidelines for managing peatlands and peat swamp forests were also less clear than forest management, according to a senior manager of a private company:

“With regard to enforcement for forests, the rules and regulations are clear because developers need to come up with specific guidelines for timber. They have a management plan. For peatlands, the actions are less clear.” (N30, 2012)

Several informants referred to the lack of capacity within the Forestry Department to manage the peat swamp forests. A senior technical employee of an NGO said that the Forestry Department focused on illegal logging and did not consider the hydrology of peat swamps:

“The Forestry Department only looks at trees in the forests. They assume that the
Another informant, a technical officer of a private company, noted that the Department did not know how to log in a flooded forested area:

“The Forestry Department has little knowledge of peat swamps and their capacity is questionable because they don’t know how to remove timber from flooded peat swamp forests. They control theft and carry out research for rehabilitation. The peat swamp forest is viewed as a timber source, and the Forestry Department doesn’t know what to do when it floods.” (P6, 2012)

5.2.3.3 Department of Environment

The Department of Environment had an important role to play in the enforcement of regulations pertaining to the Environmental Quality Act, according to about a third of the informants (33%), especially with regards to monitoring open burning. A scientist with a private company explained that the Department issued permits for companies and individuals who needed to practice open burning and thus controlled the impact from fires on peat:

“There is a moratorium on burning peat; you have to get permission from the Department. You need to apply for a permit to burn and limit the size; if it is controlled then you will be allowed to burn.” (N15, 2012)

A scientist with another private company indicated that the Department was enforcing the open burning policy and did not go on the ground to check how peatlands were being managed:

“The Department of Environment has been active on enforcement but not on the use of peatlands. Enforcement officers use helicopters and when they see open burning, they will land and try to nab the perpetrators. They don’t go to the ground to check how peatlands are being used.” (N26, 2012)

It was difficult for the Department to enforce the moratorium on open burning because illegal burning was normally carried out at night making it hard to detain the perpetrators, described a senior technical manager of a private company:

“Open burning and repeated burning in peat swamps have caused haze, farmers normally burn at night so it is hard for the Department of Environment to nab them.” (S2, 2012)
The main problem with enforcement faced by the Department was that they did not know the owners of the land where the fires start:

“The problem is that in many cases, they don’t know who the land owners are because the area is developing not according to the lots that have been allocated to the rightful land owners [by the District Office].” (N1, 2012)

As a result, a technical officer with a private company felt that the Department’s enforcement was more reactionary “when there is a complaint and a need to implement a law” (P6, 2012).

5.2.3.4 Department of Wildlife and National Parks

More than a fifth of the informants (21%) mentioned that the Department of Wildlife and National Parks were involved with enforcement activities in National Parks and protected areas, especially when it came to protected species or encroachment into the protected areas. A senior officer at a government agency said that the Department had its own rules for enforcement:

“When it comes to peat swamp forests, the Wildlife Department has stringent rules. They have their own laws and penalties if the peat area falls under Wildlife Reserve.” (N11, 2012)

However, according to a scientist with a private company, there were overlapping responsibilities between departments:

“There is overlap in the jurisdiction of the Wildlife and the Forestry departments. The Wildlife officers have to inform the Forestry Department before they go into the forest and this is cumbersome for them; the Forestry Department controls what happens in the forest and the Wildlife Department monitors the wildlife.” (P2, 2012)

5.2.3.5 Department of Agriculture

The Agriculture Department was involved with enforcement according to a small number of informants (11%), especially relating to quarantine procedures, pesticides and fertilisers that came under the ambit of the Department, according to a senior manager of a private company:

“If there is some plant that we want to bring in, it has to go through the quarantine procedure and that is under the ambit of Department of Agriculture. Pesticide
enforcement is also under the Pesticide Board which comes under the same Department.” (N20, 2012)

5.2.3.6 District Councils

Enforcement at the district level depended on the District Councils, according to a few informants (16%). A senior manager of a government agency indicated that “the local authority had a role as it was involved with the zoning of activities in the Local Plan” (N23, 2012). There were no specific rules for enforcement by the District Councils, a scientist with a private company pointed out:

“There are no specific policies whether it is peat swamps or dry land forests; the same rules apply.” (N15, 2012)

An officer with a government agency indicated that not all activities at the district level were monitored by the District Councils:

“The District Land Office does not get involved in all activities; it controls only selected activities. All approved activities have their requirements and the Land Office monitors to see if they are being complied with.” (S7, 2012)

District Council decisions sometimes lacked context as a senior technical manager of an NGO said:

“Some decisions [of the District Council] are made without information and understanding so it can be a difficult job.” (S3, 2012)

5.2.4 Potential for Additional Stakeholders in Peatland and Peat Swamp Forest Management

Of the 66 informants who answered Question 5, a majority of them (77%) felt that there was a need for more stakeholders to be involved in peatland and peat swamp forest management in Peninsular Malaysia while less than a quarter of them (23%) felt that there were sufficient stakeholders. Of those who felt that more stakeholders needed to be involved, they cited related government agencies (53%), local
communities and Orang Asli (52%), the private sector (42%), NGOs (35%) and researchers (26%) as the stakeholders who should be involved (Figure 5.5).

![Bar chart showing the percentage of informants alluding to different stakeholders.]

**Figure 5.5: Additional stakeholders for peatland and peat swamp forest management in Peninsular Malaysia alluded to by informants**

(Percentage of 66 informants who alluded to relevant categories; some informants cited more than one group)

5.2.4.1 Documentary Evidence of Additional Stakeholders

Documents showed that research on land-use planning in peatlands called for the involvement of all relevant sectors and major stakeholder groups from the outset of development planning (Silvius and Giesen, 1996; Wetlands International, 2008; Baukering *et al.*, 2008; Wösten *et al.* 2008). Efransyah *et al.* (2008) suggested that intensive stakeholder consultations and consultative planning at the local level was needed if sustainable peat swamp forest management was going to be
mainstreamed into local governance. Wise management of peatland ecosystems required a change of approach from single sector priorities to integrated, holistic planning strategies, involving all stakeholders to ensure that consideration was given to potential impacts on the peatland ecosystem as a whole (Baukering et al., 2008; Wetlands International, 2008). Documents also suggested that the hydrological vulnerability of peatlands and their ecological relationships with the surrounding habitats and land-uses should be considered in land-use planning involving peatlands; stakeholders who used these peatlands provided the information that was needed for the planning approach.

5.2.4.1.1 Related Government Departments

Documents highlighted the need for a more integrated approach to peatland and peat swamp forest management and the need for a multi-sectoral approach, i.e. involving related government departments. Wösten et al. (2008) found that one of the biggest obstacles to the wise use of tropical peatlands was the division of responsibility for the resources within the peatland landscape to among several separate agencies (e.g. forestry, agriculture and environment) that operated virtually independently of each other. They suggested that these agencies had failed to recognise the consequences of their uni-sectoral involvement on other stakeholders, which meant that problems of tropical peatland resource management were not addressed in a coordinated and integrated manner. Silvius and Giesen (1996) proposed that a multiple wise use approach was more likely to safeguard the range of functions, attributes and services that peat swamp forests provided to a wide range of stakeholders.

5.2.4.1.2 Orang Asli and Local Communities

Documents pointed out that there was now a realisation among Governments that wise use of peatlands was not exclusively dependent on government ownership and
management of forest resources (Chambers, 1992; Singh, 2004; Agrawal and Ostrom, 2008). Savinder et al. (2009) found that there was an increasing need for the Jakun community in Southeast Pahang peat swamp forest to be involved in the management of resources to maintain ecological integrity and meet their subsistence needs; they proposed that a framework be developed to address the rights of the Jakun to access, use and manage natural resources in Southeast Pahang. The Forest Management Certification Scheme (2013) report on the Southeast Pahang peat swamp forest recorded steps taken by the Forestry Department to improve on the lack of consultation between their staff and the Orang Asli community, especially regarding the mapping of special sites including Orang Asli settlements in some districts. The free, prior and informed consent of the Orang Asli had also not been obtained in logging operations in parts of the Southeast Pahang peat swamp forest. The Forest Management Certification Scheme (2010) in Selangor also identified that, although the rights of the Orang Asli who lived on the fringes of the peat swamp forest reserves to access the forests were not curtailed, there were no provisions for them to manage the forests which were part of their traditional territories (Jomo et al., 2004).

5.2.4.1.3 The Private Sector

There was documentary evidence to show that Peninsular Malaysia was interested in involving the private sector in the management of peat swamp forests (Forestry Department, 2003) particularly in forest rehabilitation and plantations; and in biodiversity conservation (Ministry of Science, Technology and the Environment, 1998). The recently concluded UNDP/ GEF Project on Peat Swamp Forests and the ongoing ASEAN Peatland Forests Project have both had objectives aiming to support involvement of the private sector in management of the peatlands and peat swamp forests. However, there are only a few good examples of private sector involvement with other stakeholders for peatland management in Peninsular
Malaysia. The Roundtable on Sustainable Palm Oil (RSPO), which also concerns itself with plantations on peat, had been moderately successful (The Guardian, 2013; Mongabay, 2013) in achieving its aims to “develop, implement, verify, assure and review credible global standards for the entire supply chain of sustainable palm oil” and “engage and commit all stakeholders,” including the private sector. The Malaysian Timber Certification Scheme (MTCS) was noted as another example of encouraging the private sector to subscribe to recognised schemes and standards promoting sustainable forest management (Yong, 2012).

5.2.4.1.4 Non-governmental Organisations and Researchers
Documents highlighted the involvement of several non-governmental organisations such as the Global Environment Centre (IFAD/GEF, 2009), Wetlands International and the Malaysian Nature Society as being involved in stakeholder discussions on the management of peatlands and peat swamp forests (UNDP, 2006; Yong, 2012). Similarly, research institutions such as the Forest Research Institute of Malaysia, the National Hydraulic Research Institute of Malaysia and several universities have carried out several projects on peatlands and peat swamp forests assessment and conservation ((FRIM-UNDP/ GEF, 2005; Yule, 2010; Mohd Ghazali et al., 2013; Ismail et al., 2011; Chee and Cheah, 2013). However, these organisations have had little involvement in the management of these ecosystems.

5.2.4.2 Related Government Departments and Agencies
More than half the informants (53%) alluded to the need for more related government agencies at the national, state and district levels to be involved in peatland and peat swamp forest management, especially those that were involved with policy formulation (N2, N6 and N12, 2012) and planning (N28, 2012) as well as agencies like the Economic Planning Unit and the District Office that could bring
several departments and agencies together for multi-stakeholder discussions (N37, 2012).

Several informants described how bringing the related government departments and agencies together would highlight various aspects of peatland and peat swamp forest management and help identify actions and solutions needed on the ground:

“The government departments think about their sectoral aspects and when merged together, the approach will be more multi-dimensional. The government departments know their legislation and what is possible and not possible on the ground, especially at the state level.” (N14, 2012)

“No one sector knows all the issues, so bringing people together will bring up more issues and better solutions can be found.” (N19, 2012)

“Stakeholders need to be involved in planning; some agencies focus on certain issues or benefits. More stakeholders mean more ideas and we can draw a better plan for development.” (S10, 2013)

A senior officer of a government agency also felt that bringing all the relevant government agencies together helped in ensuring better implementation, “in terms of coordinating to make sure that the technical agencies are working together, that action has been taken by the technical agencies and that what has been agreed is implemented by the relevant agencies” (N37, 2012). Issues could also be resolved amicably when stakeholders were brought together, according to a senior manager of a government-linked agency:

“A multi-stakeholder committee can resolve all issues amicably. You can discuss them openly, all the stakeholders are represented and that can resolve whatever issues for the best of peat swamp forests.” (P1, 2012)

An employee of an NGO mentioned that present arrangements for stakeholder participation needed to be changed when stakeholders are brought together:

“The way we manage stakeholder participation now is unhealthy. We have key agencies, like the Forestry Department, that lord it over other agencies. There should be real and genuine participatory processes.” (S4, 2012)
Hierarchy in government departments was also the cause for an imbalance during discussions where stakeholders who were younger refrained from voicing their opinions, according to a senior technical manager of a private company:

“At the state level, there is cross-sectoral management through the Executive Committee where all the state directors and heads of department meet collectively with the Chief Minister to resolve issues. By tradition, the junior members keep their mouths shut and senior members take charge of the discussion.” (P3, 2012)

This had consequences for the ways with which different departments implement policy, as pointed out by a senior manager of a private company:

“There are government agencies involved but they just take instructions and are unwilling to share their findings and ideas.” (N30, 2012)

Capacity building was one of the requirements for multi-stakeholder participation, as was pointed out by a senior manager of a government agency:

“We definitely need bigger stakeholder participation but the question is who is going to lead it? At the ministry level, they need to build capacity because the Ministry handles a huge area. At the state level, there must be an agency with the capacity to handle the range of issues involved.” (N27, 2012)

5.2.4.3 Local Communities and Orang Asli

One group that should be included in stakeholder discussions on peatland and peat swamp forest management mentioned by a majority of the informants (52%) was the local community and Orang Asli who depended on peatlands and peat swamp forests for their livelihoods. Informants argued that they should be involved in consultations regarding the development of peatlands and peat swamp forests “from the start of the consultation process” (N23 and N32, 2012) “to share their views and aspirations” (N31, 2012). A senior manager of an NGO explained:

“The peat swamps are converted to other land uses without proper consultation with the local community. They depend on the peat swamp forest for their livelihood and they don’t get a chance to make their views known.” (N24, 2012)

Informants also highlighted that “there aren’t many examples where local communities are involved in management” (S2, 2012). A senior technical manager of a government agency suggested that, while the Orang Asli had their roaming
areas for their activities, local communities tended to encroach onto forested lands for their activities, and therefore it was good to involve them in management:

“The Orang Asli are not often involved in management of the forests because they have their own roaming spaces and forests for their activities. If there are local communities living in the vicinity of the forest inevitably they will be involved. If you don’t get them involved, there will be issues of encroachment and slash and burn.” (N2, 2012)

A senior manager of an NGO pointed out that, when it came to the Orang Asli, they were now considered rights-holders and not stakeholders:

“The Orang Asli are not considered stakeholders. They have a right to the use of these areas, so they are rights-holders and should be treated equally. Stakeholders are those who are interested in developing an area, they have a stake but they are not necessarily rights-holders.” (P5, 2012)

This respondent also went on to say that it was important to involve more stakeholders to ensure that “the ownership [of peatlands and peat swamp forests] is not in the hands of one authority.” An employee of an NGO suggested people living in the vicinity of peatlands and peat swamp forests were the first ones to suffer the consequences of peat fires and haze:

“People residing near the forests must be involved because they can smell the smoke and see the haze; they are the first to detect [and problems] and suffer [from it].” (S9, 2012)

Another informant, a senior manager of an NGO, said that “those directly dependent on resources of peat or impacted by bad management of peat” (N1, 2012) needed to be involved.

The local community also helped diffuse threats to peatlands and peat swamp forests by understanding how their activities impacted these areas, suggested a senior technical manager of an NGO:

“The local community can help diffuse certain threats. They may not be conscious that their activities on peatland are affecting the habitat in a negative way. Given the right treatment and engagement, they can be part of the solution.” (N7, 2012)
They could also help with enforcement activities as they were close to the peatlands and peat swamp forests but would need to see some benefits for doing so, according to a senior manager of a government agency:

“The local and indigenous communities need to be involved in the daily management of the area since they are living within the peatlands and peat swamp forests. By involving them, there are extra hands and they can be the ears and the eyes of the government. They can assist but will need to benefit from being involved in management.” (N23, 2012)

Two senior managers of separate private companies suggested that local knowledge helped to improve forest management and could be the start of community-managed forest areas:

“The local stakeholders know local conditions better and certain things the authorities might not know. Through the participation of the Orang Asli in a Forest Management Plan, you can mark the important areas because they have local knowledge.” (N32, 2012)

“The local communities are the people on the ground so, by involving them, they become part of the whole process and we can create community managed forest areas.” (N30, 2012)

Their free, prior and informed consent for forest development had also become a requirement of the timber certification process, according to a senior manager of a government-linked agency:

“Stakeholder consultation is a requirement of timber certification in the form of free and prior informed consent of the local people. These consultations have come a long way towards improving [the communication] because there is a third party and it involves other government agencies.” (N12, 2012)

5.2.4.4 The Private Sector

The private sector was another group of stakeholders mentioned by the key informants (42%) that should be involved in discussions on peatland and peat swamp forest management, in particular private companies dealing with logging, oil palm estates and mining in peat areas, smallholder farmers and land owners, although a scientist with an academic institution also indicated that these groups were sometimes “represented by a government agency or an association” (P4, 2012). Three informants also highlighted that the private sector could make an
important “financial contribution” to the management of peatlands and peat swamp forests and “fund activities” (N5, N11 and P9, 2012).

Two informants explained that the private sector also had its own resources for transferring technology and knowledge on best management practices on peat to other groups. A senior technical manager of a government agency said this was because some of these companies had experience of planting on peat:

“The private sector has its own group where they transfer technology and exchange knowledge and information, to improve their management. Some of the oil palm plantations have planted oil palm on peat since the 1950s and they have knowledge other plantation companies build on.” (N2, 2012)

Another informant, a senior technical manager of an NGO, suggested that the private sector could work with small holders and local communities to transfer knowledge on fire and water management:

“Plantations can also help with fire and water management and they should work with smallholders and communities by giving good fertilisers and having a buy-back system.” (S3, 2012)

Three informants talked about private sector involvement through the certification process, which could further encourage the exchange of knowledge and experience and have positive results if they became more widely accepted:

“Private sector involvement is important for promoting best management practices for existing oil palm on peat to ensure good yield and minimise destruction; there are 660,000 ha in Malaysia [of private oil palm plantations].” (N1, 2012)

“It would also take away some power off the State Government, which is not a bad thing.” (N4, 2012)

“Through forums such as the RSPO, the private sector has become more aware of how their activities may be impacting the peat swamp forests. RSPO is limited by resources and membership is not comprehensive; many smallholders and local companies are still not part of the RSPO.” (N24, 2012)

Three other informants also felt that by bringing the private sector into discussions on peatland and peat swamp forest management, better solutions that were workable on the ground could be found:
“The private sector can help to identify the problems, what the people want and the best solutions, which is good information for developing a strategy. If they can get involved then it will be implemented well.” (N3, 2012)

“The owners of peatlands want the greatest benefits out of their land and cannot afford to let the land sit idle. They can then give recommendations on how to prevent the degradation of peatlands and how to manage it sustainability.” (N26, 2012)

“When it comes to more stakeholders involving the private sector, there may be more ideas coming in and we can have a better plan for development.” (S10, 2013)

A senior manager of a government agency, however, warned that it was important for the stakeholders to be mature in order to reach a compromise:

“Stakeholder involvement is a useful thing but the maturity of the stakeholders is important if we are to put it to gainful use. They have failed in the past because it was hard to come to a compromise.” (J3, 2012)

“Bringing other players who haven’t typically been part of the discussions could expand that level of support to other players,” (N6, 2012) suggested a senior technical employee of an NGO.

5.2.4.5 Non-governmental Organisations

More than a third of the informants (35%) indicated that non-governmental organisations should also be involved in peatland and peat swamp forest management, especially as they “sometimes acted on behalf of the local people” (N31, 2012) and “understood the state of biodiversity and global issues” (N28, 2012). A senior technical employee of an NGO said that the non-governmental organisations represented the benefits of conservation in discussions:

“The different stakeholders have their own priorities or agenda. Involving them will result in more balanced discussions and decisions. It also provides a better chance for people to voice their concerns and for the decision makers to take these into consideration, so we will be able to strike a balance between development and conservation. The State Government can listen to the environment NGOs who promote conservation and to those who promote the development agenda.” (J1, 2012)

Echoing similar sentiments, a senior manager of a private company explained that “because no one sector knew all the issues, more issues will surface by bringing more people around so better solutions could be found” (N19, 2012). More
awareness could also lead to an overall win-win situation for all stakeholders, according to an employee of an NGO:

“If there is more awareness, more stakeholders will get involved and the international community would take a bigger interest in the peat forests in Malaysia and provide monetary incentives for peat conservation. The local community could benefit from it and local environmental NGOs could get involved with work on the ground. It could be a win-win for everyone.” (S5, 2012)

A senior manager of a government-linked agency warned though that there was a need for stakeholders to have an open mind and not a pre-judged agenda at multi-stakeholder discussions:

“The right people with the right expertise must be involved and everybody needs to come to the table with an open mind, not a pre-judged agenda. You have to look at the facts before making the decisions.” (N17, 2012)

5.2.4.6 Researchers

The final group whom more than a quarter of the informants (26%) said should be involved in peatland and peat swamp forest management was the scientists and researchers who provided the necessary information and knowledge and who “might have research that proved that certain planned projects might not be good [for peatlands]” (N31, 2012). A senior officer with a government agency highlighted that “all the right actors were currently involved but capacity is lacking; the sector that should come out more is the scientists” (N11, 2012). A scientist with an academic institution suggested that “research could provide the background knowledge and come up with a shared vision and strategy to find sustainable solutions for these areas” (N28, 2012), while a senior technical officer of a government agency alluded to the role of research to “investigate and find a solution for a problem” (N36, 2012).

A senior manager of a private company indicated that in the end “researchers could support the claim for conservation through scientific findings and bring up the benefits of peatlands” (N30, 2012). A scientist with an academic institution, however, warned that it was important for researchers to be transparent because “sometimes studies are not considered and they can jeopardise a certain program; for example
EIA reports on development projects that are not considered because they do not approve certain planned development programs” (N31, 2012).

5.2.4.7 No Additional Stakeholders Needed

Of the informants who felt that the present involvement of stakeholders were adequate and that other stakeholders were not required, some said that there was already a range of government agencies coordinated by the State Economic Planning Unit that were involved in “developing a detailed plan” (N41, 2012) and that this was because “the State Government has all the resources” (N29, 2012). Two scientists from separate academic institutions described how the Orang Asli had “traditional knowledge” (N34, 2012) and felt that they did not need to be told to manage the peat swamps as “they know the benefits they get from them” (P7, 2012). A senior officer also indicated that “private companies manage their private land” (N10, 2012) and the private sector was not “affected by state policy” (N35, 2012). A scientist with a private company explained that “NGOs can explain to local people how management schemes worked” while researchers could “support the work on the ground” (N15, 2012) but these stakeholders were already part of the present arrangements for peatland and peat swamp forest management. A scientist with an academic institution summed up:

“We should not have too many stakeholders and it should be long-term involvement. Whenever we have people from outside coming to develop peatlands, these areas will have the highest incidence of poverty. When the private companies pull out, the local people are left without an education and so they suffer, with no small-scale production schemes for these villages.” (N22, 2012)

A senior technical manager of a government agency suggested that what was needed more importantly was a balance in the influence of each stakeholder group:

“The institutional structures that are in place may give some stakeholders a louder voice or more influence than others. What is needed is for the system to be rebalanced with more local involvement.” (N8, 2012)

Similar thoughts were echoed by a scientist with a private company:
“We need the right stakeholders to be given the authority and the information to make those decisions.” (N25, 2012)

A senior manager of a government-linked agency pointed out that only a few stakeholders were needed to implement the plan once there was consensus:

“We cannot expect everybody to make an intervention on the forest; what is needed is to get a consensus about how to manage in the integrated management plan and identify the key stakeholders to execute the plan.” (N38, 2012)

Stakeholders also needed to be selected so there was a balance between those who were aware of issues relating to policy and implementation arrangements, according to a senior manager of a government agency:

“The process takes time because you need to get the right people, people who can give you the information and clarify their interests. Sometimes state level agencies cannot give you the right solutions because they are more operational, so we need people who are involved with policy at the national level.” (N40, 2012)

5.2.5 Analysis of Stakeholders for Peatland and Peat Swamp Forest Management in Peninsular Malaysia

Using information from the interviews and documentary evidence discussed earlier, an analysis of the main stakeholders – both the important users and administrators - is discussed here (Tables 5.5 and 5.6). The analysis was carried out according to the following sections (Crosby, 1992; ODA, 1995; Grimble, 1998; Brugha and Varvasovszky, 2000; Freeman, 2010):

i. Involvement – actions of the stakeholder with regards to peatland and peat swamp forest management;

ii. Interest – ranked high, medium or low according to the importance the stakeholder attaches to peatland and peat swamp forest management or the relevance of the issue to their mandate or economic activity;

iii. Influence/ power - ranked high, medium or low according to the influence the stakeholder has over the policy and to what degree the stakeholder is able to help achieve or block the desired change;
iv. Position – ranked strongly retention, moderately retention, neutral, moderately development, strongly development;
v. Impact – the impact of the issue on the stakeholder ranked as high, moderate or low.

For organizing and analysing the data, a matrix table was constructed to describe the four attributes mentioned above – the stakeholder’s interest in peatland and peat swamp forest management; their influence or power; their position (supporters of retention of peatlands and peat swamp forests or supporters of development of these areas) and the impact of peatland and peat swamp forest management on the actor. The judgement for this was based on the primary and secondary sources of data collected (Varvasovszky and Brugha, 2000), where the assessments were revised as needed throughout the research. Data collection and analysis in stakeholder analysis are iterative processes: they entailed a process of continuously extending and deepening the analysis until all important stakeholders were identified, their positions and relationships mapped, and their actual potential influences assessed (Varvasovszky and Brugha 2000; Reed, 2008).

In the stakeholder analysis, I weighted interest based on information gathered from documents and considered the user or administrator’s dependence on peatlands and peat swamp forests, their level of involvement in management of these ecosystems, their level of awareness of the importance of the peat ecosystem and their potential to gain economically from peatlands and peat swamp forests. Weighing the scores for power in the stakeholder analysis, I considered the user or administrators’ influence on important people and public opinion, their level of involvement in the decision-making process as well as in the management and implementation of peat-related policies.
Table 5.5: Analysis of important users in peatland and peat swamp forest management in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Involvement in peatland and peat swamp forest management</th>
<th>Interest in the issue</th>
<th>Position</th>
<th>Power/ Influence</th>
<th>Impact of issue on actor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orang Asli and local communities</td>
<td>Small-scale farming in peatlands Reliance on NTFP for subsistence and trade Ecotourism Cultural identity</td>
<td>High Dependent on resources from these ecosystems</td>
<td>Strongly retention</td>
<td>Low Low level of involvement in decision making process</td>
<td>High Resources affected if peat swamp forests are converted</td>
</tr>
<tr>
<td>Oil palm plantation companies</td>
<td>Lease peatlands from State Government for oil palm plantation</td>
<td>Moderate Management according to company policy</td>
<td>Moderately retention</td>
<td>High Develop own policies for management</td>
<td>Moderate Have mandate to follow own management prescriptions Poor management can affect yield</td>
</tr>
<tr>
<td>Smallholder farmers</td>
<td>Farming of cash crops, paddy and oil palm</td>
<td>Low Difficult to manage small plots of peatlands Low awareness of importance of management</td>
<td>Moderately retention</td>
<td>Low Low level of involvement in decision making process</td>
<td>High Yields are affected if peat swamp forests are converted or by poor management</td>
</tr>
<tr>
<td>Peatland-related research institutes</td>
<td>Research sites situated in peatlands and peat swamp forests</td>
<td>High Peatland and peat swamp forest management focus of some research projects</td>
<td>Moderately retention</td>
<td>Moderate Provide research support but low involvement in policy making process</td>
<td>Low Research results and management prescriptions have little bearing on their role or income</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Involvement in peatland and peat swamp forest management</td>
<td>Interest in the issue</td>
<td>Position</td>
<td>Power/ Influence</td>
<td>Impact of issue on actor</td>
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<tr>
<td>Logging companies</td>
<td>Logging in peat swamp forests</td>
<td>Moderate - Interest in extracting timber, not focused on management</td>
<td>Moderately development - Currently no management for logging in Stateland forests, loggers decide</td>
<td>High - Companies normally connected to important people</td>
<td>High - Management prescriptions could affect business practices</td>
</tr>
<tr>
<td>Developers</td>
<td>Development of housing projects, KLIA and infrastructure on peatlands</td>
<td>Low - Low awareness of importance of management</td>
<td>Strongly development - Preference is for development of peatlands for economic gains</td>
<td>High - Companies normally connected to important people</td>
<td>Low - Developers leave the area once the job is completed and do not experience the impact of poor development</td>
</tr>
<tr>
<td>Mining companies</td>
<td>Mining of clay, aluminium, sand in peatlands and peat swamp forests</td>
<td>Low - Priority is to mine the area for maximum profit</td>
<td>Strongly development - Preference is for development of peatlands for economic gains</td>
<td>High - Companies normally connected to important people</td>
<td>Low - Companies leave the area once the job is completed and do not experience the impact of poor development</td>
</tr>
<tr>
<td>Aquarium fish traders</td>
<td>Collection of aquarium fish species from peatlands and peat swamp forests</td>
<td>Moderate - Management will ensure fish stock is maintained</td>
<td>Moderately retention - Currently low management for fishing</td>
<td>Low - Low level of involvement in decision making process</td>
<td>High - Management prescriptions could affect their business practices</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Involvement in peatland and peat swamp forest management</td>
<td>Interest in the issue</td>
<td>Position</td>
<td>Power/ Influence</td>
<td>Impact of issue on actor</td>
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</tr>
<tr>
<td>Aquaculture companies</td>
<td>Use of peatlands as a source of land and water for aquaculture development</td>
<td>Moderate</td>
<td>Neutral</td>
<td>High</td>
<td>Moderate - Water supply could affect profits but companies often leave the area once the project is no longer viable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short-term enterprises, priority is to maximise profits; low awareness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGOs</td>
<td>Involved with community-based management aspects and management of biodiversity</td>
<td>High</td>
<td>Strongly retention</td>
<td>Moderate</td>
<td>Low - Not directly impacted by decisions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Advocates of sustainable peatland management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tourists</td>
<td>Visit peatlands and peat swamp forest for pleasure</td>
<td>High</td>
<td>Strongly retention</td>
<td>Low</td>
<td>Moderate - Not directly impacted by decisions but lose the opportunity to appreciate aesthetic value of peatlands and peat swamp forests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- mostly interested in exploring in peatlands and peat swamp forests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- High level of awareness of consequences of poor management</td>
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<tr>
<td></td>
<td></td>
<td>- Low level of involvement in decision making process</td>
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</tr>
</tbody>
</table>
Table 5.6: Analysis of administrators in peatland and peat swamp forest management in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Involvement in peatland and peat swamp forest management</th>
<th>Interest in the issue</th>
<th>Position</th>
<th>Power/Influence</th>
<th>Impact of issue on actor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Plantation Industries and Commodities</td>
<td>Involved with policies related to timber and oil palm production</td>
<td>Low</td>
<td>Strongly development - Supportive of peatlands being converted because of scarcity of land for agriculture</td>
<td>High - Management of finances from levy for research and development</td>
<td>High - Management of peatlands affects oil palm plantations on peat and their business arrangements</td>
</tr>
<tr>
<td>Ministry of Natural Resources and Environment</td>
<td>In charge of peatlands and peat swamp forests and related policies</td>
<td>High</td>
<td>Strongly retention - Several agencies under the Ministry looking at conservation related issues</td>
<td>High - Has ability to drive conservation of peatlands and peat swamp forests</td>
<td>Moderate - Policies affect their role but they are not directly affected by them</td>
</tr>
<tr>
<td>Department of Forestry</td>
<td>Management of peatlands and peat swamp forests under the category of forest reserves</td>
<td>High</td>
<td>Moderately retention - Implementing the selective management system as part of the sustainable forest management approach</td>
<td>High - Management of peat swamp forests under forest reserves that were being logged</td>
<td>High - Involved in implementing any changes to management prescriptions</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Involvement in peatland and peat swamp forest management</td>
<td>Interest in the issue</td>
<td>Position</td>
<td>Power/ Influence</td>
<td>Impact of issue on actor</td>
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<tr>
<td>-----------------------------------------</td>
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</tr>
<tr>
<td>Department of Drainage and Irrigation</td>
<td>Involved with management of drainage and canals in peatlands and peat swamp forests at state and district levels</td>
<td>Moderate</td>
<td>Neutral</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>- Involved with maintaining water catchments and drainage, flood and fire control</td>
<td>- Focus is on drainage and water flow, not on management</td>
<td>- Low awareness of peatlands and peat swamp forests</td>
<td>- Federal agency working at state and district level</td>
<td>- Involved with flood control and fire prevention</td>
</tr>
<tr>
<td></td>
<td>- Involved with management of water levels in plantations</td>
<td></td>
<td>- Not involved in decision making process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Environment</td>
<td>Mostly to do with open burning monitoring and enforcement</td>
<td>High</td>
<td>Strongly retention</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>- The key agency in charge of haze and peat fire prevention</td>
<td></td>
<td>- Management of peatlands and peat swamp forests will ensure reduce emissions, peat fire prevention and less haze</td>
<td>- Able to issue high fines for open burning in peat areas</td>
<td>- Peat fire prevention is their main task, and failure to do this will result in haze</td>
</tr>
<tr>
<td>Department of Wildlife and National Parks</td>
<td>Enforcement in National Parks and protected areas, especially where wildlife is present</td>
<td>Low</td>
<td>Strongly retention</td>
<td>Low</td>
<td>- High awareness of peat fires in related agencies</td>
</tr>
<tr>
<td></td>
<td>- Emphasis is on wildlife conservation, not on peatlands and peat swamp forests</td>
<td></td>
<td>- One of the agencies under the Ministry of Natural Resources and Environment concerned with conservation related issues</td>
<td>- Handles requirements and approval of EIA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Federal agency working at state and district level</td>
<td></td>
<td>- Management of protected areas affect wildlife conservation</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Involvement in peatland and peat swamp forest management</td>
<td>Interest in the issue</td>
<td>Position</td>
<td>Power/Influence</td>
<td>Impact of issue on actor</td>
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</tr>
<tr>
<td>Department of Agriculture</td>
<td>Sets the policies and guidelines regarding agriculture on peatlands</td>
<td>High - Provides guidance on soil suitability for various crops on peatlands</td>
<td>Moderately retention - Emphasis is on food production and not conservation, but management affects productivity</td>
<td>Moderate - Does not decide on land use change</td>
<td>High - Peatland management directly affects productivity of crop yield</td>
</tr>
<tr>
<td>Department of Town and Country Planning</td>
<td>Develops spatial plans to guide land use planning at state and district levels</td>
<td>Moderate - Emphasis on land use planning and high awareness to look at green spaces and environmentally sensitive areas</td>
<td>Moderately retention - Understands the need for green spaces and conservation of environmentally sensitive areas</td>
<td>Moderate - Federal agency working at state and district level - Not involved in decision making process</td>
<td>Low - Involved in planning and not directly affected by what happens on the ground</td>
</tr>
<tr>
<td>State Governments</td>
<td>Decides on land concessions and planning</td>
<td>High - Utilisation of peatlands to increase State income</td>
<td>Neutral - Focus is on State revenue, not on conservation</td>
<td>High - Decides on land use and concessions</td>
<td>Moderate - Peatlands and peat swamp forests one of several land types to generate income for State</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Involvement in peatland and peat swamp forest management</td>
<td>Interest in the issue</td>
<td>Position</td>
<td>Power/ Influence</td>
<td>Impact of issue on actor</td>
</tr>
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</tr>
</tbody>
</table>
| District Councils   | Management of peatlands and peat swamp forests that fall under the category of Stateland at the district level                  | Moderate  
- Issues land titles for development projects on peatlands and peat swamp forests  
- Low awareness of the important role of peatlands and peat swamp forests                                                                                                                                  | Neutral  
- Focus is on State/District revenue, not on conservation                                                                                                                                      | High  
- Makes final decision on land use and concessions                                                                                                                                                | Moderate  
- Peatlands and peat swamp forests one of several land types to generate income for State and district                                                                                                 |
Based on the analysis in Tables 5.5 and 5.6, the stakeholders were organised in different matrices according to their interest and power (Figures 5.6 and 5.7) to determine the level of engagement of each of the stakeholder in efforts to improve the management of peatlands and peat swamp forests (ODA, 1992; Grimble, 1998).

For peat swamps in Peninsular Malaysia as a whole, the stakeholders with high power and interests were the Ministry of Natural Resources and Environment, State Governments, Forestry Department and Department of Environment and they represent the stakeholders who are important to fully engage and bring on board for improvements in peatland and peat swamp forest management (Figure 5.4).

![Figure 5.6: Matrix of power versus interest of stakeholders for peatland and peat swamp forest management in Peninsular Malaysia](image)

**Figure 5.6: Matrix of power versus interest of stakeholders for peatland and peat swamp forest management in Peninsular Malaysia**
At the land tenure level (individual plots of peatland or peat swamp forest), the important stakeholders are the State Governments, the oil palm plantation companies, logging companies and smallholder farmers as they are the land owners (or are on long lease arrangements with the State Governments). The owners of these lands make decisions with regards to management and there are few regulations provided by the State Government with which they are obligated to abide. The main motivation for the State Government is to maximise profits from these lands, and they will try to make the situation conducive for these private companies to maximise their profits and therefore contribute to the economic development of the State. The Ministry of Natural Resources and Environment, the Forestry Department and the Department of Environment were less important as land management comes under the jurisdiction of the State Governments.

Another group that is important are the stakeholders with moderate to high power and high to moderate interests (ODA, 1992; Grimble, 1998), such as the Town and Country Planning Department, Department of Agriculture, and Ministry of Plantation Industries and Commodities, as well as District Councils, research institutes, NGOs, and the Orang Asli and local communities. Grimble (1998) suggested that these agencies, departments and organisation could assist in lobbying for improvements in management of peatlands and peat swamp forests. Stakeholders with low interest and high power such as developers, mining companies (at the land tenure level) do not feature prominently but warrant engagement with to ensure overall improved management of peatlands and peat swamp forests.
### Figure 5.7: Matrix of power versus interest of stakeholders for peatland and peat swamp forest management in Peninsular Malaysia based on land tenure

<table>
<thead>
<tr>
<th>Power</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
</table>
| Low   | • Drainage and Irrigation Department  
       • Department of National Parks and Wildlife  
       • Aquarium fish traders  
       • Tourists |
| Moderate | • Ministry of Natural Resources and Environment  
            • Ministry of Plantation Industries and Commodities  
            • Town and Country Planning Department |
| High | • Developers  
      • Mining companies  
      • District Councils  
      • Forestry Department  
      • Department of Environment  
      • State Governments  
      • Oil palm companies  
      • Logging companies  
      • Smallholder farmers  
      • Ministry of Natural Resources and Environment  
      • Ministry of Plantation Industries and Commodities  
      • Town and Country Planning Department  
      • Department of Agriculture  
      • Research institutes  
      • NGOs  
      • Orang Asli and local communities |

#### 5.3 Discussion

Integrated natural resource management approaches focus on identifying strategies for sustaining natural resource stocks and flows of goods and services, in addition to their underlying ecological processes. The key focus should not be the natural resource itself, but the interactions of humans with each other and with their natural environment, and the decisions they make about using and managing resources (Lal et al., 2001; Knoepfel et al., 2007). The focus of making decisions that include stakeholders aims to identify and implement action-oriented strategies and, where
necessary, to apply economic and non-economic instruments that motivate
behavioural change. It is the changes in the behaviour of consumers and producers
and in the allocation of resources among uses, users, time and space that will be
necessary to achieve sustainable development (Lal et al., 2001; Knoepfel et al.,
2007).

The human dimension in integrated natural resource management is complex
because it is represented by a diverse set of institutions and behaviours and
interactions between stakeholders. In fact, Endter-Wada et al. (1998) clarified that
implications of analyses of social-ecological systems generally differed from
analyses of social or ecological systems alone. They also argued that addressing
only the social dimension of resource management without an understanding of
resource and ecosystem dynamics will not be sufficient to guide society towards
sustainable outcomes. Grumbine (1994) pointed out the need to include social data
when studying ecosystem management, saying that non-biological data can
sometimes be more important than scientific information in solving management
problems. This chapter has sought to incorporate social information in the analysis
of peatland and peat swamp forest management in Peninsular Malaysia by carrying
out a stakeholder analysis and discussing important actors and institutional
arrangements.

5.3.1 Nature of Stakeholder Groups

5.3.1.1 Categories of Stakeholders

Stakeholders for peatlands and peat swamp forests in Peninsular Malaysia can be
classified according to four categories as owners, appropriators, producers and final
users (Gerber et al., 2009), and each category of stakeholders is associated with
specific access and use rights and involvement with peatlands and peat swamp
forest management (Table 5.7). Gerber et al. (2009) also explained that these
categories are not exclusive and the same stakeholder can belong to more than one category simultaneously. In the case of peatlands and peat swamp forest in Peninsular Malaysia, the most important owner of the resource is State Governments where the peat area is found, as the Federal Constitution accords rights over land to State Governments (discussed further in Section 6.1.2.1). All matters of the State Government are administered by the State Executive Council, which is chaired by the Chief Minister together with his group of appointed council members and administrators. It is the State Executive Council that makes key decisions on peatlands and peat swamp forests. Another important group of owners are private land owners, such as oil palm plantation companies who have long-term lease agreements with State Governments and individual smallholder farmers who have land titles. The involvement of these owners with peatlands and peat swamp forests has primarily been on developing them for economic return.

The appropriators are the various government departments and agencies related to peatlands and peat swamp forests at the federal and state levels that have access and use rights as provided for by public policy (Gerber et al., 2009). In most cases, they are involved with administrative matters and, to a lesser degree, the management of the peatland. These agencies and departments carry out specific activities or administer the implementation of these activities in peatlands, including the management of the impact of their activities on the ecosystem. In Peninsular Malaysia, the two main ministries related to peatlands and peat swamp forests are the Ministry of Natural Resources and Environment and Ministry of Plantation Industries and Commodities. Many of their agencies and departments, namely the Departments of Forestry, Environment, Drainage and Irrigation are involved. The Department of Town and Country Planning under the Ministry of Urban Well-Being, Housing and Local Government is also relevant because it is the Department that is responsible for developing the spatial plans (National Physical Plan 2, State
Structure Plans and Local Plans) and more recently, has been involved in managing the implementation of these plans. The Ministry of Rural and Regional Development, while being concerned with land development, does not deal directly with land involving peatlands and peat swamp forests and so is less important.

Other important appropriators are State departments and agencies involved with peatlands and peat swamp forests, although their relation to peatlands and peat swamp forests is less obvious from documents and interviews. Jomo et al (2004) explained that at the State level, forest departments for example, answered to both Federal and State governments on different matters. They explained that the Federal Government was concerned with management of the resource, while the State Government were concerned with operations and enforcement, as well as revenue and royalty collection. Another important group of appropriators are the District Councils which are involved with administration and management of peatlands at the district level, and who issue permits approving activities on the ground.

Producers are private companies and individuals who have been given the right to use and convert peatlands, or extract a specific good from peatlands for economic benefits. They act as intermediates between the appropriators and the final users and trade or transform resource units acquired from the appropriators or owners (Gerber et al., 2009). This group consists of private companies with interests in oil palm plantations, timber, mining and aquaculture.

The final users are those who use a specific good or service (Gerber et al., 2009) provided by peatlands and peat swamp forests. The use of the resource could either be through allowance directly by the owner (e.g. oil palm companies who profit from the production of palm oil and Orang Asli collecting NTFPs in Forest Reserves),
through administration by the appropriator (e.g. research institutions who have permission from the Department of Forestry to carry out research) or as a product by the producers (e.g. palm oil from plantation companies being used by private cooking oil companies). Lenzen et al. (2012) pointed out the role that international trade chains play in today’s globalised economy in accelerating habitat degradation. They showed that consumers in developed countries caused threats to species and habitats through their demand for commodities that are produced in developing countries. Malaysia, being the main exporter of crude palm oil in the world, is being driven by global demands for vegetable oils and therefore seeks to increase its productivity by expanding oil palm plantations, sometimes into environmentally sensitive habitats such as peatlands and peat swamp forests.

Although most stakeholders have access and use rights, each category of stakeholders has a different use of the peat resource. The existence of various categories of users is an indication that different aspects of the peat resource are valued differently by the groups of stakeholders (Grimble, 1998). The owners are normally driven by economic factors such as the need to ensure that the State and the private owners (i.e. the smallholder farmers and private companies) are able to derive an income from land resources, including from peatlands and peat swamp forests (Jomo et al., 2004; N33, 2012).

The appropriators (i.e. government agencies and departments) serve the purpose of the State Governments (i.e. the owners) and ensure that activities that are in favour of economic and social development can be implemented without difficulty; in the example studied here little consideration is normally given to environmental protection (Jomo et al., 2004). There are also few policies providing guidance to these appropriators on how to manage the peat resource (Section 6.4.1.1).
Producers have therefore devised their own management arrangements. As profit is their main objective, they have few incentives to consider the sustainable management of peatlands and peat swamp forests. Similar circumstances exist for final users where restrictions come in the form of the area where they can pursue their activities (e.g. in the buffer zones), rather than the type of activities (rice cultivation or planting of cash crops) that can be carried out (Gerber et al., 2009). The different values attached to the peat resource by the different stakeholders often lead to rivalries and conflicting land uses. These are discussed further in Chapter 7.
Table 5.7: Categories of stakeholders for peatlands and peat swamp forests in Peninsular Malaysia, their rights and level of involvement

<table>
<thead>
<tr>
<th>Stakeholder Category</th>
<th>Stakeholders</th>
<th>Rights</th>
<th>Involvement in Peatlands and Peat Swamp Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners</td>
<td>State Governments</td>
<td>Jurisdiction over land matters, including forests and the environment</td>
<td>Makes decisions over the allocation of peatlands and peat swamp forests for various land uses</td>
</tr>
<tr>
<td></td>
<td>Plantation companies and smallholder farmers</td>
<td>Possess rights to use peatland and peat swamp forest</td>
<td>Developers of oil palm plantations and other agricultural crops on peatlands for economic gains</td>
</tr>
<tr>
<td>Appropriate</td>
<td>Ministry of Natural Resources and Environment</td>
<td>Have use rights for one (or more) of the goods or services provided by peatlands and peat swamp forests from the owners, usually through a public policy</td>
<td>Involved in implementing specific activities or administering the implementation of these activities in peatlands, including the management of the impact of these activities on the peatland or peat swamp forest</td>
</tr>
<tr>
<td></td>
<td>Ministry of Plantation Industries and Commodities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Forestry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Irrigation and Drainage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Agriculture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Town and Country Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>District Councils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Producers</td>
<td>Oil palm plantation companies</td>
<td>Have use rights of peatlands and peat swamp forests, which were given by the owner</td>
<td>Act as intermediates between the appropriators and the final users as they trade or transform resource units acquired from the appropriators or owners</td>
</tr>
<tr>
<td></td>
<td>Smallholder farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Logging companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mining companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquaculture companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final users</td>
<td>Orang Asli and local communities</td>
<td>Peatland-related research institutions</td>
<td>Aquarium fish traders</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>Most have use rights which have been obtained from the owner</td>
<td>Use of yield from peatlands and peat swamp forests (raw or transformed) as well as goods and services provided by them</td>
<td></td>
</tr>
</tbody>
</table>
5.3.1.2 Power and Influence of Stakeholders in Peatland Management

In federal systems of government such as in Peninsular Malaysia, the issue of peatland management is challenging because of the constitutional separation of legislative and executive powers between the Federal and State Governments (Jomo et al., 2004; Rose, 2011). The Federal Government is empowered to establish the general direction for the sustainable management and utilisation of peatlands and peat swamp forests through engagement with the private sector and international conventions (N11 and N25, 2012). However, State Governments have a high level of power and influence over the use of peatlands and peat swamp forests. There tends to be more evidence of the challenges, rivalries and complexities of peatland management at the State than the Federal level (N4, N18 and N33, 2012). Similarly, other stakeholders under the category of owners, such as smallholder farmers and private oil palm plantation companies, have a high level of power to influence decisions over the use of peatlands and peat swamp forest under their ownership (N1, N2 and N6, 2012). Sustainable use, management and conservation of the peat ecosystem are often a lower priority when the prime motivation for these land owners is profitability of the land (N17, N27, N33, 2012).

Among the group of appropriators, the stakeholder analysis showed the importance of District Councils in administrative matters pertaining to peatlands and peat swamp forests. It is the district councils that issue use permits to private companies for development activities in peatlands and peat swamp forests at the district level that fall under the category of Stateland (Section 5.3.2.4) and they are entrusted to abide by Local Plans (and the State Structure Plans) when doing so. Local Plans do not, however, provide detailed requirements for specific activities and District
Councils often refer to government agencies and departments at the local and state levels for guidance on specific management requirements for peatlands and peat swamp forests when issuing land titles for development projects (N6, N7, N24, S6, S7, 2012). It is at this level of engagement that the expertise and skill of the institutions involved will have a major impact on the management of peatlands as institutions that have the relevant skills and expertise would be able to provide better advice to District Councils.

Peninsular Malaysia also abides by the centuries-old administrative culture by which the authority of line-ministries cannot readily be challenged (Rose, 2011); power and interest are inherent within various ministries and their line agencies and this inherent power becomes important when dealing with peatland and peat swamp forest management. For example, the Natural Resources and Environment Ministry and its agencies are viewed with apprehension as they are suspected of usurping or limiting the traditional functions of other line ministries and agencies (N8, N10, 2012) such as the Ministry of Plantation Industries and Commodities and the Ministry of Agriculture and Agro-based Industries. These ministries can, in fact, act independently when dealing with issues related to the management of peatlands that have been used for oil palm plantations. The Ministry of Plantation Industries and Commodities can decide which tenet and principle of sustainability proposed by the Ministry of Natural Resources and Environment it chooses to adopt (N11, N25, S3, 2012), thus appearing to have more autonomy and power than the Ministry of Natural Resources and Environment.
The situation is sometimes exacerbated by ambiguous demarcation of overlapping powers and functions, as well as complex procedures (Rose, 2011). The digging of a canal from Sungai Tengi in the North Selangor Peat Swamp Forest for irrigation of the nearby paddy fields (S3 and S6, 2012) by the Agriculture Department is an example. The digging of this canal was sanctioned by the Agriculture Department in 2010 but it was in direct conflict with the Department of Forestry’s efforts to maintain higher water levels within the peat swamp forest to curb peat fires and for rehabilitation. The conflicting use of the peat swamp only became known to the departments involved when staff of a local NGO apprised the Department of Forestry of developments at the site (S3 and S7, 2012), demonstrating a lack of coordination and clear jurisdiction between the government departments. This situation is particularly complicated where natural peat domes cut across administrative and ministerial boundaries; resulting in competing cross-cutting systems and stakeholder interests (Rose, 2011). As in the case at North Selangor Peat Swamp Forest, the drainage of one part of the peat ecosystem for development could affect the water level in another section of the same system which has been designated for rehabilitation (N1 and N15, 2012); both stakeholders in this situation could have competing interests in terms of water management of the peat ecosystem. This situation increases the challenges for implementing an overarching and cross-sectoral institutional approach to peatland management. The atmosphere of lack of trust and complexity in administration of peatlands has also made interaction and partnerships difficult and has sometimes led to the proliferation of environmental cells in various other ministries and agencies, such as the Malaysian Palm Oil Research Board (MPOB) and its Council (MPOC) which are
affiliated to the Ministry of Plantation Industries and Commodities, to counter international environmental concerns for palm oil production.

Stakeholders in the category of producers are guided in their use of peatlands and peat swamp forests by the appropriators. They thus have limited power and influence where they are subject to management requirements, if any, provided by the appropriators. However, there are actually few regulations that directly affect peatlands and peat swamp forests (Section 6.3.2.1) and enforcement of the guidelines and management requirements is lacking. Thus there are, in reality, few limitations on the producers – such as oil palm plantation companies, smallholder farmers, timber concessionaires, and mining and aquaculture companies – which consequently operate largely independently when developing on peatlands. Few government departments and agencies follow up on regulations and guidelines to monitor these private companies to see if they are complying with any provisions or guidelines. In many cases, government officers have limited resources to visit plantations, which are situated in isolated areas, and often miss the chance to meet estate managers when they appear for inspection at the respective plantation estates (N25, 2012).

At the local level, final users such as the Orang Asli and local communities have limited power and influence over decisions on the use of peatlands and peat swamp forests although their actions, such as the use of fires for land clearing, can have a high impact on the peat resource. However, if one defines among the stakeholders the final users of the products derived from producers, such as oil palm and timber, then the influence has the potential to be considerable. While none of the
interviewees, from any sector, identified this group of stakeholders, they are nevertheless among the main drivers for change in management, either through advocacy NGOs or through producer associations such as the RSPO group.

An example of consumer sentiment driving changes towards sustainable production is the move towards greener palm oil policies led by the world's largest palm oil company, Wilmar International Ltd (Reuters, 2014; Guardian, 2014). Wilmar’s "No Deforestation, No Peat, No Exploitation" policy launched in December 2013 was seen as a step towards a more sustainable industry and the company had said then that “all its suppliers in Malaysia and Indonesia needed to agree to the company’s new policy or risk losing its custom,” to ensure the industry developed “a better name” (Reuters, 2014). With its new policy, oil palm growers intending to trade with Wilmar will have to stop cutting down forests, stop exploiting people and stop clearing peatlands (Guardian, 2014).

In Malaysia, the Malaysian Palm Oil NGO Coalition (MPONGOC) has urged the Government to follow the example set by private companies and support the transition towards less environmentally destructive palm oil production (Mongabay, 2014). The MPONGOC explained that people globally would want to see equal emphasis on social, environmental and economic elements in commodity production.

5.3.2 Implications for Policy Implementation
Like most other natural resource management issues (Grimble, 1998), management of peatlands and peat swamp forests in Peninsular Malaysia is complex and dynamic. Natural peat domes cut across administrative boundaries, challenging the current administrative functions of government agencies. The peat domes are interconnected and what happens in one part of the dome has an impact on another area, although policy makers may not be immediately aware of its effect. Peat ecosystems are also used by a multitude of stakeholders each valuing different aspects of the peat resource. There are also products and services provided by peatlands and peat swamp forests that currently have no monetary value in economic terms, but are nevertheless important.

Stakeholder analysis can help policy makers see these issues and increase their understanding of the complexities of peatland and peat swamp forest management. Understanding the power dynamics between stakeholders also helps policy makers identify the key stakeholders that are involved in the decision making process and those who need to be engaged with to effect change in peatland and peat swamp forest management.

5.4 Conclusions

Four main categories of stakeholder were identified in the analysis of stakeholders, the land owners, the appropriators, the producers and the final users. These categories are not exclusive which means that stakeholders can belong to more than one category. Land owners are the State Government and other private owners such as smallholder farmers and private companies who have been given land
leases by the State Government. The appropriators are Federal and State level
government departments and agencies who have been given access and use rights
through public policy. The producers are private companies and individuals who
have the right to use and convert peatlands for economic benefits. The final users
are those who use a specific good or service provided by peatlands and peat
swamp forests.

For peatlands and peat swamp forests as a whole in Peninsular Malaysia, the main
stakeholders are the Ministry of Natural Resources and Environment, State
Governments, Forestry Department and Department of Environment. However,
based on individual peatland or peat swamp forest plots, the main stakeholders are
the State Governments, the oil palm plantation companies, logging companies and
smallholder farmers as they are the land owners. It is the State Executive Council of
the State Government, which is led by the Chief Minister, which plays an important
role in making key decisions about the use and management of peatlands and peat
swamp forests.

Other stakeholders under the category of owners, such as smallholder farmers and
private oil palm plantation companies, are also powerful stakeholders who make
their own decisions over the use and management of their peatlands and peat
swamp forest. District Councils are also important because they oversee
administrative matters concerning peatlands and peat swamp forests at the district
level.
At the Federal level, there are overlapping powers and functions between several ministries, such as the Ministry of Natural Resources and Environment, the Ministry of Plantation Industries and Commodities and the Ministry of Agriculture and Agro-based Industries. This overlap can prove challenging for peatland and peat swamp forest management.

Producers, such as the oil palm plantation companies, smallholder farmers, logging companies etc., are nominally guided by the appropriators (government departments and agencies) but there are few regulations that directly affect peatland and peat swamp forest management, especially at the State level. As a result, producers operate fairly independently when developing on peatlands. The final users have limited power and influence on the management of peat resources, although their actions might have a directly impact on them.

The next chapter analyses the policies relating to the uses of peatlands and peat swamp forests and those governing the users of the peat resources identified in this chapter.
Chapter 6  Analysis of the Regulation Mode: The Policy Context for Peatland and Peat Swamp Forest Management in Peninsular Malaysia

This chapter seeks to establish the current policy context for the uses and users of peatlands and peat swamp forests in Peninsular Malaysia as described in the previous chapters. It determines the ‘extent’ of policies (and legislation) affecting peatland management in Malaysia - i.e. the number of goods and services that are being regulated – based on documentary evidence as well as information gathered from informants. On the level of the main goods and services provided by the peat resource and identified in Chapter 4, it also analyses all regulations observable for the purpose of identifying existing and non-existing use rights attributed to specific user groups. The aim of the analysis is to identify general gaps and inconsistencies in policies and regulations that might exist. Policy gaps are then discussed with reference to those identified from interviews.

6.1 Description of Policies Related to Peatlands and Peat Swamp Forest Management in Peninsular Malaysia

6.1.1 National Policies Relevant to Main Uses of Peatlands and Peat Swamp Forests

Policies relating to the main uses of peatlands and peat swamp forests identified in the previous chapter are listed in Table 6.1.
### Table 6.1: Policies relevant to the main uses of peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Main uses of peatlands and peat swamp forests</th>
<th>Relevant policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropping/ Agriculture</td>
<td>National Agricultural Policy</td>
</tr>
<tr>
<td>Timber/ Logging</td>
<td>National Forestry Policy, National Policy on Biological Diversity, National Policy on Wetlands</td>
</tr>
<tr>
<td>Biodiversity conservation</td>
<td>National Forestry Policy, National Policy on Biological Diversity, National Policy on Wetlands</td>
</tr>
<tr>
<td>Fishing and aquaculture</td>
<td>National Agricultural Policy</td>
</tr>
<tr>
<td>Non-timber forest products - genetic resources, medicinal resources, hunting ornamental resources</td>
<td>National Forestry Policy, National Policy on Biological Diversity, National Policy on Wetlands</td>
</tr>
<tr>
<td>Minerals extraction</td>
<td>National Mineral Policy</td>
</tr>
<tr>
<td>Hunting</td>
<td>National Policy on Biological Diversity</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>National Policy on Climate Change</td>
</tr>
<tr>
<td>Recreation and ecotourism</td>
<td>National Policy on Biological Diversity, National Forestry Policy, National Policy on the Environment</td>
</tr>
<tr>
<td>Education and research</td>
<td>National Policy on the Environment</td>
</tr>
<tr>
<td>Infrastructure development</td>
<td>Development Policies</td>
</tr>
</tbody>
</table>


The fourth National Agricultural Policy has two components – the National Agro-Food Policy and the National Commodity Policy (www.doa.gov.my). The main thrust
of the National Agro-Food Policy is food security to guarantee sufficient food supply for safe consumption in the country. Among the key objectives of the policy are high-value and sustainable agriculture development, private sector investment to modernise the sector as well as knowledgeable and informed human capital. It covers agro-food industry development and focuses on the rice industry, fisheries, livestock, vegetables and fruits, aquaculture, agro-based industry and agro-tourism. The National Commodity Policy, which covers oil palm, rubber, cocoa, pepper, tobacco and forest plantations, aims to transform the commodity sector in the country through strengthening the commodities industries, diversifying production of high value-added products, generating new sources of revenue and accelerating development among smallholders and entrepreneurs. The plantation and commodity sector is one of the National Key Economic Areas (NKEA) of growth for the country identified in this policy. The National Agricultural Policy also sets specific targets for fisheries production for coastal areas, off-shore fisheries and aquaculture,


This Policy makes provisions for managing Permanent Forest Estates (PFEs, also known as Permanent Reserved Forests or PRFs) which are classified into four categories – protection forests; production forests; amenity forests and research and education forests. There are also provisions for maximising social, economic and environmental benefits; for implementing a planned programme of forest development; for promoting efficient harvesting and utilization within the production forest and for increasing the production of non-wood forest products. After the Rio Summit in Brazil in 1992, the National Forestry Policy was revised to take into consideration matters relating to biological diversity conservation and sustainable
utilization of genetic resources, as well as the role of local communities in forest development through community forestry. PFEs are also divided into functional use classes that include timber production forests under sustained yield; soil protection forests; soil flood control forests; water catchment forests; forest sanctuary for wildlife; virgin jungle reserved forests; amenity forests; education forests; research forests; forests for federal purposes; and state forest parks.

6.1.1.3 National Policy on Biological Diversity (1998)
This Policy was formulated with the aim of enhancing the conservation of Malaysia’s genetic, species and ecosystem diversity and creating a safe, healthy and productive environment. The policy has implications in several areas such as economic benefits, food security, environmental stability, national biological heritage, scientific, education and recreational values as well as biosafety, including air and water quality. This is the first policy that has documented multi-sectoral involvement and calls for streamlining biological diversity into development plans at the planning stage itself. Among the strategies to conserve biological diversity and promote the sustainable use of biological resources are improving the scientific knowledge base; strengthening the institutional framework for biological diversity management; encouraging private sector participation; developing policies, regulations, laws and capacity on biosafety as well as establishing funding mechanisms for biological diversity management.

The National Policy on Wetlands was introduced to fill a gap as there was no policy relating directly to the conservation and sustainable use of wetlands outside
protected areas. Existing sectoral policies, legislation and acts affecting wetlands were issue-specific and often set different priorities for wetlands and their use. This Policy outlined strategies for the sustainable use of wetland resources - reviewing legislation, enhancing institutional awareness and establishing a national framework for wetland management are among actions listed.


The National Policy on the Environment sets out the broad principles and strategies necessary to ensure that the environment remains productive, both ecologically and economically. It states that Malaysia recognizes that indiscriminate resource utilisation, over-consumption and other unsustainable development practices could jeopardise the nation’s continued progress. Two of the principles to harmonise economic development with environmental imperatives are integrated decision-making in planning to protect the environment and strengthening the role of the private sector in environmental protection and management. It also identifies the key areas for Malaysia’s green strategies, which includes education and awareness (including research and development to promote environmental soundness in all sectors), effective management of natural resources (including land use planning and identifying land suitability), integrated development planning (through regional plans, master plans, structure and local plans), prevention and control of pollution and land degradation, and effective enforcement of environment-related legislation. The environmental strategies also include a long-term national plan for water management and measures for managing wetlands.
6.1.1.6 National Policy on Climate Change (2010)

The National Policy on Climate Change aims to mainstream climate change through wise management of resources and enhanced environmental conservation and integrating responses into national policies, plans and programmes. The strategic thrusts are to facilitate the harmonisation of policies to address climate change adaptation and mitigation and to make development climate-resilient through a low carbon economy. The Policy also proposes to streamline and coordinate across existing legislation and policies to establish an inter-ministerial and cross-sectoral committee to drive and facilitate implementation.

6.1.1.7 National Water Resources Policy (2012)

The National Water Resources Policy is a relatively new policy which aims to determine the future direction for the water resources sector based on a review of national water resources and to assist in realising a guaranteed water supply and subsequently food security in the country. The Policy was launched in March 2012 to ensure the security of water supply for economic development, especially in the agriculture and industrial sectors, and for the rapid growth of populations in urban centres. It seeks to encourage strategic measures to identify and increase national water resources including finding alternative water sources which have the potential to cater to the demand for water in Malaysia, such as underground water.


The National Mineral Policy-2 aims to ensure the sustainable development and optimum utilisation of mineral resources in the country to enhance the industry’s contribution to the national economy and strengthen its global competitiveness. It
aims to “encourage activities to be undertaken in a responsible, effective and efficient manner to protect the environment through best mining practices” for sustainable development. The Policy promotes environmental stewardship and the use of local minerals and mineral-based products; and aims to encourage the recovery, recycling and reuse of metals and minerals with private sector participation.

6.1.1.9 National Policy for Solid Waste Management (2008)
This Policy aims to establish comprehensive, integrated, cost-effective, sustainable and socially acceptable solid waste management and to implement it through giving priority to waste reduction, intermediate treatment and final disposal. It has a strategic plan which recommends a management plan involving several stakeholders and instituted the setting up of a separate department at the national level to implement this policy. The department comes within the Ministry of Housing and Local Government and has taken the responsibility away from the local authority.

Development policies in Malaysia have a three-tiered cascading planning horizon (Table 6.2). Vision 2020 was launched in 1991 to cover a 30 year period and spells out the national development aspirations to achieve developed nation status and provides the focus of national development efforts. Outline perspective plans (OPPs) are also seen as longer-term plans to set the broad strategies in the national development agenda over the long-term.
For medium-term planning, five-year development plans are formulated to operationalize the OPPs; the Tenth Malaysia Plan currently in operation sets objectives for maximising economic growth and socio-economic development in the country, as well as building an environment that enhances quality of life. The objectives in the Tenth Malaysia Plan use the methodology of National Key Results Area (NKRA) and Key Performance Index (KPI) to ensure that focused attention is given to priority development areas. The Economic Transformation Programme (ETP) is another policy built on the Tenth Malaysia Plan to support Malaysia’s aim to become a high-income nation by 2020. The ETP is a new economic model that focuses on key growth engines or National Key Economic Areas (NKEAs) and is led by private sector growth, investment and policy actions. The final tier of development planning is short-term planning through the annual budgets.

Table 6.2: Development planning in Malaysia (Economic Planning Unit, 2004)

<table>
<thead>
<tr>
<th>Planning Horizon</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- First, Second and Third Outline Perspective Plan (1971-2010)</td>
</tr>
<tr>
<td></td>
<td>- Fourth Outline Perspective Plan (2010-2015)</td>
</tr>
<tr>
<td><strong>Medium Term Planning</strong></td>
<td>- Five Year Development Plans, such as the 10th Malaysia Plan (2010-2015)</td>
</tr>
<tr>
<td></td>
<td>- Mid-term Review of the five-year Plans</td>
</tr>
<tr>
<td></td>
<td>- Supported by the Economic Transformation Programme</td>
</tr>
<tr>
<td><strong>Short Term Planning</strong></td>
<td>- Annual Budgets</td>
</tr>
</tbody>
</table>
6.1.2 Other Relevant Policies and Plans for Peatlands and Peat Swamp Forest Management

Other policies in Malaysia that are relevant to peatland and peat swamp forest management include the Constitution of Malaysia, National Land Code, Land Capability Classification, State Land Use Plans, National Physical Plan 2, National Ecotourism Plan and the National Action Plan for Peatlands (Table 6.3).

Table 6.3: Other relevant policies and plans for peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Policies and Plans</th>
<th>Relevance to Peatlands and Peat Swamp Forests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constitution of Malaysia</td>
<td>• States have jurisdiction over land, forests, fishery, agriculture and water resources</td>
</tr>
<tr>
<td></td>
<td>• States have power to decide on use and allocation of resources</td>
</tr>
<tr>
<td>National Land Code</td>
<td>• All Stateland vests with the ruler of the State</td>
</tr>
<tr>
<td></td>
<td>• States have the power of disposal and reversion of alienated land</td>
</tr>
<tr>
<td>Land Capability Classification</td>
<td>• Ranks mining as highest priority for land use, followed by agriculture, forestry and other uses</td>
</tr>
<tr>
<td>National Physical Plan</td>
<td>• Provides a spatial plan to complement development programmes</td>
</tr>
<tr>
<td></td>
<td>• Improves coordination in planning between federal and state agencies</td>
</tr>
<tr>
<td>State Land Use Plans</td>
<td>• States pursue their own policies on land, forests and the environment</td>
</tr>
<tr>
<td></td>
<td>• State Executive Committee and Chief Minister decide on land use matters</td>
</tr>
<tr>
<td>National Action Plan on Peatlands</td>
<td>• To sustainably manage peatlands in Malaysia in an integrated manner</td>
</tr>
<tr>
<td>National Ecotourism Plan</td>
<td>• Provides policies and guidelines for ecotourism development</td>
</tr>
</tbody>
</table>
6.1.2.1 Constitution of Malaysia (1957)

The Malaysian Constitution defines the differences in power, responsibility and interests between the Federal Government and the State Governments. The National Parliament has the exclusive power to make laws over matters falling under the Federal List (such as citizenship, defence, internal security, civil and criminal law, finance, trade, commerce and industry, education, labour, and tourism) whereas each State, through its Legislative Assembly, has legislative power over matters under the State List (such as land, local government, Syariah law and Syariah courts, State holidays and State public works). Article 74 (2) specifies that each State has jurisdiction over land, forests, fishery, agriculture, and water resources within their respective boundaries, including the power to decide on the use and allocation of resources. This means that State Governments are empowered to enact laws and formulate policies independently while the authority of the Federal Government extends to the provision of advice and technical assistance, training and research. Parliament and State legislatures share the power to make laws over matters under the Concurrent List (such as water supplies and housing) but Article 75 provides that, in the event of conflict, Federal law will prevail over State law.

The Constitution was amended in 1963 to admit Sabah and Sarawak as member states. The amendment included supplements to the State List and the Concurrent List that apply only to Sabah and Sarawak, according these states greater autonomy over matters such as native law and customs, ports and harbours (other than those
declared to be federal), hydroelectricity and personal law relating to marriage, divorce, family law etc.

### 6.1.2.2 National Land Code (1965)

The National Land Code adopts a long-term development perspective and categorises land into agriculture, building and industry. It provides that all Stateland vests in the ruler or governor of the State concerned, who has the powers of disposal of such land and the rights to acquire alienated land for development purposes. According to the National Land Code, “alienated land” means any land that has a title (whether granted by the State Authority or any other previous land law) but does not include mining land. It aims to ensure certainty in land use through the land categorisation system and in tenure in terms of ownership rights but has no direct bearing on natural resources or biodiversity (MOSTI, 1998). Although the National Land Code is federal legislation, land is legally and administratively under the jurisdiction of the State Governments. This division of functions between State and Federal Governments and the absence of a single authority for land administration means that the maintenance of forests for the conservation of natural resources is devolved to individual states (MOSTI, 1998).

This varying jurisdiction of the state and federal governments over land matters and natural resources causes complexity in planning at the national level. To facilitate the coordination between federal and state governments, the National Land Council and the National Forestry Council were established in December 1971. These Councils serve as forums for federal and state governments to discuss and resolve issues relating to land and forest policies, administration and management. The
National Land Council endorses all decisions of the National Forestry Council but responsibility for implementing these decisions lies largely with State Governments. The National Forestry Council was disbanded in 2010 and decisions on all forestry matters reverted back to the National Land Council, which was, in any case, the highest body that formulated relevant land-related policies (Thang, 2013).

6.1.2.3 Land Capability Classification (1976)

The Land Capability Classification, first established in 1963 (MOSTI, 1998), is a grouping and grading of soils in unused land according to their potential (and limitations) for producing agricultural crops. “Unused land” is land that is classified as alienated land in the National Land Code (Panton, 1965). The result has been the systematic segregation of various types of land according to capability of the soil, degree of erosion and other factors. This was meant to provide a scientific method for land use planning and conservation, and to ensure that unused land was not irretrievably committed to a particular use purpose which might later be found to be inappropriate. Maps which embodied this classification were prepared to be used as guides to planning by the development authorities (Panton, 1965). The Land Capability Classification in Malaysia was extended in 1976 to include mining and forestry. It ranks mining to be of highest priority for land use, followed by agriculture (which crops were allowed for different soils), forest plantations, recreation and other purposes, including conservation and commercial exploitation such as urban development (Panton, 1965; MOSTI, 1998). In its First National Report to the Conference of Parties of the Convention on Biological Diversity, Malaysia reported that the weakness of the Land Capability Classification was that it did not take adequate account of biodiversity and conservation issues (MOSTI, 1998).
6.1.2.4 National Physical Plan 2 (2010-2020)

The National Physical Plan 2 was developed to provide the spatial planning needed for implementing development programmes in the country, taking into consideration Malaysia’s commitments to international conventions and agreements such as Habitat II, Agenda 21, Convention on Climate Change, and Convention on Biological Diversity. The Plan “sets out the national strategic spatial planning policies and measures for the direction of land use and physical development in Peninsular Malaysia, which includes conservation” (National Physical Plan 2, 2010). The spatial planning vision, policies, measures and land allocations of the NPP-2 are implemented primarily through the State Structure Plans.

The National Physical Plan is therefore seen as a guide for implementing planning at both federal and state levels throughout Peninsular Malaysia, in coordination with policies of related sectors and state structural and local plans (Figure 6.1). Prior to this Policy, land use plans were undertaken at the state or district levels without being strategized at the national level. One of the key objectives of the National Physical Plan 2 is to optimize utilisation of land and natural resources for sustainable development. It also aims to enhance national planning and improve coordination between federal and state agencies.
Figure 6.1: National development planning framework (National Physical Plan-2)
Both five-year development plans (socioeconomic development plans i.e. currently Malaysia’s 10th Development Plan) and physical (spatial) plans (National Physical Plan) are prepared at the federal level. These plans are subsequently interpreted into the State (Five-Year) Development Plans and Structure Plans respectively (National Physical Plan, 2010). These state plans in turn serve as the framework for development planning at the local level, which is in the form of a local plan or a special area plan. Structure plans are drafted by each state with that state as the fundamental unit, while regional plans entail projects involving two or more states, and are prepared for areas that have priority development issues of an interstate nature that need to be addressed (National Physical Plan, 2010).

6.1.2.5 State Land Use Plans

Two plans determine the State Land Use Plans, the State Structure Plan and the State Development Plan. The State Structure Plan is drafted in accordance with the National Physical Plan while the State Development Plan is guided by the 5-Year National Development Plans. The policies and strategies for development in the Malaysia Plan are translated into a physical plan at the state level through the State Structure Plan (Selangor Structure Plan, 2007). It is seen as an integrated plan for the physical as well as the socio-economic development of the State. However these plans do not necessarily have the same time frame as the National Development Plans - the current State Structure Plans for Selangor, Pahang and Johor were published in 2007 and were written to cover development plans until 2020, in line with the country’s Vision 2020.
When developing Structure Plans, it is the State Director of Town and Country Planning who is required to examine the provisions of the NPP-2 and other national economic, social, physical, environmental and conservation policies (Selangor Structure Plan, 2007). The Structure Plan must include matters prescribed by the State and National Physical Committee, the committees overseeing the implementation of the NPP-2, and conform to their guidelines. This has been described in the *Town and Country Planning Act* 1972.

The Constitution also provides that the Federal Government is empowered to establish departments or ministries for, for example, the conservation of resources and to inform local governments of its plans. Particularly important for decision-making at the State level are State Development Councils and Executive Committees, which are led by the Chief Minister of each State, make critical decisions regarding development and land-use matters at the State level with regards to cross-sectoral policies (Chen *et al.*, 2012). Under the Constitution, State departments are obliged refer to their federal counterparts on certain matters but State Development Councils and Executive Committees tend to exert much greater power over State departments than do the federal counterparts of those departments. This is particularly true for policies on land, forests and the environment which generate revenue for the state and maximise development and utilisation (MOSTI, 1998).

The State development planning system is applied on the ground through Local Plans which provide detailed and site-specific information on development and control at the local level. Local plans aim to provide some certainty about how the
State and National plans will be applied to land by the Local Planning Authorities and local residents and land owners within the planning areas.

6.1.2.6 National Ecotourism Plan (1996)

This Plan provides policies and guidelines for the development of ecotourism in the country through improved planning and management of ecotourism sites and through human resource development. In the current plan, now nearly 20 years old, 52 sites throughout the country were targeted for ecotourism promotion; some of them include peat swamp areas. The Ministry of Tourism has adopted this Plan to provide policies and guidelines for the conscientious development of ecotourism as environmentally responsible travel and visits to undisturbed natural areas.

6.1.2.7 National Action Plan for Peatlands (2011)

The National Action Plan on Peatlands was approved by the Malaysian Cabinet in August 2010. It was formulated in line with regional efforts by ASEAN to streamline peatland management with the Action Plan meant to promote actions in Malaysia. The aim of the National Action Plan is to manage peatlands in Malaysia sustainably in an integrated manner to conserve resources, prevent degradation and fires, and generate benefits for current and future generations. Among the objectives outlined are the sustainable and integrated management of peatlands as well as effective multi-stakeholder cooperation.
6.1.3 Policy Implementation and Enforcement

Policy implementation is described as a series of steps undertaken by government and its institutions to achieve the objectives articulated in policy statements (Burke et al., 2012). Once a policy is formulated and described, steps should be taken to ensure it can be implemented through the formulation of laws. This is the stage where the government aims to execute an adopted policy as specified by the legislation or policy action. Government agencies and departments, responsible for the respective area of policy, should then also be made formally responsible for implementation of these policies and resources allocated for the specified actions to be carried out.

Table 6.4: Legislation relevant to the main uses of peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Main Uses of Peatlands and Peat Swamp Forests</th>
<th>Relevant Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crops/ Agriculture</td>
<td>Environment Quality Act 1974</td>
</tr>
<tr>
<td>Timber/ Logging</td>
<td>National Forestry Act 1984</td>
</tr>
<tr>
<td>Water supply and regulation</td>
<td>Waters Act 1920, Drainage Works Act 1954</td>
</tr>
<tr>
<td>Minerals extraction</td>
<td>Mineral Development Act 1994</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>Environmental Quality Act 1974</td>
</tr>
<tr>
<td>Recreation and ecotourism</td>
<td>-</td>
</tr>
<tr>
<td>Cultural diversity</td>
<td>Aboriginal Peoples Act 1954</td>
</tr>
<tr>
<td>Education and research</td>
<td>-</td>
</tr>
<tr>
<td>Waste decomposition and detoxification</td>
<td>Environmental Quality Act 1974</td>
</tr>
<tr>
<td>Infrastructure development</td>
<td>Town and Country Planning Act 1976</td>
</tr>
</tbody>
</table>


Table 6.5: Legislation related to the policies affecting peatlands and peat swamp forests in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Policies</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Agriculture Policy</td>
<td>Environment Quality Act 1974</td>
</tr>
<tr>
<td>National Forestry Policy</td>
<td>National Forestry Act 1984</td>
</tr>
<tr>
<td>National Policy on Biological Diversity</td>
<td>Protection of Wildlife Act 1972</td>
</tr>
<tr>
<td></td>
<td>Animals Act 1953</td>
</tr>
<tr>
<td></td>
<td>International Trade in Endangered Species Act 2008</td>
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<tr>
<td></td>
<td>Wildlife Conservation Act 2010</td>
</tr>
<tr>
<td>National Policy on Climate Change</td>
<td>-</td>
</tr>
<tr>
<td>National Water Resources Policy</td>
<td>Waters Act 1920</td>
</tr>
<tr>
<td>National Policy on Solid Waste Management</td>
<td>Local Government Act 1976</td>
</tr>
<tr>
<td>National Policy on Wetlands</td>
<td>-</td>
</tr>
</tbody>
</table>

6.1.3.1 National Forestry Act 1984

This Act covers issues related to the classification and excision of land from permanent reserved forests (PRFs); property rights over forest produce in PRFs and Stateland (i.e. that all forest produce are the property of the state authority); the issuance of licenses for access, removal and use of PRFs; royalty and premium payments; offences and penalties as well as the power of arrest, search, seizure and investigation. The State authorities also enforce various forestry enactments and ordinances that have been formulated for effective forest management and the
implementation of the National Forestry Policy, which falls under the *National Forestry Act*.

### 6.1.3.2 Protection of Wildlife Act 1972

This Act deals with the issuance of licenses and permits in wildlife reserves and sanctuaries, as well as search, seizure and arrest issues related to these. It also sets out the conditions for the declaration of wildlife reserves and sanctuaries and specifies which groups have permits for access, noting specifically the exception for aboriginal people to shoot certain animals within the reserves and for wildlife officers to shoot even protected species. It also lists relevant offences and penalties.

### 6.1.3.3 Animals Act 1953

This Act covers the importation and exportation of animals and birds, the prevention of the spread of diseases and of cruelty to animals as well as the conservation of animals and birds and improvement of livestock. It also includes the power to search for diseased animals or birds and the conditions for arrest, penalties and forfeiture.

### 6.1.3.4 International Trade in Endangered Species 2008

This Act deals with matters concerning the trade of scheduled species, the need for permits, certificates and registration, and the power for enforcement, seizure and arrest.

### 6.1.3.5 Wildlife Conservation Act 2010

This Act concerns the conditions and methods for hunting and keeping protected wildlife (including birds and birds’ nests) and the issuance of licenses for these
purposes. It outlines the duties and obligations of the license hunter, the prohibitions in wildlife reserves and sanctuaries, and exceptions and presumptions to the prohibitions. There are also prescriptions for offences and penalties under the Act.

6.1.3.6 Environment Quality Act 1974
This Act relates to the prohibition and control of pollution (atmosphere, noise, soil and inland waters) and open burning; as well as those relating to the discharging of environmentally hazardous and scheduled wastes. It also deals with prosecution and the issuing of compounds for offences with regards to the prohibitions mentioned earlier.

6.1.3.7 Waters Act 1960
This Act deals with rivers and the restoration of river banks; the prohibition of diversion of water from rivers; the pollution of rivers; licensing to divert water; and the restriction on construction of walls and buildings on banks of rivers or within flood channels. It also includes penalties and sanctions for prosecution.

6.1.3.8 Mineral Development Act 1994
This Act covers the area of administration of the department of mines; regulations pertaining to exploration and mining; accidents and inquiry; enforcement, investigation, evidence, offences and penalties; prohibitions against disclosure of information; and the provision that this Act prevails over the provisions of any other conflicting law.
6.1.3.9 Local Government Act 1976
This Act deals with the administration of local authorities, including matters relating to the pollution of streams for e.g. from trade refuse and the use of public spaces for development.

6.1.3.10 Aboriginal Peoples Act 1954
This Act deals with aboriginal areas and reserves for the Orang Asli in Peninsular Malaysia, their rights of occupancy, procedures for dealings in land with the aboriginal people and the rights of the aboriginal people in Stateland and Malay Reservations. In Sarawak and Sabah Indigenous peoples are called ‘native’ not ‘aboriginal’ and relate to the State through a different set of laws.

Aboriginal areas and reserves, according to the Aboriginal Peoples Act, are areas declared by the State Authority as such for the “protection, well-being and advancement of the aboriginal peoples of Peninsular Malaysia.” An aboriginal area is an area gazetted on the basis that the area is “predominantly or exclusively inhabited by aborigines,” and cannot be thus declared a Malay Reservation, a sanctuary or reserve for wild animals and birds, alienated land, or land for the collection of forest produce by any other “persons not being aborigines.” The same caveats exist for aboriginal reserves, which are areas gazetted as such by the Aboriginal Peoples Act because the Orang Asli are likely to remain permanently in that place and may lie within an aboriginal area.
6.1.3.11 *Fisheries Act 1985*

This Act concerns fisheries plans which describe the management and conservation policies of the plan, licensing provisions as well as offences and enforcement of the Act. It also has provisions for inland fisheries - the promotion of development and management of inland fisheries – and aquaculture.

6.1.3.12 *Drainage Works Act 1954*

This Act covers matters with regards to the declaration of intention to constitute or vary drainage areas; the appropriate authority; the imposition of drainage rates; the interference with drainage works and construction of unauthorized drains; the unauthorized use of vehicles and boats in a drainage area; prosecution, rules and power to compound for offences as well as the right of access.

6.1.3.13 *Town and Country Planning Act 1976*

This Act sets out provisions for the four levels of the development planning system in Peninsular Malaysia, i.e. the National Physical Plan, the State Structure Plans, the Local Plans and the Special Areas Plan. It also provides for the setting up of the National Physical Council, the state and local planning committees as well as regional planning committees. In providing for the preparation of the National Physical Plan for Peninsular Malaysia, the Act determines the general directions for physical development. It also allows for the preparation of the necessary planning controls in other development Plans such as the structure and local plans.
6.2 Results

6.2.1 Policies Influencing Peatland and Peat Swamp Forest Management in Peninsular Malaysia

The policies influencing peatland management and peat swamp forest management in Peninsular Malaysia that were identified by key informants in the interviews (Figure 6.2) were the National Forestry Policy (1997, revised 1993); State Land Use Plans; National Agricultural Policy (2010); Development Planning Policies; National Policy on Biological Diversity (1998); National Physical Plan 2 (2010); National Policy on the Environment (2002); National Policy on Wetlands (2004); Federal Constitution (1960); National Action Plan for Peatlands (2011); National Policy on Climate Change (2010); and National Water Resources Policy (2010).
Figure 6.2: Policies relating to peatland and peat swamp forest management in Peninsular Malaysia considered relevant by interview informants


6.2.1.1 National Forestry Policy

More than half the key informants interviewed (57%) alluded to the National Forestry Policy as having direct relevance to the management of peatlands and peat swamp forests in Peninsular Malaysia as peat swamp forest is classified as one of the three types of forest management categories under the Policy. Informants described the
adoption of the sustainable forest management (SFM) approach for managing these forests following revisions to the National Forestry Policy in 1993, where the use of the selective management system (SMS) and reduced impact logging (RIL) were introduced in various forest management units (FMUs).

A senior officer with a government agency alluded to the improved management systems in FRs that are managed by the Forestry Department, which helped reduce the risk of forest fires:

“We prefer this [peat] land to be FR or to be used for recreation; it is better managed and it won’t spark fires and we don’t have any problem in terms of haze.” (N37, 2012)

Describing the role of the National Forestry Council in overseeing the implementation of the National Forestry Policy, a senior manager with a private company highlighted that there were no special arrangements for peat swamps:

“The Federal Government would set certain national standards and then the States would be obliged to comply through agreement under the National Forestry Council and the [National Forestry] Act in which it has been implemented. There is no special arrangement for peat swamps.” (N16, 2012)

Although the National Forestry Council had a role to assist in finding solutions to conflicts on forestry issues between the Federal and State Governments, a senior manager with an NGO pointed out that the final decision on forestry issues was still in the hands of the State Government:

“Some policies need land which comes under the state’s purview. This means that it still comes under state control; if the state government doesn’t agree, then it all goes down the drain. The National Forestry Council might make decisions which involve the states but the final say is still with the States.” (S1, 2012)

While peatlands and peat swamp forests in FRs were being managed by the Forestry Department, not all peat areas came under the category of forests and
therefore some of these areas were not being managed, as was noted by a senior officer in a government agency:

"Nationally there is the concept of sustainable forest management but not all peat areas are under forests." (N10, 2012)

A technical officer with a private company also pointed out weaknesses in the SMS being used in FRs which was designed for use in dryland forests and suggested that it might not be appropriate for peat swamp forests:

"In Malaysia, we don't have a proper approach for managing forests. There is the SMS used in dry forests where there is a minimum cutting limit but this cannot be used for peat swamp forests where the content of the dipterocarp is very low. Ramin [a species of high timber value found in peat swamp forests] is protected so they cannot remove them and other species are of low value, so we might as well keep the forests. The problem now is that there is a blanket rule [for SMS] which is not proper and correct for peat swamp forests; the composition of peat swamp forests in Pahang is different from Selangor." (P6, 2012)

An employee with an NGO suggested that peat swamp forests in FRs, although being managed by the Forestry Department, might not necessarily enjoy total protection:

“Some [peat swamp forests] are part of gazetted FRs but that doesn’t necessarily mean that they are safe. Temporary logging licenses… yellow letter from the Sultan… Menteri Besar [Chief Minister] keen to make a bit of ‘makan’ money [colloquial term for profit] here and there… and very soon 'chip-chip-chop' they are gone!” (S5, 2012)

Another aspect of the National Forestry Policy that was highlighted by key informants was that it looked at peat swamp forests and peatlands solely from the forestry perspective and did not consider the ecology of the whole ecosystem in its management. A senior officer with a government agency explained:

“The sustainable management of peatlands should consider the whole perspective, not just in terms of local haze but of maintaining the peatland for beneficial use, for conservation and to maintain the ecology of the system." (N37, 2012)
Two informants also indicated that peat swamp forests were not being given the special treatment they needed:

“People just treat peatlands as any other forest. In Ayer Hitam FR, they don’t take trees out from the forest but they drain the water and that is bad for the peat swamp forest. Forestry Department doesn’t see that it would affect the health of the forest.” (J1, 2012)

“Attempts have been made to reclassify forests according to their different functions but still there is no specific policy for peatlands except that it is another wetland forest. In terms of use of peatland forest, the policy is to avoid the use of peat swamp forests which are listed as ESAs but it does not specifically recognise the function of peatlands.” (S1, 2012)

Even within the FR the entire area does not have the same level of protection. One of the tenets of the Policy is that buffer zone within an FR be designated where certain types of small-scale agriculture are allowed. An officer with an NGO explained that the buffer zone is used by the Forestry Department to stop the spread of fires into the FR:

“The buffer zone exists in the FR itself; the Forestry Department creates the buffer zone mainly for stopping the spread of forest fires. People in nearby individual lands clear the rubbish and trees and burn them, and this can spread into the forests. That is why the Forestry Department has a buffer zone within the FR.” (S9, 2012)

6.2.1.2 State Land Use Plans

Another policy mentioned by key informants (51%) that influences peatland and peat swamp forest management is the State Land use and management policy. A senior manager with a government-linked agency elaborated on the arrangements for land use planning in the States:

“States have their own land titles so they decide what crops are to be planted. The Land Department for each region [within the state] has already decided what crops are to be planted in certain areas and on peat; they have a plan. I am not sure how often they have a new plan or update the existing one. It is a State matter when it comes to land; they are the authority.” (N13, 2012)
A senior manager with a private company suggested that State Land use plans were determined by state revenue plans and economic structures:

“If you look at the employment structure in a state in the 1980s, a large portion of the population in Malaysia was employed in the agriculture and forestry sectors. That portion has gone down now from 50% to less than 25%. What has grown is the number of those working in the service sector. The revenue form the service sector does not go to the State but to the Federal Government in the form of taxes. The State Government will not get this money so they are still forced to rely on land [for their revenue] and so they are under pressure to convert and log the forests.” (N33, 2012)

This sentiment was echoed by a senior manager at a government agency:

“The states looking at conserving [peat] land have to forgo revenue and potential future revenue. These revenue streams are not being offset by existing policies, so the lack of financial instruments and the pressure of development is always there.” (N27, 2012)

Several informants indicated that the policies given priority by the State Governments are those likely to deliver economic benefits. Those relating to expansion of commodity crops and conversion of forested lands into plantations will have an impact on peatlands and peat swamp forests:

“Policies at the state level are biased towards developing areas they don’t recognise [as important] or they feel are undeveloped. The administrators of the state don’t recognise the ecological function of the soil, they don’t value it, they see it as an unused area, they want to convert it to some economic use.” (N16, 2012)

“Plantation development will influence peatland management. There is a push in some states for development of plantations by 2020 and to open up a certain portion of oil palm plantations; some are in peat areas.” (N28, 2012)

“There is a good chance that peatlands will be impacted when plantations are expanded. Policies determined by the plantation industries and State Governments will be influential. Logging or any conversion is seen as a source of income.” (N6, 2012)

At the local level, it was noted that local plans and site-level integrated management plans influenced the management of peatlands and peat swamp forests. An officer with a government agency elucidated:
“Conditions [for land use] are imposed by the District Office according to the feedback they receive from government agencies. If the agencies don’t approve a certain activity, we will not get a permit to carry out that activity.” (S8, 2012)

A scientist with an academic institution also pointed out that economics influenced whether the local community complied with prescriptions in site-level integrated management plans:

“The first regulation is you cannot chop down trees and the second one is that you can’t use nets and cannot use poison [for fishing], but local people do use nets because they need to eat. Local people also need wood for their traditional houses.” (P7, 2012)

A senior manager with a government-linked agency referred to the pressure being exerted on State Governments to comply with a wise use approach for peatland and peat swamp forest management:

“There is pressure to conserve rather than to develop such [peat] lands. Development practices are also getting more stringent. There are other values gaining importance like carbon in the soil and emissions from peatlands. Certain State Governments are being pressured to manage their peatlands better.” (N12, 2012)

Two informants suggested that it was probably timely for State Governments to develop their own policies for peatlands and peat swamp forests (N14, 2012 and P3, 2012).

6.2.1.3 National Agricultural Policy

Informants (45%) also alluded to the National Agricultural Policy as having an influence indirectly on the management of peatlands and peat swamp forests because the policy classified areas that could be used for agriculture:

“The Agriculture Policy is not directly related to peatlands but in terms of land use planning and types of land for agriculture; it is stated in the policy.” (N3, 2012)

“I don’t think Agriculture has any direct policies [on peat], but indirectly [it is related] in terms of land use change.” (N23, 2012)
A senior manager with a government agency alluded to the thrust of the Policy which was food security which is the availability of food and one's access to it:

“In the past, the Agriculture Policy had a rice cultivation scheme where poor farmers were aided under the rural economic development programme. Some people living below the economic poverty line and small holders had land on peat, you couldn’t say don’t touch it. It was under the guise of helping these marginal farmers that we started developing the peatlands. That was the motive; that was the reason for our involvement.” (J3, 2012)

Food security is still the thrust of the present Agriculture Policy and, although there are demands for wise use, there can sometimes be conflicts with peatland management approaches as was pointed out by some informants:

“The food security policy might drive things like fisheries where they dig up the peatlands for fish and shrimp ponds.” (N8, 2012)

“Policies might sometimes be in conflict because the National Agricultural Policy might want to increase areas for food production which may actually be in the back of peat swamps.” (N24, 2012)

“The Agriculture Policy calls for wise use of land but its ultimate aim is food security and to increase food production.” (N 11, 2012)

Two informants from NGOs accused the State Governments of a lack of coordination and planning land use.

“The land use was not coordinated and was not done in a rational way. Sime Darby, for example, went for rice in an area of 30,000 ha in peatlands which was a failure. The idea of some big companies seems to be to grab the land first and then decide how to use it.” (S1, 2012)

“The peat policy in Malaysia is that they should be converted to agricultural use and oil palm. But big companies like Sime Darby have now acknowledged that there are significant issues related to drainage in oil palm plantations on peatlands that cannot be stopped unless you rehabilitate peatlands.” (N21, 2012)

A senior officer with a government agency also acknowledged that fires in peatlands that are being used for agriculture have become an issue:
“We don’t prefer peatlands to be used for agriculture because once this area is gazetted for agriculture, the local people will clear the land and the fires will start.” (N37, 2012)

Two informants pointed out that peatlands were considered unsuitable for agriculture under the National Agricultural Policy, and therefore considered the Policy to be of little relevance to peatland and peat swamp forest management:

“I am not sure what policy they have [for agriculture] because peatlands are considered as problematic land under the Agriculture Policy.” (S10, 2013)

“And the Agriculture Policy, peat swamp is considered as marginal land; it’s not suitable for agricultural activity. Now that they have encroached into peat swamps, there must be a different policy with regards to the utilisation of peat swamps for oil palm.” (P1, 2012)

6.2.1.4 Development Policies

Several informants (42%) alluded to national development policies, particularly those that related to the development of Commodities such as palm oil and timber and which have been driven by the Tenth Malaysia Plan, as having influence on the management of peatlands and peat swamp forests.

A senior manager from an NGO explained how development projects could affect peatlands and peat swamp forests:

“There are conflicting economic targets. They [the Government] want to increase their oil palm acreage. If you exclude the very steep areas, you will end up in significant peat areas. Clearing of land for formal development schemes and land-based projects mean that forested land will be eaten up, especially in some states. That can have direct implications [on peatlands and peat swamp forests].” (N9, 2012)

Another senior manager with an NGO suggested that it was for the valuable timber on the land that peat swamp forests were cleared for development:

“We have four million hectares of idle land all over the country, why don’t we develop this land? That’s because there’s no timber there. If there’s no timber, it’s unlikely that
people will touch it. It's all about dollars and cents [from the timber].” (N4, 2012)

A third senior manager with another NGO thought it was a lack of appreciation for peat swamps that brought on development plans:

“People don’t look at the land as peatlands or peat swamps but as land, and wonder how they can utilise it. First they log it, then drain it and then convert it.” (N5, 2012)

Two informants highlighted the particular focus of the Economic Transformation Programme which identified the palm oil sector as one of the National Key Economic Areas for growth as having an impact:

“Policies such as trying to become the No. 1 palm oil producer in the world and better than Indonesia have a huge influence on the management of peatlands.” (N22, 2012)

“If there is growing demand for vegetable and palm oil, there might be pressure to open up peat swamps.” (N27, 2012)

Two other informants also argued that the production of palm oil in Peninsular Malaysia was being subjected to stringent regulations to ensure it was sustainable, particularly in international markets. A senior officer with a government agency explained how stringent standards in America and Europe have made it difficult for the development of biofuel using palm oil:

“The Renewable Fuels Standard under the US directive [RFS2] and EU Directive [Energy Policy Act 2005] have stringent regulations regarding palm oil plantations, palm oil-based products, palm-oil based biodiesel and crude palm oil export which have made it very difficult for us to trade in Europe and USA. They have imposed rules regarding indirect land use change conditions [ILUC] and carbon emissions and as a result, our products are not being endorsed.” (N10, 2012)

A senior manager with a private company explained the producers’ predicament at trying to achieve international standards:

“The producers’ policy is sustainability at all cost because we don’t want to be branded internationally as being irresponsible, but the GHG standards [set by the US and EU]
is a tall order for the industry. Best management practices might minimise carbon emissions but peatlands also naturally give out methane.” (N29, 2012)

Four informants also alluded to the National Biofuel Policy and related to the focus of the ETP on encouraging research on the use of palm oil as alternative fuel sources such as for biodiesel. A senior manager with a government-linked agency suggested that research was probably the right approach for increasing the yield in present plantations and therefore helped Malaysia to fulfil its development targets while maintaining its area of peatlands:

“If Malaysia continues to push the private palm oil sector for intensification, you will be able to increase the yield through research and technology. Government policy should be directed towards that purpose, then forest requirement for expansion of plantations will reduce. If there is promotion of intensification, the policy will indirectly benefit peatlands by not disturbing the current peatlands that we have.” (N38, 2012)

But informants from NGOs argued that this could instead have a negative effect on peatlands and peat swamp forests. A senior manager with an NGO elaborated:

“The Biofuel Policy looks at subsidising oil palm for use as fuel but this has not been encouraged by the market. These policies mostly have a negative effect and the authorities open up more peat areas.” (N1, 2012)

His views were echoed by a senior technical manager from another NGO:

“The policy with biofuel, under the National Key Results Areas, talks about oil palm and how we utilise it; in a way that could impact peatlands and peat swamp forests.” (N7, 2012)

Informants also suggested that the National Timber Industry Policy, another policy that is related to the ETP, could influence on peatlands and peat swamp forests. This Policy provides the guiding principle for the downstream development of the timber industry in Malaysia and looks particularly at expanding timber plantations. A senior manager from an NGO pointed out:
“The National Timber Industry Policy aims at having more timber plantations but it may not be relevant because its main focus is rubber plantations which normally wouldn’t impact peat.” (N24, 2012)

A senior manager from a private company shared the same opinion:

“The National Timber Industry Policy has a National Timber Industry Board for downstream processing which is in charge of forest plantations. They are planting on state and alienated land, giving out soft loans to encourage plantations but they should not be planting on peat swamp forests.” (N32, 2012)

The same informants mentioned another development policy that could have an impact on peatlands and peat swamp forests in Pahang is the East Coast Economic Region (ECER):

“The Pekan area [in Pahang] is affected by ECER which is part of the development policies. If the policy relates to [clearing of] forest, then land comes into the picture.” (N32, 2012)

A Senior Technical Officer with an NGO elaborated on this point:

“At the national level, the national investment for ECER can cause degradation. A lot of the land has been converted to oil palm and for infrastructure and the focus is economic development. Investment projects sit at the top of the agenda for the State and when they implement it the environment components will be missed out. ECER has quite an influence on natural resources.” (J1, 2012)

A senior manager with an NGO suggested that it was necessary for development policies to look at the overall impact of the policy:

“The national development policy captures the investment policy and provides guidance on how to be self-sufficient. In agriculture the oil palm development policy is considered only from a single sector to create revenue but we don’t look at other connecting factors and impacts of these policies.” (S1, 2012)

A scientist with an academic institution pointed out that local people living in the area did not stand to benefit much from these development projects:

“ECER does not bring much benefit to the local people; outsiders come in and run these projects. The policy is to get land to plant more oil palm which is good for the Government because they get an income but there’s no benefit to local people or the environment.” (N31, 2012)
6.2.1.5 National Policy on Biological Diversity

The National Policy on Biological Diversity was another policy alluded to by key informants (42%) as having influence on peatland and peat swamp forest management. A senior officer with a government agency described the relevance of the policy:

“The policy is about ecosystem management. There are now funds to review the Policy so it is going to be looked at in totality rather than having so many sectors. There is also the Common Vision on Biodiversity [launched in 2009], which calls for mainstreaming biodiversity in all sectors including in plantations. These documents support managing biodiversity in different landscapes.” (N11, 2012)

A senior manager with a government agency explained how the policy was prescriptive and has a federal council to oversee its implementation:

“It is a prescriptive policy that recommends certain actions to be taken, but there is no legislative backing or financial instruments for the policy. The only thing that supports the policy is a federal council called the National Biological Diversity Council where biodiversity issues are brought up and discussed.” (N27, 2012)

A senior manager from a private company highlighted that the Policy needed State participation for implementation:

“It recognises that there are peat ecosystems that are important. It recognises what should be done to protecting them at a landscape level and to ensure the integrity of the ecosystems. Whether these are implemented on the ground is not the prerogative of the Federal Government anymore, because land use is a state matter.” (N16, 2012)

A senior technical officer with an NGO described the Policy as being a “failure” because it lacked the implementation support:
“It is a little bit of a failure. They came up with the policy in 1998 and didn’t do anything else. There’s no real mechanism to say if it’s been effective or how much we have done. Again, it’s one of those policies that we came up with at the national level and expected everything else to fall in place. And of course, it didn’t.” (N6, 2012)

Echoing sentiments on difficulties in the implementation mechanism of the Policy, a senior officer with a government agency questioned:

“The problem with the National Biodiversity Policy is who is monitoring it? Which government, state or federal? Which agency monitors the resource allocation? That is not clear. And who will carry out the policy?” (S10, 2012)

A senior manager with a private company thought that the National Biodiversity Strategy and Action Plan which was being drafted would be important for sorting out such implementation issues (N33, 2012).

Other informants argued that this Policy had little guidance that directly affected peatland and peat swamp forest management. A scientist with a private company pointed out:

“The National Biodiversity Policy makes a passing reference but doesn’t really focus on peatlands, or wetlands for that matter.” (N25, 2012)

6.2.1.6 National Physical Plan-2

Several informants (34%) alluded to the National Physical Plan-2, and the related Central Forest Spine (CFS) Master Plan, as being important for peatland and peat swamp forest management, especially in its classification of several peat areas under the category of Environmentally Sensitive Areas (ESAs) and in trying to link fragmented forests in Peninsular Malaysia. A senior manager with a government agency pointed out:

“The National Physical Plan has designated areas that are environmentally sensitive to be conserved and protected under the plan. At the same time, there are other areas that can undergo land use changes.” (N23, 2012)
Some of the areas listed as ESAs which are to be conserved are peat swamp areas, as indicated by a senior manager with an NGO:

“A number of the remaining peat swamp areas have been identified as ESA Class 1 which means there should be no conversion, and where minimal activities are allowed such as low-impact tourism. There is also the CFS Master Plan which tries to link up forest fragments and forest landscapes in Peninsular Malaysia and a few of these landscapes have peat.” (N24, 2012)

A senior manager with a government agency explained how the National Physical Plan sets out the general direction and trends for physical development in the country, especially by avoiding sensitive areas:

“We don’t have policies that would normally categorise peat, mangroves or other green areas under non-built up areas. We would not promote any economic activities involving heavy expenditures in these areas; here [in the NPP] we look at it from an ecosystem perspective.” (N40, 2012)

Some informants pointed out that this was the first Policy which attempted to work through inter-agency cooperation at various levels of government. A senior officer with a government agency elaborated this point:

“The NPP was drawn up by the Town and Country Planning Department but for implementation, it comes under the relevant agencies. For activities to do with agriculture it comes under the Agriculture Department; and for infrastructure, it comes under the Public Works Department, the Drainage and Irrigation Department, or the Local Authority. For forest development it comes under the Forestry Department. Under the related local plan, the State Authority will call for comments from other related departments. That is one of the advancements made by the government [in this Policy] and also that State Governments are involved in the National Physical Council.” (S10, 2013)

Monitoring the implementation of this Policy is also being carried out at several levels of Government, as described by a senior manager with a government-linked agency:

“The NPP is being implemented by the Town and Country Planning office at the state and district levels, and the land office and the district office are also involved. They
have a committee at the district office to look at certain developments at the district level.” (P1, 2012)

The main setback of the NPP according to the informants was that its implementation was dependent on the State’s acceptance of the Policy and some states have not been keen to implement it. Two informants highlighted that the Policy was not accepted by some states in Peninsular Malaysia and even the East Malaysian states:

“The National Physical Plan was developed to streamline the National Land Code but in the end it was only confined to Peninsular Malaysia; Sabah and Sarawak did not accept it. This has made it weak in terms of stakeholders.” (S1, 2012)

“They’ve never really taken it [the Policy] out to the states, it’s something which has been hashed out in Putrajaya [the administrative capital] but they’ve never had an endorsement at state level. It will be nice to take it to Sabah and Sarawak; there’s also no buy-in from Pahang and Perlis and some states here [in the peninsular].” (P3, 2012)

A senior technical manager with a private company suggested that the reason for non-acceptance from the States could be because they were not properly consulted before the Policy was endorsed:

“The NPP did not have an impact on the ground because they [the States] did not recognise it. The Pahang state was not happy with it; they said they were not fully consulted. That was the impact.” (N14, 2012)

6.2.1.7 National Policy on the Environment

Informants (34%) also alluded to the National Policy on the Environment as another policy that was relevant to peatlands and peat swamp forest management in an indirect way. A senior manager with an NGO suggested that legislations linked to this Policy has been used as measures to check on development projects on peat:

“Some of the Acts [related to the Policy] that can be used as instruments; for e.g. the EIA [where] some of them [i.e. development projects] are environmentally sensitive or
catchment issues for water [supply] and for flood mitigation. We use those instruments to advocate against development [on peat].” (N4, 2012)

A scientist from a private company also alluded to the EIA report which provided the recommendations and mitigating actions for development in peat areas:

“Basically when we go out to work [on a development project], we ask for the EIA report. What does the EIA report recommend and what was approved by the department? That should be our guidance. Besides the peat depth being an issue, the EIA says that you cannot plant on slopes more than 20 degrees. That is our guidance, that’s the policy.” (N26, 2012)

Another area of this Policy that was highlighted by informants as being relevant to peatlands and peat swamps was the legislation relating to the prohibition of open burning in peat areas, particularly as a result of transboundary haze from burning peatlands in Indonesia. A senior manager from a private company explained that negotiations with Indonesia resulted in the Malaysian Government looking at the issue on a national scale:

“There is another issue that is not just about Malaysia’s peat swamps. Peat swamps and peatlands were converted in Indonesia, resulting in transboundary pollution and this affects Malaysia in a serious manner via the haze. It created problems so DoE was involved with negotiations, setting out Malaysia’s position using ASEAN as a forum to discuss with their counterparts in Indonesia. On a national level, these are related issues. Peat is not just part of the land but you have to look at the much bigger picture.” (N16, 2012)

Criticisms of this Policy centred on its ineffectiveness because it was too broad and contained little that related directly to peat:

“The Policy is so generic that it is useless; it was prepared ages ago and so the document does not help.” (N33, 2012)

6.2.1.8 National Policy on Wetlands

Some informants (27%) mentioned this Policy as being relevant to peatland and peat swamp forest management but there was a lack of awareness of its details.
Among the phrases used when describing the policy were: “not publicly exposed to the Malaysian community” (N7, 2012); “not made known to everyone” (N24, 2012); “not really well publicised” (N27, 2012) and “don’t hear much about it” (N33, 2012).

A senior technical officer with an NGO suggested the reason for the lack of awareness, as follows:

“The current [wetland] policy is not sufficient because of how it was formed, it is a very basic document, and until now the Ministry of Natural Resources and Environment hasn’t launched it or made it available [to the public]. That policy was supposed to guide the states on how to manage their wetlands, including peatlands, but it didn’t happen.” (J1, 2012)

Also alluding to weaknesses in the process of formulating the Policy was a scientist with a private company:

“The National Wetland Policy went through a lot of sanitization before it was finally approved by Cabinet and then promptly forgotten; maybe it mentions peat somewhere but I doubt it went into any great detail.” (N25, 2012)

Steps are now being taken to streamline the Policy and ensure its effectiveness, as indicated by a senior manager of a government-linked agency:

“Now they [the Government] are trying to produce an action plan on peat swamp and a national policy on peat swamp, the national wetland policy. I have not seen that policy; but it has been endorsed by the Government.” (P1, 2012)

A senior officer with a government agency confirmed that the Policy was currently being reviewed:

“The National Wetlands Policy is being reviewed; it might be elevated soon because … have just secured some funds to review this Policy together with the Biological Diversity Policy so … are going to look at it in totality rather than having so many sectors.” (N11, 2012)

6.2.1.9 The Federal Constitution and National Land Code

Informants (25%) also cited the Federal Constitution and the related National Land Code as influencing the management of peatlands and peat swamp forests,
especially because these policies accord land matters under the jurisdiction of the State Governments. A scientist with a private company explained:

“Since land is a state matter [under the Constitution], any land matter comes under the State’s jurisdiction; if the land is Stateland, it is entirely the State’s decision. Even for matters regarding peat areas, the State can give out that land and the Federal [Government] has no say, even if it is given for logging. It is entirely up to the State Government, they have a committee to decide and they take it on a case-by-case basis.” (N15, 2012)

Also touching on the role of the State on land matters as mentioned in the Federal Constitution and the National Land Code, a senior manager with a private company said:

“If the State Government has converted the status [of an area] from forestry to a Stateland forest, which means that the State has given permission for the change in land use although maybe on the ground it is a peat swamp. Potentially any time the State gives a [land] concession, the area may be logged or converted to different uses. Zoning is not the prerogative of the Federal Government because land use is decided at the state level.” (N16, 2012)

Describing the state’s authority on land matters and how it affects policy implementation, a senior manager with a government-linked agency stated the following:

“You have the legal framework to have a tougher governance of peat in Malaysia. The only problem is that because of the state authority under the Constitution, the implementation [of policies] is not well coordinated.” (N38, 2012)

A senior manager with a private company suggested that it was the Federal Constitution, which provided that States collect revenue from land-based resources, which caused peatlands to be developed for economically beneficial activities:

“The Federal Constitution; therein lies the root cause of all the degradation of peatlands and wetlands. It simply boils down to the revenue sharing between the Federal and the State, because State Governments are forced to rely on land-related resources, and therefore there will always be pressure on them to convert peatland forests.” (N33, 2012)
Also falling under the purview of the Federal Constitution are the rights of the Orang Asli in terms of land use, as alluded to by a scientist with an academic institution:

“The Orang Asli have their own Act [under the Constitution] that allows them to use the land even when the forest is a FR. Where there are Orang Asli communities living close to a FR, the community has access to this forest. Under the Act, there is a special provision that allows the Orang Asli to exploit these resources. The communities that are near peat swamp areas might find these forest areas are now being developed for oil palm.” (P4, 2012)

6.2.1.10 National Action Plan for Peatlands

There were differing views on the National Action Plan for Peatlands from the informants (22%). Two informants from government agencies felt that the document presented a clear mandate and guidance on how peat areas should be managed:

“Specifically on peatlands, we have the Peatland Action Plan that gives a clear mandate on managing and conserving and using peatlands wisely.” (N11, 2012)

“We have the National Action Plan on Peatlands to guide domestic action.” (N43, 2012)

A senior manager with a government-linked agency suggested that the NAP would be a good guide for peatland management but suggested that the document was not launched because certain State Governments did not accept the document:

“We were to develop a National Action Plan for Peatlands but this has not yet been launched. We should have that in place to be used as a guide. The document is there but it has not been launched because some of the States have reservations, which is a bit unfortunate.” (N13, 2012)

This was also suggested by a scientist of a private company:

“There is the national peatland strategy and most people have agreed with it or approved it but Sarawak is holding out. Because of that, it has not been launched.” (N25, 2012)

6.2.1.11 National Policy on Climate Change
There was agreement among the informants who alluded to this Policy (16%) that it dealt with measures for reduction in GHG emissions but lacked clear actions for peatlands. A senior manager with an NGO explained:

“The Climate Change Policy is relatively new but it is not clear in terms of implementation. There is a target of 40% reduction in GHG emissions but it totally ignored peatlands. The Ministry commissioned UNITEN to come up with a strategy and they outsourced it to TATA Energy Research Institute in India, who came up with recommendations like changing your light bulbs to energy saving ones but did not include peatlands.” (N1, 2012)

A senior technical manager from a government agency agreed with these sentiments:

“The Climate Change Policy doesn’t specifically mention peat swamps, but we have to use it in that context and look at how you balance your country’s GHG emissions and removals.” (N2, 2012)

Another senior technical manager with a government agency alluded to the important role played by peatlands in the GHG balance mentioned in the Policy:

“We acknowledge in the Policy that peatlands are a huge carbon sink and that they can continue their role as carbon sinks if they are managed in a right way. The alternative is, if improperly managed, they can be a huge source of GHG which will then be part of the national inventory.” (N8, 2012)

Another informant, a senior manager with a government-linked agency also highlighted the importance of peatland management in a global context:

“Now climate change issues are coming into play, there is pressure to protect peatland areas and implement conservative approaches in managing peat forests. Malaysia is actively involved in climate change negotiations. We’ve got an interest because forest is an important sector so we need to be careful with management policies for peatlands. They are rich in carbon and there is global concern on how they are being managed, which puts pressure on us.” (N12, 2012)

A senior officer with a government agency, however, suggested that the Policy had concentrated on foreign issues and lacked publicity in the local areas:

“The National Climate Change Policy deals with peatlands, but that policy is not very well exposed to the local people.” (S10, 2012)
6.2.1.12 National Water Resources Policy

Another policy related to peatlands that was mentioned was the National Policy on Water Resources although many informants were not aware of the details of the Policy or how it related to peatland and peat swamp forest management.

A senior officer with a government agency suggested that there needed to be a dedicated unit coordinating all policies to ensure synergy in action that related to peatlands:

“Peat has water, so there’s a National Water Policy that has just been launched. The idea is now to look at the synergistic aspects of all policies [relating to peatlands] especially when they are managed by different ministries. One might say that we need to use peatlands for agriculture while another might say we need to conserve it. We hope that these things can be resolved at the ministry level.” (N11, 2012)

A senior manager at an NGO suggested that this Policy had little relevance to peatlands and attempted instead to mitigate water resource problems on a national scale, although it was still dependent on the State Governments for its implementation:

“The Water Resources Policy is still dependent on the States. The recent issue with shortage of water supply in Selangor and other states showed that States have the entire jurisdiction over water resources.” (S1, 2012)

6.2.2 Policy Implementation for Peatland and Peat Swamp Forest Management in Peninsular Malaysia

Informants highlighted that the implementation of a policy was dependent on the legislation that enforced the policies. A senior manager at a government agency elaborated on this point:
“Policies are formulated to set the direction and intention of the Government. Enforcement needs an act or legislation. Some of the policies have related Acts. For e.g. the National Forestry Policy has the National Forestry Act, the National Environment Policy has the Environment Quality Act and the National Biodiversity Policy comes under the National Forestry Act and the Wildlife Conservation Act. The National Policy on Wetlands also comes under National Forestry Policy.” (N18, 2012)

These views were echoed by a senior manager from a private company, who described legislation as an instrument of policy:

“Policy is an instrument and laws take that into consideration. It is laws that provide for penalties, fines and conviction; you need to have a law to provide for the effective implementation of a policy.” (N32, 2012)

One of the setbacks in policies formulated in Peninsular Malaysia according to a senior technical manager from a private company is that they were often related to weak legislation and enforcement:

“Our policies are very weak; they don’t translate well. They are not well written, they don’t create a mechanism for legislation and enforcement. They stop at policy; they don’t create a structure for implementation.” (N14, 2012)

These sentiments about lack of enforcement were also expressed by a senior manager of a government-linked agency who described some examples as follows:

“If you dug a canal to drain water from the peat swamp forest, you should be penalised but nobody monitors the remote areas. There are regulations for poaching of wildlife in the forests; the animals [that are poached] are confiscated from time to time but it’s not enough. Using fertilisers in new plantations that contaminate the rivers in peat swamps [is also not allowed] but enforcement is very weak.” (N38, 2012)

One informant argued that peatlands outside FRs and under the management of private companies were subjected to limited enforcement and legislative action:

“Once peatlands are converted to oil palm plantations there is no enforcement because there are few laws that you can enforce. If somebody puts in a big drain and drains the peat, there are no laws preventing them from doing that.” (N33, 2012)
Another informant, a senior manager from an NGO, referred to the plantation owners as “the big guys” and agreed that enforcement in peat areas was inconsistent:

“When they enforce [the law], they only enforce it on the small guys who encroach onto peat forests for illegal logging or poaching. They do not enforce on the big guys because they supposedly come in legally. Enforcing a policy on maintaining peat swamp forest to ensure we have a certain percentage of peat areas is not being done.” (P5, 2012)

Enforcement was often subjected to action at the state level carried out by government agencies in charge of the various sectors, according to a senior manager with a private company:

“All enforcement is carried out at the state level; enforcement is probably by different agencies. If it is on forestry aspects, it is under FD; if it on land aspects, it will be the Land Office.” (N16, 2012)

Two informants highlighted that most land development schemes, including those on peatlands, were sanctioned by the local authority:

“Apart from illegal encroachment or illegal logging in forest reserves, all other land development has been sanctioned.” (N9, 2012)

“There are no real penalties for conversion [of peatlands to other land uses] because conversion is really the state’s prerogative.” (N6, 2012)

One area where enforcement seems to be lacking, according to two informants, was in the area of ecosystem management:

“There are penalties for draining wetlands and protected areas that are wetlands. For illegal clearing, establishing a farm, grazing livestock illegally and draining will probably carry some kind of penalty.” (N8, 2012)

“I can’t think of any law that have a penalty related to ecosystems.” (N11, 2012)

6.2.2.1 Legislation for Enforcement of Policies
The main laws related to enforcement and penalties for peatland and peat swamp forest management in Peninsular Malaysia that were highlighted by the key informants from interviews were the *National Forestry Act* 1984, *Environmental Quality Act* 1974, *Drainage Works Act* 1954 and *Wildlife Conservation Act* 2010 (Figure 6.3). There were also several responses which highlighted the role of the Local Authority on matters concerning land use at the local level, which come under the respective State Land Acts related to the National Land Code.

![Figure 6.3: Legislation relating to peatland and peat swamp forest management in Peninsular Malaysia considered relevant by interview informants](image)

6.2.2.1.1 *National Forestry Act* 1984
A piece of legislation that was commonly mentioned by informants (46%) for enforcement was the *National Forestry Act* 1984 which is related to the National Forestry Policy and enforced by the Forestry Department; three informants had the following remarks about the NFA:

“There are laws that cover peat swamp management indirectly like the NFA 1984 for Peninsular Malaysia where, if a particular FR happens to have peat swamp areas within it, then the law would be applicable to that particular peat swamp area. And the penalties are strong and severe governing access into the forest, taking out forest produce, [carrying out] damaging activities, setting fires etc. If a peat swamp forest is within a FR, then it would enjoy a considerable amount of protection, at least on paper.” (N24, 2012)

“The NFA is mostly with regards to things applicable to peat swamp forests but only for [those within] FR; even entry without permission is an offence.” (S10, 2012)

“The enforcement is embedded and implicitly outlined in the National Forest Policy as areas demarcated for conservation and protection.” (P1, 2012)

Two areas of enforcement were highlighted by informants as being particularly effective under the NFA, illegal logging and encroachment. A senior officer with a government agency made the following comment:

“The National Forestry Act where offences are followed by a fine, action taken against illegal logging or encroachment to hunt or extract forest produce without permission from a FR... work closely with the Department of Wildlife and National Parks when there is an invasion because they have the training and expertise to identify illegal entry.” (P9, 2012)

However challenges in enforcement through the NFA still exist, as pointed out by a senior manager of a NGO:

“The Forestry Department is concerned with enforcement within FRs. In Selangor and Pahang, Stateland exists around the FR. In Raja Musa FR, they also deal with illegal settlers. There are no specific policies that can be enforced in this case, there are no regulations on water management; the Forestry Department can only give advice.” (N1, 2012)
In addition the NFA does not have any special provisions for peatlands or peat swamp forests, as mentioned by two informants:

“The Forestry Act does not have any species-based provisions; it’s general and any intrusion and encroachment into the FR is considered an offence. There are no provisions where there is totally protected or protected species.” (N27, 2012)

“With regards to forests, the rules and regulations are clearer and they have come up with more rules and regulations because of the timber; they have come up with specific guidelines for use and management. But in terms of the use of peatlands, it cannot be compared to the forestry sector.” (S4, 2012)

6.2.2.1.2 Environment Quality Act 1974

This was another Act mentioned by key informants (31%) as being relevant to peatlands and peat swamp forest management, particularly in the areas of conversion to other land uses and open burning. For conversion of peatlands to other uses, informants said that this was mainly regulated through the requirement of an environmental impact assessment (i.e. for any area larger than 20ha in ESAs or 50ha in other areas) which is monitored by the Department of Environment (DoE):

“The EQA has a clause on peat in terms of conversion; you have to do an EIA, and there is a clause for wetlands and peatlands as ESAs.” (N14, 2012)

“Only when you are going to clear the land will DoE will come in and they will give you a set of guidelines [to follow].” (N15, 2012)

The second was a restriction in the Act on open burning and the high penalty that is imposed, as mentioned by a senior manager at a government agency:

“DoE has a zero burning policy and they have a high penalty, something like RM500,000 (c. AUD170, 000) if you burn peat areas and the plantation sector is not allowed to burn. Those days when they wanted to remove their biomass, they would just burn. But under the EQA, they are not allowed to do it anymore under the zero burning policy, especially during the haze season.” (N11, 2012)
A senior officer with a government agency explained that there were several approaches to address the monitoring of open burning in peatland areas in Peninsular Malaysia:

“Enforcement is [covered] in the Clean Air Action Plan [under the Environmental Quality Act 1974] and in the DoE Strategic Plan. It is mostly to do with open burning for peatlands, ground surveillance and the monitoring of hotspots. (N37, 2012)

A senior manager at an NGO noted that the surveillance on open burning in Peninsular Malaysia had some notable differences compared to Indonesia:

“Good enforcement in Malaysia is that conversion of peat swamp forests to other land uses is not done by use of fire; so that’s why you see fewer fires in Malaysian peat swamps than in Indonesia.” (N21, 2012)

A senior manager of an NGO, however, noted that the main challenge with surveillance on open burning was when it was not possible to trace the land owners:

“The problem with DOE enforcement for open burning is not land owners but in many cases, they don’t know who the land owners are because the area is developing not according to the lots that have been allocated to the rightful land owners.” (N1, 2012)

An employee of an NGO explained that community patrolling groups have had to be established to assist government agencies in their tasks as implementation was still facing challenges:

“When we ask DoE why they do not do patrolling, they tell us their problem. It is because the area they have to manage is very large and they only have four staff and it is difficult for the four of them to monitor the whole area. We have developed community patrolling under our project [to address this issue].” (S6, 2012)

6.2.2.1.3 Wildlife Conservation Act 2010 and International Trade in Endangered Species Act 2008

The main legislation cited by key informants (21%) for illegal hunting of wildlife was the Wildlife Conservation Act 2010 and the International Trade in Endangered Species Act 2008. The former was enforceable in areas that have been designated
as protected areas or wildlife reserves, according to a senior technical officer from an NGO:

“For enforcement in peat areas, you get the odd person hunting an animal and they will be subjected to the Wildlife Conservation Act. People go and trap birds in forest reserves and they will not stay away from peatland forests because there are great animals and birds in peatland forests as well.” (N6, 2012)

The penalties for offences under the *Wildlife Act* was also said to be stringent, as described by a senior officer of a government agency:

“When you talk about peat forests, Wildlife Department have stringent rules. If the peat area falls under Wildlife Reserve, then they have their own laws and penalties for offences.” (N11, 2012)

According to a scientist of a private company, wildlife in peat areas theoretically came under the enforcement section of the Wildlife Department and the department had a standard operating procedure as it had been working on wildlife protection for the last 30 years:

“They have standard operation procedures and their own policies. They have their own procedures for monitoring and enforcement, arrests and prosecution. How often and how well it is implemented is questionable; most people will say that it is a big state with a small manpower base, and they can’t enforce everywhere.” (N25, 2012)

A senior manager with a government agency also explained that stiffer penalties were recently imposed through the *Wildlife Conservation Act*, for the illegal trade of wildlife, including those coming out of peat areas:

“If there is trade of animals such as monitor lizards and snakes under CITES [Convention on International Trade in Endangered Species of Wild Fauna and Flora], it will come under the International Trade in Endangered Species Act [2008]. For local trade, the Wildlife Conservation Act [2010] still applies. The penalty now is much higher since it was implemented in 2012, it can go up to RM500,000. For trade in protected species, the maximum is RM100,000 so there are various degrees of offences.” (N27, 2012)

6.2.2.1.4 State Land Acts
The role of the District Office in enforcement, especially on matters concerning land use, was highlighted by seven of the interviewed informants. A senior manager from a government agency described how the District Office enforced the zoning of activities according to the Local Plan which were developed from the State Structure Plan:

“The Local Authority has a role in enforcing some of the elements [of land use] because they are also involved in zoning according to the local plan, what activities can be allowed within a certain zone.” (N23, 2012)

However, an officer at a government agency in Selangor described how enforcement activities by the District Office were being carried out on certain land use types according to the State Land Act (which is related to the National Land Code):

“The Land Office does not have any enforcement activities in the North Selangor Peat Swamp Forest except for sand and clay mining. [The office does] not interfere with agricultural matters and other issues. The mining schemes are controlled by approval permits. When they [the developers] apply for permits, [the office sets] a limit on how much they can extract according to a local plan and imposes restrictions on the period they can extract and what they can take. These restrictions are imposed after getting feedback from the various government departments.” (S7, 2012)

He said the State Land Act concerned the payment of royalty, the procedure for application of permits and other matters relating to the administration of the land.

A scientist with a private company suggested that enforcement actions for peatlands at the local level were no different those for any other type of land:

“If you have not cleared your land and it is still a forested area, it could still come under the District Office. They don’t have any specific policies whether it is peat swamp or dry land forests, the same rules apply.” (N15, 2012)

6.2.2.1.5 Drainage Works Act 1954
There were several references by the informants (9%) to the enforcement of policies relating to the extraction of water (through the digging of canals) and obstruction of drainage under the *Drainage Works Act* (1954) through the Drainage and Irrigation Department (DID). Some of the issues highlighted which were linked to peatland and peat swamp management related to their role as catchment areas for water supply and for flood mitigation (N7, N25 and J4, 2012). A scientist with a private company described how the role of DID needs to be broadened to include matters other than flood control:

“The areas with peat tend to flood; they flood quite badly in certain times of the year. The DID have developed a consistent programme over the years to build large drains to take the water out of the [peat] area during the rainy season. It dries up the peat during the dry season but this [action] is parked under flood control.” (N25, 2012)

Another scientist with a private company suggested that DID could come up with guidelines for peatland development based on its hydrology:

“If they can modify and come up with new guidelines for peatland development for hydrology because there is water involved, they could give guidance on when to drain and how to do it. Or if you should not drain a particular swamp, DID should be involved.” (N15, 2012)

A senior technical manager with a private company, however, highlighted that the DID currently had limited powers when it came to decisions on drainage issues which were made at the state level:

“Drainage and irrigation [officers attending meetings] tend to be junior. If they are invited to the table at all to take part in discussions, normally it is when there is a problem. DID is mostly concerned with state level, water being a state resource; the federal government doesn’t have much say in it.” (P3, 2012)

### 6.2.3 Gaps in Peat-related Policies and Legislation

Of the 67 key informants who were interviewed, more than half of them (51%) felt that policies were currently inadequate for peatland and peat swamp forests
management; of this 18% indicated that there were currently no policies relating directly to peatlands or peat swamp forest (outside PFEs). Another 43% of the key informants felt that the policies were currently adequate while 6% of the informants did not answer this question (Figure 6.4).

Two main gaps were identified in policies relating to peatland and peat swamp forest management - the gap in policies that allowed national policies to be implemented at the state level and the lack of policies addressing peatlands and peat swamp forests as ecosystems.

In elaborating on the first gap of a lack of state-level policies on peatlands and peat swamp forests, two informants made the following comments:

“There needs to be more policies at state level; state-level forest policies now allow forest reserves to be cleared for oil palm. In Peninsular Malaysia, they have been
allowed to get rid of Permanent Reserved Forests without public consultation. Only in Selangor, the government has ensured that a public enquiry is held before a Forest Reserve is excised. There should be more policies to tighten up the protection of forests reserves.” (S2, 2012)

“The biggest gap is that the Federal Government does not have executive powers over the state.” (S1, 2012)

According to a senior manager of an NGO:

“The main gap is the imbalance in decision making; you have to tilt this imbalance to make the State respect the guidelines and the federal legislation.” (N4, 2012)

A senior technical manager with a government agency explained that the reason for this imbalance dated back to the time of the formulation of the country’s Constitution:

“A federal policy suffers from the constraints that were put in place at the time the country was put together. This is due to the separation of powers of the Federal and State Governments, and not all the State Governments got the same deal. In negotiating the terms for their federation, some states got a better deal and so it has been a continuing problem for Malaysia where federal policy, federal laws, acts have to go through the state and they can take them and decide whether to accept them in totality, or have a state specific interpretation which is then subject to other qualifications.” (N8, 2012)

Another area that lacked policy at the state level was in land distribution. A scientist at a private company suggested that politics seemed to override technical considerations in the distribution of peatlands:

“They [the State Governments] give out land, say 5,000ha; the peat swamp itself maybe 60,000 ha. If you want to give out the land you must look at the whole catchment and the influence of your development on the whole catchment. Pekan Forest Reserve is a good example, the area was proposed [for conservation] and there was a study, but subsequently they still took out the small piece for the last [General] Elections, so that is politics overriding technical recommendations.” (N15, 2012)

This sentiment was shared by a technical officer of a private company:
“The one who is supposed to look after the forest is FD, but they are helpless; land belongs to politicians and FD is at the mercy of the politicians.” (P6, 2012)

The importance of considering current land use was also alluded to by a senior technical officer of an NGO:

“Management and conservation would have to be linked to the current land use policy, either in agriculture or development. If you only look only at conservation, rather than land use, it is quite difficult to implement.” (J1, 2012)

Some key informants also highlighted that implementation arrangements at the state level were often unclear and policy documents needed to be translated into action on the ground to be implemented effectively. Two informants described how this was a necessary step in policy formulation:

“The gap is who is to start to move it [the policy]. The National Biological Diversity Policy for example, who is the main player and who is supposed to coordinate [its implementation]? When it comes to the budget [allocation], is there any other agency to realize the policy objectives? When the Forestry Department has their own budget for biodiversity, is that under the National Biological Diversity Policy or the National Forestry Policy?” (S10, 2013)

“What is lacking is effort to translate the policies and action plans into strategies and approaches, and putting them into practice with the practical programmes and helping the state authorities to come up with plans on the ground.” (N30, 2012)

These sentiments were also shared by a senior manager of a government agency:

“Basically the policies are already there, what matters now is the implementation. As of now, they are certain constraints.” (N23, 2012)

One of the constraints was that the State Governments saw peatlands as land that could be utilised to increase the State’s income, as observed by a senior manager of a private company:

“We have these beautiful policies at the federal level but then to what extent has it been implemented on the ground? They are all under the State’s jurisdiction because the states see these [peatlands] as a source of income; when you go with the approach of conservation or protection, then the states feel that their income is threatened.” (N30, 2012)
A senior manager of an NGO observed that income generation and politics were a key consideration in the State’s decision on land development:

“The enforcement or the application of policies is always subsumed and inferior to other policies that bank on development and income generation. The big guys are all there to make money; they have no regard for policy.” (P5, 2012)

The second gap in policy that was identified by key informants was that there was no policy addressing peatlands and peat swamp forests as an ecosystem and which considered the sustainability of their functions as an ecosystem. Two senior managers of NGOs elaborated on this point:

“There is no policy that relates to water management or site selection which considers peat depths, suitability, the underlying soil or drainability. No clear policy or regulations for REDD+ incentives related to carbon or climate change; there is no value for carbon. No clear policy for towns or housing on peat.” (N1, 2012)

“This ecosystem is not looked at for its importance, for water management, for its endemism, for the community in supporting indigenous people’s livelihoods etc.” (N5, 2012)

Alluding to the same point, a senior technical employee of an NGO pointed out that, coupled with the lack of policy, was a lack of strategy to address peatland issues at the national level:

“So the gap would be a lack of any clear importance to peatlands and a clear strategy to address peatland issues. People say all the right things when you go to international conferences - we will protect this, we are managing this, we have this much forest, we’re doing all the right things but when you go onto the ground, it’s not quite the same. So the gap is obvious - the lack of a clear policy on peatlands at the national level.” (N6, 2012)

One of the reasons for this, as cited by a senior manager of a private company, was probably due to the complexity of managing a whole peat ecosystem as there were many actors involved:
“The secret to effective water management on peat is elusive, nobody has really pinned it down, and it’s done by trial and error. People say use science and use the best technology. If you control the whole ecosystem of peat, that’s possible but that seldom happens. That’s why we will always have this battle to manage the water on peat; that’s really the biggest gap.” (N19, 2012)

There also wasn’t a system of addressing peatland areas that lie outside of protected areas, according to a senior manager of an NGO:

“The integrity of the current peatland areas is ineffective because we’ve not had a system of addressing those areas that are outside the protected areas. It’s unfortunate that peatland management needs the whole area to come under some kind of management; and that we don’t have the tools or the systems to do that. Often this is seen in isolation and that is the biggest issue or weakness.” (N9, 2012)

Informants also pointed out that there was no policy that considered any incentive or payment for the ecosystem services provided by peatlands and peat swamp forests, as alluded to by a senior technical manager of a government agency:

“One thing that all these policies and laws fail to address is providing incentives to the services provided by the ecosystem.” (N2, 2012)

A senior technical officer of an NGO suggested that present policies will need to be revised to consider incentives for peatlands and peat swamp forests:

“We are using existing policies that are not targeted at peat swamp forests. For carbon financing in Peninsular Malaysia, the Forestry Department originally said we could not do it. It was not possible because there were no provisions in the Forestry Act that allowed them to trade carbon. In Sabah, they revised the State Forest Ordinance to make carbon a resource to make it easy for them to do their work [on carbon trading].” (J1, 2012)

Another area where incentives were needed was for rehabilitation of peatlands used for oil palm, according to a senior officer with the government agency:

“We need more stringent regulations and incentives for oil palm on peat, incentives for replanting, planting materials and the need to comply with certain conditions.” (N10, 2012)

Another gap that was identified by a scientist with an academic institution was the lack of clarity of the rights of the Orang Asli living in the vicinity of peatlands:
“Stopping the public from removing resources from peatlands depends on the local situation. When it comes to the Orang Asli, the Government has to be a little flexible because of the issue of politics and human rights. Firstly, the Orang Asli can claim that the land was originally theirs; that the exploitation of resources from the peatlands is their traditional livelihood, which is protected by the human rights conventions.” (N31, 2012)

A senior manager of an NGO observed how development and conversion of forested lands in the states could influence the availability of forest produce for the Orang Asli and therefore influence their livelihoods indirectly:

“As a result of development, the Orang Asli lost their subsistence [from the forest] and they go and catch wildlife in other areas and they get penalised for poaching.” (P5, 2012)

6.2.4 Variation among Informant Groups

Most informants from government agencies, government-linked agencies, private companies and NGOs cited the National Forestry Policy as the main policy concerned with peatland and peat swamp forest management, but they differed when citing other related policies (Table 6-5). Only informants from academic institutions did not think the National Forestry Policy was especially important. Informants from government agencies, private companies, NGOs and academic institutions also cited State Land Use Plans as being important, but this was not considered as important by government-linked agencies. Informants from government agencies, government-linked agencies and NGOs named the National Agricultural Policy, while government-linked agencies also cited the National Policy for Wetlands as being important. Those from private companies listed the National Policy on Biological Diversity and the National Policy on the Environment as being important while informants from NGOs thought Development Policies were also affecting peatland and peat swamp forest management. Informants from academic
institutions cited State Land Use Plans as the main policy impacting peatlands and peat swamp forests and they alone identified the Federal Constitution as important. While informants from NGOs, academic institutions and government-linked agencies felt that there were gaps in the policies related to peatland and peat swamp forest management, fewer informants from the private sector and government agencies felt the same (Table 6.6).

### Table 6.6: Frequency (%) with which the key informant groups referred to selected policies and plans for peatland and peat swamp forest management in Peninsular Malaysia

<table>
<thead>
<tr>
<th>Policies and Plans</th>
<th>GA</th>
<th>GLA</th>
<th>PC</th>
<th>NGO</th>
<th>AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Forestry Policy</td>
<td>50</td>
<td>50</td>
<td>65</td>
<td>75</td>
<td>17</td>
</tr>
<tr>
<td>State Land Use Plans</td>
<td>50</td>
<td>33</td>
<td>53</td>
<td>56</td>
<td>50</td>
</tr>
<tr>
<td>National Agricultural Policy</td>
<td>50</td>
<td>50</td>
<td>47</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Development Policies</td>
<td>23</td>
<td>33</td>
<td>47</td>
<td>69</td>
<td>33</td>
</tr>
<tr>
<td>National Policy on Biodiversity</td>
<td>45</td>
<td>17</td>
<td>71</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>National Physical Plan 2</td>
<td>41</td>
<td>17</td>
<td>35</td>
<td>38</td>
<td>17</td>
</tr>
<tr>
<td>National Policy on the Environment</td>
<td>45</td>
<td>0</td>
<td>53</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>National Policy on Wetlands</td>
<td>27</td>
<td>50</td>
<td>24</td>
<td>31</td>
<td>0</td>
</tr>
<tr>
<td>Federal Constitution</td>
<td>9</td>
<td>33</td>
<td>41</td>
<td>19</td>
<td>50</td>
</tr>
<tr>
<td>National Action Plan for Peatlands</td>
<td>32</td>
<td>33</td>
<td>18</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>National Policy on Climate Change</td>
<td>27</td>
<td>17</td>
<td>12</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>National Water Resources Policy</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Gaps in policy</td>
<td>36</td>
<td>50</td>
<td>47</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>n</td>
<td>22</td>
<td>6</td>
<td>17</td>
<td>16</td>
<td>6</td>
</tr>
</tbody>
</table>

6.2.5 Status of Current Peat-Related Policies in Peninsular Malaysia

6.2.5.1 Benefits of Current Peat-Related Policies

Among the benefits highlighted by the key informants for the current peat-related policies were that people were able to utilise peatlands for agriculture for quick economic gains through oil palm plantations and other agriculture; that the forest management systems were more sustainable through certain guidelines such as the Malaysian Criteria and Indicators in the certification process; that the agencies’ ability to monitor peat fires in land that was unused for commercial purposes had increased; and that through a few national projects there had been increased appreciation of the role of peat swamp forests as carbon sinks and this had managed to stop a plan to build a road through a peat swamp forest in Pahang.

6.2.5.2 Challenges of Current Peat-Related Policies

In addition to the factors driving policy implementation, gaps in policy and the implementation enablers identified by key informants, some of the main challenges of current peat-related policies acknowledged by informants were managing peatlands and peat swamp forests as integrated ecological units so that they met all the conflicting demands for land use; securing the support of states for policies that were formulated at the national level to meet international obligations; ensuring a more coordinated approach towards the management of peatlands and peat swamp forests when the issue was under the jurisdiction of three ministries currently the Ministry of Plantations and Commodities (for peatlands planted with oil palm), the Ministry of Agriculture (for peatlands planted with other crops) and the Ministry of Environment and Natural Resources (for other peatland areas).
6.3 Discussion

Qualitative public policy analysis involves using interviews and document analysis to provide depth in understanding of the issue being studied and thereby increase the researcher’s ability to provide meaning to otherwise ambiguous observations and statements (Lewis and Ritchie, 2003; Tierney and Clemens, 2011, Owen, 2013). The approach is also advantageous because, when comparing the knowledge of key informants with analysis of policies from documents, risks associated with framing the issue being analysed from a single perspective are overcome (Tierney and Clemens, 2011; Owen, 2013). In this study, qualitative analysis was also able to widen the scope of analysis to explore alternative explanations for why public policies on peatland and peat swamp management in Peninsular Malaysia might be failing to halt the degradation of peatlands and peat swamp forests and to stop peat fires and the occurrence of haze.

6.3.1 Nature of Policies

6.3.1.1 Plans related to Peatlands and Consistency with other Policies
There are no policies in Peninsular Malaysia that directly concern the management of peatlands and peat swamp forests. Instead there are contradictions in existing policies with some containing principles that create risks to the persistence of the peat ecosystem if implemented (Table 6.7).

An example is the National Agricultural Policy which aims to increase food productivity and strengthen the oil palm sector to generate new sources of revenue. This is having a continuing impact on peatlands where the areas of food production and oil palm expand into peatland and peat swamp forest areas (Wetlands International, 2010; Wicke et al, 2011; Koh et al, 2011). Agriculture on peatlands, which normally involves drainage through the digging of canals, can also lead to either flooding or fires depending on the water management regime (Page et al, 2009; Lim et al, 2012). Similarly, questions have been raised regarding the sustainability of management regimes imposed by the National Forestry Policy in Permanent Reserved Forests and whether they suit the special requirements of the peat ecosystem (Davies, 2011) given that the management regimes proposed describe mostly dryland conditions (Ismail and Ismail, 2011; Ismail et al, 2011). Additionally, peat swamp forests that are not classified as Permanent Reserved Forests are not subject to the same principles of management when logging is carried out or when these forests serve as catchment forests, wildlife sanctuaries or as forests for research.

In the case of the National Policy on Biological Diversity, the Federal Council on Biological Diversity was set up to ensure that any discrepancy or conflict in the implementation of the policy could be addressed. However, it does not have the
legislative authority to insist that State Governments adhere to the principles of biodiversity conservation in development projects but can only provide advice (Ministry of Natural Resources and Environment, 2012). The National Wetland Policy has had weak implementation arrangements and has been ineffective in providing the multi-sectoral approach to management of wetlands for which it was intended (N11, N25, J1 and P1). Limited protection was also accorded to peatlands and peat swamp forests against drainage and other development activities through the National Policy on the Environment as it makes no special provision for activities involving peatlands or peat swamp forests (N14 and N33, 2012). Development policies which aim to maximise economic growth through establishing economic corridors and value-adding activities for timber and palm oil products also impose risks from expansion of these areas into peatland and peat swamp forest areas (Wetlands International, 2010; Wicke et al, 2011; Koh et al, 2011).

Many of the potential risks to peatlands and peat swamp forests posed by the national policies discussed above have been considered in the Malaysian National Action Plan for Peatlands (NAP) and there are plans to address some of these issues (Table 6.6). For example, there are plans in the NAP to develop national guidelines for, and undertake monitoring of, peatland areas to ensure that expansion into peatland areas are legitimate and implemented according to the prescribed measures. The NAP also plans to promote best management practices (BMPs) for agriculture on peatlands and research the hydrology of peatlands for recommendations for BMPs. In terms of timber harvesting, the NAP plans to develop and implement post harvesting rehabilitation of peat swamp forests as well as integrated management of the peat ecosystem. It will also identify areas for
conservation and strengthen fire prevention measures. However, these initiatives have remained plans since the adoption of the NAP by the Malaysian Cabinet as implementation mechanisms have yet to be put in place and it has yet to be launched (N11, 2014). The National Steering Committee formed through the National Wetland Policy, which was also meant to oversee the implementation of the NAP, has started meeting again although infrequently and State Working Groups for peatlands are yet to be formed (N11, 2014). Until and unless these committees are formed and start functioning effectively, it will be difficult to determine whether the recommended actions outlined in the NAP are able to address the inconsistencies in Peninsular Malaysia’s policies with regards to peatlands and their potential risks to peatland degradation.
Table 6.7: Consistency of selected policies in Peninsular Malaysia with National Action Plan on Peatlands

<table>
<thead>
<tr>
<th>Policies/ Plans</th>
<th>Main Principles related to Peatlands</th>
<th>Potential Risks to Peatlands</th>
<th>Consistency with NAP on Peatlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Agricultural Policy includes the National Commodity Policy</td>
<td>Aims to increase food productivity and strengthen the oil palm sector to generate new sources of revenue and increase the number of smallholders and entrepreneurs</td>
<td>Food production areas and oil palm plantations expand into peatland areas</td>
<td>Plans to develop national guidelines for and undertake monitoring of peatland areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significant risks (e.g. flooding and fires) with using peatlands for agriculture</td>
<td>Plans to promote best management practices for agriculture on peatlands</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management regimes in peat swamp forests not sustainable</td>
<td>Plans to undertake research in peatland hydrology</td>
</tr>
<tr>
<td>National Forestry Policy</td>
<td>Manages Permanent Reserved Forests for logging, catchments, wildlife, education and research</td>
<td>Management regimes in peat swamp forests not sustainable</td>
<td>Plans to develop and implement post harvesting rehabilitation of peat swamp forests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No special arrangements for peat swamp forests and ecosystem</td>
<td>Plans to develop integrated and sustainable forest management plans and guidelines for peatland forests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Areas not under PRF not managed</td>
<td>Plans to develop national guidelines for and undertake monitoring of peatland areas</td>
</tr>
<tr>
<td>Policies/ Plans</td>
<td>Main Principles related to Peatlands</td>
<td>Potential Risks to Peatlands</td>
<td>Consistency with NAP on Peatlands</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>National Policy on Biological Diversity</td>
<td>To enhance the conservation of the country’s biological diversity through streamlining biodiversity into development plans</td>
<td>Federal council does not have legislative authority, advice not mandatory</td>
<td>Plans to identify specific peatland areas for conservation</td>
</tr>
<tr>
<td>National Policy on Wetlands</td>
<td>To enhance the management of wetlands</td>
<td>Poor implementation so not effective in managing wetlands</td>
<td>Plans to review policy to enhance its effectiveness</td>
</tr>
<tr>
<td>National Policy on the Environment</td>
<td>Promotes management of natural resources through integrated development planning and includes plans for managing wetlands</td>
<td>Limited protection to peatlands against development</td>
<td>Plans to strengthen fire prevention in fire prone areas</td>
</tr>
<tr>
<td>Development Policies</td>
<td>To maximise economic growth through adding value to timber and palm oil products, and through economic corridors which will involve road construction</td>
<td>Timber in peat swamp forest becomes target for increasing revenue</td>
<td>Plans to develop and implement post harvesting rehabilitation of peat swamp forests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil palm plantations expand into peat areas</td>
<td>Plans to develop national guidelines for and undertake monitoring of peatland areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Road construction expands onto peatland areas</td>
<td>Plans to develop national guidelines for and undertake monitoring of peatland areas</td>
</tr>
</tbody>
</table>
6.3.1.2 How Selected Plans relate to Case Study Sites

Several inconsistencies appeared when analysing the land use plans at the federal, state and district levels relating to the three case study sites for this study. The National Physical Plan-2 provides some indication of the importance of peat swamp forests for conservation and for maintaining ecosystem services and the State Structure Plans for the three case study sites outline the forest reserves as Environmentally Sensitive Areas. While the activities within the forest reserves might be controlled, activities in the immediate vicinity of the peat swamp – such as agriculture and road construction - could affect the peat ecosystem within the forest reserves. There were no indications in any of the State Structure Plans of any mitigation actions for these activities. Inconsistencies were also evident in District Local Plans where the peat swamp forests were located; agriculture activities were being carried out in the immediate vicinity of the peat swamp. Highways and rail transit lines have been proposed to cut through peat swamps.

Overall there appeared to be little consideration of the need to manage peatlands and peat swamp forests as an ecosystem and in an integrated manner involving all relevant sectors and stakeholders, especially where peatlands and peat swamp forests straddled different administrative boundaries and land use zones (Parish et al., 2008). Nor was management adopting an ecosystem approach (Section 4.3.2.1), which takes into consideration upstream and downstream habitats, as well as competing land uses (CBD Secretariat, 2004; Ramsar Convention Secretariat, 2007).
6.3.1.2.1 National Physical Plan-2 (2010-2020)

The principle and strategy outlined in the NPP-2 that has an indirect bearing on the conservation of peatland areas is the proposal to integrate land use with natural resource planning and management, especially in Environmentally Sensitive Areas (ESAs) identified in the NPP-2. ESAs have been identified in the 10th Malaysia Plan (2011) which "serve as biodiversity reservoirs and watershed areas" and are of "critical importance in terms of the goods, services and life-support systems they provide" and "as areas where limited or no development will be permitted" (NPP-2, 2010). Of the three case study sites, only the Southeast Pahang was named in the NPP-2 as one of 18 "most important areas" to be included as an ESA.

The NPP-2 also recommended that National Action Plans be formulated for the wise use, conservation and protection of high conservation value areas, including natural wetlands and acknowledged the importance of peatlands as carbon sinks. It also noted that "the two major peat swamp forest complexes in North Selangor and Southeast Pahang have been severely degraded or converted to agriculture" and mentions that efforts were being made to sustainably manage and rehabilitate these areas. The Ayer Hitam Forest Reserve in Johor appears as forest on a map of existing land uses in the NPP-2 but there is no specific mention of any plans for conservation or rehabilitation of this area.

Despite these proposals for conservation and sustainable management of peat swamp forest complexes in the NPP-2, there are strategies in the Plan that involve the establishment of development corridors and sub-development corridors which run close to the three case study sites (Figure 6.5) and include peat land outside the
FRs where development could affect the peat swamp hydrology. The North-South Corridor runs along the west of the North Selangor Peat Swamp Forest and the Ayer Hitam Forest Reserve in Johor, while the Kuantan-Muar Sub-Corridor affects both the Southeast Pahang Peat Swamp Forest and the Ayer Hitam Forest Reserve. In addition to industrial development, new major highways and agriculture developments (i.e. oil palm, crops and livestock) in these areas have also been initiated. Complementing these development initiatives is the East Coast Economic Region, which includes the Mersing-Rompin Special Economic Zone where development is said to be focused on key areas such as oil, gas and petrochemical manufacturing as well as agriculture and oil palm (10th Malaysia Plan, 2011), all of which pose potential risks to the Southeast Pahang Peat Swamp Forest ecosystem.
Figure 6.5: Development and sub-development corridors identified in the National Physical Plan-2
6.3.1.2.2 State Structure Plans (2002-2020)

The principles of the NPP-2 are translated into State Structure Plans (2007) for the states of Selangor, Pahang and Johor and all three case study sites have been identified as Permanent Reserved Forests in the respective Structure Plans.

The North Selangor Peat Swamp Forest was identified as a Permanent Reserved Forest (PRF) in the Selangor State Structure Plan (2007) and was also listed as an Environmentally Sensitive Area (ESA); other areas listed as ESAs were steep slopes, islands, water catchments and granary areas. According to the Structure Plan, the State plans to retain forest cover of at least 30% as Permanent Reserved Forests or conservation areas. Buffer zones of Permanent Reserved Forests were also to be established in the form of forests on steep land adjacent to the forest reserves. However, this is not evident in the areas immediately adjacent to the North Selangor Peat Swamp Forest, which are lowlands, have been named as ‘Agro Valley’ where intensification of current agricultural practices would be promoted as part of the state’s food security plans (Selangor State Structure Plan, 2007). Towards this end, the Plan also proposes to “identify and develop abandoned land for agriculture”, particularly for oil palm and rice cultivation – abandoned land in this case being alienated land that has not been designated for other purposes (Selangor State Structure Plan, 2007). Similar to the development corridors in the NPP-2, the Selangor State Structure Plan also identified a strategic development network comprising highways and secondary linkages between towns in the state. Some of these networks, such as the link between Kuala Selangor-Bestari Jaya-Bukit Beruntung-Batang Kali, could affect the hydrology of the peat ecosystem in North Selangor. The ecological needs of the North Selangor Peat Swamp Forest are notably absent from planning for development of the area.
The Pahang State Structure Plan (2007) was also written to comply with the recommendation in the NPP-2 for the Southeast Pahang Peat Swamp Forest to be included as an Environmentally Sensitive Area. Guidelines for its development and integrated management would be implemented under the plan. It also states that it takes into consideration other ESAs in Pahang identified in the NPP-2 and streamlines these areas into the overall state and local planning regimes. The Structure Plan also acknowledged the need to expand the conservation area within the State as identified in the NPP-2 to include “lowland dipterocarp forests and wetlands,” and plans to maintain the forested area in the State at about 55% of the total land area until 2020. Also included in the Plan were measures to reduce flooding by maintaining the forest reserves and building retention ponds. Agricultural development plans are also outlined which include oil palm and rubber (currently covering 95% of the total agricultural lands) and other types of crops (5% of agricultural land) and the Plan proposes that c. 20,000 ha of Stateland be re-gazetted for agricultural development. Other agricultural development plans in the Southern Development Zone in the State (i.e. Pekan and Rompin) include improving infrastructure for rice cultivation, aquaculture activities, integrated oil palm and animal husbandry (i.e. cattle) and forest plantations, all of which need to be integrated with plans to retain peat swamp forests in the area. Similarly, a new Kuantan-Pekan-Rompin road that is expected to be built by 2015, in line with its plans for improving the road system, could impact the Southeast Pahang Peat Swamp Forest area but no mitigation action is discussed in the Structure Plan.

The Ayer Hitam Forest Reserve has been designated as a Permanent Reserved Forest in the Johor State Structure Plan (2007), which means that development in
the area should be avoided. The forest reserve is isolated from other, larger forested areas and makes up a small portion of the 13,000ha of peat swamp forest in the State (which is mostly on the east and southeast of Pahang). Therefore, it does not enjoy the level of protection accorded to the other forested areas as evidenced by the development planned for areas immediately adjacent to the FR. The Structure Plan outlines plans for the East-West Development Corridor which includes the construction of a link road for Batu Pahat-Air Hitam-Kluang-Jemaluang-Mersing. Although the road link does not directly affect the Forest Reserve, the road link would make the area more accessible and open to encroachment and therefore would require enhanced management and enforcement to ensure it retained its existing values.

6.3.1.2.3 Local Plans (2002-2015)

The district Local Plans provide details of the development activities according to those outlined in the respective State Structure Plans.

The North Selangor Peat Swamp Forest falls under the jurisdiction of two districts, Kuala Selangor and Sabak Bernam districts. About 43,000 ha of the Raja Musa and Sg Karang Forest Reserves is situated under the Kuala Selangor District and the rest within the Sabak Bernam District. The Forest Reserve is featured in the Kuala Selangor District Council Local Plan (2007) and the Sabak Bernam District Council Local Plan (2007) as a conservation area; both plans were prepared to conform to the Selangor State Structure Plan (2007). According to the land use maps in both of the Local Plans, there is no buffer zone between the Forest Reserves and other land uses surrounding it. The North Selangor Peat Swamp Forest is flanked by the Tanjung Karang and Sekinchan rice fields while the new Bestari Jaya Township is to
the south of the peat swamp. To the southwest and north of the Peat Swamp Forest are agricultural zones where the main crop is oil palm. The Sabak Bernam District Local Plan also outlines plans to build a highway along the main canal of the peat swamp forest which cuts through a portion of the swamp in the northwest section and could isolate it from the other parts of the peat swamp forest. The Local Plan acknowledges that clearing of the peat swamp area for development could lead to fires as a result of the peat drying, and recommends a 60 m buffer zone within the forest reserve for any development plan. These activities do not conform to the requirements of an Environmentally Sensitive Area where development should be controlled and minimised. It also does not consider the need for managing the peat ecosystem as one hydrological unit. Additionally, there is no mechanism for the two district councils to come together to plan for the management of the peat swamp forest as one whole system.

Most of the Southeast Pahang Peat Swamp Forest falls within the Pekan District and its land use is planned for in the Local Plan (2006); a small portion of the Resak Forest Reserve comes within the Rompin District Local Plan (2007). The Pekan District Local Plan marks out the four Forest Reserves that form the Southeast Pahang Peat Swamp Forest (Pekan, Kedondong, Nenasi and Resak) and identifies them as one of the ESAs identified in the NPP-2. However, there are inconsistencies in plans for the forested area (Stateland) around these Forest Reserves. In one map of the Local Plan, the area is listed as proposed to be included as Permanent Reserved Forests and in another map, it is listed as a potential area for development including for agriculture (particularly oil palm), aquaculture and ecotourism. In another map, the same area is marked out as a special resource development area (classified as Class 3 of ESA) where developers
of the land would need to prepare guidelines to propose mitigation action for their development activities. The Rompin District Local Plan also identifies the southern part within the Resak Forest Reserve as a proposed agriculture area for oil palm, cash crops and coconuts. The proposed Rapid Rail Transit for central Rompin is also expected to cut across a section of this Forest Reserve. These inconsistencies in land use would certainly affect the way management for the area is carried out.

The Ayer Hitam Forest Reserve falls within the jurisdiction of the Muar District Local Plan (2007) and the Batu Pahat District Local Plan (2007) and has been included as an ESA (Class 1 where no development is permitted). It is noted for its important role in flood mitigation in the Muar District Local Plan. However, agriculture development (i.e. oil palm) has been planned for the areas immediately adjacent to the northern and southern sections of the Forest Reserve. No buffer zone has been included in the areas between the Forest Reserve and the agriculture zone. There is also a state road system on the western side of the Forest Reserve which is likely to increase its isolation from other natural systems and affect the hydrology of the peat swamp. A few areas surrounding the Ayer Hitam Forest Reserve have been described as controlled areas because of the risk of soil erosion (erosion between 50-150 tonnes) and where monitoring for open burning is also meant to be enhanced.

6.3.2 Knowledge of Informants

6.3.2.1 Extent of Knowledge of Policy of Informant Groups

An assortment of policies and plans relating to peatlands and peat swamp forests were identified by key informants who were interviewed based on the main uses of peatlands and peat swamp forests. However, key informants were generally not
informed of details of the policies and knew little of the actual relevance of the policy to peatland or peat swamp forest management. Those who were from government agencies were more aware of policies relating to their sectors, for example, those from the Forestry Department knew more about the National Forestry Policy and similarly, those from the Department of Agriculture knew more about the National Agricultural Policy, which was to be expected. The same was true of informants from the other four informant groups; informants from government-linked agencies who were involved with forestry issues were more aware of the principles of the National Forestry Policy and informants from conservation organisations were more aware of the National Policy of Biological Diversity, for example. The reason for this is likely to be that policies that relate directly to the work of the informants are considered when they carry out their work tasks; the approach in many agencies and organisations is still very much according to their own sectors.

Cross-cutting plans such as State Land Use Plans, development policies and the National Physical Plan were poorly understood by most informant groups, even those from government agencies who were interviewed. Although some of the key informants mentioned some of these policies, many of them were unsure about the finer details of the policy. For example, only a handful of the informants mentioned the State Structure Plans and Local Plans when discussing the NPP-2 and how the federal spatial plan was translated into state and local plans through the Structure and Local Plans. Additionally, only a handful of them knew about the details in the respective Structure and Local Plans. Key informants were also unaware of the implementation plans and arrangements for these plans, especially where they differed among States. Unless the informants were directly involved with implementation of these plans at the State level or experienced with working with
the State agencies, they were mostly unaware of State mechanisms for policy implementation.

Key informants were also generally unclear about some of the other cross-cutting policies and plans mentioned such as the National Policy on Wetlands, National Policy on Climate Change and National Action Plan on Peatlands. This was perhaps due to the weak implementation arrangements because the implementing agency was either ineffective or missing altogether (discussed further in Section 5.4.4. below).

6.3.2.2 Extent of Differences among Informant Groups

Four of the informant groups – informants from government agencies, government-linked agencies, the private companies and NGOs - cited the National Forestry Policy as the most important policy related to peatlands and peat swamp forest management (Table 6.6) as it is one policy that mentions peat swamp forests and has been implemented since 1976. Among the principles in the National Forestry Policy are management regimes for reduced impact logging and for the commercially valuable timber species Ramin (Ibrahim, 1997; Sawal, 2004; Ismail et al., 2011; Davies, 2011); the importance of timber to the country’s economy (Garret et al., 2010) has raised awareness among these groups of informants about the issues related to peatlands and peat swamp forest management.

Informants who did not feel that the National Forestry Policy was important were those from academic institutions. It was also the only informant group that did not mention the National Agricultural Policy as being important. Informants from this group were mainly social science researchers who focused their research on
community involvement in peatland and peat swamp forest use and management, and had little interest in forestry or logging issues, or in diseases of crops, crop productivity and food security (i.e. issues which were the main principles of the National Agricultural Policy and National Forestry Policy). However, it was this group that pointed to the Federal Constitution (especially on the issue of the State’s authority over land and forests) when discussing policies affecting peatlands and peat swamp forests as their research focused on land rights, an issue was intricately related to the Federal Constitution.

Four informant groups - government agencies, the private companies, NGOs and academic institutions - also cited State Land Use Plans as an important influence on peatland and peat swamp forest management. The informant group that didn’t think State Land Use Plans were as important was the group from government-linked agencies. These informants usually carried out research based on priorities identified by the government and were not usually involved in making decisions on land use. As a result and because of their links to federal government agencies, they rarely dealt with government agencies at the state level in a decision-making capacity. Therefore, it is highly likely that the impact of State land use decisions had not featured in their research, which focused on issues such as carbon content (Ahmad Shukri et al., 2011; Paramananthan, 2011), GHG emissions (Melling et al., 2005; Melling et al., 2006), impact of logging methods in peat swamp forests (Ismail and Ismail, 2011; Ismail et al., 2011), the control of diseases of oil palm in plantations (N13, 2012), or the viability of a crop in peatlands (N15, 2012). Government-linked agencies instead thought that the National Wetland Policy was important in considering peatland and peat swamp forest in Peninsular Malaysia, although some informants highlighted that the implementation mechanism for the
Policy was weak (Informants P1 and N11, 2012). From a theoretical perspective, the Policy has the potential to fulfil many of the needs of a policy for peatland and peat swamp forest management if its effectiveness was enhanced. This was the focus of informants from government-linked agencies.

Informants from the private companies also specifically found the National Policy on Biological Diversity and the National Environment Policy to be important in relation to the management of peatlands and peat swamp forests. One of the areas of research that the government has been emphasising on in recent annual budgets is the area of biotechnology and pharmaceuticals (10th Malaysia Plan, 2010), and the private sector in Peninsular Malaysia has responded with enthusiasm. Their interest in research on genetic resources and other aspects of biodiversity that are related to biotechnology and pharmaceuticals has increased (International Service for the Acquisition of Agri-Biotech Applications, 2013). Furthermore, private companies are now interested in the way genetic resources may be accessed and how users and providers reach agreement on the equitable sharing of the benefits that might result from their use. These rules of access and benefit sharing are related to the National Policy on Biological Diversity (Ministry of Natural Resources and Environment, 2012), which was developed according to the requirements of the Convention on Biological Diversity (CBD Secretariat, 2011). In the case of the National Environment Policy, it is the private companies that are usually involved in carrying out Environmental Impact Assessments and recommending mitigation action for the various development activities that require an EIA. However, while it is not surprising that the requirements of the EIA under the National Environment Policy would be considered important to informants from private companies, it is telling that the other groups paid little heed to it.
Informants from NGOs, more than any other informant group, highlighted the importance of development policies in influencing peatland and peat swamp forest management. Development policies which focus on economic growth have the tendency they feel to consider only the benefits of economic progress, sometimes at the expense of the country’s environment and natural resources.

### 6.3.2.3 Gaps Identified by Informant Groups

Most of the informants who thought that policies relating to peatlands and peat swamp forests were adequate were from government agencies (Table 6.8) who were generally satisfied with current uni-sectoral management arrangements. The Forestry Department has a general framework to guide the logging activities through the National Forestry Act 1984, and it is understandable that they would see no need for changes. Similarly, policies already pose restrictions on agriculture in peatlands and it would be surprising if officers from the Agriculture Department felt further additional restrictions were needed, wanting instead to make more land available to achieve food security targets. The Drainage and Irrigation Department would also be governed by the Drainage Works Act 1954, and would follow requirements set by the principles in the Act.

Of key informants who thought the current peat-related policies were inadequate, a majority of them were from NGOs (Table 6.8) who have been advocating a more integrated approach to the management of peatlands and peat swamp forests based on an ecosystem approach. A majority of the current peat-related policies, with the exception of the National Policy on Biological Diversity and the National Wetlands Policy, are uni-sectoral in their approach. However, while both these
policies try to employ a more integrated approach to management, their implementation has been hampered by a lack of support in terms of institutional arrangements.

Informants from private companies were divided in their responses, with some of them feeling that policies were adequate and others less convinced. All, however, acknowledged that there were policies directly relevant to peat (Table 6.8). Informants from private companies ranged from agronomists and those involved with oil palm plantations governed by company policies, to those involved with management or local communities who dealt with a multitude of policies. Those from the former group were more likely to consider policies to be adequate while those from the latter group were less satisfied. By contrast, no informants from government-linked agencies felt that there were policies which related directly to peatlands and peat swamp forests. Informants in this group were involved with research on the effectiveness of some of the government policies and therefore, were particularly aware of the gaps in existing policies.

Three groups of informants – those from government agencies, the private sector and NGOs – identified the two main gaps discussed in the study, the failure in the implementation of policies at the state level and the need for policies to address the peat as an ecosystem. Two other informant groups – the government-linked agencies and academic institutions did not identify these issues as being gaps in policy. These two groups also did not feature prominently in discussions on whether peat-related policies were adequate or not, having less experience in dealing with policy matters.
Table 6.8: Frequency (%) of key informant groups’ responses to questions about the adequacy of and gaps in peatland policies

<table>
<thead>
<tr>
<th>Are policies related to peatlands adequate?</th>
<th>GA</th>
<th>GLA</th>
<th>PC</th>
<th>NGO</th>
<th>AI</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>41</td>
<td>10</td>
<td>31</td>
<td>10</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>0</td>
<td>36</td>
<td>36</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>There are no policies relating to peat</td>
<td>33</td>
<td>25</td>
<td>0</td>
<td>33</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Gap in implementation at state level</td>
<td>21</td>
<td>8</td>
<td>33</td>
<td>33</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Gap in policies relating to peat as an ecosystem</td>
<td>28</td>
<td>11</td>
<td>22</td>
<td>33</td>
<td>6</td>
<td>18</td>
</tr>
</tbody>
</table>


6.3.3 Gaps in Policy from Documentary Evidence and Interviews

The need to integrate environmental considerations into national socio-economic planning is now widely recognised (Rose, 2011) as it can minimise potential environmental damage or prevent the occurrence of environmental problems. Although resource conservation legislation incorporate a wide range of environmental management concerns, including water resources protection and conservation, land use management, existing defects in legislation make the administration of conflicting demands on resources difficult to manage. The implementation of legislation that covers cross-sectoral issues as environmental management inevitably requires further enabling legislation; the basic framework
can remain intact but the legislation is reformulated to accommodate socio-economic and ecological factors. A comparison of documentary analysis and interviews highlighted several gaps in policy that exist for peatlands and peat swamp forests in Peninsular Malaysia. The gaps identified are in policy on management of peat swamp forests, policy on natural resource management and carbon rights, policy on peat as an ecosystem, and policy related to Orang Asli rights.

6.3.3.1 Gaps in Policy on the Management of Peat Swamp Forests

One of the gaps in policies identified by key informants was state-level policies on the management of peatlands and peat swamp forests. The division of powers between the Federal and State Governments (and their agencies) poses a challenge for policies that are formulated at the federal level and meant for implementation at the state level (Lee and Krishnapillay, 2003). For example, while the Federal Government does have some power over forestry-related issues, it is the States that are responsible for regulating the forestry sector. The powers of the Federal Government include planning for resource conservation and local development (through the Local Plans and State Structure Plans related to the National Physical Plan) as well as oversight on matters such as regulations on forested catchments (Rae et al., 2011). However it is hard for the Federal Government to insist on implementation of its policies when State Governments not only have the head of power over local land-use decisions but also when resource rents are among the few ways the States can derive revenue. In essence, the Federal Government can only insist on the implementation of its policies if it provides the financial support to the State Government in lieu of revenue from local land use rents that the State Governments would have otherwise generated.
In Peninsular Malaysia peat swamp forests may be represented under any one of the categories of forested lands under the National Forestry Policy (i.e. Totally Protected Areas, Permanent Reserved Forests or Stateland) and are defined differently according to their functions. Stateland is land owned by the State Government and is essentially viewed as a land reserve for development. The Federal Government would find it hard to meet the objectives of the National Forest Policy where the policy conflicts with plans to develop State forest lands for other purposes.

Of the remaining peat swamp forests in Peninsular Malaysia, about 67 per cent are estimated to be within the category of Permanent Reserved Forests (UNDP, 2006) and are classified as production forests. This means that they are either being logged or have been scheduled for logging, and so managed according to the National Forestry Policy and the National Forestry Act 1984. Under this Policy, the Forestry Department adopted a forest management approach in Peninsular Malaysia in 1978 called the Selective Management System (SMS) for the selective removal of the mature crop in a single operation (Lee et al., 2001). The SMS has involved a management regime to optimize not only the objectives of efficient and economic harvesting, utilization, and reforestation but also to ensure that forest development is biologically, ecologically and environmentally sustainable (Mok, 1992).

Ismail and Ismail (2011), however, pointed out that the SMS was actually developed for hill forests and is not suitable for use in peat swamp forests. The stand structure of peat swamp forests is different from that of hill forests (Shamsuddin, 1997) and the management system for peat swamps needs to be modified to suit their different
conditions. In 2011, the Forest Research Institute of Malaysia (FRIM) initiated a specific study at the South East Pahang Peat Swamp Forest to develop an appropriate optimum harvesting system for the peat swamp forest in view of the fact that a proper management system was still lacking (Ismail and Ismail, 2011). Modifications to the SMS are thus anticipated to ensure that peat swamp forests are being managed appropriately. This doubt about existing policy, however, was not mentioned by the government informants, who are those most closely associated with its implementation.

The remaining 33% of the peat swamp forests in Peninsular Malaysia falls under the category of Stateland forests (UNDP, 2006) and is thus directly under the purview of the State Governments. These areas are currently being managed according to state policies and plans, such as State land use, management and structure plans as well as local plans. These plans provide for infrastructure development (Economic Planning Unit, 2004) and guidelines for environmentally sensitive areas (Section 5.4.1.2) but no specific plans are included to accord specific protection status or outline a specific management regime for peat swamp forest areas. Site-level integrated management plans, on the other hand, have been developed for specific sites that have been set aside by the State Governments for integrated management - i.e. the North Selangor Peat Swamp Forest Integrated Management Plan which is currently being reviewed (S3, 2013) and the South East Pahang Peat Swamp Forest Integrated Management Plan which was completed in 2008. However, it is left entirely to the State Governments to decide how and to what extent these integrated plans will be implemented.
6.3.3.2 Gaps in Policy on Natural Resource Management and Carbon Rights

Like plans for forested lands, other natural resource management plans at the state level are also limited in their scope. As Hasmah (1994) pointed out, the management of natural resources which includes water resources, mining, wildlife and fisheries, goes beyond the scope of the Environmental Quality Act 1974 and the role of the Department of Environment. The scope of many federal policies and laws in the States is limited, and the bulk of legislation on natural resource and environmental management comprises State-enacted laws (Memon, 2000). State government decisions over the allocation and management of these resources tend to be politically sensitive issues and the Federal Government has to tread warily to avoid being perceived as interfering in State matters (Memon, 2000). Regulatory requirements and laws that provide guidance for the maintenance of conservation areas and river reserves in Peninsular Malaysia are also limited (Lim et al., 2012).

Another area where policy on natural resource management is lacking is in the area of carbon rights and who exactly owns the carbon stored in peatlands and peat swamp forests. The National Forestry Act does not currently include carbon so inclusion of carbon would need an amendment of the law (UNDP, 2013). The debate regarding rights over carbon has parallels with experiences in other property rights systems, such as the development of intellectual property rights over traditional biodiversity knowledge. In this instance, under a proposed national access and benefit-sharing law to fulfil Malaysia’s international obligations under the
Convention on Biological Diversity, all State Governments are expected to agree to allow the Federal Government to act upon matters that otherwise fall within the States’ exclusive jurisdiction (Nijar, 2012). The jurisdiction of this law is expected to extend to traditional knowledge associated with biological resources. Consultations with stakeholders, including State Governments, are under way and the proposed law will preserve the States’ autonomy by granting the administration of the access and benefit-sharing law related to biological resources found in each state to an authority nominated by the State Government. An analogous arrangement could also be considered for the administration of carbon rights.

6.3.3.3 Gaps in Policy Relating to Peat as an Ecosystem

Ecosystem or landscape management aims to achieve a balance between ecological and human needs by taking an holistic approach to natural resource management (in this case peatlands and peat swamp forest management) (Avishek et al., 2012). Its relevance to policy makers is not only because it addresses engineering components (such as hydrological management and drainage systems, etc.) but also because it coordinates local plans and policies across larger landscapes (Kirklin, 1995; Beatley, 2000), for e.g. an entire peat dome. It focuses on total ecosystem services and management, which is crucial for the economies of many developing countries as they depend on ecosystem services that are being altered by land use changes (Raffaele et al., 2009). The value of these benefits and services has currently not been evaluated in Peninsular Malaysia (Mohd Azmi et al., 2009).

The services provided by fragile ecosystems such as peatlands and peat swamp forests have not received adequate recognition in national economic decision
making and planning processes in Peninsular Malaysia and these limitations have contributed to science-policy gaps in the country (Mohd Azmi et al., 2009). Non-market valuation of the peat ecosystem can provide information needed by decision-makers for comparing the opportunity costs of proposed land use changes with the ecosystem services provided by the peat ecosystem. This paradigm shift in understanding the systems of sustainable land management would include assessing the integrity of the entire peat ecosystems as well as other factors such as evaluating and monitoring soil quality, assessing the potential for peatlands to release methane and other GHG upon drainage (Padmanabhan et al., 2008).

6.3.3.4 Gaps in Policy on Orang Asli Rights

The inclusion of indigenous peoples as significant actors in natural resource management and forest sustainability regimes is growing in acceptance internationally. In Peninsular Malaysia, however, the rights of the indigenous Orang Asli to forest areas have often been infringed in favour of commercial exploitation of forest resources and the aim of commercial maximisation of timber resources has had particular ramifications for indigenous communities (Rae et al., 2011). It is telling that, although 68% of respondents identified Orang Asli as users of forest resources, none of them mentioned legislation relating to their rights in peatlands and peat swamp forests.

Although it may appear that indigenous people’s rights are protected in the Federal Constitution (Article 13 [1]), in federal and state legislation (Aboriginal Peoples Act, 1974) and at common law (Malayan Law Journal, 2001) through the gazettal of aboriginal areas and reserves, the various State Governments retain ownership over almost all of Peninsular Malaysia’s forested land as Crown lands (National Forestry
Act, 1984), except for some privately owned plantation forests and those lands leased out to timber companies.

Furthermore, the National Land Code excludes the right of indigenous people to obtain land title (except as private citizens) and does not recognise collective ownership. However, the Aboriginal Peoples’ Act 1954 does allow ‘Aboriginal Reserves’ to be gazetted within which the Orang Asli are permitted to reside and eke out a living. The Act also states that Permanent Forest Reserves cannot be established in ‘Aboriginal Reserves’ (Fay, 2007).

The situation is much more ambiguous with respect to ‘Aboriginal Areas’, which can also be declared under the Aboriginal Peoples Act 1954. Land categorised as ‘Aboriginal Areas’ can be used by the Orang Asli for the same purposes as the reserves. However, declaration of land being an “aboriginal Area’ does not exclude the establishment of PFR over the same land (Fay, 2007). This has led to ambiguity about the legality of the extraction of timber and timber products by the Orang Asli from PFRs.

While the State identifies timber taken without official permission and without rent as illegal, the Orang Asli indicate that there are inadequacies in the land and forestry legislation in the different States, which allow logging and plantation licences to be held over ‘Aboriginal Areas’ without their consent (Rae et al., 2011). Additionally, they argue that the procedures for granting forestry licences lack transparency and the laws lack mechanisms for resolving conflicts between entities undertaking commercial utilisation of the forests and indigenous groups (Rae et al., 2011).
At one level, the Malaysian Criteria and Indicators (MC&I) purports to offer protection with respect to indigenous peoples’ rights and tenure but on the other hand, the Malaysian Timber Certification Council (MTCC) states that “land ownership and tenure rights for indigenous peoples lie outside the mandates of MTCC, forest and timber certification” (MTCC, 2005). To date, Malaysia’s forest certification scheme only recognises customary land rights in accordance with existing Malaysian law. This led the Timber Procurement Assessment Committee in the Netherlands to decide that the MTCS does not meet its standard for sustainable timber (Rae et al., 2011), largely due to concerns about the recognition of indigenous peoples' rights relating to the control of external activities in certified forest areas.

6.3.4 Implications for Policy Implementation

Debate on what constitutes responsible management continues in the field of public policy analysis and natural resource management, and on how governments, communities and companies can optimise the development potential of resources (including those in peatlands and peat swamp forests) and ensure sustainable development (Hoosten et al., 2002; Parish et al., 2008; Prentice, 2011; Lim et al., 2012). Policies do not function in a vacuum; all are conditioned by the environment in which they operate (Scherr et al., 1995) and how they are interpreted and implemented. Organisations responsible for natural resource management are also especially influenced by the characteristics of the resource and the need for and structure of management. Inconsistencies in policies, gaps that exist and the absence of implementation enablers with regards to the peat ecosystem impede effective peatland and peat swamp forest management, which cannot be offset even
if other information on good organisation, or extension, is available (Eden, 1996; Tierney and Clemens, 2011; Owen, 2013).

Policy initiatives can be designed to reduce or remove potential physical-technical, sociological, economic or institutional obstacles with the purpose of facilitating the process of policy implementation (Eden, 1996; Tierney and Clemens, 2011; Owen, 2013) but for this to happen, inconsistencies and gaps in policies must be acknowledged and addressed, and implementation enablers must be made available.

Knowledge of the implementation enablers and how these factors enhance or halt the implementation of policies, and how they support local organisations and agencies in their peat resource management, both in general analysis and in site-specific situations help to facilitate the implementation of policies.

6.4 Conclusions

Many of the policies relating to peatlands and peat swamp forests are formulated by the Federal Government and meant for implementation by the State Government because matters pertaining to land administration come under the jurisdiction of the State, according to the Federal Constitution and the National Land Code. There were policies related to each of the uses of peatlands and peat swamp forests (as identified in Chapter 4) and these were mentioned by the key informants.

Many of the policies identified have associated legislation which aims to regulate policy implementation, as identified through documentary evidence. This is lacking
for the National Policy on Climate Change, and the National Policy on Wetlands as well as policies relating to recreation, tourism, education and research. Legislation that related directly to the uses of peatlands and peat swamp forest is also lacking, as identified by both key informants and documentary analysis. Key informants identified five types of legislation which relates to uses of peatlands and peat swamp forest, namely those relating to forestry, environmental quality, wildlife conservation, drainage works and state land use.

Several inconsistencies in policies also exist at the case study sites. While the National Physical Plan-2 has identified the case study sites as Environmentally Sensitive Areas leading to the expectation that activities within the sites might be controlled, activities in the areas immediately adjacent to the sites are not controlled and will affect the integrity of the peat swamp. Integrated management involving all stakeholders is also lacking, especially when peat swamps are straddled between different administrative zones.

The research highlighted that gaps in policies exist in peat swamp forest management, particularly in areas that fall under the category of Stateland and there are no policies being implemented at Federal or State level that relate directly to peatland and peat swamp forest management. Other gaps identified were those policies relating to natural resource management (and carbon rights of peatlands and peat swamp forests), policies regarding peat as an ecosystem for sustaining the ecosystem goods and services provided by peat and policies relating to Orang Asli rights in natural resource management.
The next chapter explores the current governance of peatland and peat swamp forest management, attempts that have been and are being made to regulate the rivalries that exist in peatland and peat swamp forest use, and the mechanisms that exist for collaborative regulation of rivalries.
Chapter 7  Analysis of the Implementation of the Regime: Interaction between Users and Political-Administrative Actors

In this chapter, I analyse one aspect of the implementation of the regime of peatland and peat swamp forest management in Peninsular Malaysia, the interaction between the various users and the political-administrative actors responsible for the regulation of the peat resource. I start with examining the current governance of peatland and peat swamp forest (i.e. governance being the implementation of the policies and regulations described in Chapter 6). I then analyse the key issues of concern for peatland and peat swamp forest management, which relates to rivalries and inconsistencies that might exist. I also analyse the factors influencing the implementation of policies and requirements for policy implementation highlighted by informants and compare them with the main schools of thought on policy implementation and theories on implementation enablers.

7.1 Implementation Theory

There is no definitive theory of implementation or single framework commonly accepted in the field of policy implementation. However, there are significant messages emerging from the various schools of thought on implementation (Burke et al.; 2012) that I used to guide the analysis and discussion on factors driving the implementation of peat-related policies (Table 7.1).
A trend in literature on policy implementation is the examination of factors which facilitate effective implementation – there is a range of terms that are used for these factors, such as resources, enablers for implementation, drivers, facilitators and core components. I have chosen to refer to them as implementation enablers. Certain implementation enablers have emerged consistently from research and these are stakeholder consultation and buy-in, leadership, resources, implementation teams,

### Table 7.1: Main schools of thought on policy implementation (adapted from Burke et al., 2012)

<table>
<thead>
<tr>
<th>School of Thought</th>
<th>Factors Influencing Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Implementation Deficit</td>
<td>Successful implementation reliant on good linkages between levels of government and organisations at local level</td>
</tr>
<tr>
<td>Top-down or Bottom-up Debate</td>
<td>Factors categorised under 3 headings:</td>
</tr>
<tr>
<td></td>
<td>• Factors affecting the tractability of the problem (factors of the target group and the degree of behavioural change required)</td>
</tr>
<tr>
<td></td>
<td>• Ability of the statute (legislation) to structure implementation</td>
</tr>
<tr>
<td></td>
<td>• Non-statutory variables affecting implementation</td>
</tr>
<tr>
<td>Communication and Policy Implementation</td>
<td>Focuses on the acceptance or rejection of messages between layers of government</td>
</tr>
<tr>
<td>Ambiguity-Conflict Approach</td>
<td>Policies have high or low ambiguity and high or low levels of conflict, which influences implementation</td>
</tr>
<tr>
<td>Network Settings</td>
<td>Focuses on the need for cooperation and coordination especially when the setting is complex and when there are interconnected groups and systems</td>
</tr>
<tr>
<td>Human Infrastructure in Practice and Programs</td>
<td>Proposes that implementation is synonymous with coordinated change at system, organisation, programme and practice levels, the essence is behaviour change</td>
</tr>
<tr>
<td>Factors in Practice Settings</td>
<td>Identified individual characteristics, organisational factors and community factors</td>
</tr>
<tr>
<td>Quality Implementation Framework</td>
<td>Quality implementation depends on assessment strategies, capacity building, structural features for implementation, structures to support implementation and improving future applications</td>
</tr>
</tbody>
</table>
implementation plans, staff capacity, organisational support, supportive organisational culture, communication, monitoring and evaluation, and learning from experience (Burke et al., 2012). Knoepfel et al. (2007) also provides an overview of the resources available to public policy (Figure 7.1). These implementation enablers were used as a guide to categorise the requirements for policy implementation mentioned by key informants for this question.

![Figure 7.1: Overview of different public policy resources (Knoepfel et al., 2007)](image)

The process of applying the IRR framework in an empirical study based on case study sites is referred to as investigating the local regulatory arrangement (Schweizer et al., 2013) and its use has become more defined in recent developments of the IRR (P. Knoepfel pers comm., 2014). The Institutional Regime (and the analysis of extent and coherence) is described as the input of the empirical
study while the Local Regulatory Agreement is the output of the analysis (Figure 7.2). Policy implementation is described as the process of activating the strategies employed by actors to get from the input to the output, and it is differentiated from policy formulation (Sabbatier, 2007; Burke et al., 2012).

Policy implementation can vary considerably but attempts have been made to generalise it through implementation theories. Hill and Hupe (2009) described implementation theory as being “the search for some pattern or way of structuring the process of implementation in a manner where there will be a high probability of policy accomplishment.” Implementation theory can also explain why policy implementation sometimes fails, especially by dealing with informal arrangements in policy implementation.

Various paths of implementation (Aubin, 2008) have been described for policy implementation (Figure 7.2), namely the activation of public policy (i.e. pure implementation) (Aubin and Varone, 2013) or through private arrangements for natural resource management not necessarily involving direct State intervention (Ostrom, 2011). In describing the latter, Aubin and Varone (2013) also provided details of private arrangements involving the activation of rules (or policies) between owners of the resource and those who do not necessarily have property rights over the resource through such means as negotiation, persuasion or coercion (e.g. through contract).
Figure 7.2: Policy implementation and its relevance to the Institutional Resource Regime Framework

(adapted from Aubin, 2008 and Schweizer et al., 2013)
Other forms of implementation that actors use to develop ad hoc, tailor-made solutions that go beyond what is provided for informal policy designs (i.e. innovative implementation) were also described by Schweizer et al. (2013) such as bypassing (in cases where there is a scope for manoeuvre) (de Buren and Knoepfel, 2011) or by simply hijacking the process of implementation (Aubin, 2008). This analysis attempts to explain the path of implementation for policies relating to peatland and peat swamp forest management in Peninsular Malaysia and the strategies involved in the activation of these policies based on the description above.

7.2 Results

7.2.1 Current Governance of Peatlands and Peat Swamp Forests

Informants and documents classified peatlands and peat swamp forests into two categories of management, those that came within the category of Permanent Reserved Forests (or Forest Reserves) and those outside this category.

7.2.1.1 Peatlands and Peat Swamp Forests classified as Permanent Reserved Forests

For peatlands and peat swamp forests that came under the category of Permanent Reserved Forests, a majority of the informants (75%) said that Department of Forestry managed the area using provisions under the National Forestry Act. A senior technical manager of a government agency explained that the Department of Forestry had offices in the states that followed prescriptions for managing the logging in peat swamp forests according to their own forestry laws under the Act:

“The Forestry Department has a prescription because all states are subject to their own forest laws. In Peninsular Malaysia there is the National Forestry Act and each
state has its own State Enactment that enables it to manage the forests. The prescription includes the cutting cycle and is specific to each state." (N2, 2012)

In addition to the State Forestry Enactments, a senior manager of a government agency said that Integrated Management Plans were also developed to manage other uses of specific peat swamp forests:

“There are Forestry Management Plans for the states and district plans; they also produce forest harvesting plans for 10 years. The Forest Management Plans were not sufficient so integrated management plans were developed to look at other uses of the peat swamp forests such as for conservation, wise use, and common goods for the community, drainage, carbon stock and climate change.” (N18, 2012)

A senior manager of a private company also referred to the Forest Management Plans that identified the different types of forests and their uses, but said these plans did not include areas that needed to be conserved:

“The Forestry Department is supposed to have management plans that map out the entire forest areas in the state and categorise them by their types and uses, but this does not include critical areas that must be conserved or managed.” (N30, 2012)

For peat swamp forest areas, a senior manager of a government-linked agency indicated that not all the main peat swamp forests had Integrated Management Plans:

“The Integrated Management Plans for Pahang and Selangor are supposed to be reviewed but there is no management plan for Ayer Hitam in Johor. These are the three states that have the main peat swamp forests.” (P1, 2012)

According to a senior manager of a private company, management plans were prepared selectively:

“If an area is being logged, then there will be a management plan but areas that are not logged, for peat swamps for example, it is unlikely to have such plans. If the Forestry Department is not going to log an area, they will not actively manage it.” (N33, 2012)

A senior manager of an NGO also pointed out that there was no active management that was being carried out by the Forestry Department in terms of water or fire management and that the forest was left to recover after logging without any intervention:
“Each forest reserve is supposed to have a management plan. Forestry Departments have been checking logging licenses and preventing illegal logging, but there is not much active management taking place such as water management, fire management or rehabilitation. The forest is normally just left to recover after being logged, there have been some attempt to replant but these have failed because of the difficulties in rehabilitating peat.” (N1, 2012)

The reason for this, suggested a senior manager of an NGO, was that federal policies were considered advisory and the States could choose not to abide by them as forestry was a state matter:

“We are in an odd situation; forest is a state matter so the state can choose to ignore a federal policy. Take the example of the ban on logging above 1000m on hill forests; the State Forest Department ignore them saying these are guidelines and not in their regulations.” (N4, 2012)

**Documentary evidence:** Documents showed that the Forestry Department implemented the National Forestry Policy to manage Malaysia’s forest resources (including those in peat swamp forests) under the broad categories of Permanent Forest Reserves (which were formerly referred to as Permanent Forest Estates) (Figure 7.3). There are also Stateland forests and alienated land (classified as such under the National Land Code) which are owned by the State Government, while Protected Areas are managed by the Department of Wildlife and National Parks (note: the area of peat swamp forests under the category of Protected Areas in Peninsular Malaysia is small) (MOSTE, 1998). They also pointed out that the term Permanent Forest Estate was misleading because it implied that the forest area was permanent when in fact its permanency was not guaranteed. The Executive Council within State Governments could de-gazette any area of Permanent Forest Estate for infrastructure, agriculture, housing and other purposes (MOSTE, 1998) as forest came under the jurisdiction of the State.
Fern (2002) highlighted that more than two-thirds of the Permanent Reserved Forests were production forests, which allowed sustainable logging. Prior to the introduction of Sustainable Forest Management guidelines in 1974, commercial extraction of timber in Peninsular Malaysia had been shown to be largely destructive. An ITTO study showed that less than 1% of the natural forests in the country had been managed on a sustainable basis and in all cases, over-harvesting had been the usual practice (Poore et al., 1989). Krishnapillay et al. (2007) concluded that if the conditions of logging did not improve, logged forests would be poorly stocked and natural regeneration would be scarce. They also noted the effects of over-harvesting and fire damage in peat swamps in Peninsular Malaysia.
over a span of 20 years, which led to forest degradation especially after peat swamps were burned.

Most states in Peninsular Malaysia had gazetted the *National Forestry Act* as State Forestry Enactments and Rules and these were made uniform to streamline forest administration, planning and management (Kamaruzaman and Nik Mohamad Shah, 1997). According to Wells *et al.* (2008), each State in the Peninsula was considered a single Forest Management Unit and all Permanent Reserved Forests within a State were managed according to a single 10-year Forest Management Plan. Documents noted that the implementation of these policies, plans and strategies required a high level of cooperation and coordination between State Forestry Departments to ensure that target levels of forestry operations were adhered to.

According to Kamaruzaman and Nik Mohamad Shah (1997), forest harvesting in Permanent Reserved Forests was entirely controlled, with various felling blocks (i.e. an area of not more than 4,000 ha) being demarcated and there were penalties for non-compliance to prescribed guidelines. Among the logging guidelines and practices that were being promoted were the selection of a suitable forest management system (i.e. the Selective Management System); the adoption of a forest operation plan which included a forest engineering plan and a tree harvesting plan; pre-logging planning, inventory and tree marking; road construction and skidding; logging machines; felling and post-logging assessments. However, Krishnapillay *et al.* (2007) found that the forestry enactments and rules formulated by State authorities were deficient and weak in areas of forest management planning and forest renewal operations; he suggested that this was what led to the revisions in the *National Forestry Act* in 1993 to include aspects of land conservation and environmental quality.
Documents also showed that peat swamp forests managed by the State Forestry Departments, where commercial logging was taking place, were being audited according to the Malaysian Criteria and Indicators (MC&I, 2002) of the Malaysian Timber Certification Scheme (Yong, 2012). According to Malaysian Timber Certification Council records, the Pahang and Selangor Forest Management Units (FMUs) were noted to have Integrated Management Plans for peat swamp forests which were prepared through collaboration with international donor agencies. The guidelines in the MC&I (2002) included prescription of a minimum diameter for cutting; the allocation of buffer strips on either side of rivers and streams in peat swamp forests; and annual surveillance audit to ensure continued compliance. Yong (2012) also explained that the assessment for forest management certification of FMUs involved documentation review, stakeholder consultations and field verification.

7.2.1.2 Peatlands and Peat Swamp Forests outside Permanent Reserved Forests

For peatlands and peat swamp forests that were located outside Permanent Reserved Forests, informants said that they were being managed by the respective State Governments (24% of informants), the private land owners and private companies (29%) dealing with oil palm plantations and various government departments (19%). Other informants ventured no opinion.

7.2.1.2.1 Peatlands under the Category of Stateland

For peatlands that were classified as Stateland and being managed by the State Governments, the informants said that they were being guided by the Structure Plans and Local Plans, which were based on the National Physical Plan. It was the
State Government who decided which of these peatland areas was to be converted or logged, according to a senior manager of a government-linked agency:

“If it is Stateland, the one managing the peatland will be the State Governments and they will decide which land to open and where to log.” (N13, 2012)

Informants also mentioned that it was up to the State Government to decide who was managing the area and how it was being done (N37, 2012). A senior manager of a private company emphasised that the Federal Government had no jurisdiction over this decision and it was strictly for the State Governments to decide:

“It strictly comes under the State Governments and the Federal Government does not have jurisdiction unless it falls under specific regulations, like Wildlife Sanctuary; then the federal government has some kind of influence.” (N30, 2012)

A senior manager of another private company suggested that it was the Land Office that managed peatlands that fell under the category of Stateland:

“It is the Land Office when there is alienated land. These areas were peatlands before but were alienated because they were to be converted to some other land use because land conversion is within the power of the State Government.” (N32, 2012)

The Land Office might “refer to other government agencies but they had the authority over the land”, according to a senior manager of a government agency (N39, 2012).

7.2.1.2.2 Privately-owned Peatlands

For peatlands that were privately owned, a senior manager of a government-linked agency explained that some of them were degraded peatlands that were licensed to private companies who had management plans to deal with the difficult conditions of planting on peat:

“The areas that are being planted with oil palm are converted and degraded peatlands that have been drained. The land has been converted to agricultural land and licensed to the companies involved through a land concession. These companies have a management plan for the plantations because peat is not the preferred soil type for planting oil palm.” (N17, 2012)
A senior manager of a government-linked agency suggested that each plantation had its own management plan to suit local conditions:

“Each oil palm plantation has its own management plan, in terms of water level management. The Malaysian Palm Oil Board had a workshop to develop standard operating procedures for plantations on peat and the three regions [Peninsular Malaysia, Sabah and Sarawak] have their own procedures based on their requirements.” (N13, 2012)

Most oil palm estates lack management plans but do have plans to maintain the water level at a specified level to ensure the peat didn’t decompose, according to a senior technical manager of a private company:

“The oil palm estates don’t have management plans but they might manage an area of about 2,000 ha by maintaining the water level in peat 50-75 cm from the surface to ensure the peat doesn’t degrade, decompose or collapse. They manage for planting and if it is deep peat, it is slightly more expensive to manage.” (N14, 2012)

A senior manager of a private company also referred to the private oil palm plantations’ focus which was management to achieve high levels of productivity:

“Private peat-land owners have their own standard operating procedure and are interested in productivity; they do not want to be below national productivity levels. For peat estate management, the target is early, high yield to produce enough fruits in three years.” (N20, 2012)

As it is, only the high price of oil has kept the industry viable, especially for smallholders:

“Oil palm cultivation on peat is more expensive and it is being sustained by the high crude palm oil prices. If the price dropped then it is no longer a very attractive proposition. The plantations can achieve high yields; smallholders do not have the technology for producing high yields because of poor management.” (N29, 2012)

7.2.1.2.3 Peatlands Managed by Other Government Agencies

Several other government agencies were named by informants as being involved with managing peatlands and peat swamp forests that were located outside forest reserves, including the Department of Agriculture, Department of Irrigation and Drainage, and Department of Environment although the informants were unsure if the agencies were “managing or just using the peatlands” (N3, 2012).
Department of Wildlife and National Parks, which is a federal agency, played a unique role in managing the Tasek Bera Ramsar Site (Stateland, partly peat swamp forests) as the “management authority” (N23, 2012) as designated by the State Government.

7.2.1.2.4 Peatlands with No Management

Less than a fifth (19%) of the informants felt that there was no management for the peatlands and peat swamp forests that were located outside the Permanent Reserved Forests. A senior manager of an NGO suggested that a lack of management was resulting in the drainage of peat areas and indicated that this could lead to permanently flooded peat areas in the future:

“They [peat areas] are being managed badly. All peatland use except fisheries involves drainage. That is unsustainable and within a period of 25-100 years, these areas will be flooded and the current land uses will disappear. The question then will be what can we do with these flooded lands?” (N21, 2012)

Informants felt that while “the Structure Plans may identify green areas, no one really follows it” (N1, 2012) because “there was no central authority for peatland management” (N15, 2012). A committee at the Ministry of Natural Resources and Environment had now been given the responsibility to coordinate efforts to manage peatlands, according to a senior officer of a government agency:

“The ASEAN Peatland Forest Project in Malaysia has got a team mobilised. Under the National Peatland Action Plan, there is a coordinating committee at the Ministry to coordinate efforts to manage peatlands. This is a better approach because if there are Stateland [that needs to be conserved], then the committee can work with State Governments to manage these peatlands.” (N11, 2012)

Two informants referred to the Orang Asli way of managing peat swamps in the past. A senior manager of an NGO felt that there were no issues with peatland use until logging by private companies started:
“Traditional systems have been applied for hundreds of years and the indigenous people have been managing the forests in a sustainable way since recorded history. They were not only using it but also managing it. It was only when people needed to regulate logging activities that the problems arose.” (P5, 2012)

7.2.1.2.5 Management outside of Permanent Reserved Forests from Documents

Documents highlighted the fact that all forest land, with the exception of a few hundred thousand hectares of privately owned plantations of agricultural crops (oil palm) was owned by the State. Consequently, all forest produce originating from Permanent Reserved Forests or Stateland forests was considered the property of the State Authority, and all exploitation of forest product was to be licensed and administered by the State Authority (Fern, 2002; Forestry Department, 2003; Jomo et al., 2004; Krishnapillay et al., 2007; Wells et al., 2008). Some of the protected areas that had been gazetted also fell outside of Permanent Reserved Estates (Fern, 2002) and were managed by the Department of Wildlife and National Parks.

Some documents suggested that Stateland forests were essentially viewed as a land reserve for development (MOSTE, 1998) and were earmarked for conversion to agriculture and other uses (Jomo et al., 2004; Krishnapillay et al., 2007; Wells et al., 2008). Kamaruzaman and Nik Mohamad Shah (1997) also stated that Stateland forests opened for logging were also earmarked for conversion to other uses including housing, infrastructure, agriculture, industrialization and mining. They explained that all timber harvesting and related management operations in concession forests were carried out by contractors operating on the basis of either a
long-term logging agreement or a short-term licence; large concessions were often
tied to wood-based industries and some of them covered periods of up to 30 years.
Licensees in Permanent Reserved Forests, on the other hand, were given annually
renewable concessions and in turn, were required to develop and implement forest
management, harvesting and reforestation plans (MOSTE, 1998). Encroachment by
landless populations into newly logged forests was also taking its toll on forest
resources in Peninsular Malaysia (Krishnapillay et al., 2007).

Peatlands that were privately owned and converted to oil palm plantations were
being managed by large private companies using in-house guidelines for Best
Management Practices (BMP), some of which were drawn from more than 30 years
of experience in cultivation of oil palm on peatlands and on recent research on GHG
emissions and water management (Lim et al., 2012; Schrier-Uijl et al., 2013). However,
there was little or no management on medium and small-scale cultivation
of oil palm on peat, and therefore these areas lent themselves to the negative
impacts of cultivation on peat. The RSPO also recognised that the smallholder
sector needed more technical guidance and financial support to implement the BMP
effectively (Noormahayu et al., 2009).

7.2.2 The Key Issues in Peatland and Peat Swamp Forest Management in
Peninsular Malaysia

The key issues alluded to by informants covered a range of topics which were
categorised into lack of governance, conversion to other uses, poor water
management, peat fires and haze, lack of awareness, decline in biodiversity, GHG
emissions and peat ecosystem loss (Figure 7.4 and Table 7.2).
Figure 7.4: Key issues for peatland and peat swamp forest management in Peninsular Malaysia alluded to by informants

(Percentage of 65 informants who alluded to the relevant issue as the most important; some informants cited more than one issue)

Among the groups, key informants from government agencies cited water management as well as fires and haze as key issues for peatlands and peat swamp forest management (Table 7.2), which are related issues because peat fires are most often controlled by increasing the water levels in peat areas through blocking of drainage canals. Key informants from the other groups of government-linked agencies, private companies, NGOs and academic institutions also cited lack of governance and conversion to other land uses as key issues. Other issues cited by academic institutions were a decline in biodiversity and peat loss while were also cited as key issues for management. Government-linked agencies also cited GHG
emissions while private companies, the lack of awareness as other key management issues.

Table 7.2: Frequency (%) with which key issues for peatlands and peat swamp forests in Peninsular Malaysia were mentioned by key informant groups

<table>
<thead>
<tr>
<th>Key Issues</th>
<th>GA</th>
<th>GLA</th>
<th>PC</th>
<th>NGO</th>
<th>AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Governance</td>
<td>14</td>
<td>67</td>
<td>53</td>
<td>44</td>
<td>40</td>
</tr>
<tr>
<td>Conversion to other Uses</td>
<td>24</td>
<td>33</td>
<td>35</td>
<td>31</td>
<td>40</td>
</tr>
<tr>
<td>Water Management</td>
<td>43</td>
<td>33</td>
<td>18</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Fires and Haze</td>
<td>48</td>
<td>17</td>
<td>0</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Lack of Awareness</td>
<td>19</td>
<td>0</td>
<td>35</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Decline in Biodiversity</td>
<td>10</td>
<td>0</td>
<td>12</td>
<td>19</td>
<td>40</td>
</tr>
<tr>
<td>GHG Emissions</td>
<td>19</td>
<td>33</td>
<td>6</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Peat Loss</td>
<td>10</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>n</td>
<td>21</td>
<td>6</td>
<td>17</td>
<td>16</td>
<td>5</td>
</tr>
</tbody>
</table>


7.2.2.1 Lack of Governance

The issue alluded to by informants most often (39%) was the lack of governance for peatland and peat swamp forest management, particularly the lack of an overarching policy on their wise and sustainable use. A senior manager with a private company suggested that a policy should be formulated to address specific peat issues:

“The most important issue is that we need to have a national peatland policy; the National Peatland Action Plan is not sufficient. We need political commitment and a
properly formulated policy. Policies like the National Biodiversity Policy cover some aspects [of peatland management] but we need to be more specific.” (N29, 2012)

Another informant, a senior technical manager with a private company, called for the Natural Resources and Environment Ministry to take the lead in this matter:

“If there is no awareness and political will, the momentum will not be up there in NRE [Ministry] and in the respective states. The policy will then only add to the pressures on land use changes.” (N14, 2012)

One example of a specific peat issue that the policy could address, as highlighted by a senior technical manager of an NGO, was to increase the level of protection and the area of peat swamps that were classified as protected areas for biodiversity:

“The key issue is to accord some level of recognition and protection to the remaining peat swamp forests which still support good biodiversity. Another issue is to increase the area of peat swamp conservation areas or protected areas because the representation of peat swamps in protected areas currently is not high compared to montane and other types of terrestrial forests.” (N7, 2012)

Two informants suggested that the biggest management challenge was the protection of peat swamps that were located on Stateland because “states can change their status and make them no longer forest reserves, or convert them to private land or give them to a private entrepreneur” (S2, 2012). A senior manager with an NGO elaborated on this point:

“The failure of protecting peatlands on Stateland is probably the most pressing issue. That means influencing their management, their alienation and what happens to these areas in the first place. By not addressing that, the integrity of the PA will continue to degrade, and at some point they have so little value that you might as well put oil palm plantations on them.” (N9, 2012)

A scientist with an academic institution highlighted that a lack of management at the Tasek Bera Ramsar Site had affected the fishing resources of the Orang Asli:

“Fishing no longer brings income to the local community and they have to rely on rubber trees and oil palm. The problem with oil palm is that in some of the nearby areas, the fish are quite smelly because of the fertiliser they use. The Orang Asli don’t fish there anymore, they go deeper into the forest.” (P7, 2012)
Another management issue highlighted by a senior technical officer of a private company was the draining of water through the building of canals in peat swamp forests:

“In peat swamp forests, the water is still being drained out by the construction of canals and that’s a big issue.” (N3, 2012)

A policy was also necessary because peatlands and peat swamp forests needed to be addressed as a hydrological unit, according to a senior manager with an NGO:

“For peatlands, they have no integrated management and for peat swamp forests, the key issue is how to manage it as a unit, as a functional unit that includes purposes of protection.” (S1, 2012)

A senior manager with a government-linked agency explained that it was also important for all the actors involved to adhere to the principles of integrated management if management were to be effective:

“Number one in terms of policy is to stabilise the land use and respect the integrated management plan; that means every manager - the private, the plantation, the state forestry logging - has to cooperate, such that they have a united action and approach to maintain the integrity of the peat.” (N38, 2012)

Three informants from private companies pointed to the lack of guidance on how peatlands and peat swamps should be managed, which areas were to be conserved and which areas could be developed with specific management prescriptions. One of them, a scientist, noted:

“We need to do a survey of the [existing] peat swamps; the soil and other aspects like endangered species, existing cultivation, native population, etc. We need to look at that information and make a decision about which particular peat swamps should be conserved and which ones can be released for agriculture. Then the government policy must say we want to keep 50%, or 60%, or 70% of the peat intact.” (N15, 2012)

Another informant, also a scientist, suggested that deep peat areas should not be developed:

“Deep peat areas must be left alone. If they have to use the land, then use the shallow peat but there must be proper management because shallow peat is still a problem, especially for oil palm. If the land is not used for plantation tree crop but for pineapple instead, it is manageable because you don’t have to drain the soil.” (N26, 2012)
The third informant, a senior manager, proposed that only the degraded peat areas be developed for oil palm plantations and other social schemes:

“The heavily degraded areas should be left for oil palm and other social schemes and settlements.” (N29, 2012)

Several informants also suggested that overall land use planning be included as part of the management for peatlands and peat swamps. A senior technical manager of an NGO explained:

“We need to understand peatland resources from an ecological point of view, that peatland is a forest where land and water management is necessary. Now we think of how to get maximum benefit from peat swamps and then we do the planning for it. We need to take stock of the roles and functions of peatlands, taking care of community needs and view development in terms of strategic planning.” (S3, 2012)

Sustainable use planning would require consideration of all aspects of land use, according to a scientist of an academic institution:

“The main issue is the non-sustainable use of peatlands currently and to ensure sustainable use, all aspects will need to be considered - the water, GHG, social, politics and economic aspects”. (N28, 2012)

Another aspect that governance needed to address was the procedures for logging in peat swamp forests. A senior technical employee of an NGO suggested that there was no management taking place in peat swamp forests, including those being managed by the Forestry Department as production forests:

“There is no real management where peatlands is concerned. Legally they are being classified as forests, but that doesn’t mean according it any real protection. In production forests, the selective management system is being practiced and there has been no real management prescribed for those areas.” (N6, 2012)

A technical officer with a private company also elaborated on this issue:

“Peat swamp forests that are not included in Permanent Reserved Forests cannot hope to be protected because they are lowland forests and can easily be developed. People in power have direct access to land and can instruct the Forestry Department to release land in PRFs.” (P6, 2012)
Two senior managers from the same government-linked agency had differing opinions about the Reduced Impact Logging (RIL) approach being practised in the peat swamp forests in Pahang. One of them felt that while “there are still many issues to address because it is a very challenging environment to manage, they [the logging companies] are trying to implement RIL systems which has improved [procedures for the] extraction of timber from such lands” (N12, 2012). The other informant said that the logging companies “claim they are practicing RIL but on the ground, the damage is still very high and they need to have a commitment and take concerted effort to reduce the damage” (P1, 2012).

Several informants highlighted the need to strike a balance between conservation and development as both were needed for the country to progress. A senior manager of a government agency suggested that this balance could be achieved by scientific understanding:

“In peat swamp forests we should strike a balance when managing them, not just for extracting timber but for their other roles. We need better scientific understanding; if we use best management practices, then you can sustainably manage the peat swamp forests while preserving other eco-functions.” (N18, 2012)

Another informant, a senior manager at a government-linked agency felt that NGOs particularly needed to consider development issues when discussing peatland and peat swamp forest conservation:

“The NGOs have a single approach to peat; they argue only from the viewpoint of conservation, but our problem is that we have to marry development with conservation and where do we draw the line?” (N17, 2012)

**Documentary Evidence:** There have been several attempts in Malaysia to address the management of peatlands and peat swamp forests through a national strategy; the National Action Plan for Peatlands (Department of Forestry, 2011) and the National Wetland Policy (Government of Malaysia, 2004) were both developed by
the Ministry of Natural Resources and Environment towards this aim. However, these documents have not been accepted holistically by all states in Malaysia and face multiple challenges in implementation (N11, 2012). Documents showed that plans to promote the development of crops, particularly oil palm plantations, in unproductive and peat swamp forests continue to be promoted in Malaysia (Colchester et al., 2007; Schrier-Uijl et al., 2013; Bryan et al., 2013), which poses a challenge for the development of a national policy for peatlands and peat swamp forests.

Several authors recognised the importance of integrated management for peatlands and peat swamp forests (Phillips, 1998; Wösten et al., 2008; Parish et al., 2008) especially when there is significant conflict between different user groups or economic sectors such as forestry, agriculture, water supply, industry as well as between governments, the private sector and local communities over the development and management priorities and strategies for peatlands. Parish et al. (2008) explained that integrated management can be greatly complicated by the fact that large peatlands were single hydrological units up to one million ha that commonly cut across different administrative boundaries and land use zones.

Several international Conventions have recommended that land-use planning in peatlands follow an ecosystem approach. This approach is described as taking special account of the hydrological vulnerability of peat domes and their ecological relationships with the surrounding habitats and land-uses, including upstream and downstream habitats (CBD Secretariat, 2004; Ramsar Convention Secretariat, 2007). They also prescribed that the consideration of multi-river basin complexes, as multiple watersheds, might be dependent on shared peat domes, so the impacts on
one river basin might affect other rivers originating from the shared dome. Parish et al. (2008) highlighted that wise management of peatland ecosystems required a change in approach from sectoral planning (e.g. for agricultural development) to integrated, holistic planning strategies, involving all relevant sectors and stakeholders to ensure that consideration is given to potential impacts on the ecosystem as a whole.

The methods for logging in peat swamp forests were discussed in Section 4.3.1.1.2 under documentary evidence. Generally, high impact log extraction techniques included the use of heavy excavators; these tend to compact peat, and alter the drainage of peatlands prior to logging in order to facilitate access (DANCED, 2003). Logs can also be extracted via drainage canals. These logging techniques were known to significantly reduce the chances of natural regeneration, with drainage leading to significant subsidence and enhanced fire risk (DANCED, 2003).

**Comparison between Key Informant Impressions and Documentary Evidence:**

Many issues highlighted by key informants were similar to issues raised in documents in terms of the lack of governance for peatlands and peat swamp forests. The key informants who highlighted the issue of the lack of governance were largely employees of NGOs and private bodies, but there were several officers from government agencies and government-linked agencies who also highlighted the need for a national policy. One of the preconditions for successful integrated planning, highlighted in documents, is the common understanding and agreement that is needed between the various managers, owners, occupiers and others whose activities link to or are affected by the peatlands – in other words, the stakeholders; an analysis of the stakeholders was described in chapter 5.
7.2.2.2 Conversion to Other Uses

More than a third of the informants (31%) alluded to the conversion of peatlands and peat swamp forests for other land uses as a key issue in management of the areas. Eight of these informants - from government agencies, government-linked agencies, private bodies, NGOs and academic institutions - specifically mentioned the conversion of peatlands to oil palm plantations as the key management issue. A senior technical manager with a private company pointed out:

“The main issue is deforestation and conversion of peatlands through drainage and replacement with oil palm plantations, and the issues associated with it.” (S2, 2012)

Another informant, a senior technical employee of an NGO, suggested that the peat ecosystems were being threatened by conversion and that the Government needed to make an informed decision about their management:

“Looking at how big and influential the plantation industry is and the rate at which forested land is being converted, peatlands will be the first ecosystems to go. There needs to be an informed decision taken by the country. We have lost enough peatlands already, how much more are we willing to lose before we stop?” (N6, 2012)

There was agreement from a senior officer of a government agency that the issue of oil palm on peat needed to be managed:

“We have the whole issue about oil palm plantations on peat which is not getting positive feedback from international NGOs, so we need to look at how to manage this.” (N11, 2012)
A senior manager with a private company suggested that the best way to manage oil palm on peat to see an improvement in their yields was to follow the guidelines prepared by the Roundtable on Sustainable Palm Oil (RSPO):

“We need to follow the advice being laid down in the RSPO Principles & Criteria, including maintaining the water table, ensuring infrastructural development is done correctly, planting in the right densities, ensuring that manuring programs are strictly adhered to, particularly for micro-nutrients. Oil palm farmers cultivating on peatlands need to make the effort to adjust and fine-tune the copper and zinc contents in the palm; it can mean a huge difference in the yield potential.” (N35, 2012)

Several informants highlighted encroachment by local people into peatland areas as another related issue that needed to be addressed. An employee of an NGO noted that:

“The [local] people who burn and cut [peatlands] are trying the market, if there is no action [taken against them], then they keep on opening, burning and planting oil palm. They are hoping that, with some political interference, these areas will be given to them through temporary occupational licenses.” (S9, 2012)

Another employee of another NGO suggested that all types of development on peatlands should be stopped:

“Our goal should be to introduce a blanket ban on any encroachment into peat, no more development on peatlands, whether agricultural or commercial.” (S5, 2012)

The reason for this, according to a senior manager with a private company, was that drained agricultural land which bordered peat swamps could affect the management regime of the area:

“In the buffer zone outside the peat swamp forests, agriculture comes right up to the edge of the peat swamps and there are drains that have been dug; this issue needs to be considered in the management of the affected area.” (N33, 2012)

Two other informants also referred to the conversion of peatlands and peat swamp forests by the Orang Asli for their subsistence activities. A scientist with an academic institution described the effect conversion has had on the Orang Asli community at Tasek Bera:
“At first there was the resort in the area; now they say there is no freedom to go for the picnic on the other side of the resort and set up a house in the trees like they did before. Only specific areas are open for them to roam freely.” (P7, 2012)

**Documentary Evidence:** Documents indicated that large areas of tropical peatlands, including those in Malaysia have been converted for plantation crops during recent decades and that the process is continuing (Colchester *et al*., 2007; Singh, 2008; Wösten *et al*., 2010; Schrier-Uijl *et al*., 2013; Bryan *et al*., 2013). Singh (2008) estimated that about 20% of the oil palm plantations in Southeast Asia (i.e. total 110,000 km²) were on peatlands, of which 6% were in Malaysia. Documents also noted that land conversion changed the natural peat ecosystem functions as reservoirs of biodiversity, carbon stores and hydrological buffers (Bryan *et al*., 2013).

The rapid increase in use of peatlands for agriculture in recent decades has occurred largely because the demand for agricultural land could not be met by areas with more suitable soil capability (Paramananthan, 2008; Parish *et al*., 2008; Davies, 2011). Agricultural productivity on drained peat can be high in the short term but drainage soon caused the peat to degrade, the land to subside, and increased challenges in water management (Colchester *et al*., 2007; Wösten *et al*., 2010). The depth of the peat, underlying soil types and its hydrological regime determined the agricultural potential of a peatland area (Safford and Maltby, 1998).

Documents also noted that peat swamp forests were being cleared for agriculture by local communities who relied on forests for their sustenance and life. For example, the agricultural crops of illegal settlers in the Raja Musa Forest Reserve were destroyed and their houses and other dwellings dismantled when the Selangor State Forestry Department was ordered by the State Government in 2009 to move them out of the area (SSFD, 2009). Mohd Azmi *et al*. (2009) described the encroachment
and illegal logging in the Southeast Pahang Peat Swamp Forest and proposed that enforcement activities by the Forestry Department be enhanced to address this issue. Savinder et al. (2009) acknowledged that the local Orang Asli community in the same area had the right of access, use and management of the natural resources and therefore, a framework needed to be developed to address the issue of sustainable forest management among the Orang Asli community.

**Comparison between Key Informant Impressions and Documentary Evidence:**

It was difficult to find direct references from documents on the conversion of peatlands and peat swamp forests in Peninsular Malaysia. Many of the documents referred to studies for tropical peatlands as a whole in which studies carried out in Malaysia included the East Malaysian states of Sabah or Sarawak. By virtue of having the largest area of peatlands and peat swamp forests in Malaysia, Sarawak is usually the focus of research on peat in Malaysia.

### 7.2.2.3 Poor Water Management

The informants who alluded to poor water management (or poor water table management) as a key issue (29%) acknowledged that water management in peatlands and peat swamp forests have different challenges. Water was necessary for the formation of peat in these areas as pointed out by a senior manager with an NGO:

> “Peatlands will survive as long as there is water, if there’s no water they dry up, sometimes this is irreversible and peat will not be deposited.” (N5, 2012)

Additionally, a scientist with an academic institution suggested that peatlands and peat swamp forests be preserved to maintain their role as a water source and to avoid a water crisis:

> “We should preserve and rehabilitate these areas because they are important for..."
wildlife and are a source of water. Areas that have been converted to oil palm plantations are dry and there is no water even in the channels. We might face a water crisis if we do not conserve these areas." (N31, 2012)

Water management was also considered important to ensure that the water table in peat areas was kept at the optimum level to suit their different land uses, as explained by a senior manager of an NGO:

“If you disrupt the hydrology and natural water regime, peat swamp forests will not recover. We must restore the water regime to manage the forestry and biodiversity. In plantations [on peat], water needs to be managed appropriately. If the water level is too low, you will have problems with fires, subsidence and a low yield and if it is too high, there will be flooding and also a low yield.” (N1, 2012)

A senior manager of a private company summarised that “the success in peat development is how best you manage the water table” (N20, 2012).

Informants, however, pointed out that most forest management plans did not include hydrological management and a senior manager of a government agency attested to this:

“Many drains and channels were built for timber extraction; unless and until we have proper water management and channel management after extraction, more damage will ensue.” (N18, 2012)

A senior officer with a government agency also highlighted how forestry operations in a peat swamp forest have had implications on the local flooding situation:

“If the activities in the peat swamp forest are not controlled, we will surely experience flooding. We dig channels to ensure the quick flow of water to the sea but flooding is still a key issue in terms of management.” (P9, 2012)

**Documentary Evidence:** Documents described how improved water management of peatlands was a critical step to support their sustainable management as water was the most fundamental component of a peatland; most peatlands being approximately 90% water (Andriesse, 1988; Wösten et al., 2006; Prentice, 2011). They also called for the management of water resources in peatlands to be
undertaken at the river basin or sub-basin (catchment) level to preserve the natural hydrological regime for the functioning of peat swamp ecosystems. Prentice (2011) explained that seasonal floods were an important part of the ecology of swamps, providing influxes of nutrients, flushing out the system, and allowing aquatic animals to disperse.

The extent to which the water table need to be lowered for agriculture varies with the crop. For example, oil palm and coconut require a lowering of the water table to between 50 and 70 cm (Lim et al., 2012) from the ground surface while optimum yields of sago and vegetables were obtained when the range was between 20 and 40 cm lower (Davies, 2011). The RSPO Manual on Best Management Practices stated that most palm feeder roots were concentrated in the top 50 cm of the peat; therefore this zone should not be water-logged (Lim et al., 2012). The manual and suggests that a peat basin should not have conflicting land-uses which required differential water-levels.

The Forest Management Plans (FMPs) for the states of Selangor (2011-2020), Pahang (2006-2015) and Johor (2006-2015) prepared by the respective state Forestry Departments did not provide any special arrangements for water management within peat swamp forests. The Selangor FMP stated that the FMP was important for “maintaining forest biodiversity, water and soil” but did not specify how water management was going to be carried out, especially in the peat swamp forests. The Pahang FMP emphasised on the importance of timber supply from its forests, as well as maintaining environmental goods and services such as safeguarding water resources and catchments, conserving and reclaiming soils etc. but there was no mention of water management in the peat swamps. The Johor
FMP also acknowledged that catchment forests (all types of forests) played an important role in water supply in the State and that there was a need to manage them sustainably, but it stated that there was still information that was lacking on the impact of human activities on the ecosystem including ground water.

**Comparison between Key Informant Impressions and Documentary Evidence:**

Although some informants referred to the water crisis and flooding that might ensue if peatlands were developed, the direct connection between water management in peatlands and peat swamp forests and water supply in Peninsular Malaysia was difficult to find in documents. Newspaper reports in 2013 point to an imminent water crisis in the country, particularly in and around the capital city of Kuala Lumpur (*The New Straits Times*, 2013), but the sources of water that became the focus of discussions in these articles were rivers and rainfall (more than catchment forests) and the lack of proper management of water reservoirs. Water management in peatlands was discussed in greater detail in specific guidelines for developing peatlands for agricultural use, particularly for the more recent development of oil palm plantations on peat by RSPO (Lim *et al.*, 2012).

### 7.2.2.4 Fires and Haze

Related to water management, peat fires and haze were also highlighted as key issues in peatland and peat swamp forest management by a fifth of the informants (20%). According to a senior officer of a government agency, if water levels were kept too low through drainage then the peatlands would dry up, which made them susceptible to fires because they comprised organic matter:

> "The most important issue is that peatlands are being drained. Most peatlands are dry, particularly during the dry season, and this can easily cause peat fires. Peat swamps are supposed to be wet as they are swamps." (N37, 2012)
Another senior manager with a government agency described the damage on the land that could be inflicted by peat fires:

“The fire risk is great and it can sometimes be started by a cigarette butt or someone burning rubbish. In peat when somebody burns something, the fire catches on and it doesn’t die. It burns very quickly and suddenly the whole land drops. Even then the fire continues burning, causes haze and that can impact the environment.” (J3, 2012)

Informants emphasized that it was land occupied by local people and illegal settlers that were areas prone to peat fires, not traditional agricultural land, as fires were the cheapest way for local people to clear abandoned land. A senior manager with a government agency explained:

“Peat areas that have been traditionally developed for agriculture are not prone to fires because the peat is already stable. The areas prone to fires are those adjacent to the forests where you have illegal settlers. They use the government land illegally. They assume that the land is abandoned because there are no signboards to say otherwise.” (N39, 2012)

Contradicting this view, a scientist with an academic institution highlighted the Orang Asli perspective on the cause of these fires:

“They [the Orang Asli] know that people blame them for starting fires in peat areas. They say that in the past they use to smoke while fishing and throw their cigarettes in the peat but this action did not cause fires back then. Today, they do the same and it starts a fire. They blame the timber industry for draining the peat swamp and making it easily combustible.” (P4, 2012)

According to an employee of an NGO, there was also a misconception among local settlers that fires increased the fertility of the soil and was therefore good for farming:

“People have misunderstood the concept of burning. They think that when they burn the peat soil, the end material is organic fertiliser so it is better for their land. They do not realise that there are related problems like subsidence. People have a very low level of knowledge when it comes to developing peat.” (S6, 2012)

In areas where these peat fires have occurred annually over the last few years, an officer with a government agency explained that multi-sectoral committees comprising related government agencies were established to fight these fires:
Quarterly meetings are being held throughout the year to make preparations for firefighting measures and natural disasters. The committees have been effective in fighting fires early and preventing them from spreading.” (P8, 2012)

**Documentary Evidence:** Documents showed that fire-prone peatlands covered less than 10% of the total area of peatlands in Southeast Asia and that they were primarily those areas that have been opened up and drained, especially areas that may were not under prudent management (GEC, 2010). They stated that once peatlands became significantly altered by fire and deforestation, they were susceptible to repeated burning (Siegert *et al.*, 2001; Page *et al.*, 2009). Documents also pointed to the role of large-scale plantations in the cause of peatland fires, particularly in Indonesia (Tacconi, 2003; Bechteler and Siegert, 2004; Saharjo and Munoz, 2005; Page *et al.*, 2009; van der Werf *et al.*, 2010), but there were no documents that made that connection in Peninsular Malaysia. In fact, Dennis *et al.* (2005) found no single dominant cause for the fires at eight locations across Borneo and Sumatra.

Agus (2008) found that the burning of peat soil was often conducted intentionally in traditional farming to increase the soil pH and fertility. The use of fire was prevalent among small-holder farmers as a traditional means of land preparation (Saharjo and Munoz, 2005). Byron and Shepherd (2009) highlighted the link between land-tenure conflicts and peat fires, saying that local people started fires in abandoned land as a way to secure the rights to the land, fearing that they might lose in a race for marginal land against big companies. This was the case in Indonesia but its importance in Peninsular Malaysia needs further investigation.

Other documents elaborated on the effects of large-scale, uncontrolled burning on the health of local communities (Tacconi, 2003; Page *et al.* 2009) and the economic
losses as a result of the haze (Tacconi, 2003; Bechteler and Siegert, 2004), which were not highlighted by informants.

**Comparison between Key Informant Impressions and Documentary Evidence:**

Ten of the 13 people who highlighted fires and haze as key issues in peatland management were staff of government agencies, indicating a high level of awareness and importance placed on this issue by government. Various government agencies are also involved in task forces to fight peat fires that have been set up at the national, regional and local levels, and this could be one of the reasons for the high level of awareness of this issue.

**7.2.2.5 Lack of Awareness**

Close to a fifth of the informants (19%) talked about a lack of awareness of the importance of peatlands as a key issue in peatland management. This led to a relatively low price for the purchase of peat-lands, according to a technical employee of an NGO:

“Land per acre in peatlands is cheaper than in the dry land and that is why people use peatlands for development. Decision makers at the state level see peat swamps as less valuable so they lease it out for agriculture to bring some income to the State.” (JI, 2012)

Two other informants also highlighted the need to get State Governments to recognise the role of these ecosystems. A senior technical manager with a government agency elaborated:

“It really has to do with getting states who have jurisdiction over land use to recognise the role of peat swamps and peat swamp forests, not just for biodiversity, but for water storage, for flood mitigation and water treatment; and all the services they provide. This is so that their functionality is not disrupted by drainage.” (N8, 2012)
A lack of information on the status and condition of peatlands and peat swamp forests was cited as another reason for the lack of awareness. A senior manager with a private company made reference to this:

“We don’t have an overview of peat swamps and peatlands in the country. There is a constant flow of products from the Southeast Pahang forest to nurseries in Sg Buloh [popular garden centre close to Kuala Lumpur] so the links to the markets are very strong but we don’t know how much damage is done [as a result of the collection of these forest produce]. We don’t know whether the [extraction] rates have gone up or down. Managers don’t have a good view of what is happening in these peat areas.” (N16, 2012)

This sentiment was echoed by a senior officer of a government agency:

“We have started to map out the remaining peat areas. We know roughly where they are but we don’t know the status for the whole of Malaysia. Based on the [National Peatland] Action Plan, we have to make a concerted effort on peatlands that we need to conserve because then we can focus on areas that are vulnerable.” (N11, 2012)

Locally, informants from the states made reference to the need to educate the local community and school children, particularly those living close to the peatlands and peat swamps, so they learn how to use land adjacent to forest reserves without disturbing the ecosystem.

Documentary Evidence: Peatlands and peat swamp forests are often referred to by developers in documents as “marginal land”, “problem soil” or land with a “difficult terrain” (Xaviar et al., 2004; Duraisamy et al., 2007; Hashim and Islam, 2008; Tang, 2011), thus they are not the preferred land for development (Paramananthan, 2008). Paramananthan (2008) explained that it was the scarcity of lowland areas for development that has forced Governments to consider peatlands.

Among the actions identified in the Malaysian National Action Plan for Peatlands is to “determine the extent and status of resources of peat areas in Malaysia” and “improve the knowledge and understanding of peatland management” (NAP, 2011);
it is thus recognised by the Malaysian Government that these are important aspects
development. There are also plans through the National Action Plan to
review management options for peatlands once the status of peatlands in Malaysia
has been determined.

**Comparison between Key Informant Impressions and Documentary Evidence:**
Both impressions from key informants and documentary evidence show that there is
a need to raise awareness about peatland and peat swamp management in
Peninsular Malaysia. One aspect where there has been little consideration is
participatory management. Although the Ramsar Convention and Convention on
Biological Diversity (CBD Secretariat, 2004; Ramsar Secretariat, 2007) encourage
the participation of local and indigenous people’s involvement in wetland
management, there is currently little scope for these groups to assist in maintaining
or restoring the ecological integrity of peatlands, as well as contributing to
community well-being and more equitable access to resources in Peninsular
Malaysia. Participatory management has been considered fundamental to raising
awareness (Middendorf and Busch, 1997) but there was no evidence of it occurring
in either the responses from interviewee or the documentary evidence relating to
peatlands.

7.2.2.6 Decline in Biodiversity
A small percentage of the informants (14%) highlighted a decline in biodiversity as a
key issue for peat swamp forest management, and proposed that “leaving these
ecosystems as they are” (P4, 2012) might benefit the country in the longer term. A
senior technical manager from a private company pointed out that:
“Peat swamp forest biological diversity is a dynamic process; you need to maintain the biological processes which allow peat to develop, to reach its maturity and to die.” (P3, 2012)

Two informants also described the importance of these ecosystems in maintaining the culture of the people living in their vicinity. A senior manager with a government agency explained:

“People in the conservation industry are concerned with the biodiversity, both in terms of the flora and fauna, and also the culture of the communities that thrive around the peat swamps.” (N27, 2012)

However, these informants also acknowledged that peatland biodiversity conservation remains a challenge because there is a lack of recognition of their importance and peatlands were seen as wastelands needing to be developed. A senior technical manager with a private company highlighted that the lack of recognition was evident in that “peat swamp forests are under-represented in terms of protected forests” (S2, 2012).

Another aspect related to biodiversity conservation is the rehabilitation of degraded peatlands and the regeneration of forests in these areas. Current royalty and ‘cess’ payments (a tax payment imposed by the Malaysian government) for timber extraction were very low, informants suggested, and they were insufficient to pay for rehabilitation. A senior manager with an NGO clarified:

“There are royalty and cess payments in Malaysia, which are supposed to be used for rehabilitation and reforestation but the amount is too small. That’s why forests in Malaysia are being degraded. These payments should be dependent on the market value of timber. In PNG for example, companies are expected to plant back the same area of forests they have harvested.” (S1, 2012)

Some informants also raised a lack of knowledge about rehabilitation as an issue.
**Documentary Evidence:** Documents highlighted that Malaysia has been recognised as one of the 12 mega-biodiversity countries in the world as its natural environment supports key milestone and endemic species of flora and fauna (Yeap et al., 2007). They also drew attention to the lack of information about tropical peat swamp forest biodiversity and stated that this was alarming as vast areas have already been lost or degraded. Posa et al. (2011) predicted that the difficult logistics of swampy conditions coupled with an assumption of low biodiversity present had discouraged biologists from surveying in the past. Although scientific papers have since described significant biodiversity in tropical peat swamps (e.g. Page et al., 1997; Yule, 2010), those in Peninsular Malaysia have yet to be comprehensively surveyed.

Documents highlighted that experience of peatland rehabilitation per se was limited and much of the experience came from temperate peatlands, especially where peat extraction had taken place. For tropical peat swamps, documents stressed that open conditions were unsuitable for the re-growth of most peat swamp forest species and this often led to the development of secondary forests dominated by a limited number of pioneer species (Page and Graham, 2008; Clarke and Rieley, 2010; Davies, 2011). Rehabilitation of degraded peatlands required two stages, the raising of the water table and re-vegetation; if the latter was carried out without the former, there was a high chance of the plants being destroyed by fires and a low survival rate (Davies, 2011).

**Comparison between Key Informant Impressions and Documentary Evidence:** Although key informants mentioned that peat swamp forests were under-represented in the protected areas network in Peninsular Malaysia, it was difficult to
find documents addressing this issue. Documents highlighted various species that were targeted for protection (such as the Malayan Tiger *Panthera tigris jacksoni*) (Kawanishi and Sunquist, 2004; Laidlaw, 2000) but issues pertaining to the status of specific habitats, peat swamps for example, have not been discussed.

**7.2.2.7 Emissions of Greenhouse Gases (GHG)**

Informants who highlighted the key issue of GHG emissions from peatlands and peat swamp forests (14%) were aware of the role they play as carbon sinks. Two senior managers from a government agency explained that peatlands needed to be managed to reduce the amount of CO$_2$ being emitted into the atmosphere:

“We have to manage peat swamp forest practices which relate to climate change and carbon storage functions. If we don’t and they degrade, they will emit CO$_2$ into the atmosphere and the consequences can be quite damaging.” (N18, 2012)

Malaysia had an obligation as a signatory to the UNFCCC to manage its peat resources, as pointed out by a senior manager of an NGO:

“As a signatory to the UNFCCC, Malaysia has made a commitment at the international level to curb CO$_2$ emissions. Crucial action must be taken to prevent further CO$_2$ emission through the conversion of peat swamps because conversion will lead to CO$_2$ being released into the atmosphere.” (N24, 2012)

These informants also referred to Malaysia’s international status as a country with a net carbon sink, therefore offsetting any emissions from other industries. A senior manager with an NGO pointed out:

“Malaysia as a whole has so much forest that we are a carbon sink and not an emitter, so the oil palm industry can continue to produce and its CO$_2$ emissions will be offset by the forest.” (N9, 2012)

An employee of an NGO also explained that the role of peatlands as a carbon sink is of global importance:

“They are very important for the preservation of biodiversity and the preservation of the world’s most powerful natural carbon sink. This is absolutely critical; it is of global importance.” (S5, 2012)
However, debate remained on whether converted and degraded peat swamps and peatlands were emitting more or less GHG than oil palm plantations on peatlands that were properly managed. Highlighting the need for water table management in peat areas that were being developed, a senior manager with a government agency pointed out:

“If we allow too much lowering of the water table, then there will be too much exposure of the peat, and it will emit carbon dioxide, such as in Indonesia. They [i.e. peatlands and peat swamp forests] burn and that is the worst part.” (N18, 2012)

A senior manager with a government-linked agency highlighted the connection between GHG emissions and accusations towards the oil palm industry in Peninsular Malaysia:

“The problem we face is the accusation that the existing peatlands in Malaysia are being increasingly converted to oil palm plantations and that these will result in substantial GHG emissions. The accusation is that the oil palm industry is not a sustainable, environment friendly industry.” (N17, 2012)

Hence the call from these informants for scientists working in the field to “get the science right” and “more solid” with regards to this debate; a few informants also suggested that pending that, the precautionary approach should be considered as restoration and rehabilitation of these peatlands would incur huge costs.

**Documentary Evidence:** Documents showed that peatland burning and drainage activities have led to massive increases in the emissions of greenhouse gases as well as contributing significantly to climate change (Joosten et al., 2012; Davies, 2011; Hooijer et al., 2006; Page et al., 2002; Lim et al., 2012). The Ramsar Convention Secretariat (2007) stated that, while the health impacts upon humans of the peat fires in 1997/8 were felt at the regional level, “the impacts upon the Earth’s health were global” as it was estimated to have contributed an amount of carbon equivalent to 13–40% of the mean annual global carbon emissions from fossil fuels.
Furthermore, Paramananthan (2011) has argued that the estimates of the extent of tropical peatlands, hence the estimates of carbon stocks, may be higher than thought. Using a case study of the Baram area in Sarawak, he asserted that the current above ground estimates do not consider the phasic vegetation communities in peat domes or the wood (i.e. logs) in the vertical profile which can be undecomposed.

Documents also showed that the use of peat as a substrate for horticulture was a significant source of peatland degradation and carbon emissions (Hooijer et al., 2006; Couwenberg et al., 2010; Hooijer et al., 2010; Murdiyarso et al., 2010; Page, 2011; Ahmad Shukri et al., 2011). Drainage of these peatlands to enable oil palm to grow, for example, had led to a rapid decomposition of the organic carbon of the peat and greenhouse gas emissions (Schrier-Uijl et al., 2013). A total of 10% of the drained soil was being oxidized annually, forming CO₂ and causing emissions of up to 100 tonnes CO₂ per hectare per year (Wösten, et al., 2006) but these estimated figures referred mostly to Indonesia.

Research in GHG fluxes from peatlands and oil palm plantations on peatlands do appear to be more complex than previously realised and further research appears to be needed to understand such issues as soil characteristics (Kimura et al., 2012), humidity and the water table (Melling et al., 2005) and the use of fertilisers (Melling et al., 2006). For example, Melling et al. (2005), who studied the monthly soil CO₂ flux from tropical peatlands in Sarawak over the period of a year, found that the soil CO₂ flux was highest in the forest ecosystem, followed by oil palm plantations and was lowest from a sago plantation. Page et al. (2010) tried to establish an accurate inventory of tropical peatlands in Malaysia to estimate the transfers of peat-derived
GHG (including CO₂) to the atmosphere resulting from land use change. They concluded that this information was important because of the current interest in GHG emissions from developed and degraded peatlands, as well as the need to predict future trends under the influence of land use and climate change. Various studies have tried to estimate the CO₂ emission from peatlands and peat swamps in Southeast Asia (Hooijer et al., 2006; Page et al., 2010) but the difficulty in acquiring data such as peat thickness, distribution of peatlands, land use and land cover, as well as drainage depth, have hampered a more accurate estimate for Peninsular Malaysia.

**Comparison between Key Informant Impressions and Documentary Evidence:**
Both informant interviews and the documentary evidence suggested that estimates of CO₂ emissions for Peninsular Malaysia are inaccurate and based on very few studies, with most Malaysian research focusing on Sarawak.

**7.2.2.8 Peat Loss**

Three informants who are scientists indicated the rate of loss of the peat ecosystem in Peninsular Malaysia due to oxidation, drainage and subsidence as a key issue in peatland management; one of them said:

“The loss of peat itself is through oxidation and drainage, subsidence and associated ecosystems; we can’t get peat back after it is lost. We will end up with a severely degraded area that cannot be used for any land use that is profitable.” (N28, 2012)

Three senior managers, two from government agencies and one from an NGO, cited West Johor as an example where peatlands experienced problems with subsidence after development. One of them pointed out that other peatlands in Peninsular Malaysia could also face similar problems:
“At the moment the ultimate impact of subsidence is apparent in Johor. Some peatlands [in Peninsular Malaysia] are underlain by acid sulphate soils. When all the peat is gone, they will not be suitable for agriculture anymore, and this will lead to unsustainable and unproductive landscapes.” (N21, 2012)

A senior manager with a government-linked agency recalled that reducing peat loss through proper drainage systems were crucial:

“In the West Johor project, there was once an incident when a whole tractor went plop into the peat and was never recovered; the peat can be that deep! That’s why drainage of peat must be done through the ring way of draining peat, which is where they have a circle and they move slowly to the centre.” (J2, 2012)

**Documentary Evidence:** Documents showed that while drainage has greatly improved the ability to use peatlands for farming, plantations and other land uses (Schrier-Uijl, 2013), it has led to loss and subsidence of peat soils (Hooijer *et al.*, 2010). Researchers thus recommended that a balance between drainage and conservation was needed to protect peatland soils (Joosten and Clarke, 2002; Clarke and Rieley, 2010; Davies, 2011; Prentice, 2011).

Conservationists argued that estimates of annual peat growth varied between 0.5 - 1.0 mm annually (Davies, 2011; Prentice, 2011) and the subsidence rate of drained peat were of the order of 1.5 - 3.0 cm (Andriesse, 1988); this caused agricultural activities involving peatland drainage to lead to the loss of peatlands and their associated functions and therefore be unsustainable. Documents also showed that the peat layer was lost through oxidation, compaction and erosion (Murdiyarso *et al.*, 2010; Hooijer *et al.*, 2010) when drained and when there is no further growth of the peat layer, drained peatlands subside and (providing drainage continues) eventually the entire peat layer would be lost (Davies, 2011).
Hooijer et al. (2010) showed that subsidence could bring the peat surface close to the drainage base which resulted in increased flooding and reduced agricultural productivity, leading to abandonment of the land. They also argued that drainage systems in abandoned peatlands could continue to draw down water levels as no funding was available for costly canal-blocking activities.

**Comparison between Key Informant Impressions and Documentary Evidence:**
Both documents and key informants acknowledged a relationship between drainage depth, the rate of subsidence and CO₂ emissions but few published long-term studies could be sourced on subsidence rates of drained peatlands in Southeast Asia, and in particular Peninsular Malaysia. Many assumptions exist in short-term studies and therefore questions regarding the issue of peat subsidence and loss after drainage remain.

**7.2.3 Factors Driving Policy Implementation**

Key informants were also asked what factors they thought were important for influencing policy implementation. These factors were divided into six categories (Figure 7.5) based on the schools of thought described earlier in Section 7.1. The categories were economics (49%); clarity of policies and implementation arrangements (31%); awareness, public interest and support (29%); linkage between federal and state agencies (28%); politics and political will (20%); institutional capacity and coordination among agencies (20%); and availability of resources (12%).
Informant groups from government-linked agencies, private companies, NGOs and academic institutions cited economics as the main factor driving policy implementation, while government agencies thought the linkage between the Federal and State Governments was most important (Table 7.3). Informants from private companies and NGOs also thought that the lack of a clear policy on peatlands and peat swamp forest was also an important factor driving policy implementation, as was awareness, interest and support; while informants from government-linked agencies cited institutional capacity and resources as being important factors. Informants from government agencies named economics; lack of...
a clear policy; awareness, interest and support; as well as institutional capacity as being other factors.

Table 7.3: Frequency (%) with which the key informant groups referred to factors driving peat-related policy implementation

<table>
<thead>
<tr>
<th>Policies and Plans</th>
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<th>GLA</th>
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<td>5</td>
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7.2.3.1 Economics

Informants who alluded to economics as the main factor driving the implementation of peat-related policies explained that peatlands formed one of the last opportunities for development in the country to increase income from land-based activities and provide income generating opportunities. Two senior managers with government-linked agencies elaborated on this point:

“Right now there’s a tendency [to believe] that development [of peat] is better than protection because through development you see revenue. If you convert peatlands to oil palm plantations, you see direct revenue for the state and individuals.” (N12, 2012)
“There is a need to empower the population with a higher income. The question is what other land area do we have to create an agricultural or non-agriculture economic base that will provide better living conditions for the poor?” (N17, 2012)

These views were also shared by a senior manager of a private company:

“If the mineral land has been planted and there is no land left for development, and if the demand for land is high, this is when plantations will go into peat areas. Given the choice, we won’t plant in peat, we prefer mineral soil. If there is no mineral land left, we will have to use peat.” (N20, 2012)

Another senior manager of a private company described how the palm oil sector is currently the second largest contributor to Malaysia’s Gross National Product, after petroleum which benefits the length of the supply chain:

“Palm oil is a huge generator of economic activity for growers, and upstream and downstream users. Upstream users are transport companies, mills and refineries while downstream users are banks, shipping companies, railways and tankers. About eight out of ten tankers on the road now carry palm oil.” (N20, 2012)

Current commodity prices favour the development of peat areas for palm oil outstripping alternative uses such as for carbon retention. As explained by a senior technical manager of another private company:

“The international [high] price of oil palm is an important factor; oil palm is financially more lucrative than conservation. The price of carbon is very low [at 40 sen or AUD$0.15 per unit], this is the reason why REDD+ projects are not attractive. These prices are market-driven.” (S2, 2012)

For one senior manager at a private company, development of peatland is an economic inevitability:

“As in anything to do with natural resources, if the opportunity cost to leave the natural resource alone is too high then it will be exploited.” (N19, 2012)

This view was refuted by a senior technical manager of a government agency, who said that planting oil palm on peatlands incurred high costs which meant it was not always a viable option:

“Peat is not easy to manage. Opening up an oil palm plantation on mineral soil is half the cost compared to peatlands. For peatlands, you have to get it right from the seed stage and there are extra costs. It is high in nutrient requirement [i.e. fertilisers] and..."
fertiliser is not cheap. Even with the increasing price in palm oil, people will not just jump into peatlands and plant oil palm.” (N2, 2012)

A response echoed by a senior manager for a private company:

“Economic development is the key factor that determines whether peat swamps are developed, if the costs of developing them are high and no subsidy is given to draining the swamp, then that development project will not proceed.” (N16, 2012)

While agreeing that economics (and capitalism) drives policy implementation, a senior manager of an NGO refuted the suggestion that development of peatlands and peat swamp forests was needed for the benefit of local people:

“Decision-makers see peat swamp forests as a land base for development like logging. But where these things are the most, that’s where you will find the poorest people. So the argument of using land for development purposes does not hold good because the people are worse off in those areas.” (P5, 2012)

Local people also tended to lose their connection with the land when economics became the prime factor in decision-making, as explained by a scientist of an academic institution:

“In the capitalist system, when everything is based on cash and subsistence economies and people are less dependent on the resources, destruction of the environment will be really bad. Some communities are no longer attached to the forest and there is little appreciation for what it used to be like.” (P7, 2012)

A senior manager with a government-linked agency highlighted the conflict between development and conservation because economic development looked at short-term gains while conservation needed to look at longer-term benefits:

“In conservation of natural resources, the horizon is longer term. If forced into competition with shorter term [development] activities, we will find ourselves in conflict. If you don’t talk about the future, then we will not know the value of ecotourism. But in 20 years from now, people would pay a lot of money just to watch a bird of paradise.” (N38, 2012)

Overall, while a majority of government-linked agency and private company informants suggested that development of peatlands is inevitable for economic
reasons, the general message from NGOs and academic institutions was that peatland development is economically marginal and provides few local benefits.

7.2.3.2 Clarity of Policies and Implementation Arrangements

Informants also alluded to a lack of clear policies on peatland and peat swamp forest management as one of the factors influencing policy implementation. Two informants elaborated on this lack of clarity in policy:

“They [the Government] will implement this [policy] and certain things may be against the policy, like economic development or the agriculture policy may super-impose on the existing policy [on peatlands] so it will not be implemented." (N13, 2012)

“Policies that impact peatlands are incoherent. There is no recognition of the specific management requirement of peatlands in the policy sector and there is no overall federal peatland policy in Malaysia." (N21, 2012)

Proposing a balance in the area of peatlands to be conserved, a scientist with a private company made the following observation:

“Right now there is no policy; peat swamp forests are like any other FR. Whether it is peat or dry land forest, we need to conserve a certain portion. If there are endangered species, we should conserve it. If there are no endangered species, then we should retain a portion of the peat swamp as a natural habitat for wildlife and fish." (N15, 2012)

Citing another example of the weak requirements of an EIA for development policies, including those for peatlands, a senior manager of an NGO referred to it as a failure:

“A lack of clear strong policies that relate to peat development standards is another factor. EIA is a failure and doesn’t make a difference; there are only little things you have to do [according to the EIA] to get compliance." (N1, 2012)

As a result of the lack of a clear policy, peatland development seemed to be directed by commercial interests and industry, as observed by a scientist of an academic institution:

“We need a policy specific to peatlands. What is lacking in our policy for forestry is that
ours is driven by commercial interest. We are not serious about sustainability; we're not taking other views into account when we look at these resources. It's very much about extracting, turning them into a commodity and then selling them. We're very industry driven." (P4, 2012)

A senior manager with an NGO suggested that peatland development formed part of the overall development policies:

“According to Vision 2020 Malaysia’s vision is to have developed nation status by 2020, to create a safe environment, transparent government policies and peatland is just part of the whole thing.” (N5, 2012)

A senior manager of a government agency warned that this might not be a good position for the country:

“If we don’t have a policy that gives us the direction, then we are not ready to dwell into peat.” (J3, 2012)

Informants also highlighted that there was no peat-related policy at the state level and this was affecting the implementation of policies. A senior manager of a private company referred to the role of the Forestry Department as an example:

“At the state level, there is no peat policy or peatland management. Forestry officers at the state level probably recognise peat and they have different management systems for different types of forests but they don’t have any influence with regards to land use change. It’s really up to the State Governments.” (N16, 2012)

Suggesting that national and state policies be harmonised, a senior manager of an NGO suggested that valuation of ecosystem services could be the start for this mechanism:

“There should be a national and state harmonised policy; not just inviting consultants and international bodies to show that we are wonderful. New and effective policies and mechanisms should be developed for valuing ecosystem services.” (N4, 2012)

Informants also referred to the need to have clear implementation arrangements in policy documents and action plans for it to be translated into action on the ground:

“In order to get policies implemented, we need Acts [legislation] and proper guidelines.” (N18, 2012)
“Policies are made at a nice 5-star hotel, but do they [the Government] know what is really happening on the ground? Who is going to implement the policies, this is not there [in the document]! Before they come up with the policies, they should have a stakeholder dialogue with the affected area. The process of coming up with policies now is not consultative enough.” (S6, 2012)

An officer with a government agency explained the reason for the lack of implementation at the district level:

“We can control activities for which we issue permits like sand-mining because there are certain conditions to abide, but for agricultural land we don’t impose any conditions so it is difficult to monitor and stop certain activities there.” (S7, 2012)

Overall, while a majority of government agency informants suggested that clear implementation arrangements were needed for policy to be effective, informants from NGOs, academic institutions and government-linked agencies felt that there were no policies that related directly to peatlands and those that were loosely related were inconsistent and unclear in their guidance.

7.2.3.3 Awareness, Public Interest and Support

Informants also touched on the lack of awareness of the importance and unique qualities of peat as a factor affecting the implementation of peat-related policies. A senior officer of a government agency noted:

“Another factor is awareness about this whole issue. There is little awareness about peatlands, even among government agencies and State Governments. We know so little about peatlands and its science for us to have effective policy interventions.” (N11, 2012)

Two informants highlighted how this lack of awareness affected decisions that were made about the use of peatlands:
“Politicians and decision makers who don’t understand the value of peatlands consider peat less valuable than lowland forest. They log it continuously and there is more value placed on lowland forests than on peatlands.” (N6, 2012)

“Unless it [the peat area] is gazetted, people think it is waste land, abandoned and not being used. It not a beneficial area and they can use the area.” (J4, 2012)

A senior manager of a private company also observed that people were not aware that peatlands were part of a large ecosystem and this led to their mismanagement:

“Many people don’t see peatlands as a large ecosystem; they assume that their land title is the extent of the peat but actually the peat extends beyond the land titles. Mismanagement in one section of peat causes mismanagement in the whole system.” (N19, 2012)

Information on peat areas needed to be provided to decision makers in a form that was easily understood to influence the implementation of peat-related policies, suggested a scientist with a private company:

“Information in a form that policy movers and decision makers can be swayed to understand how important it is and to make the right decision about it; now there is disconnect between the information we have and getting it to the people who can really make a difference in a form that is digestible.” (N25, 2012)

One example that was cited by a senior manager of a government agency was when the Pahang State Government agreed with the UNDP/GEF Peat Swamp Forest Project recommendation that forests be returned as reserves:

“In Pahang, the UNDP Project recommended that the forests be reclassified back as reserves and the State Government agreed. The State Government can take steps if the information is available and if they know that people are still relying on forests for their livelihoods.” (N18, 2012)

Informants also mentioned the lack of public interest and support towards demanding better environmental quality (for e.g. in housing) and a general apathy among the people towards conservation in Peninsular Malaysia as factors affecting policy implementation.

“Some State Governments are extremely progressive, on par with environmental awareness of the residents in that state. With increasing affluence comes increasing levels of awareness and a certain demand for environmental quality. There’s no point
Overall informants from government agencies, and a few from NGOs and private companies, felt that a major contributor to the lack of policy implementation for peatlands was ignorance of their important role in landscape processes and a lack of personal contact with peatlands.

### 7.2.3.4 Linkage between Federal and State Governments

Informants alluded to the linkage between levels of government, particularly the Federal and State Governments and their agencies, as another factor influencing the implementation of peat-related policies. A senior technical manager with a government agency explained:

“If the policy says to maintain a certain amount [of peatlands], the State will look at maintaining those. If the policy does not give any target, it is up to the State to draw the balance.” (N2, 2012)

Effective implementation of the policies was also dependent on the willingness of the State to accept these policies, as suggested by a senior manager with a government agency:

“If we want to conserve some peat forests as protection forests, the States have to inform the Land Council how much peat swamp forest they have put under protection. There must be a willingness of the government wheel; some of them have been gazetted as permanent reserve forests and this is because State Governments have the sole jurisdiction and they can influence this decision.” (N18, 2012)

A scientist of a private company elaborated on the need for agreement from the State if policies are to be implemented:

“Even if policies are formulated at the federal level, their implementation must be with the consent of the State and usually the states have their own views about conservation. It is the prerogative of the State Government to change land use as they see fit.” (N25, 2012)
In fact, a senior manager of a private company pointed out, the Federal Government had limited jurisdiction over how the State Governments decide to use their lands:

“If the State Government misbehaved and if they started converting peatlands; the Federal Government will not do anything. The Federal Government might, in their wisdom, think about giving them an incentive [not to do so]. It can only influence State Governments through incentives or disincentives.” (N16, 2012)

A senior technical manager of a private company explained that that was the reason for the selective implementation of policies at the state level:

“The policies are effective for forest reserves and have the support of the lower levels of government at state and district levels; then everything works. Where the State does not recognise the policy and they don’t want to argue with the Federal Government, they just ignore it! So basically the State chooses where to apply the policy. They show support for federal policies but selectively implement them on the ground, just so they don’t cause too many problems.” (P3, 2012)

The Federal Government needed to consider the State’s need to generate revenue, according to a senior manager of an NGO:

“The Federal Government comes up with policies as parties to multi-lateral environmental agreements but they may not translate down to the ground or state level because the State has other priorities. This has to do with where State Governments get their revenue from.” (N24, 2012)

Two informants pointed out that land and forests which lie outside Totally Protected Areas (TPAs) and Permanent Reserved Forests (PRFs) in Peninsular Malaysia came under the purview of the State Governments, and this Stateland was usually viewed as land that was available for development purposes to generate income for the State:

“The need for states to generate revenue is where they find themselves at odds with the Federal Government. The Federal Government has a big picture view of things but State Governments have their own structure and institutions that they need to feed.” (N8, 2012)

“States have to generate their own income. They might get a subsidy from the Federal Government but they have to set aside some money. If their income is based on forest and forested land, they will be aggressive in converting forest and reserved forest to plantations. If they want to double their income from palm oil, they will have to convert these forests. It is state income that drives land use change.” (N38, 2012)
A senior manager of a government agency suggested that the federal agencies could assist by providing resources in the form of finance for the implementation of the policy:

“Most peat areas and peat forests belong to the States and the federal departments and ministries need to collaborate with them. We can formulate policy only with their collaboration and support the implementation through finance and technical advice. More importantly, what is the incentive for them to conserve [the peatlands]?” (N23, 2012)

In fact, a manager with an NGO suggested that it was perhaps “the failure to link incentive programmes to peatlands” (N9, 2012) that saw State Governments opting for the conversion of peat areas.

Overall, informant groups agreed though that there was a need for the Federal Government to incentivise conservation to encourage State Governments to conserve their peatlands and peat swamp forests. Informants from the private sector felt that State Governments implemented peat-related policies of the Federal Government selectively as they had full jurisdiction over land matters, while government agency informants felt that State Governments were willing to obey the tenets of the policies but needed to see economic benefits.

7.2.3.5 Politics and Political Will

Politics and a lack of political will were also highlighted as factors influencing peat-related policy implementation. On the one hand, there was pressure from politicians for economic activity in a local area as noted by a senior manager of a government agency:

“Development of these peat areas is a result of the pressure from politicians and government to improve the standard of living of the people in the area because they have no other areas to develop.” (N42, 2012)
On the other hand, a senior manager of a private company suggested that it was always politics that interfered when decisions were not based on technical recommendations:

“If the technical feedback is that you shouldn’t convert an area, and if it is still converted then you have to ask who has the final say? Is it corruption, poverty or land concessions? The main factor is always politics; if technical feedback is not considered.” (N32, 2012)

A scientist with an academic institution shared these views:

“There is political influence. We know that the peatlands and peat swamp in Runchang [in Southeast Pahang] is very important but the Government has approved the planting of oil palm. Policy is over-ruled by the local situation.” (N31, 2012)

A scientist with a private company suggested that it was politics that hindered the preparation of a national policy on peat:

“Politics is the main stumbling block. That is one of the main reasons why they [the Governments] don’t come up with a policy. If you have a peatland policy then indirectly, their hands are being tied. The current politicians want to give out land and get some benefits. If you have such a policy, the next guy who comes in and takes over the government, his hands are tied too. I don’t think they want to do that.” (N15, 2012)

Two informants suggested that leadership is needed from the very top to promote peatland conservation for it to have the necessary impact:

“Environmental and conservation policy is not being driven by a charismatic person; it’s not driven by the No. 1 man. Weak ministers can’t really drive it. They can’t make it a priority at Cabinet meetings or a priority as a national initiative. Conservation is now on low ebb because NGOs are weaker and the environment is being politicised.” (N14, 2012)

“The Board of Directors makes the decisions and is chaired by the Chief Minister and executive committee members. They make the decisions, they discuss and if they approve an activity on peatlands, then is it allowed to proceed.” (S8, 2012)

Informants also suggested that political will was dependent on pressure exerted from the Malaysian public, from local NGOs and international agencies, as suggested by a senior technical manager of a private company:
“The media is now picking up on this and making it an issue. This has raised the profile of peatland management. It was also a reason for stopping the expansion of oil palm in Kuala Langat South. Decision makers are increasingly more democratic and happy to win over voters.” (S2, 2012)

Another senior technical manager of a private company suggested that large numbers of people were needed to demand that action be taken for peat conservation:

“People will support the protection of the charismatic, the spectacular, something which looks good in the Sunday supplement but peat doesn’t tend to fall into that category and doesn’t sustain an interest. If Datuk Seri Najib [present Malaysian Prime Minister] saw 200,000 people sitting outside his office saying “Do something about peat!” he probably would do something.” (P3, 2012)

At the state level, a scientist with a private company suggested that decisions were being made by a small group of people with vested interests:

“Planning is done on a five-year cycle and we don’t have publicly available documents. We can’t read through them and say this is something we need to think about. We don’t have publicly available information or the platform or forum to provide that kind of feedback. So decisions are being made at a different level, among a small group of people, with a don’t-care attitude beyond the next 10 years.” (N25, 2012)

Overall, government agency, academic institution and private company informants agreed that politics and interference from politicians influenced peat-related policy implementation, principally by a small group of influential people at the state level. They suggested that the drive for peatland conservation should be led by high-level politicians and other influential people but was more likely with demonstrable public support.

7.2.3.6 Institutional Capacity and Coordination among Agencies

Informants talked about the lack of institutional capacity in government agencies and the lack of coordination on actions related to peatland management as another factor contributing to weak policy implementation. According to a senior technical
manager of an NGO, this was due to peatland management not being made a priority:

“The institutional capacity of the agencies involved is the key determinant whether they [the government agencies] successfully manage it according to the policies; they also need technical capabilities. Where conserving our natural heritage is concerned, including peat, it’s not normally given priority so we don’t give it the necessary resources.” (N7, 2012)

Priority actions for government agencies, according to a senior officer of a government agency, were still being set by the head of the department:

“Malaysia does things top-down and many things are not institutionalised. It’s very individual-based and only if the top guy says we are going to focus on this issue, then the whole machinery will look at it.” (N11, 2012)

Informants also suggested that a special unit be formed to look into peatland management and the policy-science interface to address issues. A scientist with a private company suggested the following:

“We must have a body or an agency to monitor peatlands. Otherwise nobody will be in charge and nobody will bother. The government has to set up a body and there must be enforcement and penalties.” (N26, 2012)

A senior manager with a government-linked agency proposed that the unit should include various government agencies with the necessary expertise:

“We need] to get the relevant agencies involved and not depend on present government agencies. Peat is about water management; once you drain a small portion the whole basin will be affected. So [we need to have] a bigger picture; there isn’t any big scale scheme at the moment to control a peat area.” (N13, 2012)

Overall, informants from government agencies and NGOs felt that many agencies lacked institutional capacity for peatland management because peatland management was not a priority for Governments. Informants from government-linked agencies and the private sector suggested that a special multi-sectoral unit be established to address peatland management from a wider ecosystem perspective.
7.2.3.7 Resources

Lack of resources in terms of funding (i.e. the financial instrument for policy implementation), personnel and equipment were also cited as reasons for poor implementation of peat-related policies. Two informants from government agencies noted the importance of a financial instrument for policy implementation:

“These policies need financial instruments that will be a major consideration. What financial instrument is there for the states and the districts to implement the policy? When it comes to conservation, rarely do we have such instruments and it is dependent on external funding which has a short life-span and lacks sustainability.” (N27, 2012)

“The other common factor is funding, do we have funds to implement? The State Government will certainly ask if the Federal Government is prepared to give some kind of monetary benefit. So funds play a crucial role.” (N11, 2012)

Resources are also needed in the form of adequate personnel to carry out the task of enforcement, as pointed out by a senior manager of a government agency:

“Environment doesn’t get the desired allocation and the mechanism to monitor; a good example is DoE’s manpower for enforcement. We need staff to ensure that action is taken to reduce infringement; similarly for peat. Environment does not feature very high compared with economic and other income generation activities.” (N40, 2012)

A senior manager of an NGO added that:

“DoE does not have enough personnel and just one vehicle for the whole of Kuala Lumpur and Petaling Jaya.” (N1, 2012)

A senior manager of a government-linked agency suggested that financing was allocated to government agencies according to the level of importance regarded for the work they carried out, and the environment was of low priority:

“When it comes to enforcement, when it comes to managing peat, it is related to finance. Finance is allocated according to the importance a certain agency sets on an area. Awareness of the importance of this land is very important and public opinion can influence the way we allocate our budget. If there is high awareness among the public about the importance of this land, then there will probably be more allocation to manage them well.” (N12, 2012)
Overall there was unanimity among the government agency, government-linked agency and NGO informants who mentioned this issue that the low priority placed by all forms of government on peat management meant that few resources was allocated to planning, regulation or compliance.

7.2.4 Requirements for Peat-related Policy Implementation

The requirements identified by the key informants for policy implementation were a clear implementation plan (51%), capacity building measures (45%), an institutional framework (40%), increased knowledge and research (35%), increased resources (34%) and stakeholder buy-in (31%) (Figure 7.6).

Figure 7.6: Requirements for peat-related policy implementation
Informants from government agencies, private companies, NGOs and academic institutions suggested that a clear plan was needed for peat policy implementation while those from government-linked agencies considered knowledge and research more important (Table 7.4). Informants from all groups listed staff capacity as another important requirement, while those from the government and government-linked agencies also felt that organisational support was essential. Government agency informants also thought more resources were required for policy implementation while those from private companies and academic institutions were more likely to mention stakeholder buy-in as being important.

**Table 7.4: Frequency (%) with which the key informant groups referred to requirements for peat-related policy implementation**

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<td>43</td>
<td>50</td>
<td>41</td>
<td>56</td>
<td>20</td>
</tr>
<tr>
<td>Organisational support</td>
<td>62</td>
<td>50</td>
<td>24</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td>Knowledge and research</td>
<td>14</td>
<td>83</td>
<td>41</td>
<td>44</td>
<td>20</td>
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<tr>
<td>Resources</td>
<td>43</td>
<td>33</td>
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<tr>
<td>Stakeholder buy-in</td>
<td>24</td>
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**7.2.4.1 Implementation Plan**
The main requirement identified by key informants for peat-policy implementation, which related to one of the main gaps identified in Section 5.3.3, was a clear implementation plan for the policy particularly at the state level. A senior manager with a private company explained:

“What is lacking are [efforts towards] translating policies and action plans into strategies and approaches, putting them into practice in programmes and helping the state authorities and other agencies to plan on the ground.” (N30, 2012)

Implementation plans for policies should also consider the hydrological features of specific sites, according to a senior technical manager of an NGO:

“Site-specific policies are needed and development should be done according to hydrological units. We must take an ecosystem or a landscape approach. Canals must be dug according to contours and agriculture must be planned according to the ecosystem.” (S3, 2012)

A senior technical manager of a private company indicated that strategic plans should be made over the long term, and should be introduced to the private sector:

“It has to be a thoroughly structured policy that comes out with a strategic plan over the next 10 years. The strategic plan should take into account the state conflict, weaknesses in management and most importantly, the private sector because these lands will be managed by them.” (N14, 2012)

According to a senior manager of a private company, oil palm companies needed to include implementation plans in their plantations:

“More can be done for private companies who might not be aware of how to carry out best practices for plantations on peat, like nutrient or water management. Further training opportunities for these are needed.” (N35, 2012)

Better management practices should also be imposed for activities on peat, suggested a senior manager of a private company:

“Structures, procedures and awareness are needed. If the agriculture sector wants to develop on peat, it will need to comply with better management practices and treat peat as a special area, needing a license to operate. That way the government agencies can pay closer attention to these areas.” (N19, 2012)
Another key area related to the need for implementation plans was enforcement and monitoring actions on the ground. A senior manager with a government agency recommended that a system of reward and punishment be enforced:

“There must be reward and punishment-in, the legislation so that if you trample upon peat swamp there must be punishment. Those structures are not there yet.” (N27, 2012)

Citing the North Selangor Peat Swamp Forest as an example, an officer with an NGO said that the act of ground-truthing policies to ensure they can be implemented on the ground was crucial:

“Policies on paper might be good but on the ground, we might encounter problems. We have experienced this in Sg Karang FR where there were people living inside the FR, they had their own houses and land. The gazettal of the FR was made in 1991 but these people had been living in the area from the 1980s. [The problem has arisen because] whenever an area is demarcated as a FR, they do it from the office based on GIS maps. It is not done on the ground.” (S6, 2012)

Overall, private sector informants alluding to a need for a clear implementation plan felt that long term plans were needed at the state level to implement peat-related policies, while other informants suggested that enforcement should be strengthened and that policies be verified on the ground for implementation.

7.2.4.2 Staff Capacity

Another requirement for policy implementation alluded to by key informants was the training and capacity building of relevant civil servants in peatland and peat swamp forest management. A senior manager with a private company suggested that the current training for forestry officers should be expanded so they are able to better advise the State Governments:

“If the capacity of the state’s civil service is enhanced by increasing their knowledge about the constraints of development [on peat], and if the decision makers or politicians want to change the land use [of a peatland], civil servants can give reasons why it shouldn’t be done or done in a certain way, where to zone and gazette and where to maximise benefits and minimise costs.” (N16, 2012)
The training should also include managing water levels and biodiversity in peatlands and peat swamp forests, according to a senior officer of a government agency.

“Forestry Department needs specific courses on the use of peat swamps and water management. From the logging perspective, we have technical training but we do not have the expertise on flooding and we need to seek assistance from DoE or DID to provide training for flood control and water management.” (P9, 2012)

Regular training of civil servants was needed as trained officers were transferred to other departments and new officers needed to learn their jobs quickly, highlighted a scientist of a private company:

“Sometimes there is a major reshuffle and [trained] forestry officers are transferred to another department. The state FD is part of the public service department, so it cannot stop its staff from being transferred. The new officers often struggle to learn because they come from a different state and they don’t know the issues. This kind of reshuffling takes a toll on forest management.” (P2, 2012)

Another type of training required for civil servants was how to fight peat fires, particularly for officers at the state and district levels who served on site-level inter-agency committees and who were called upon to help when peat fires became uncontrollable.

Overall informants felt that the training of civil servants was especially important for peatland and peat swamp forest management, especially with respect to water management, fire-fighting and biodiversity conservation, to empower them to provide better advice to State Governments.

7.2.4.3 Organisational Support

Key informants also suggested the need for a single central authority to oversee all matters concerning peatland and peat swamp forest management as one of the requirements for policy implementation. A senior manager with a government
agency suggested that the unit must be one dedicated to overseeing the implementation of the peat-related policy:

“The unit is important; intentions are good but we need a dedicated unit and staff to follow it through. It could be situated at the ministry, government agency or at a university. At the government level, there must be a policy and secretariat looking at its implementation and monitoring issues.” (N27, 2012)

One suggestion from a senior officer from a government agency was for the National Wetlands Committee to assume that role to ensure inter-agency collaboration:

“The national committee hasn’t been meeting because the NAP hasn’t been launched. Once the national structure and the coordinating committee are in place, the institutional framework will be solid. We will have a coordinating body to take stock and monitor its implementation.” (N11, 2012)

Another senior manager of a government agency suggested that the unit be placed directly under the Prime Minister to ensure that the implementation of the peat policy was not fragmented:

“What is lacking is the structure to implement because at the moment it is very fragmented; some actions come under this department and other actions come under another agency. If we have one body under the Prime Minister, it will be more powerful and effective.” (N39, 2012)

Such a level of interest would assist with effective implementation of the policy, according to another senior manager of a government agency:

“The need is for an institutional set-up to monitor across the board, the state actors and technical agencies and to have the Prime Minister’s interest like for the National Physical Council. When there is that [level of] interest, there will be monitoring.” (N40, 2012)

Three informants from the state proposed that the coordinating unit for peat policy implementation be established at the state level:

“In the Selangor Action Plan for Peatlands, there was a task force to look at peat and this should also be done in other states [where there is peat].” (S3, 2012)

“If we make the [state] task force a permanent feature it will be more effective, so we can plan for the following year before there is a problem and if we have the necessary allocation.” (S7, 2012)
“The implementation mechanism needs to be coordinated by a committee that calls for a meeting and requests for allocation from the Federal Government for the various agencies. Then it is possible for the agencies to implement the plan together; otherwise the agencies will do their own thing.” (S10, 2013)

Overall government agency informants who alluded to the need for a dedicated unit for peatland and peat swamp forest management agreed that it should be led by top management in both the Federal and State Governments if it were to get the attention it needed.

7.2.4.4 Knowledge and Research

Another requirement identified by key informants (how many?) was the need for more knowledge and research on how to manage peatlands and peat swamp forests and their resources. A scientist with a private company alluded to the need for more information on the unique nature of peat to understand them better:

“More research to understand the nature of peat because no two areas of peat are the same in terms of how they function and their viability. Peat areas are more specific and they differ in depth, vegetation, location, water absorption rate, rate of water release and connection to a river. People have been studying temperate peat for years but research in tropical peat hasn’t got to the point where we can say we understand it.” (N25, 2012)

Such information could help formulate better policies for peatlands and peat swamp forests, suggested a senior manager with a government-linked agency:

“There is a lot we don’t know about peat swamp forest. Information needs to be collected about the ecosystem and brought into revisions of national plans. This information can help to educate policy makers that peat swamp forests are not only
valuable for its peat, timber and water but other ecosystems depend on them.” (P1, 2012)

A scientist with an academic institution stated that there was little research being carried out currently on the biodiversity of peatlands and peat swamp forests:

“..."We need research to understand the significance of peat swamps and peatlands in the larger landscape. During the [UNDP peat] project, FRIM and Fisheries said they lacked the expertise for particular indigenous species; there isn’t much research being done." (P4, 2012)

The carbon economy of Peninsular Malaysia’s peatlands and peat swamp forests was also little understood, according to two informants:

“We don’t know how much carbon is locked up or how much CO2 is emitted. We need to be able to monitor them. Existing agencies don’t have the skills to know how much carbon is being sequestered, not even DoE or FD.” (S2, 2012)

“[We need] an inventory of all peatlands areas on a map so we know how much oil palm is planted on peat. The problem is we have not done research on the main issues, for e.g. on carbon content or GHG.” (N13, 2012)

Information relating to the impact of oil palm plantations on peat was also scarce, as pointed out by a senior manager of a government agency:

“We need water management guidelines for BMP; guidelines by DID are on drainage and water resources. Some States have water management guidelines for peat and plantation areas but they need improvement. That’s why more research is needed; we need to identify how to solve the problems and hopefully these guidelines can help.” (N37, 2012)

It was suggested that more information on peatlands would lead to increased understanding and more public support for peat-related policies. Two senior managers with an NGO explained how this was necessary:

“More research on peatlands, their users and impacts to educate the public to get support from them. In Belgium, farmers are willing to give up their land for rehabilitation due to their understanding of the value of peatlands. In Malaysia, there is no public commitment and they are not educated. They are not given information and there are not enough studies with sustainability information. Even a well-coordinated policy will not work under these circumstances.” (S1, 2012)

“We will need proper maps showing location of peat and these location maps should interface with land use planning for development approvals.” (N1, 2012)
The information could also present solutions for overcoming the federal-state conflict in land use priorities and understanding the constraints within the State, a senior manager of a private company suggested:

“To get policies in place, the decision makers must be able to understand what constraints there are in the state and the constraints of land uses in peat swamps.” (N16, 2012)

Conflicts in land use decisions should be researched to find a win-win solution for all stakeholders, recommended a scientist from a private company:

“Conflict means that there are other factors at play which influence and which need to be researched further. How do we balance and make the situation a win-win situation for all the different stakeholders, the government, state governments, local people, general public, investors, contractors and loggers?” (P2, 2012)

While many informants recommended that investment in research be increased, there was also broad agreement among informants from government agencies that policy and management were being developed and enacted on the basis of flimsy knowledge, and that a greater understanding of peat systems would feed through to better policy and improved policy implementation, not least because it would raise the profile of peatlands in the community.

7.2.4.5 Other Resources

Having adequate resources was another requirement alluded to by key informants for policy implementation particularly for local level activities, as referred to by a senior manager of an NGO:

“Having the resources to support management on the ground is another requirement.” (N9, 2012)
A senior manager with a government agency suggested that the financial instrument or mechanism for a policy was crucial to pay for monitoring and management activities at the site level:

“The financial instrument issues need to be addressed because there is lack of management and monitoring in peat swamps. Someone must do it and some mechanism must fund the activities.” (N27, 2012)

The only means of financial support for the Ayer Hitam Forest Reserve was from the annual operating costs, as noted by a senior technical officer at an NGO:

“At Ayer Hitam, they have the annual operating costs. There’s no money for studies and this makes it quite difficult. The State needs to work with research institutions or NGOs to make research possible and feed the information into their management. There is hardly any allocation for such study at the state level.” (J1, 2012)

The funding for such studies should come from the Government, suggested a senior manager of a private company:

“Adequate funding is necessary and this is a commitment that has to come from the Government; Federal and State.” (N29, 2012)

Manpower for implementing the actions on the ground was also needed, according to a senior manager of a government agency:

“People need resources. They need to be able to analyse data and to have GIS capability; they need to be able to source data from the relevant State Governments and government agencies. They often work in a vacuum; they don’t have the data so can’t really monitor what’s going on.” (N40, 2012)

Coupled with that is the necessary infrastructure (like weirs), technology and equipment (such as helicopters) for implementation on the ground, as pointed out by two informants:

“Many facilities are needed such as walkie-talkies, water pumps, machinery like excavators and back hoes, appropriate clothing and shoes. If there is a peat fire, the task force at the district level will request an allocation from the State Economic Planning Unit. We don’t have an annual allocation and there is no allocation under the District Office’s budget.” (S7, 2012)

“The Forestry Department needs helicopters to fly over the peat swamp to check on the damaged or burnt forests. If they had their own helicopters, it will increase the
Overall, informants recognised a need for Government resources additional to annual operating costs in the form of finance, manpower and equipment, facilities and infrastructure, if policies to improve peatland and peat swamp forest management are to be implemented.

7.2.4.6 Stakeholder Buy-in

Key informants touched on the need for awareness and understanding of the various stakeholders affected by the policy for it to be implemented effectively. A scientist with a private company suggested that cross-cutting policies like a peatland policy would need a buy-in from all the stakeholders:

“The biggest challenge would be to get everybody on board. In Malaysia, the government agencies tend to work sectorally. Cross-cutting policies like the biodiversity policy have never been implemented because there is no buy-in from stakeholders. It’s seen as belonging to MNRE; it’s theirs to implement and it’s their responsibility. And similarly with the peatland policy, who does it belong to? Who is going to take ownership and who is going to implement it?” (N25, 2012)

Policy makers and scientists would also need to be brought on board if the policy was going to be implemented, according to a scientist with an academic institution:

“We’ve got to create the awareness of thinking sustainable and that conservation is important; it’s not just among the population, but among the policy makers and scientists.” (P4, 2012)

Cabinet members also need to give the policy the necessary level of importance, argued a senior technical officer of an NGO:

“Policies driven up by NRE are not seen to have a high value in the larger scheme of things at the national level. How many Cabinet ministers understand the value of the environment or peat? This is not an issue that is specific for peat but across the board where environment and conservation is concerned.” (N6, 2012)

Informants highlighted the need for awareness-raising among the local community to enlist their support for the policy, as “conservation and survival needs of the local
community can sometimes seem to be conflicting” (P7, 2012). These activities to raise awareness could include consultation at the village level, suggested two informants:

“Policy formulation should be done through consultation; it should be transparent and include socialisation, which is getting the support of people who will be affected. Socialisation puts the onus on the people trying to gain information or for people to promote it.” (P3, 2012)

“There must be some forum conducted by the authorities in villages near the forest. We invited all the villagers to hear about how to manage the forest and the do's and don'ts for them. That is the best way of alerting the people.” (S9, 2012)

There also needed to be buy-in from the State Governments if any policy on peat was going to be effectively implemented, pointed out a senior manager of a government agency:

“Federal and state governments look at things differently, and this is the challenge now. If you are the owner of a large peatland and you have to make a living from it, any rational and good policy on peat would be hard to comply with. If we want someone who has peatland not to use it, then we must institute something. Don’t penalise the owner of a peatland, he will comply if we make it possible for him to comply.” (J3, 2012)

A senior manager of a government-linked agency referred to the role that NGOs played in acting as mediators between the Federal and State Governments in such matters:

“NGOs can play a big role in enhancing awareness. Land matter is a State Government issue; there is limitation by government agencies on what they can do. Public opinion and NGOs play a strong role in influencing state policies and make the work of the government agencies easier.” (N12, 2012)

As noted earlier, one reason given for the apparent failure of peat-related policy was a lack of consultation and buy-in from those who would have to implement it, not just those from Sarawak who refused to endorse the policy at all.

7.3 Discussion
7.3.1 Nature of Governance

Governance is described as “interactions among structures, processes and traditions that determine how power and responsibilities have their say” (Graham et al., 2003) and “by which people in society make decisions and share power” (Folke et al., 2005). Dietz et al. (2003) added that governance was the means of “creating the conditions for ordered rule and collective action or institutions of social coordination.” In differentiating the terms governance, management and monitoring, Boyle et al. (2001), explained that governance was the process of resolving trade-offs and providing a vision and direction for sustainability, while management was the operationalization of this vision, and monitoring provided the feedback and synthesized the observations of how the situation might have emerged and what might unfold in the future. This section discusses issues related to governance based on these definitions.

7.3.1.1 Top Down and Hierarchical

The approach to governance and the management of peatlands in Peninsular Malaysia is similar to approaches and structures for other forms of management arrangements, in that it is top-down and hierarchical (Jomo et al., 2004, Rose, 2011). Policies affecting the management of peatlands (and other natural resources) made at the higher levels in the political process such as at the prime-ministerial level (e.g. the Malaysian Cabinet) or by the State leadership (e.g. Chief Minister of the State or at the State Executive Council) are then communicated to subordinate levels and imposed on the agencies lower down the government structure (for e.g. the Department of Forestry, the Department of Agriculture or Department of Irrigation and Drainage). These agencies are then charged with the technical,
managerial and administrative tasks of putting the policy into practice. There is little opportunity for consultation with the lower levels of management responsible for implementation of the policies or with the local people who will be affected by policy decisions.

Policy formulation and execution are also seen as distinct activities (Buse et al., 2005) in Peninsular Malaysia and not as an interactive process involving policy makers, implementers from various levels of government, and other actors. In addition, due to the need for bureaucratic accountability, there is little scope to change policy during implementation. The designation of Tasek Bera (which holds some peat swamp forests) as Malaysia’s first Ramsar site is a case in point, where the Federal and State Governments came to an agreement without consultation with the local Orang Asli (Semelai) community living in its vicinity (N31 and P2, 2012). This has led to a lack of involvement by the Semelai in the management of the site and many issues resulting from non-cooperation have emerged (P2, P4 and P7, 2012). Management arrangements have also been complex as the Department of Wildlife and National Parks, which is the federal agency responsible for Ramsar sites, was put in charge of the area which normally fell under the jurisdiction of the Department of Forestry. The State Government has refused to make any budgetary allocation for the site, and the Department of Wildlife and National Parks has struggled to manage the site with minimal allocation from the Federal Government (N1, 2012), because the land technically belongs to the State Government.

In describing Malaysia's political system as “semi-democratic, quasi-democratic and as a repressive-responsive semi-authoritarian regime”, Hezri (2004) highlighted that the Constitution provided the state with political control instruments “to avoid inter-
ethnic conflicts and to provide political stability conducive to socio-economic development.” He said such a political context limited the flow of information within the policy system, which created barriers to an open and liberal decision-making process. Malaysia’s lack of acceptance of the principle of freedom of information and the economic rationale that has always underpinned its policy planning (i.e. making choices about decisions and approaches based on economic efficiency) were identified by Hezri (2004) as constraints on improving the policy formulation process in Peninsular Malaysia.

Gillis (1988) touched on the autonomy of the States in Peninsular Malaysia on matters concerning forest utilization and highlighted that political forces outside of State’s boundaries, no matter how powerful they might be at the national level, had virtually no influence on State land use policies. Power over land disposition was in the hands of the States and the authority over timber, which was the major source of budget revenue for many States, was tightly guarded by State Governments. State Governments also had the ultimate authority over agro-conversion and the creation and size of state and national parks (Gillis, 1998). Individual States decided which land was to be designated as permanent forests and enforcement of all other provisions remained their prerogative.

The top down governance approach to natural resource management could also be the cause for the confusion and rivalries that exist in terms of establishing the future direction for peatland management in the country. Policy makers and leaders, particularly those at the State level, do not necessarily engage with research and scientific discovery to formulate policies, and there seems to be a dilemma characterized by tensions between effectiveness, participation and legitimacy (Folke
et al., 2005). The non-acceptance of research findings from Western countries and the questioning of its legitimacy (i.e. that pristine peatlands are being destroyed for oil palm plantations) has led to local scientists producing data from their scientific studies which have contradicted international research findings (N1 and N25, 2012), leading to confusion in policy formulation for managing peatlands. State Governments have also not necessarily chosen the most effective and participative process in formulating State policies, which is often kept within a small circle of influential people (N25, 2012).

The attempts to establish national apex advisory institutions such as the National Steering Committee on Wetlands and, subsequently, the relevant State Wetland Steering Committees to integrate environment and development have largely failed because the committees have been inactive. While the National Steering Committee on Wetlands has been put in charge of monitoring the execution of the National Peatland Action Plan, it has met so infrequently that State Wetland Steering Committees have yet to be formed (N11, 2012). Perhaps the reason for not activating these consultative agencies lies in their size and constitution of these bodies, and in financial constraints, as well as the readily available use of alternative and more informal consultative mechanisms (Rose, 2011). For example informal consultative mechanisms exist between the Ministry of Natural Resources and Environment, Department of Forestry and Global Environment Centre (N1, N43, S1, S3, 2012) in the implementation of the ASEAN Peatland Forest Project, although major decisions still need to go through the National Steering Committee on Wetlands for official endorsement.
Folke et al. (2005) have suggested that various alternatives to conventional top-down government control, including collaboration, partnerships, and networks should be explored to improve natural resource management. There is a need “to shift from a highly centralised, technocratic, rules-based, mechanistic approach of governance to a decentralised, participative, cooperative governance framework” (Rose, 2011).

Two examples of this are the collaborative networks for peatland fire-fighting and rehabilitation which have been formed through collective effort between various government agencies as well as through cooperation between government agencies, the private sector and non-governmental organisations.

7.3.1.2 Stakeholder Networks for Peatland Management

Two formal strategic stakeholder networks currently exist with regards to peatland management in Peninsular Malaysia, both of which are issue-focused (Roloff, 2008; Lockwood et al., 2010). The first is the network for peatland fire-fighting which comprises personnel from government departments and agencies (particularly the Department of Forestry, Environment as well as Irrigation and Drainage), NGO staff and fire-fighting teams made up of volunteers from the local communities (N18, P1, P2 and P4, 2012). A second network draws together government agencies, NGO staff and the local community for rehabilitation efforts, such as tree planting and canal blocking (N18, P1, P2 and P4, 2012). In the case of North Selangor, local community groups are also involved with developing nurseries for plant saplings used in the replanting (S3 and S7, 2012). The fire-fighting network is an ad-hoc arrangement and comes into effect during the dry periods when the risk of peat fires is higher; while the network for rehabilitation is a longer term arrangement aimed at
improving the ecological sustainability of peatlands. These strategic connectivity opportunities are an important consideration for sustainability in an environment of multilevel governance (Lockwood et al., 2010) and through which complex problems and challenges in cooperation with stakeholders can be addressed (Roloff, 2008).

The fire-fighting network exists at the North Selangor and Southeast Pahang peat swamp forest areas while the rehabilitation network exists only at North Selangor. There have been attempts to form a network for the management of the Ayer Hitam Forest Reserve (J1, 2012), essentially through the State Government, but efforts towards this end are still ongoing. The fire-fighting networks in Pahang and Selangor have acquired the necessary requirements for implementation highlighted in the previous chapter (Section 5.3.5), such as a clear mandate and implementation plan, as well as organisational and public support, especially after receiving a mandate from the State Governments. Special effort has been made to acquire other factors that have been lacking such as staff capacity, knowledge and research. The one area where support is still lacking is in the resources available to make the networks more effective in achieving their longer-term goals (S3 and S7, 2012), and here is where factors such as economics and political will become more pertinent. Rose (2011) suggested that improved integration and networking, not just within and between government agencies, but with economic and community institutions outside governments, in particular, with business and environmental non-governmental organisations, offers a way forward in environmental law.

One possible way forward is through enhanced partnerships that include the private sector, as is being encouraged by the rehabilitation network at North Selangor. This has been through corporate social responsibility programmes by private companies
such as Bridgestone Tyres (Bridgestone, 2013) and Hong Kong and Shanghai Banking Corporation (GEC, 2014d). In a globalised, networked world, smarter regulation requires co-administration with partners across government and beyond (Rose, 2011). Closer partnerships across a wider range of networks collaborating for compliance will enable more implementation opportunities to be taken up successfully. So it is in networking between the four stakeholder groups – the owners, appropriators, producers and final users - that peatland and peat swamp forest management could see closer partnerships for sustainability.

There are several informal and hidden networks that might exist with regards to peatlands in Peninsular Malaysia, which are probably more influential that the local networks described above. Several informants referred to these networks during the interviews but because this thesis did not set out looking for information on these networks, they were not verified during the course of this study.

7.3.2 Key Issues of Peatlands and Peat Swamp Forests in Peninsular Malaysia

Two of the key issues highlighted by informants were the lack of governance of peatlands and peat swamp forests in Peninsular Malaysia and their conversion to other land uses. These issues are linked because a lack of clear guidance, in terms of a policy on peatlands and peat swamp forests or mainstreaming their management into development planning, has seen the conversion of these ecosystems for land uses that were not sustainable (Colchester et al., 2007; Schrier-
Uijl et al., 2013; Bryan et al., 2013). The development of a national policy has also been hindered by a lack of agreement from all states in Malaysia, particularly Sarawak, on the tenets of the policy (N11, 2012). Other issues related to the policy were the need to address the management of peatlands and peat swamp forests as a hydrological unit (Parish et al., 2008), to adopt an ecosystem approach (CBD Secretariat, 2004; Ramsar Convention Secretariat, 2007) and the paradigm shift from sectoral planning to multi-sector or integrated management (Parish et al., 2008). These issues will be discussed further in the following chapters.

Water management was another important issue discussed and it was recognised that requirements for peatlands and peat swamp forests were different. The water table in peatlands being used for agriculture needed to be managed to ensure that optimal yields were obtained (Davies, 2011) while reducing peat oxidisation, subsidence and CO₂ emissions (Page et al., 2004; Wösten et al., 2006). For peat swamp forests, water management in the canals and other drainage structures was important to ensure that regeneration of the logged peat swamps was possible and that the peat did not become too dry as a result of drainage (Page et al., 2004; Wösten et al., 2006).

Peat fires and the resultant haze were another important concern, especially among the government agencies in Peninsular Malaysia, as the number of haze free days was an indicator of the performance of the Ministry of Natural Resources and Environment (N37, 2012). Peatlands that have been cleared and drained are especially prone to drying, and thereafter fires and repeated burning if they are not properly managed (Siegert et al., 2001; Page et al., 2009; GEC, 2010). There have been several attempts to address the management of peatlands and peat swamp
forests in Malaysia through the National Action Plan for Peatlands (2011) which was discussed in Chapter 5.

Another issue raised was the lack of awareness among the users and managers of peatlands and peat swamp forests of their importance, that there was a lack of information about them (Page et al., 2009) and that peatlands were sold at a lower price in the past as they were not preferred for development (Paramananthan, 2008). The National Action Plan for Peatlands (2011) hopes to improve the understanding by enhancing the knowledge about peatland management and reviewing the management options for them.

GHG emissions was another key issue discussed and there are indications that the drainage and clearing of peatlands and peats swamp forests are leading to higher GHG and CO₂ emissions (Joosten et al., 2012; Davies, 2011; Rieley, 1992; Hooijer et al., 2006; Page et al., 2002; Lim et al., 2012), but there are other studies that have indicated that well-managed oil palm plantations can produce less GHG and CO₂ emissions than degraded peatlands (Melling et al., 2005; Melling et al., 2006). Questions still abound on how peatlands that have been developed could be rehabilitated but there was a need for more research before a better understanding could be developed. Some informants proposed that a precautionary approach be adopted while the science was being worked out but it did not seem to be the popular choice (Duraisamy et al., 2007).

Peat loss through oxidation, drainage and subsidence was another issue highlighted by informants and documents, which both agreed could be addressed through better management. Longer-term studies were thought to be needed to better understand
the science of peat loss, especially of peat subsidence and loss as a result of drainage.

7.3.2.1 Disputed Knowledge – the Extent to which Informants and Documents Disagreed

A comparison of the issues highlighted by key informants was mostly similar to the documentary evidence regarding the main uses of peatlands and peat swamp forests and the key issues but there were some issues where key informants and documentary evidence disagreed, particularly with regards to oil palm plantations on peat, the sustainability of logging in peat swamp forests, and the link between catchment management and flooding.

7.3.2.1.1 Oil Palm Plantations on Peat

There has been considerable debate about the ongoing expansion of oil palm plantations (Sarvision, 2010; Page et al., 2011; Koh et al., 2011; Wicke et al., 2011; Miettenen et al., 2012), and whether this involved peatland areas. Even when informants agreed that peatlands had been planted with oil palm, there was disagreement about whether the peatland areas were pristine or degraded. Key informants from government agencies, government-linked agencies and private oil palm companies tended either to deny that oil palm had been established on peatland or else insisted that the peatland was already degraded before clearing began. The informants then went on to emphasise the economic gains from Malaysia’s current standing as the world’s largest producer and exporter of palm oil. [Malaysia produced 47% of the world’s supply of palm oil and accounted for the highest percentage of global vegetable oils and fats trade in 2005 (Sumathi et al., 2008).] Many from this group felt that Malaysia stood to gain from responding to the
growing global demand for vegetable oil and bio-fuel, particularly from India and China (N33, 2012), and that it was undisputable that oil palm was highly productive and generated considerable profitability when planted on peat as one informant said, “it [oil palm] provides better returns than any other perennial crop [on peat]” (N35, 2012).

On the other hand, a majority of key informants from NGOs and academic institutions suggested that not only had oil palm plantations been established on peatlands but these were in near pristine conditions before they were destroyed. They then accused palm oil of being the driving force behind the destruction of tropical peatlands, leading to emissions of CO₂ and recurrent peat fires. They argued that human activity in tropical peatlands affected the sensitive peat accumulation and storage process, which depended on the delicate balance between hydrology, ecology and landscape morphology (Page et al., 1999; Parish et al., 2008; Hooijer et al., 2010; Miettenen et al., 2012). They were convinced that the continued drainage and land degradation for oil palm cultivation, involving soil subsidence and loss of hydrological functions, could cause many of the plantations and surrounding areas to become irreversibly destroyed and useless wastelands. RSPO’s recently adopted Principles and Criteria in relation to peatlands, which recommends reconsideration of the drainage limit and the avoidance of peatlands in new plantation developments, was also cited by informants from NGOs and academic institutions in support of their arguments for the conservation of peatlands.

Documents showed that the expansion of oil palm had taken place mostly in East Malaysia, and undoubtedly did involve lowland peat areas (Page et al., 2011; Koh et al., 2011; Wicke et al., 2011; Miettenen et al., 2012), but there were also peat areas
in Peninsular Malaysia that were planted with oil palm (Hooijer et al., 2006; Koh et al., 2011; Wicke et al., 2011). They also confirmed that recent conversion of peatlands to oil palm plantations in Malaysia had caused controversy both regionally and globally because of the potentially adverse socio-environmental effects (Hooijer et al., 2006; Sheil et al., 2009).

Some informants, especially those from government and government agencies, as well as from oil palm companies, deny and overlook this documentary, evidence perhaps because of a fear of a conflict with their agency’s culture. Informants in Peninsular Malaysia are generally reluctant to voice an opinion, especially if it contradicts the opinion of the top leaders in the country. Some have also suggested that information on differences between a well-managed peatland and one that is not is still lacking.

7.3.2.1.2 The Sustainability of Logging Methods in Peat Swamp Forests

Another issue where documents and informants differed was the sustainability of logging methods currently being used in peat swamp forests. Government documents described various procedures that have been put in place to ensure sustainable forestry in peat swamp forests (Ismail and Ismail, 2011; Ismail et al., 2011; Mohd Ghazali et al., 2013). They also highlighted that reduced impact logging is being practiced in many forest management units to minimise impacts on the residual stands and that reduced impact logging could be implemented successfully in the peat swamp forest environment (Zulkifli, 2005; Mohd Hizamri, 2006; Ismail, 2009). Studies have also been undertaken to employ optimum harvesting regimes (Ismail and Ismail, 2011) in peat swamp forests in Peninsular Malaysia.
Many informants from NGOs and academic institutions felt that logging in peat swamp forests in Peninsular Malaysia was unsustainable (N4, 2012; N21, 2012; N22, 2012; P2, 2012; P4, 2012), especially because the logging pressure had been intense and logging cycles have had to be shortened, causing the vision for long-term forestry to disappear. Even reduced impact logging was considered unsustainable: “any logged over peat swamp forest that had successfully recovered” (N4, 2012). Informants from NGOs and academic institutions argued that the process of certification and auditing of logging methods is not adequately participatory and is subject to abuse (N4, 2012; P2, 2012; S2, 2012). They considered that because logging plans (according to allocated compartments) are audited by assessors who are appointed by the Forestry Departments there is a conflict of interest. Furthermore, access to areas being logged is restricted to officers from the Forestry Department, auditors, licensees and logging contractors so that there are few independent studies on the impact of logging in peat swamp forests. Instead such studies have been carried out by government-linked agencies (such as FRIM), in collaboration with the Forestry Department so the impartiality of these findings has been questioned. Some NGOs and academics used satellite imagery combined with existing data and field surveys to demonstrate that the deforestation rates in peat swamp forests in Malaysia are high (Sarvision, 2010; Wicked et al., 2011; Koh et al., 2011). Such studies were never mentioned by government informants or by government-linked agencies.

7.3.2.1.3 Catchment Management and Flooding

Some of the informants, especially those from private companies, NGOs and government agencies discussed the importance of peatlands upstream from townships to mitigate floods and regulate water flows (N15, 2012; N24, 2012; N36,
2012; N42, 2012; S1, 2012; P2, 2012). Many of them concluded that the conversion and degradation of peat swamp forests was the cause of the flooding being experienced in low-lying towns such as Batu Pahat, Johor and Pekan, Pahang.

Documents, however, did not show any direct connection between flooding and the degradation of peat swamp forests. The Integrated Water Resources Management plan, which used the Langat River Basin in Selangor as an example, proposed that flood mitigation should be seen in terms of locations in the catchments – upland, intermediate and lowland areas – and that this classification should be used for planning (Elfithri, 2012). Elfithri (2012) considered the need to protect water “to preserve water resources and natural water flow regimes, biodiversity and cultural heritage” but did not specifically mention the peat ecosystem. That was the closest example of an approach to flood mitigation based on catchment management in Peninsular Malaysia. While the Third Outline Perspective Plan highlighted plans to manage forests sustainably through integrated river basin management plans and integrated coastal management plans (IWRM, 2011), there are no on-the-ground examples of the implementation of these plans.

7.3.3 Factors Driving Policy and Implementation Enablers

When comparing the factors driving policy implementation with the requirements for implementation as identified by key informants, several parallels emerge (Table 7.5). The clarity of policies and implementation arrangements was identified as one of the factors driving policy implementation while a lack of an implementation plan for
peatland policies was highlighted as one of the requirements for policy implementation (i.e. implementation enablers). Similarly, awareness, public interest and support were identified as factors influencing implementation which complements the need for knowledge and research as implementation enablers. The extent to which linkages between federal and state agencies are influencing policy implementation relates to stakeholder buy-in as an implementation enabler, while institutional capacity and coordination between agencies as factors driving implementation can be paralleled with staff capacity and organisational support as implementation enablers. Finally, availability of resources as a factor driving policy implementation is compared with resources as an implementation enabler. The only factor that does not have a parallel implementation enabler is economics as well as politics and political will.

Table 7.5: Factors driving implementation and implementation enablers as identified by key informants

<table>
<thead>
<tr>
<th>Factors Driving Implementation</th>
<th>Implementation Enablers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity of policies and implementation arrangements</td>
<td>Implementation plan</td>
</tr>
<tr>
<td>Awareness, public interest and support</td>
<td>Knowledge and research</td>
</tr>
<tr>
<td>Linkage between federal and state agencies</td>
<td>Stakeholder buy-in</td>
</tr>
<tr>
<td>Institutional capacity and coordination</td>
<td>Staff capacity and organisational support</td>
</tr>
</tbody>
</table>
between agencies
Availability of Resources | Resources (financial, technological and equipment)
Economics | -
Politics and political will | -

In evaluating Malaysia’s environmental policy, several authors have found that socio-economic progress (i.e. economics) was the most important factor influencing policy and decision-makers (Dovers, 2005; Hezri and Hasan, 2006) and most other factors, such as the principles of institutional change for environmental sustainability (Dovers, 2005) were marginal to the overall pursuit of socio-economic progress. Hezri and Hasan (2006) also alluded to Malaysia’s lack of political commitment to sustainable development (or political will) as another influencing factor, which they attribute to the ideological stance of a former Prime Minister who believed the concept was espoused by developed countries for ‘eco-imperialistic’ ends.

At least one motivation for this was the way in which State’s derived their revenue, as highlighted by some informants (Informants N27 and N33, 2012), with a strong incentive for resource development, from which the States derive royalties, as opposed to developing service industries from which the Federal Government garners income tax. Jomo et al. (2004) found that there was lack of concern for environmental protection on the part of decision-making bodies at the State level in favour of economic and social development and that States were unrelenting in their pursuit of economic projects with minimal consideration of the environment. They suggested that federalism – where the power to govern is shared between Federal and State Governments - was the reason environmental degradation continued to occur in some States despite the Federal Government’s stated commitment to environmental policies at the national level.
Policy implementation is also influenced by the lack of attention or resources given to arrangements for implementation, whether they are infrastructure or institutional mechanisms, of the associated policies and programmes. Williamson (2001) found that, while a great deal of attention was given to land use policies concerned with such areas as forest management, coastal zone management and environmental sustainability, less attention is given to the infrastructure that facilitates implementation of the associated policies and programmes. He suggested that land administration systems, and particularly their core cadastral components, and those concerned with the administration of land as a natural resource, are important facets of infrastructure that facilitate the implementation of these policies. These administration systems, he said, concern the social, legal, economic and technical framework within which the land managers and administrators must operate.

Institutional capacity and the ability to coordinate action between government agencies was identified as another factor influencing policy implementation, not just in terms of the agency’s support but also the leadership, commitment and size, skills for planning, climate and structure (Wandersman et al., 2008). In the case of government agencies in Peninsular Malaysia, what seems to be lacking is an agency that is able to spearhead action for peatland and peat swamp forest management across forestry, agriculture and other development sectors (Informants N7, N8, N13, N27, S4, S7, S10, P1 and J2, 2012) and also that is able to deal with peatlands and peat swamp forests that extend across several administrative blocks (i.e. districts or states). Rose (2011) also found that it was common to find situations where responsibility for enforcement of laws was divided amongst a number of government agencies that pursue conflicting interests, thereby delaying the
implementation of these policies. The sectoral approach to environmental management has had the effect of diffusing power and responsibility across diverse government departments without any mechanism for coordination, resulting in jurisdictional overlaps and conflicts that have inhibited the implementation of cross-sectoral policies (Rose, 2011).

Another factor driving policy identified in the analysis was the need for public interest and support through awareness of the importance of peatlands and peat swamp forests. Policy makers in the 1990s accepted that the general public should be involved in policy discussions over contentious issues such as the environment (UNCED, 1992), and that these discussions should not be dominated by ‘experts’ (Eden, 1996). Policy tends to assume that the uptake of environmental information and education will secure behavioural change, when behaviours are, in fact, intimately dependent upon public interpretations of the issues (Eden, 1996). The National Wetlands Policy was launched in 1998, and more recently the National Action Plan for Peatlands in 2010, both received endorsement from the Malaysian Cabinet. However, efforts to inform the public about the relevance of the policy have been lacking. As a result, many of the key informants were unaware of what the National Wetland Policy stood for. The National Action Plan for Peatlands appears to be suffering from the same neglect as it has yet to be launched because of non-acceptance by Sarawak (Informants N11, N15 and N25, 2012). The National Steering Committee on Wetlands (which is tasked to oversee the implementation of the NAP) has met only irregularly and State level working groups have yet to be formed (N11, 2012).
Availability of resources (or incentives) was also identified as a factor influencing policy implementation (Rae et al., 2011), as incentives to State Governments for preserving their peatlands and peat swamp forests, or an alternative means of sustainable revenue for State Governments, have not been forthcoming from the Federal Government even though there is potential to gain resources for peatland and peat swamp forest management through incentives schemes discussed earlier, namely in payment for environmental services (PES) schemes and carbon off-set models for quantitative verification of GHG related emissions. However, incentive schemes for reducing forest loss in Peninsular Malaysia are gaining interest through forestry certification and REDD+ schemes (Rae et al., 2011), but the benefits they bring to peatland and peat swamp forest management need to be clarified and simplified. Interest in forest certification should also be boosted by the fact that a number of European countries including Denmark, France and the United Kingdom have included the Malaysian Timber Certification Scheme as one of its accepted schemes for timber importation (Chen et al., 2012).

7.4 Conclusions

The current governance of peat resources is usefully considered separately for areas classified as Permanent Reserved Forests and those that lie outside this category, according to informants and documents. Peat swamps that are classified as Permanent Reserved Forests are managed by the Forestry Department using the
National Forestry Act while those outside Permanent Reserved Forests are managed by the State Government or private land owners (including oil palm and timber companies). Governance in Peninsular Malaysia was found to be top down and hierarchical, where policies are made at the higher level in the political process and imposed onto the agencies further down in the government structure, with little opportunity for consultation. The ultimate authority over land matters, including forestry and land conversion, remained with the State Government and no other political force had any influence on State land use policies. The State Government does not rely on research to guide policy making.

Key issues relating to the use of peatlands and peat swamp forests that were highlighted by informants were lack of governance, conversion of peat resources to other uses, poor water management, peat fires and haze, lack of awareness, decline in biodiversity, GHG emissions and peat ecosystem loss. Documentary analysis and informant interviews also identified factors influencing the implementation of policies as economics; clarity of policies and implementation arrangements; awareness, public interest and support; linkage between federal and state agencies; politics and political will; institutional capacity and coordination among agencies; and availability of resources. The requirements for policy implementation were categorised as a clear implementation plan, capacity building measures, an institutional framework, increased knowledge and research, increased resources and stakeholder buy-in.

The next chapter analyses attempts that have been made to regulate uses and the institutional mechanisms that exist for collective management, another aspect of policy implementation.

In this chapter I consider another aspect of implementation of the regime for peatland and peat swamp forest in Peninsular Malaysia, namely attempts to regulate uses of peatlands and peat swamp forests and institutional mechanisms for collective management. I first analyse why regulations for peat ecosystems have been considered necessary by informants. Then a description is given of the current institutional mechanisms for integrated peatland management at the national level and then with specific reference to the case study sites. I also discuss the need to revise institutional arrangements for peatland and peat swamp forest management, and other mechanisms that exist for management. Finally, I highlight some shortcomings of the current institutional mechanisms identified by key informants and examine recommendations to improve peatland and peat swamp forest management in Peninsular Malaysia.

8.1  Collective Management of Natural Resources

The term ‘collective management’ of natural resources is used to describe a situation in which some or all of the stakeholders involved with the use of the natural resource are involved in a substantial way in management activities (Borrini-Feyerabend, 1996). Such management can take place regardless of tenure so is not the same as managing common pool resources and, during the last decade, has become increasingly accepted in the area of natural resource management in an attempt to bring together a variety of stakeholders with differing interests.
Although it is not applicable in situations when rapid decisions and actions are needed, collective management is particularly appropriate when the local stakeholders have historically enjoyed customary rights over the natural resource, when local interests are affected by the way in which the natural resource is managed and when there are different values and needs of the natural resource to be harmonised (Borrini-Feyerabend et al., 2013). These issues describe the management of peatland and peat swamp forests in Peninsular Malaysia. Other benefits of collective management include increased effectiveness of management, greater acceptability of management actions, enhanced understanding of natural and human systems, increased trust between government agencies and stakeholders, reduced enforcement expenditures and increased public awareness of conservation issues (Schusler et al., 2003).

Carlsson and Berkes (2005) suggested an alternative approach to collective natural resource management which looked at how management tasks are organised and distributed concentrating on the function, rather than the structure, of the system. They started from an assumption that collective management is a continuous problem-solving process, rather than a fixed state, involving extensive deliberation, negotiation and joint learning within problem-solving networks.

Natural resource management typically deals with conflicting interests of various stakeholders since these stakeholders use the same resources for different purposes (Reed et al., 2009). For this reason, it is often argued that integrated management of natural resources, including peatlands and peat swamp forests, requires a platform that facilitates learning among stakeholders by sharing,
validating and understanding the situation in order to reach consensus (Rist et al., 2006).

Collective management is rarely practised in Malaysia where, as has been described, top-down regulation is more usual. This chapter describes both the regulation of peatlands and peat swamp forest and recent and current attempts at various forms of collective management.

8.2 Results

8.2.1 The Importance of Regulations for Peatlands and Peat Swamp Forests

There is a small but important difference between the uses to which peatlands and peat swamp forests that the informants described (in Chapter 4) and the purposes they ascribed for regulating the management, with the first being the status quo and the second an aspiration. Almost all the key informants interviewed (97%) felt that regulating the management of peatlands and peat swamp forests was important in Peninsular Malaysia.

One of the reasons cited by informants for regulating the management of peatlands and peat swamp forest was that regulations would address special management needs for the peat ecosystem, as explained by three informants:

“Peatlands need special attention; they are not as easy to manage. People may not be aware that what they are doing is not wise; others may be aware of it but might choose to jump over where the fence is lowest [i.e. indicating choosing the easier land preparation option].” (N35, 2012)

“There is no recognition of specific management requirements for peatlands and there is no overall federal peatland policy in Malaysia. There are significant management issues both for the short and long term.” (N21, 2012)
“Peat-related policies are not integrated. They are not addressing the impacts. Regulations are important because there are differences in the values of peatlands and policy direction.” (S1, 2012)

Another reason for management regulations suggested by key informants was to ensure that peat ecosystems continued to provide environmental services into the future. A senior manager of a private company was concerned about what future generations would think if peat was not conserved:

“Peatlands are very important because of their ecosystem services and their biodiversity resources, which has taken millenniums to evolve and the future generations may not be very happy if we do not take care of these resources.” (N29, 2012)

Another informant, a senior manager of an NGO, suggested that regulations should be formulated to put in place a mechanism to value these services:

“The authorities should pay relevant attention to have a mechanism to manage and keep them in their original state so that they can continue to provide their ecosystem services. There should be new and effective policies and mechanisms for valuing these ecosystem services.” (N4, 2012)

Indeed, a senior manager of a private company explained that a failure to regulate the management of peat for ecosystem services could be costly:

“You can develop peat and use it for agriculture but if you drain it and not manage it then forest fires will start. These elements of nature should be recognised. Not recognising this constraint imposes a cost on society and if governments don’t recognise this, then they pay the price.” (N16, 2012)

Other reasons for regulating the management of the peatlands and peat swamp forest given by key informants were that they provided valuable ecosystem services, particularly important hydrological functions through water regulation (29%), biodiversity protection (23%) and the amelioration of climate change (23%; Table 8.1). Key informants also felt that peatland use needed regulation to maximise benefit from valuable socio-economic opportunities (20%).
Among the groups, key informants from government agencies and NGOs tended to emphasise the provision of climate change regulation as a reason to regulate peatlands and peat swamp forests (Table 8.1). Another valuable ecosystem service cited by key informants from government agencies and private companies was that of water regulation. Key informants from academic institutions, who spoke mostly about local community use of peat swamp forests, mentioned their importance for socio-economic opportunities, which was also mentioned by those from government-linked agencies.

Table 8.1: Frequency (%) with which selected reasons why regulating the management of peatlands and peat swamp forests in Peninsular Malaysia was important were mentioned by key informant groups

<table>
<thead>
<tr>
<th>Reason why regulating management was considered important</th>
<th>GA</th>
<th>GLA</th>
<th>PC</th>
<th>NGO</th>
<th>AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>For water supply and regulation</td>
<td>38</td>
<td>17</td>
<td>41</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>For biodiversity protection</td>
<td>19</td>
<td>17</td>
<td>29</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>For climate change regulation</td>
<td>38</td>
<td>17</td>
<td>6</td>
<td>31</td>
<td>0</td>
</tr>
<tr>
<td>For socio-economic opportunities</td>
<td>10</td>
<td>33</td>
<td>18</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>n</td>
<td>21</td>
<td>6</td>
<td>17</td>
<td>16</td>
<td>5</td>
</tr>
</tbody>
</table>

Among those who did not consider regulating the management of peatlands and peat swamp forest a high priority was a senior manager with a private company who explained:

“People have a negative view of a swamp. The peatland area is large but the number of people it is of interest to is very small. The State might recognise the [peatland] policy because they don’t want to argue with the Federal Government, but they might just ignore it or deny that there is peat. They might say they support peat conservation but the peat will be cleared anyway. They choose where to apply the policy and implement it selectively.” (N19, 2012)

Another informant, a scientist with an academic institution, felt that greater regulation of peatland use might actually increase exploitation by local communities and felt that there should not be more regulations for peatlands:

“The capitalist system is such that when everything is based on cash and subsistence economies, people become less dependent on the resources and then destruction happens. If the local people collect rattan for example, they only take what they need. If they feel that they will not have access to it for long, then they will grab as much as they can right now. The more regulations are imposed on the community, the more they will want to get whatever they can from the forests.” (P7, 2012)

8.2.1.1 Water Supply and Regulation

One frequently cited reason for regulating the management of peatlands and peat swamp forests was because of their role in regional hydrological systems. The swamps were described as “the buffer between saltwater and freshwater systems” (N2, 2012) with an officer with a government agency pointing out the important role of the North Selangor Peat Swamp Forest to its surrounding areas:

“They provide water from their catchments and the water is used for agriculture. Water for the paddy fields in Tanjung Karang and the oil palm plantations come from the forest reserves and that is an important source of water.” (S7, 2012)

A scientist with a private company related the water levels in peatlands to the risks of fires:

“There are still many services provided by peat swamps that we depend on more in the future with changes in climate, for example the capacity to hold and release water. Water is being drained out from peat as a result of activities in its periphery. The peat starts drying, first the surface then the rest [deeper peat] and the fire starts. If left
Another informant, a senior technical manager of a government agency, referred to the natural flood mitigation role that peatlands play:

“They act as natural flood mitigation areas so we should use their landscape to benefit us and spend less on hard structures for flood mitigation. If we had preserved more of the low-lying areas around KL, we might not need the Smart Tunnel. The Smart Tunnel is a way to move water and a water storage area within the city. Its role was essentially played before by large low lying areas that were more frequently inundated than others. Peatlands are a huge buffer and so they need to be managed properly so we don’t lose that functionality.” (N8, 2012)

For several informants, the flooding that followed the development in West Johor had affected their thinking about peat drainage, as a senior officer in a government agency explained:

“What happened in Johor should not be allowed to occur in other areas because the loss to the Government and to the people is huge. We need to re-look at what we have done in the past and carry out some remedy for the future. The flood in Johor is because they have drained out all the area that was originally peat and as a result these areas are submerged. We need to make it a good lesson for us.” (S10, 2013)

8.2.1.2 Biodiversity Protection

Many informants made mention that peat swamp forests needed regulations for managing if they were to retain their biodiversity, especially the habitats of endemic flora and fauna. Such biodiversity was considered special and “could not be compared with other ecosystems” (N7, 2012).

One scientist with an academic institution wondered how species that existed in these ecosystems would survive if peat swamps were not regulated:

“The overall biodiversity of peat swamps is very important because it is the last stronghold. If they are all entirely converted, how are these species going to survive? Some of them are endemic species.” (N22, 2012)

Another aspect of the biodiversity protection highlighted by informants was of their cultural importance, “especially for the indigenous communities that depend on their
resources" (S4, 2012). A senior officer of a government agency pointed out that this should be considered one of the services provided by peatlands and peat swamp forests:

“Peat swamp forests have an intricate link with some communities who depend on them for their livelihoods and this forms a unique cultural diversity; their social-cultural dimension and their socio-economic well-being depend on the ecosystem services. This is very important and needs to be considered.” (N11, 2012)

8.2.1.3 Climate Regulation

A few informants alluded to the need for regulations to manage peatlands and peat swamp forest because of its relationship to GHG emissions (particularly CO2), as explained by a senior technical manager with a government agency that if we didn’t “manage them properly, we will have too much of carbon emissions” (N2, 2012). Also alluding to the need for regulating carbon emissions, a senior manager of a government-linked agency referred to the fires in 1997/98: “The forest fires have made people become more aware of the dangers of mis-managing our peatlands” (N12, 2012).

Regulating the management of peatlands and peat swamp forest was also important to satisfy the objectives of both the palm oil industry and carbon offsetting schemes, according to a senior manager of an NGO:

“Malaysia as a whole has so much forest that we are a C sink and not an emitter. The palm oil industry will continue to produce and it is offset by the forest. If these two spectrums do not find a way of meeting, then C offset schemes will fail.” (N9, 2012)

A senior manager of another NGO said that Malaysia needed regulations as it was obligated to curb carbon emission as signatory to the UNFCCC:

“Crucial action should be taken to prevent further carbon emission through the conversion of peat swamps because any conversion will lead to massive amounts of carbon being released into the atmosphere.” (N24, 2012)
8.2.1.4 Socio-economic Opportunities

A fifth of the informants felt that regulations for peatland and peat swamp forest management was important because there were socio-economic benefits that these ecosystems offered, like the valuable timber species Ramin, as pointed out by a senior manager of an NGO:

“Some [species] may have economic uses whether already identified or not; some valuable timber species have been found in the peat swamp forests, e.g. Ramin.” (N24, 2012)

A senior manager with a government-linked agency explained that oil palm plantations on peat – another economic use of peatlands - needed to be regulated to ensure optimum production:

“We have ways of managing the land and planting on peat so it does not destroy the environment. The main reason for management is to sustain the palm oil production on peat, to make sure that the production is optimum and that cultivation of oil palm on peat gets the maximum income, especially for the smallholders.” (N13, 2012)

The importance of regulations was also emphasised by a senior technical manager of a private company, to ensure that economic activities taking place on peat did not lead to total degradation and cause serious problems:

“You need to manage the peat swamp because if you do not show that the peatland is actually economically productive, it’s gone. It also has to be managed to ensure that it is sustainable in terms of re-growth. If you don’t manage them, the whole process of clearing and converting them for agriculture can lead to total degradation.” (N14, 2012)

A senior manager of an NGO suggested that regulations for peatlands could lead to alternative uses which could bring socio-economic benefits:

“Management is about finding a series of initiatives, getting resources to the ground and gathering the support for good management actions. At the national level, it could be sold as a way of mitigating their overall GHG output. The Government, for example, is now investing in biogas and Clean Development Mechanism type projects within the oil palm industry.” (N9, 2012)
A senior officer with a government agency suggested that regulating the management of peatlands for socio-economic benefits was particularly important for the local communities who lived in the vicinity of peat areas:

“Peatlands play an important economic role to the country and the socio-economic well-being of the local communities and thus need to be regulated.” (N43, 2012)

**Documentary Evidence:** In terms of regulating the management of ecosystem services, documents discussed the role of peatlands and peat swamp forests in water management, biodiversity conservation and climate regulation as the main reasons for their importance for management.

There have been many studies on the hydrological management of peatlands in Southeast Asia (Schothorst, 1982; Welch and Nor, 1989; Andriesse, 1994; Hooijer *et al.*, 2006; Jauhiainen *et al.*, 2008; Wosten *et al.*, 2006; Ritzema *et al.*, 1998; Dommair *et al.*, 2011). The experience with water management included management of intact peat swamp forests, rehabilitating and restoring degraded peatlands, managing water levels for particular land uses, and for fire prevention and response (Prentice, 2011).

Documents also pointed to appropriate water management as being critical for mitigating carbon losses from peat resulting from drainage and fires. Poor water management (i.e. over-drainage) combined with periods of low rainfall were highlighted in documents as key factors which enhanced the hazard and risk of peatland fires (Prentice, 2011; Lim *et al.*, 2012; Parish *et al.*, 2012) and these documents explained that, in tropical peat swamp forests, large-scale harvesting led to the drying of surface peat layers and increased the chances of fire.
In the case of flooding in West Johor, Parish et al. (2008) highlighted that poor design of the agricultural drainage and a lack of water management structures caused over-drainage and severe subsidence which has led to the collapse of most of the infrastructure and subsequent flooding.

In terms of the regulations on the management of the biodiversity of peatlands and peat swamp forests, documents suggested that well-focused management actions were needed to maintain the biological diversity of peat swamps and to permit the wise use of their resources (Joosten and Clarke, 2002; Clarke and Rieley, 2010; Prentice, 2011; Posa et al., 2011). Prentice (2011) suggested that, for biodiversity management to be effective, several areas needed to be investigated, such as acquiring an understanding of the habitats and species occurring, how they interacted with the ecosystem and the processes that sustained them. Similar to what was suggested in the interviews, Davies (2011) highlighted that tropical peat swamp forests were often the last lowland forests to be cleared and so they acted as a last refuge for many species which were formerly widespread in the lowlands. Tropical peat swamp forests were, however, susceptible to human disturbances which could upset the balance between peat, vegetation and hydrology (Posa et al., 2011).

Many of the studies in documents relating to management of peatlands and peat swamp forest, in terms of its hydrology and biodiversity, concern regulations in relation to reducing carbon emissions (Silvius and Giesen, 1996; GACCC 1998; Parish, 2002; Bechteler and Siegert, 2004; Siegert et al., 2004; Wicke et al., 2011).

Documents relating to the need for regulations about managing peatlands and peat swamp forests for economic benefits concerned regulations for timber extraction
and regeneration (Wijdeven et al., 2004; Eelaart, 2008; Ismail and Ismail, 2011; Jans et al., 2012) and oil palm productions (Lim et al., 2012; Parish et al., 2012). On regulations about the management of peat swamp forests for timber extraction, documents discussed whether the current regulations suited the peat swamp environment (Zulkifli, 2005; Mohd Hizamri, 2006; Ismail, 2009; Davies, 2011; Ismail and Ismail, 2011; Ismail et al., 2011; Wilcove et al, 2013). Lim et al. (2012) and Parish et al. (2012) recommended optimum water levels for oil palm plantations on peat but these have yet to be adopted as regulations by the palm oil industry.

**Comparison between Key Informant Impressions and Documentary Evidence:**

While documents highlighted the importance of peatland and peat swamp forest management for water and biodiversity, and for climate regulation, and provided examples of management prescriptions for these uses, it was difficult to find management prescriptions for other ecosystem services such as for the collection of non-timber forest products, ecotourism or for the promotion of cultural diversity. These were normally dealt with in site-level integrated management plans by the zonation of activities (SSFD and DANCED, 2001; UNDP/GEF, 2008a) where specified activities were allowed in parts of the site being managed. The reasons for this lack of management prescriptions could be that collection of NTFP occurred at a small-scale [Section 4.3.1.1 Section (vi)] while there were only a few examples of ecotourism in peat swamps [Section 4.3.1.3 Section (i)]. The local communities who live around peat swamps were small in number and isolated (Kamal et al., 2006; Savinder et al., 2009) and I found limited literature documenting their cultural diversity.
Both impressions from key informants and documents suggested that good economic returns could be obtained from the use of peat for oil palm and timber, but several issues required regulations for management. For oil palm plantations on peat there was a need to address water management and the use of fertilisers (i.e. micronutrients) while the method of logging needed close monitoring to ensure regeneration and minimum damage to the forest ecosystem. There was little information on the long-term consequences of these socio-economic activities from documents although several informants suggested sustainability was an issue and alternative uses were needed for longer-term use of these ecosystems.

8.2.2 Current Institutional Mechanisms for Integrated Peatland Management from Documents

In Chapter 5, I explained the responsibilities of the various government agencies and departments with regards to specific sectors of peatland and peat swamp forest management. In this section I describe the documentary evidence of attempts to regulate rivalries that might exist for the various uses of peatlands and peat swamp forest and the institutional mechanisms for collective management, in this case the integrated management of peatlands and peat swamp forest. It starts with institutions at the national level and subsequently describes institutional mechanisms at the case study sites.

Several institutional arrangements related to the management of peatland and peat swamp forests were analysed and information from documents were listed according to their related functions (Table 8.1). The analysis showed that the National Forestry Council, the National Physical Council, the National Biodiversity Council and the National Steering Committee on Peatlands played important...
advisory roles in the management of peatlands and peat swamp forests at the national level, while the District Development Committee and the Site Management Committee represented the State Government at the local level. A gap existed in the management role at the State level and there was no evidence from documents that state level committees on peatlands were currently functioning.

Table 8.2: Institutional arrangements related to peatland and peat swamp forest management

<table>
<thead>
<tr>
<th>Committees</th>
<th>Functions related to Peatland and Peat Swamp Forest Management</th>
<th>Related Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Land Council and National Forestry Council</td>
<td>• To formulate a forum for uniformity in policies relating to the utilisation of land in Peninsular Malaysia &lt;br&gt; • National Forestry Council falls within the National Land Council &lt;br&gt; • To coordinate a common approach to forestry and reconcile cross-sectoral policies that interface with the forestry sector &lt;br&gt; • To discuss and resolve common problems and issues relating to forestry policy between the Federal and State Governments &lt;br&gt; • Responsible for policies related to forest management and land use &lt;br&gt; • Decides on the annual allowable cuts for the production forests on a state-by-state (forest management unit) basis.</td>
<td>National Land Code 1965</td>
</tr>
<tr>
<td>Organization</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
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<td></td>
</tr>
</tbody>
</table>
| National Physical Council | - To promote the improvement of the physical environment for sustainable development  
- To advise the Federal and State Governments on matters related to town and country planning and on the implementation of major development projects by the government or private sector |
| National Biodiversity Council | - Apex institution for biodiversity conservation and management  
- Determines and endorses the direction, policy and strategies for conservation of biodiversity  
- Serves as a platform and dialogue on biodiversity matters between State and Federal Governments |
| National Steering Committee on Peatlands | - Led by the Ministry of Natural Resources and Environment  
- National Steering Committee is the focal point for coordinating the implementation of the Action Plan and allocating responsibility to relevant federal and state agencies  
- Reports to the National Wetlands Committee  
- Task forces to address specific issues such as climate change, water management, agriculture, environmental management, fire prevention, and local communities  
- Recommends the formation of State Peatland Working Groups in states that have significant peat areas |

**Town and Country Planning Act 1976**  
**National Policy on Biodiversity 1998**  
**National Action Plan on Peatlands**
<table>
<thead>
<tr>
<th>District-level Committees</th>
<th>District Officer responsible for the development of the district</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Two most important committees are the District Development Committee and the District Action Committee</td>
</tr>
<tr>
<td></td>
<td>No statutes provide for formation of these consultation committees but they are important to monitor and coordinate all development proposals and activities in the district</td>
</tr>
<tr>
<td></td>
<td>Disaster Management Committees formed at the district level to fight peat and forest fires which occur at the district level; District Officer can mobilise government mechanisms and manpower to combat forest fires</td>
</tr>
<tr>
<td></td>
<td>Management Committees can also be formed for peatland management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Management Committees</th>
<th>State Government decides on agencies involved in integrated management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ministry of Natural resources and Environment focuses on policy implementation and supporting management through its agencies</td>
</tr>
<tr>
<td></td>
<td>Roles of different institutions must be specified in integrated management plan for the site</td>
</tr>
<tr>
<td></td>
<td>Management planning must involve active consultation with the institutions involved</td>
</tr>
</tbody>
</table>

8.2.2.1 Institutional Mechanisms at North Selangor Peat Swamp Forest

For the North Selangor Peat Swamp Forest, two projects funded by international agencies have aimed to encourage collaboration between government agencies (as appropriators of the peatlands and peat swamp forests) with land owners, private companies and other users to encourage integrated management of the area. The ASEAN Peatland Forest Project, for which the Malaysian Government is involved in
a regional collaboration with other Southeast Asian countries through the ASEAN Secretariat, is one of the projects. The Project is being executed by the Federal Forestry Department under the guidance of the Ministry of Natural Resources and Environment (ASEAN Secretariat and Global Environment Centre, 2011). It involves a collaborative partnership between government agencies and other stakeholders of the peatlands and peat swamp forests to manage use of the area sustainably. Another related project is the EU-funded Project which is pilot testing local community involvement in rehabilitation efforts (ASEAN Secretariat and Global Environment Centre, 2011). These projects have been driven predominantly by the ASEAN Secretariat and the Global Environment Centre. Although there are capacity building activities particularly for the Forestry Department, the scope of management of the peat resource in the North Selangor area goes beyond the functions of the Department (GEC, 2014a).

At the national level, attempts have been made to revive the National Wetland Steering Committee, which is chaired by the Secretary-General of the Ministry of Natural Resources and Environment, to coordinate efforts to manage peatlands and peat swamp forests in the two projects mentioned earlier. It continues to be a challenge for the Steering Committee to meet regularly (N11, 2012). State Wetland Steering Committees were meant to be established and strengthened through the guidance of this national level committee, but the Selangor State Wetland Steering Committee has not yet been formed (N11, 2012).

At the state level, the Selangor Forestry Department has used the opportunities presented by the projects to carry out studies which have been used to review and update the Integrated Management Plan for North Selangor Peat Swamp Forest.
Several consultation sessions have been held with relevant government agencies at the state and district levels regarding the details of the IMP (GEC, 2014a). In addition, a Buffer Zone Management Plan has also been proposed which has involved consultations with private companies, smallholder farmers, NGOs and local communities (GEC, 2014b). A proposed cooperative fire management plan also calls for multiple agencies, private and community teams to collaborate during fire prevention and suppression efforts, which is to be guided by a permanent task force (GEC, 2014c). These efforts still need the endorsement of the Selangor State Government as the collaboration of the relevant government agencies (at the Federal, State and District level) with other stakeholders is beyond the mandate of the Forestry Department (GEC, 2014a).

8.2.2.2 Institutional Mechanisms at Southeast Pahang Peat Swamp Forest

Recent efforts to collaborate between the political-administrative actors and users at the Southeast Pahang Peat Swamp Forest and to regulate rivalries have been instigated by the UNDP/GEF Peat Swamp Forest Project which ended in 2008. The UNDP/GEF Project established an inter-agency forum, called the State Wetlands Management Committee, to oversee the implementation of the project outputs and the overall management of wetlands in the state (UNDP/GEF, 2008b).

Many achievements of the Project were possible through the collaborative effort of several government agencies working together with private companies and local communities. Some of the achievements include the gazettal of new forest reserves connecting the four forest reserves, establishment of the 1000 m buffer zone around the forest boundaries, and the establishment of a 200 m river buffer on both sides of the Bebar and Merchong rivers (UNDP/GEF, 2008b).
The preparation of the Integrated Management Plan for the Southeast Pahang Peat Swamp Forest involved extensive consultations between government agencies, smallholder farmers, private companies, NGOs and local communities. The consultations led to the formation of a core management team to oversee the implementation of actions identified as important for completion of the IMP. The UNDP-GEF Peat Swamp Forest Project attempted a bottom-up approach towards the management of the Southeast Pahang Peat Swamp Forest through the formation of a Management Plan Core Team, comprising representatives from 11 state government agencies and during the project implementation, which seemed to be very effective (N14, 2012). However, the Core Team has not been active since the completion of the Project because “it is laborious and time-consuming as it is difficult to get everybody to agree; in reality it is challenging to practise this” (N18, 2012).

The Project also strengthened awareness of the importance of peat swamp forest conservation among the relevant government agencies, and the IMP was subsequently endorsed as an integral part of the Local Plans. Collaboration between the Project and the Town and Country Planning Department was notably important as it involved the proposal to extend the forest reserve areas and re-align the proposed highway from Nenasi to Muadzam Shah so that it would not cut through the peat swamp area (UNDP/GEF, 2008b).

Collaboration between government agencies and other stakeholders at the case study site has not progressed much since the completion of the UNDP/GEF project. Several community livelihood projects that were initiated with the Orang Asli community in several villages, such as the Heritage Garden and Cage Culture, have
failed (P2 and P4, 2012). It is also unclear whether the State Wetland Management Committee has met even once since the project ended (P1, 2012).

8.2.2.3 Institutional Mechanisms at Ayer Hitam Forest Reserve

For the Ayer Hitam Forest Reserve, the State Government has formed two committees to streamline activities at the case study site and has invited relevant government agencies to be involved. The Steering Committee is to be in charge of administrative and management matters, while a Technical Committee is to oversee the technical studies at the forest reserve (J1, 2012). Wetlands International has been working closely with the State Government to ensure that consultations on the management actions for the site involved local communities and other stakeholders, but efforts are still at the initial stage. There have been few other opportunities to regulate the rivalries that exist at the Ayer Hitam Forest Reserve and its adjacent land areas.

8.2.3 Need to Revise Institutional Arrangements for Peatland and Peat Swamp Forest Management

On the institutional arrangements needed for peatland and peat swamp forest management, several informants referred to the current systems that were already in place. A senior technical officer of a government agency felt that the current institutional arrangements were adequate and needed only minor tweaking to improve their effectiveness:

“They [the institutional arrangements] are already there in present arrangements. We just need to enhance regulations and policies for sustainable use of peatlands, review guidelines for best management practices, and clarify and strengthen them.” (N36, 2012)
Management of peatlands would get the necessary attention if the ambit of the National Land Council were to be expanded to include peatlands, suggested a senior manager of a government agency:

"Ministries now work together through the Economic Planning Unit. We have the National Land Council which is chaired by the Prime Minister and it does not discuss peat issues. If we can include the issues into this Council that would give peat the attention it needs." (N39, 2012)

A senior technical employee of an NGO pointed out that the National Forestry Council also decided what remained as peat swamp forest and what was converted and therefore needed to be included in the institutional arrangements for peat swamp forest management:

"It is the National Forestry Council that decides how much forest is converted to other land uses and they need to be engaged. They decide what remains as [peat swamp] forest and what is converted for other purposes." (N6, 2012)

Other current institutional arrangements for the management of peatlands and peat swamp forests that were highlighted include arrangements through the National Action Plan on Peatlands; arrangements at the district level; and site management arrangements through demonstration and pilot projects.

8.2.3.1 National Steering Committee on Peatlands

Several informants referred specifically to the institutional arrangements outlined in the National Action Plan for Peatlands, which had called for the setting up of multi-disciplinary steering committees on peatlands at the national and state levels. A senior manager of an NGO elaborated:

"The NAP has a National Steering Committee on peatlands. This arrangement was accepted in January 2011 by federal ministries and state representatives. Those states with more peat areas will have their own steering committee such as Selangor, Pahang, Sarawak and Sabah." (N1, 2012)
A senior officer of a government agency explained that under the arrangement, the setting up of state peatland committees needed to be monitored by the National Steering Committee:

“There is a national committee for the NAP and we hope that state level committees can be formed where there are significant peatlands, to translate actions that we have agreed upon at the national level. The national committee will get a similar coordinating committee at the state level.” (N11, 2012)

The Steering Committees would also need the necessary political backing and resources to carry out tasks it had been designed to fulfil, according to a senior technical manager of a private company:

“If there is political will to encourage a consultative process and a directive from the government at the top, then the multi-stakeholder committee could work because it will have the resources and the political push for the job.” (N14, 2012)

A senior technical manager of an NGO felt that the Ministry of Natural Resources and Environment, working through its technical agencies, could put more stringent approaches in place for peatland and peat swamp forest management:

“There is tremendous potential for the Ministry of Natural Resources and Environment to influence the management of peatlands, especially when technical agencies such as the Drainage and Irrigation Department, Department of Environment, Forestry Department, Land and Mines Department, came under their jurisdiction. This resource-based ministry with relevant technical agencies can put in place more stringent approaches, such the ecosystem approach.” (S3, 2012)

A senior manager of a government agency pointed out that it was necessary to strengthen the capacity of several units related to peatland management to be more effective:

“The Wetland Unit at the Ministry needs to be beefed up and there must be resource people dedicated to peatlands at the science-policy interface. As managers of the biggest peatland areas, Forestry Department needs a dedicated Peatland Unit; they have just set up a Wetland Unit. The Ministry needs a funding mechanism to manage peat swamps. The Ministry of Plantation Industries and Commodities could investigate payment for ecosystem services so that companies planting oil palm on degraded peatland could pay for the conservation of the remaining peat swamps.” (N27, 2012)

8.2.3.2 District-level Committees
Informants also referred to management arrangements under the District Office for peatlands and peat swamp forests. Two senior officers of a government agency described the management committees that were in place:

“There are two types of committees, the State Budget Clearing Committee and State Working Committee. These committees should be more active and meet regularly, not only to discuss problems but to get people involved in planning and management. If there is understanding, it is easier to get people’s support.” (S11, 2013)

“The mechanism in Selangor is not perfect but the benefits are there, it is just a matter of how to improve the current arrangement. The District Land and Mines Office coordinates when there is an application for agriculture development by a big company. They gather comments from related agencies and authorise the approval of development of the peat area.” (S10, 2013)

Another senior officer of a government agency indicated that the standard operating procedures for fire prevention and peatland management coordinated by the Department of Environment involved relevant technical departments and was implemented at the district level:

“The stakeholders are already part of the fire prevention and peatland management program. We update the standard operating procedures regularly for technical agencies to be effective in prevention and mitigation.” (N37, 2012)

An officer of a government agency suggested that if the instructions for the committees came from the State Government, they could be given an annual budget and made permanent committees:

“The Executive Council needs to give the directive for the formation of these committees; then it would be easier to get an annual allocation. Lack of resources and time stops them from becoming a permanent feature.” (S7, 2012)

The committee under the District Council should also consider development of buffer zones by forming ties with community groups, according to a senior manager of an NGO:

“The District Council and the State Governments should establish stakeholder consultation groups for buffer zones with villagers whose activities impact the forest. For example, the Friends of the Peat Forest was set up in four villages in North Selangor and is a forum to bring villagers together to reduce fires and degradation of peat swamp forest and encourage sustainable use. The villagers could also assist with prevention of encroachment by outsiders.” (N1, 2012)
A senior manager of a government agency highlighted that this was one change that was being discussed and possibly tested in a few areas:

“One of the changes proposed is to form a local community level integrated management and for this coordination unit to be recognized by the district authority so that future land use will have to go through this consultative unit. There may be a similar set-up now but it needs strengthening.” (N18, 2012)

8.2.3.3 Site-level Management

Other informants referred to the various examples of site level management of peatlands and peat swamp forests and the institutional arrangements for these sites. Four informants referred specifically to the institutional arrangements that were put in place for the management of the peat swamp forest in Pekan, Pahang under the UNDP/GEF Peat Swamp Forest Project. A scientist with an academic institution suggested that the multi-agency committee established under the Project was a good starting point:

“Each agency cannot look only at its own interests; it needs to look at the interests of multiple stakeholders. A good place to start is where a management committee was formed under the Integrated Management Plan. This was an attempt to create an agency that specifically works on peat swamps at the federal level and is empowered down to the state level. It might involve legislating policies that empower institutions to enforce a multi-agency committee.” (P4, 2012)

A lot of effort was put into forming the multi-agency management committee for peat swamp forest sites during the project, according to a scientist with a private company:

“So much work was put into forming the team for the institutional arrangements. It was supposed to be a committee at the State Executive Council in Pahang comprising the different government agencies. The committee was already formed so why is it not functioning now?” (P2, 2012)

Another informant, a senior manager of a government-linked agency, suggested that perhaps the interest and commitment in following through with the committee was lacking:
“The committee had already been decided, the composition of its members and the regularity of meetings. The Project laid out the foundation, did the necessary groundwork and arrangements had been set up. The only thing needed was interest and commitment to follow through.” (P1, 2012)

A senior manager of a government agency acknowledged that there were challenges in bringing together a multi-stakeholder management committee in Pekan:

“For Pekan many stakeholders were involved in setting up the plan; there are some advantages to involving more people but the process of consultation is laborious and time-consuming and it is difficult to get everyone to agree. In reality, it is sometimes quite challenging.” (N18, 2012)

Another example cited by one respondent was the Tasek Bera Management Plan and the Management Authority that was formed under a Project with the Danish Cooperation for Environment and Development:

“Under the formulation of the Tasek Bera Management Plan, there was a proposal to actively involve the Orang Asli in management. However, after the Project ended the Orang Asli were not actively involved. There is no incentive for the Orang Asli to be involved because the number of tourists visiting is low and they don’t benefit from being a stakeholder in the management team.” (N23, 2012)

A senior technical manager of a private company pointed to the successes achieved in the management of the Kota Damansara recreational forest through the concept of community managed forests and suggested that this could be replicated in other areas including peat swamp forests:

“Kota Damansara is an example where the management committee is led by the local community. They developed the management plan and carry out the day-to-day management through the concept of community managed forest, and this was initiated by the Selangor State Government. We could do the same for the Raja Musa and Kuala Langat South peat swamp forests. Some laws will need to be amended as there is now no provision for local communities to manage community forests.” (S2, 2012)

8.2.4 Other Mechanisms for Peatland and Peat Swamp Forest Management
There are few incentives or other mechanisms to encourage peatland and peat swamp forest management. Two informants elaborated on this:

“There is potential for PES and REDD+ schemes, and international carbon incentives, but not many influence peatland management.” (S2, 2012)

“There are no grants for good management. Maybe they can follow the RSPO guidelines and have a regular review for certification but current incentives for certification are not high.” (N1, 2012)

Two other informants from NGOs also noted that policies did not encourage the conservation of peatlands:

“Our policies do not encourage people to conserve or discourage them from using peatlands. We don’t have a policy to look at how people are using peatlands and whether it is sustainable or not.” (S4, 2012)

“Current incentives are mainly for further degradation and conversion of peatlands rather than for its protection. The Government hands out land to companies and they are being forced to take peatlands. Various large oil palm companies do not want to expand on peatlands but they are being told to open peatlands, otherwise they would not get any other land.” (N21, 2012)

Incentives instead existed for agricultural expansion, including for oil palm cultivation in peat areas, as pointed out by a scientist of a private company:

“There’s a huge amount of incentives being given for agriculture, to open up areas for plantations but I don’t know of any incentives for conserving the area or better managing the ecosystem.” (N25, 2012)

In fact, a senior technical officer at an NGO suggested that it was a disincentive for State Governments to conserve peatlands and peat swamp forests as “they would then lose income off the land” (N6, 2012). According to a senior manager from another NGO, “the incentives for any State looking at agricultural land is economics - palm oil is now an interesting crop, crude palm oil price is very high so it’s very lucrative” (N5, 2012). In the words of another senior manager of another NGO, “dollar and cents is the only incentive at the moment” (N4, 2012).
Several other mechanisms for managing peatlands and peat swamp forests were discussed by key informants including non-governmental organisations, certification schemes, reduced emissions through deforestation and degradation (REDD) and mechanisms through ASEAN.

8.2.4.1 Non-governmental Organisations

One mechanism which many informants (40%) alluded to for peatland and peat swamp forest management outside of government was through working with non-governmental organisations. They mentioned “community-based projects” that NGOs were involved with (N11, 2012), such as community forestry which should be explored (N23, 2012).

“The NGOs are the first ones to know of any activities taking place in the buffer zone or in the forest reserve; they are the first ones who inform us. When the NGOs work closely with the local community, they become our eyes and ears.” (S6, 2012)

Several informants also felt that NGOs played an important part in policy advocacy and creating awareness:

“NGOs play a critical part for advocacy and they make a lot of noise when peatlands are being converted and when we are hit with a bout of haze. It’s more reactive than consistently pushing for a cause.” (N6, 2012)

“The NGOs support the implementation of policy through financial, manpower and technical expertise. Under the UNDP project, a committee was formed and relevant government and non-governmental stakeholders came together to implement the Integrated Management Plan. That was the first attempt to work together in a coherent and integrated manner.” (N7, 2012)

One informant, a senior manager of a private company, who spoke against NGO involvement, said that they should be truthful about data as they were being accused of being too stringent:

“NGOs have been very successful in policy advocacy and creating awareness. However, they shouldn’t make standards so stringent that it is not possible to conform to them. The complaint with NGOs is that they have imaginary problems and warped truth. Data is sometimes deliberately misinterpreted or missing or simply created.” (N29, 2012)
Other informants mentioned that NGOs could not do much (N14, 2012) because government departments involved with peatland and peat swamp forest management could decide if they wanted to follow certain guidelines recommended by NGOs (N15, 2012). A scientist with a private company suggested that the NGOs were the ones who often did all the good work while government departments got the credit for them:

"Without NGOs, the relevance of peat swamps may not be highlighted. Even though they are not managing the peat swamp, they influence the activities that are being carried out, directly or indirectly. They help the State Forestry Department come up with a proposal and they do all the work; so that the Department will look good in the eyes of the auditors." (P2, 2012)

Some informants also indicated that NGOs were only capable of managing small areas like the Kuala Selangor Nature Park (N16, 2012) and did not have the resources to manage bigger areas:

"NGOs are not capable of any form of management. They are far too weak and have no resources. They do not have the staff or the financial resources to get involved. They could do small, tiny spots; anything bigger will be stretching their resources too thin." (P3, 2012)

**Documentary evidence:** Ainul Jaria (2011) found that NGOs in Peninsular Malaysia played an important role in land development planning decision making by actively ensuring the promotion of environmental interests. However, there are currently no examples in documents of NGOs managing a peatland or peat swamp forest area in Peninsular Malaysia. Several documents showed examples of NGOs supporting management efforts, particularly in the rehabilitation the North Selangor Peat Swamp Forest where the Global Environment Centre, a local NGO, has been working with the Selangor Forestry Department through a Memorandum of Understanding (S1, 2012). The Global Environment Centre is also the Regional Project Executing Agency working with the ASEAN Secretariat on the ASEAN
Peatland Forest Project to assist the ASEAN Member States to formulate and implement National Action Plans for the wise use of peatlands (APFP website, accessed on 3 Dec 2013). Wetlands International, an international NGO with an office in Malaysia was contracted to undertake a Multi-Disciplinary Assessment for the Southeast Pahang Peat Swamp Forest component of the UNDP/GEF Project (GEC website, accessed on 3 Dec 2013) to assist with baseline information for the Integrated Management Plan. Other NGOs such as the Centre for Orang Asli Concerns, Worldwide Fund for Nature and the Malaysian Nature Society were noted for their involvement in policy advocacy related to peatlands and peat swamp forests. However, the role of NGOs currently does not extend to include management.

The Kuala Selangor Nature Park is the only example in Peninsular Malaysia of a protected area of mangroves and mudflats, covering an area of 800 acres, being managed by an NGO. The Malaysian Nature Society has been managing the area since 1987 under a cooperative arrangement with the Selangor State Government. It received an award from the Selangor State Government in June 2012 as one of the best ecotourism sites in the state (MNS, 2013).

8.2.4.2 Certification Schemes

Another mechanism that could influence better management of peatlands and peat swamp forests according to informants (29%) was the certification schemes for oil palm under the Roundtable on Sustainable Palm Oil, and the Malaysian Timber Certification Scheme as well as the Forest Stewardship Certificate for timber certification.
A senior technical manager of a private company highlighted that there were specific principles in the RSPO guidelines that referred to peatlands and oil palm development on peat:

“One voluntary mechanism is the RSPO which has a few principles about peatlands and development on peatlands, especially in trying to encourage oil palm companies to be more responsible in how they manage peatlands.” (S2, 2012)

The oil palm plantation companies were also carrying out their own research on reducing CO₂ emissions and increasing yield, according to a senior technical manager of a government agency:

“The plantation group has its own management. They conduct research to reduce emissions, to enhance yield and to improve stability of the plants in peat areas because peatlands are more challenging than mineral soils.” (N2, 2012)

A senior manager with a government agency suggested that the research by private companies could have a big impact on how the private peat-land banks were managed:

“There are land banks owned by large private concerns and they will be drawing up policies of how to use this land. Part of their land is peat and they will decide whether to keep it idle or develop it; they have the control in the end.” (J3, 2012)

A scientist with a private company, however, explained that RSPO had not made a decision whether palm oil from plantations planted on deep peat could be certified if palms were replanted:

“The plantation estates have no choice but to join RSPO because they want to get their oil certified and sold in Europe. However, RSPO has not made any firm decision on existing oil palm estates on deep peat and whether they should be replanted.” (N15, 2012)

A senior manager of a private company criticised the RSPO guidelines as being riddled with hypocrisy as multinationals and Western consumers were unwilling to pay higher costs for certified palm oil:

“Many producers embraced the RSPO guidelines in the past hoping that they will be given a small margin above the market prices. This is riddled with such hypocrisy, primarily by the multinationals and by Western consumers, who have run out the door and would not consider paying a tiny margin.” (N35, 2012)
Additionally, a senior manager with a government-linked agency explained that even if adherence to the certification procedures promised a higher price for the certified product, it was very difficult to meet some of the criteria when planting on peat:

“The criteria that restricts the cultivation on peat is the GHG. According to the amount of GHG emissions that is allowed in the RSPO guidelines [Principles and Criteria for the Production of Sustainable Palm Oil], you would not be able to plant on peat. The amount of GHG you produce will be higher and if you exceed that amount then you don’t comply and you don’t get the certification.” (N13, 2012)

RSPO was also having difficulty appealing to the players involved with palm oil trading as the current certified palm oil market only encompassed about 5% of the total global market for palm oil, according to a senior manager of a private company:

“RSPO is facing difficulty in getting more people to join them even as they are come up with new guidelines for GHG release. Only 5-6% of the total global palm oil market is certified.” (N33, 2012)

As a result of this challenge, there were oil palm growers who were looking for other markets that were not being influenced by the RSPO guidelines, like India and China, according to a scientist of an academic institution:

"With the stricter RSPO guidelines, some companies are saying they will sell in China and other markets that are not very sustainable. RSPO is having some influence but it is not the only answer. It requires pressure from across the board; they have to pressurise other consumers like India and China, which seem to be insatiable in their demand for palm oil." (N22, 2012)

A technical officer of a private company indicated that there were other markets that were willing to buy non-certified palm oil and “not all markets want certification, for example India and China” (P6, 2012).

A senior manager from an NGO suggested that, despite all the difficulties, private oil palm companies were beginning to recognize that plantations on peatland needed to look at the longer-term implications:

“What is interesting is the participation of Malaysian companies in the RSPO. There is increased recognition from the bigger companies, like Sime Darby, that oil palm or the
plantation on peatlands cannot be sustainable. They’ve acknowledged that there are significant issues related to peatland drainage that cannot be stopped, unless you rehabilitate peatlands.” (N21, 2012)

In terms of timber certification, informants also highlighted that the Forestry Department imposed timber certification on State Governments to maintain the health of the peat swamp forests. A scientist with a private company explained:

“The Forestry Department imposes the certification process on State Governments so that they are able to manage their forests in a sustainable manner using the Sustainable Forest Management policy. It determines the health of the peat swamp forest and is related to the logging and cutting cycles, the annual allowable cut and the certification process.” (P2, 2012)

A senior manager of an NGO explained that the MTCS and FSC certification schemes had a non-binding and non-legal way of promoting sustainable management of peat swamp forests:

“FSC and MTCS are concerned with sustainable forest management and they would have in their criteria and indicators, non-binding and non-legal measures to promote the sustainable management of forests including peat swamp forests.” (N24, 2012)

A senior technical manager of a private company alluded to the Malaysia Government requirement for timber certification which was the MTCS criteria and said that the FSC certification was necessary only for timber in the global markets:

“The Government is encouraging foresters and operators to comply with MTCS rather than FSC. They say that FSC is certification for the global market but if you want to comply with the Malaysian Government’s requirements, you need MTCS certification.” (N3, 2012)

Timber certification had the potential to influence logging in peat swamp forests because private companies might be rewarded with a license to log a larger area if they complied with certification standards, according to a senior technical manager of a private company:

“Timber certification is a market-led initiative to improve the management of forestry. A logging company might want to get certified through reduced impact logging as it might affect the renewal of its logging license or the company might get a bigger area to log. There is potential for some mechanism to improve management of peat swamp forests.” (S2, 2012)
A technical officer of a private company, however, felt that certification will not make a difference to peat swamp forests as there was no market for timber species from peat swamp forests:

"The Government owns the forests but timber from peat swamp forests don't have a market, so certification will not improve the care for them. The timber in peat swamps is not worth much so there is no need for certification of this timber." (P6, 2012)

Another informant, a senior manager of an NGO, pointed out that MTCS was facing challenges in convincing some countries that their certification was legal:

"The Government wants to paint a picture that Malaysians are managing their resources sustainably and responsibly but it does not seem to be working. MTCS is facing challenges and, while they might be recognised by certain countries as the mark of legal source of timber, it is not responsible timber and that is being challenged. There is proof that some of it is not legal." (N4, 2012)

**Documentary evidence:** Documents showed that forest certification in Peninsular Malaysia had led to greater planning and monitoring of the forest environment. For instance, according to MTCC (2009), Forest Management Plans were now being prepared following the prescribed MTCS format where information related to the environment, community participation and social aspects were included. Considerations were also being made in the management plans, such as for retention of mother trees, buffer zones for rivers and guidelines for road construction.

Documents provided evidence that the Malaysian Government’s involvement in forest management certification aimed to allay consumers’ doubts about forest sustainability as forestland in the country was owned by the government (Mohd Shahwahid, 2004; Syahaneem and Shukri, 2011). Mohd Shahwahid (2004) found that forest certification served as a tool to promote sustainable forest management and was seen as a step towards ensuring that timber production was conducted without undue undesirable effects on the physical and social environment in forests.
He found that certification initially received the support of different groups; the private sector was reacting to the fear of the loss of international markets, particularly the European markets, while environmental and community NGOs and indigenous people were looking to certification as a potential tool for promoting more transparent decision-making involving forest management and its impact upon the livelihoods of indigenous people. Mohd Shahwahid (2005) also highlighted that forest certification shifted the power balance and therefore provided a new dimension in forest management, where forest management was no longer principally the domain of State Forestry Departments nor did it focus solely on the issue of sustainable timber production.

One of the biggest challenges for the MTCS was meeting the social requirements for forest certification similar to that of the FSC, which it was unable to reach (Gilley, 2000) because indigenous people’s concerns and land rights had to be taken on board. This was said to be beyond the scope of the MTCS as recognition of such rights would require changes to the State Constitution on land rights (Mohd Shahwahid, 2005). There was currently no forest harvesting agreements involving local communities in co-management responsibilities in the country (Syahaneem and Shukri, 2011).

Forest certification also did not address the problem of conversion of forests (especially outside of Permanent Reserved Forests) to non-forest uses. There were changes in management practices such as removing felled logs from forests using overhead winching compared to on-the-ground dragging as well as efforts at protecting ecological biodiversity that were still to be addressed in certification (Mohd Shahwahid, 2004).
In terms of the global guidelines for producing palm oil sustainably, documents showed that the RSPO's Principles and Criteria for Sustainable Palm Oil Production was the voluntary certification scheme currently being used (Killeen and Goon, 2013). Certification for sustainable palm oil through RSPO was seen as a seal of approval that the palm oil used in the product was produced sustainably. Producers were also certified through a strict verification of the production process to the RSPO principles and criteria by accredited agencies and may be withdrawn on infringement of the rules and standards.

However, several NGOs felt that the RSPO principles and criteria were insufficient to prevent deforestation as it was not compulsory for producers to account for greenhouse gas emissions and clearance of carbon-rich peatland (WWF, 2013). The RSPO currently only encouraged producers to report GHG emissions and the standards were being developed by consensus, which meant that compromise was inevitable. While the RSPO acknowledged that GHG emissions were important in benchmarking the RSPO as the standard in sustainability, emissions could not as yet be monitored completely or measured accurately with current knowledge and methodologies (Scott-Thomas, 2013).

Colchester and Chao (2013) found that, in some cases, RSPO processes had led to improved understanding by communities and companies and that procedural improvements provided a basis for resolving some land conflicts. However, they also highlighted the issue that many oil palm companies were not respecting community land rights, were acquiring lands without consent and were in obvious violation of the RSPO standard. They concluded that the RSPO standard needed to
be strengthened and enforced for better peatland management, and that laws and policies to allocate lands to companies should respect community rights to avoid further conflicts over land.

8.2.4.3 Reduced Emissions from Deforestation and Degradation (REDD)

Another mechanism mentioned by informants (13%) that could influence the management of peatlands and peat swamp forests were the REDD and REDD+ schemes and other voluntary carbon schemes. A senior technical employee of an NGO felt that such schemes could “encourage government agencies to restore or keep their remaining peat swamp forests” (J1, 2012). Another employee of an NGO indicated that Governments would have to report to the international community about actions they have taken to reduce CO₂ emissions under the REDD initiative:

“For REDD, Governments have to report about emission levels from the forest sector under the United Nations Framework Convention on Climate Change; how to reduce emissions, what actions they have taken and what their impacts were.” (S4, 2012)

This has led to the perception that if a country subscribed to REDD, then people outside government would be dictating what should be done with peatlands and peat swamp forests, according to a senior manager of an NGO:

“Some government agencies have a bad perception of REDD. They think that if we sign on to the scheme then foreigners will tell us what to do with our forests. One the one hand, they want free reign over their forests but they also want to tap into international funding so there needs to be a compromise.” (N24, 2012)

A few of the key informants suggested that schemes such as REDD+ and voluntary carbon mechanisms had the potential to be explored for incentives for the future but said that there were no examples of success in implementing these schemes currently:

“There are no REDD+ projects in Malaysia. PES for carbon can provide incentives for changing the management for the conservation of peatlands. With business as usual,
you emit so much CO₂ and with REDD+ support, you are able to get credits; at present it is only in the voluntary market. (N1, 2012)

A senior manager of a government agency suggested that “REDD+ was a new concept and that there was little understanding on the issue; so we don’t see the returns yet” (N23, 2012). Similar thoughts were shared on voluntary carbon schemes, where a senior manager of an NGO said, “at some point, people were suggesting carbon credits but no scheme has been realised in Malaysia” (N9, 2012).

A senior technical manager with a government agency, however, indicated that international demands for sustainable products were having an effect locally:

“In international trade, people are moving into eco-labelling and carbon footprint processes so they are using trade to make sure that peatlands are not converted. We don’t have much, but we are bound by forestry acts and enactments in the States to prevent mass conversion.” (N2, 2012)

Some of the voluntary carbon schemes could increase the value of forests but not at current carbon prices, said a senior manager of a government-linked agency:

“There are mechanisms like REDD, Voluntary Carbon Scheme, Clean Development Mechanism that can increase the value of forests. With these mechanisms, a forest left standing may have some value; how much people are willing to pay counts. If they are willing to pay more for forest left standing, it will be more valuable than if it is cut. It also depends on the price of carbon and right now it is very low.” (N12, 2012)

A scientist with an academic institution described several projects involving Indonesian peatlands under the REDD schemes that could influence the management of peatlands in Peninsular Malaysia:

“There are a number of projects in Indonesia to harness REDD+ funds for sustainable peatland management and peat conservation. The initiative on 65,000 ha of deforested peatland to restore its hydrology and re-forest is an example and it is re-growing quite rapidly.” (N22, 2012)

Documentary evidence: Accessing private financing for peatland restoration and management via carbon markets such as through REDD schemes as one of the ways to incentivise collaboration between land owners and managers of peatlands and peat swamp forests towards sustainable management is still in the early stages
of development (UNREDD, 2013). Several initiatives have been put in place to support the implementation of the UNFCCC decision on REDD at the 13th Conference of Parties; the UN-REDD is one such initiative. Other initiatives include the World Bank’s Forest Carbon Partnership Facility, Norway’s International Climate and Forest Initiative and the Collaborative Partnership on Forests (UNREDD, 2013). Initial activities under these initiatives have been undertaken with pilot project design and policy as well as institutional frameworks being established. These have also included enabling assistance for sustainable forest and peatland management, to increase the prospects of success for REDD programmes through these initiatives.

8.2.4.4 Mechanisms through ASEAN

A few informants (10%) alluded to the ASEAN mechanisms such as the Agreement on Transboundary Haze, the ASEAN Peatland Management Initiative and the ASEAN Peatland Management Strategy, which they felt could compel Malaysia to manage its peatlands sustainably. Two informants from different NGOs explained:

“The ASEAN mechanism could get Malaysia to do something [about managing its peatlands] due to peer pressure. For example, if Indonesia is doing something Malaysia might feel compelled to follow.” (N1, 2012)

“The APMI should push Malaysia to do better where peatland management is concerned. But there is still the issue that Malaysia is a sovereign country and can decide to do what’s best for the country. No other government can then impose on another country to say this is how you should do it.” (N6, 2012)

A senior manager of a government-linked agency also wondered how much the non-intrusive strategy employed by ASEAN could help peatland management:

“With the ASEAN Transboundary Haze Agreement and the APMI, people are concerned with how much clout they will have because the ASEAN way of working is non-intrusive so it’s difficult to strictly implement recommendations. Many multi-lateral agreements find it hard to have punitive actions and there is nothing to stop a country from the business as usual scenario. There is not much anyone can do if they are not following their commitments.” (N12, 2012)
**Documentary evidence:** ASEAN mechanisms for peatland management exist in the form of the ASEAN Peatland Management Initiative and its framework for action, the ASEAN Peatland Management Strategy. These mechanisms aim “to promote the sustainable management of peatlands among ASEAN Member States through collective actions and cooperation to support local livelihoods, reduce the risk of fires and regional haze” (ASEAN Secretariat, 2005). Through these mechanisms, several ASEAN Member States collaborated with the Global Environment Facility through the ASEAN Secretariat to implement the ASEAN Peatland Forests Project which sought to “demonstrate, implement and scale-up sustainable management and rehabilitation of peatland forests in Southeast Asia” (ASEAN Secretariat and Global Environment Centre, 2010). While these have been initiatives to move ASEAN forward in terms of tackling natural resource management on a regional basis, ASEAN’s strong non-interventionist stand and its principle of conduct by consensus has meant it has been largely ineffective in solving regional environmental issues (Wan Portia, 2013).

Varkkey (2012) also pointed to the ASEAN style of regional engagement which prioritised the maintenance of national sovereignty as problematic in addressing environmental issues. Referring to the regional haze pollution, Varkkey (2012) felt that States chose to act in their national interests and exploit the economic importance of the oil palm sector as opposed to the collective regional interests of reducing the incidence of haze. These soft law mechanisms needed to be enhanced if ASEAN was to show that it could cooperate and respond to natural resource management in a timely manner (Wan Portia, 2013). Mayer (2006) also argued that, although the ASEAN Haze Agreement lacked enforceable mandatory provisions, especially on national actions for peatland management, it remained a useful vehicle
for international pressure and regional cooperation, especially for eliminating transboundary pollution.

8.2.5 Shortcomings of Existing Governance and Institutional Mechanisms

Although this was not a specific question during the interviews, several key informants highlighted shortcomings of the present governance and institutional mechanisms for peatland and peat swamp forest management.

One of the shortcomings mentioned by a senior manager with a government agency, was that policy discussions did not include developments in scientific research, and therefore what was needed was: “a state level technical committee to bring people together; or an annual conference on the developments on peat swamp studies, where you can bring science into policy level discussions” (N27, 2012).

Another shortcoming of the current governance was that the decisions-making process was not transparent, according to a senior manager with an NGO, where “consultancy reports and minutes of the meeting” were not made public (N5, 2012).

Another informant, a senior manager of a private company, said a penalty should be imposed on State Governments that did not comply with regulations relating to peatland development:

“If an area is defined as a high conservation area, and if a State does not recognise it, how do you make the States responsible? Should we issue a fine for misbehaviour? (N16, 2012)
8.2.6 Recommendations to Improve Peatland and Peat swamp Forest Management

Informants also discussed a range of changes that were needed to improve the management of peatlands and peat swamp forests. A scientist with a private company suggested that it was no longer possible to manage peatlands (and wetlands) from a sector-based approach:

“To conserve and manage wetlands properly, it has got to be a cross-sectoral approach. Biodiversity is the same, there are issues related to biodiversity that are species-related or ecosystem-related that can no longer be parked under one agency or one company.” (N25, 2012)

Another scientist with an academic institution suggested that it was necessary to look at the management of peatlands and peat swamp forests for long-term benefits and not be swayed by political affiliations:

“We need to change the way we manage according to the needs of politics, it will only worsen the situation. The current trend is to change our policy based on the political climate, we should have a longer-term approach.” (N31, 2012)

Other recommendations for change involved the policy formulation process, the involvement of the local communities and the private sector, and policies of the State Government.

8.2.6.1 Consultative Policy Formulation Process

Several informants alluded to the need to make the policy formulation process for peatlands and peats swamp forests more consultative. A senior manager of a government-linked agency suggested that there should be government intervention to ensure that all stakeholders were aware of the need to be involved in discussions on the peat policy:

“There must be government intervention. The Government must decide that stakeholder involvement is a requirement, and then change their policies. If there is awareness, there will be support to ensure present institutional arrangement takes
The involvement of stakeholders could facilitate the inclusion of their needs in the policy, a senior manager of a government-linked agency mentioned:

“The Government must involve stakeholders in planning, formulation and implementation of policies. Stakeholders should also be allowed to take part in monitoring and review of policies through institutionalized groups to ensure that their needs are included.” (J2, 2012)

According to a senior manager of a government agency, the involvement of multiple stakeholders was already being carried out under the Tenth Malaysia Plan for all new proposals:

“It is a government policy to implement value management for their programs. Stakeholders are invited to participate in a project being proposed. This has been done since the implementation of the 10th Malaysia Plan.” (N42, 2012)

A senior technical officer of a private company disagreed and suggested that stakeholders who participated should also be empowered to make decisions:

“There isn’t a multi-stakeholder approach for peat policy, so the mode of operation for drawing up the policy has to change. There must be a full inclusion of stakeholders to determine what they can contribute. This takes time because people will have to be comfortable with the process to make a contribution. Stakeholders must be empowered to make decisions.” (N14, 2012)

A senior manager of an NGO suggested that the policy formulation process should be transparent about the facts:

“The federal peatland policy should be developed through a process that is transparent about the scientific facts. We should look at alternative land use and how we should treat peatlands. It is our responsibility to the global society to reduce emissions from unsustainable land use in peatlands.” (N21, 2012)

A precautionary approach should be adopted where the science was not clear, a senior manager of a private company said:

“We need to know that, pending the science which is still in doubt, we should take the precautionary approach on peat. Then we challenge ourselves on how to give appropriate development whilst not sacrificing these [peat] areas.” (N19, 2012)
Three informants described the process adopted for developing spatial plans which could also be used as a model for the formulation of the peatland policy. A senior manager of a government agency talked about the present stakeholder engagement process for the preparation of the Local Plan, Structure Plan and Special Plans (such as the Central Forest Spine Master Plan), which included planning for green areas including peatlands:

“The government departments start with a focus group discussion to gauge who is involved. Then they establish the extent of coverage, the terms of reference and the necessary expertise. If there are conflicts between certain ministries, the political masters and decision makers are informed to resolve it.” (N40, 2012)

The spatial planning process also made it mandatory for a public display to get feedback from the public about development projects and this could be used for development on peatlands, highlighted a senior manager of a private company:

“The law provides for mandatory public participation for spatial planning. Spatial plans need to have public displays to engage the public and get their feedback. This arrangement could be used for land use change which entails environmentally sensitive areas such as peatlands.” (N33, 2012)

It was the Structure Plans that determined whether peatland areas were converted or maintained, according to a senior technical employee of a NGO:

“The State Structure Plans at the local level determine how planning is conducted at the state level. These mechanisms at the local level determine what happens to peat, whether it remains as peatland forests or if it is converted.” (N6, 2012)

8.2.6.2 Involvement of the Local Community and the Private Sector

Several informants also called for the involvement of local communities in the decision making process for peatlands and peat swamp forests. According to a senior manager of an NGO:

“There is no mechanism to engage the local community. The Forestry Department has an attitude that local people have been stealing and encroaching, and there is no partnership with the local community.” (N1, 2012)
A senior officer of a government agency said that local people were represented by government agencies and these agencies were sometimes accused of not representing their interests:

“The local people are not directly involved but are represented through the Ministry. This is tricky because they say the Ministry doesn’t speak for them, so the local people must be involved directly through an NGO.” (N11, 2012)

A senior technical manager said a top-down management approach needed to change to involve the local communities:

“The old way of working is top-down; it should start from getting people involved through the free-and-prior-informed-consent concept. We cannot proceed with development plans if people don’t agree. If people disagree, we must find ways to accommodate them.” (N3, 2012)

Managers and government agencies also needed to involve the local communities in relevant discussions so they became allies for peatland management, suggested a senior technical manager of an NGO:

“The managers and government agencies need to recognise that they [the local people] are there, they are important and need to be part of the process. They must make the effort to involve the local people in relevant discussions so they could become allies. There isn’t one institutional arrangement that will suit all areas; we need to tweak it to suit the local conditions.” (N7, 2012)

A senior manager of an NGO said that local people might also choose to conserve peatlands if they understood the costs and benefits of converting peatlands:

“It’s not just informing them but sharing information and making them part of the process and building their capacity to make decisions for themselves. They will need to know the costs and benefits of converting peatlands. People might choose to conserve peatlands if they knew how it could benefit them. (N5, 2012)

Two informants talked about the need to formalise the involvement of people living in the vicinity of peatlands in decision making processes so they could benefit financially:

“It should be made a law that where there are people living in peat swamp forests, they should be part of the management. This is an example of collaborative management.” (P5, 2012)

“There must be a need to formalise their involvement in consultations. The problem is
finding a way to incentivise the local community and the indigenous people so they can play their part and not rely too much on the government.” (N23, 2012)

Two other informants referred to the public consultation process before the conversion of forest reserves that was formalised by the Selangor State Government, which could be duplicated in other areas for local community involvement:

“We need to make sure there is public consultation before any peat area undergoes land use changes. It would be good to duplicate what has been done in Selangor.” (S5, 2012)

“The need for public consultation before forest reserves are converted would require a change in the law. In Malaysia, a guideline might not be followed; it needs to be a law before people pay attention to it.” (N24, 2012)

The involvement of the private sector was another change that was recommended by two informants. A senior officer of a government agency acknowledged that the current representation lacked the involvement of the private sector:

“The current set-up of the committee at the Ministry of Natural Resources and Environment lacks the business community and private sector representation. They should get involved through their business association, such as through the Business Council for Sustainable Development. This needs to be institutionalised so there is continuity.” (N11, 2012)

The involvement of the private sector needed to be more pro-active, according to a senior technical employee of an NGO:

“Given that the plantations industry is influential where peatland is concerned, they need to be engaged in a pro-active manner. They need to be brought to the table to say this is what is happening, let’s discuss what’s best if you want to expand plantation areas.” (N6, 2012)

8.2.6.3 State Land Use Policy to Include Peatland Conservation

Two informants also talked about changes that were needed to the process of developing state policies. A senior technical employee suggested that decision
makers at the state level needed to be influenced to consider peatland conservation in their decision making:

“The Chief Ministers and their Executive Councils determine land uses within their respective States. They should be influenced to bear conservation in mind when making decisions on behalf of the State.” (N6, 2012)

It was also the State Government that needed to involve various stakeholders to ensure a more balanced decision-making process, according to a senior manager of a private company:

“The process of stakeholder involvement is currently a nominal process. Consulting the stakeholders now means carrying out a survey if they agree or disagree. There is a need to enlarge this involvement and it will be up to the State Governments to improve the decision-making process.” (N16, 2012)

8.3 Discussion

8.3.1 Disjunction between Tiers of Government

The Malaysian Constitution established a system of federalism in which both legislative and executive powers are shared among three tiers of government, the national, state and local. Environmental functions, including peatland management, are fragmented within and among these three spheres (Jomo et al., 2004; Rose, 2011). There is disjunction between the tiers of government, especially as both
national and state legislatures are empowered to enact environmental legislation that falls within their functional areas. A regulation that is formulated at the national level only become binding when the State Government decides to adopt it and issues a State Enactment (N18, 2012). Unless incentives are given to State Governments, they can choose to implement only the legislation from which they can profit.

Whilst legislative competence is fragmented across various levels of government in Peninsular Malaysia, the administrative distribution of functions is even more complex and fragmented. According to the Selangor State Structure Plan (2007), for example, the state planning system involves physical planning and economic development planning; the physical planning is governed by the *Town and Country Planning Act 1976* while the economic development planning is governed by the five-year development plans for Malaysia and the respective state plans. The main body overseeing the physical planning system is the National Physical Council; the secretariat for the Council is the Peninsular Malaysia Town and Country Planning Department. The Town and Country Planning Department has branches at the State and District level to ensure that planning, use, development and conservation of land from Federal to State and to the District levels. However, the main body overseeing the economic development at the Federal level is the Federal Economic Planning Unit, together with the Federal Department of Treasury. At the state level, the task falls upon the Executive Council for Economic Development, whose secretariat lies within the State Economic Planning Unit and the Selangor State Department of Treasury. The bodies overseeing physical planning and economic development do not occupy the same building and are situated in different departments, which could increase the time taken to address urgent matters.
Cooperation between the physical planning councils and committees and the economic development councils and units are important because physical plans can only be executed if budgetary allocations have been made for relevant projects. Projects and plans in the National Physical Plan must be included in the state five year development plan, and there must be cooperation between the State Economic Planning Unit and the State Planning Committee to ensure sustainable development.

No institutional framework currently exists for environment-related policy. The National Physical Planning Council, for example, according to the State Structure Plans (2007), was meant to have working committees whose members were to include the State Economic Planning Unit Director and the State Planning Director as permanent members; other members were to be drawn from technical departments of state and federal agencies. There is no requirement for environmental expertise in these highly influential committees. While there are plans to include NGOs, professional bodies, business councils, universities and research bodies and public representatives in a state physical planning consultative committee to increase public participation in the state planning process (Reference), this has yet to be accomplished.

Another disjunction between the Federal and State Governments is the means of revenue collection by the State Governments. Jomo et al. (2004) highlighted that the overall tax and revenue structure generally favours the Federal Government over the State Governments, giving greater fiscal muscle to the Federal Government, and leaving both state and local government with land and municipal taxes, and certain royalties. Major revenue items, such as income and sales taxes, accrue to the
Federal Government, along with road taxes, import and export taxes (Jomo et al., 2004; N27 and N33, 2012). Hence, while the State Governments collect some royalties from timber concessionaires and oil palm plantation companies, the Federal Government collects timber and palm oil export duties and income taxes from timber and palm oil firms which extract and process logs and palm oil. It is this disparity in revenue sources that has led State Governments to exploit their natural resources (such as peatlands and peat swamp forests) and to pursue their own policies on land, forest and environment to increase their sources of revenue (Jomo et al., 2004; N33, 2012).

8.3.2 Recommendations for Change

8.3.2.1 Moving from Government to Governance

The issues related to peatland and peat swamp forest management, as with many other environmental issues, are complex but they can be addressed through new policy and institutional responses (Lockwood et al., 2010). There are differing perspectives and solution strategies, but the current fragmented institutional setting of peatland and peat swamp forest management in Peninsular Malaysia is not able to deal with the complexity of the issues involved. What is needed are new approaches to address environmental problems, and a shift from government to governance (Graham et al., 2003; Dovers, 2005; Howlett and Rayner, 2006; Lockwood et al., 2010).

The term “new governance” has emerged to describe “a mode of governing that shows a preference for collaborative approaches among government and non-government actors from the private sector and civil society” (Howlett and Rayner, 2006). Dovers (2005) highlighted that new governance is especially evident in
governing arrangements dealing with the issue of sustainability as it has an explicit connection with ethical concepts such as “participation, responsibility, stewardship, and duty of care, and which makes novel demands on institutions and policy” (Dovers 2005).

New governance also needs a greater level of integration, coordination, and attention to the spatial and temporal (i.e. multi-scalar) phenomena of environmental and natural resource policy regimes (Lemos and Agrawal, 2006). Traditional policy regimes that have emerged incrementally over time have been unsuited to solve problems that are cross-sectoral and multi-scalar, such as the case of management of peatlands and peat swamp forests. As seen from the earlier discussion, management of peat ecosystems has demanded that approaches be developed to deal with complexity and uncertainty, to manage interdependencies among stakeholders, to foster links between diverse interests at different scales and across jurisdictions, and stimulate resources, skills and knowledge more effectively than conventional government. New approaches are needed that incorporate these issues of management.

Some of the principles of new governance highlighted by Dovers (2005) include (i) integration – the connection between, and coordination across, different governance levels, at the same level of governance, and the alignment of priorities, plans and activities across governance organisations; (ii) capability – the systems, plans, resources, skills, leadership, knowledge, and experiences that enable organisations, and the individuals who direct, manage and work for them to deliver their responsibilities effectively; and (iii) adaptability – the incorporation of new knowledge and learning into decision making and implementation, anticipation and
management of threats, opportunities, and associated risks, and systematic reflection on individual, organisational and system performance.

8.3.2.2 Stakeholder Participation in Policy Formulation and Implementation
Another recommendation for improving peatland and peat swamp forest management in Peninsular Malaysia deals with increased stakeholder participation (i.e. to involve the local communities and the private sector) and adopting a more consultative approach towards policy formulation.

Ho (1992) described policy formulation in Malaysia as a bureaucratic act emanating primarily from the Prime Minister’s Department. Under a different Prime Minister (i.e. Tun Mahathir), Ho (1992) found that, while the policy formulation process in Peninsular Malaysia was open to the influence of public opinion and interest groups, it was largely regarded as solely dependent on the decisions of the Federal Government. The relationship between public policy input and social variables such as ethnic and class interests were always important considerations in developing Malaysian policy, not necessarily sustainability (Hezri, 2004).

Ainul Jaria (2011) found that public participation in land development planning processes was guaranteed in the legal system but was largely absent in the Malaysian planning system. Although there are avenues for public participation in land planning provided for in the Town and Country Planning Act 1976, whereby town plans are displayed for the public to make objections and to propose recommendations on how to overcome the objections, she argued that the planning authorities were more concerned with ensuring the successful implementation of the
country's development policies than taking into consideration the effect of such activities on the environment and the public.

The complexity of land development planning is exacerbated because land management agencies, for example the District Land Office, are compelled to work with diverse constituents and other governmental entities to manage ecological units that usually cross land ownership and jurisdictional boundaries (Lockwood et al., 2010). Government agencies appear not to realise that public involvement in planning can indicate whether those who participate in a particular process support or oppose specific management activities or proposals. Public involvement can also help provide a better understanding of key social values, uses and concerns that could impact changes in ecosystem conditions and management options (Lockwood et al., 2010). By incorporating local knowledge and by ensuring that proposals reflect local conditions and values, public involvement can also improve the chances that sustainable natural resource management will be implemented (Van Driesche and Lane 2002; Ryan et al., 2006).

8.3.2.3 Addressing Vulnerabilities in the System

One of the main vulnerabilities that exists in peatland and peat swamp forest management in Peninsular Malaysia is corruption. In terms of management of forests for logging, for example, forestry officers overseeing the implementation of regulations for ensuring sustainability of timber extraction methods can sometimes be rewarded with cash for turning a blind eye to logging contractors who flout the law during extraction (P2, 2012). The forestry officers receive low salaries from government and are subject to the physical and psychological stress that comes from working in harsh and isolated areas away from their families, so the cash
reward is seen as an incentive for their work (P2, 2012). In one incident in 2012, a forestry officer was suspected and charged with corruption when he was found with cash close to RM 720,000 (c. AUD 260,000) at his home (N4 and P6, 2012). In another case, forest management units which consisted of forests in a state were issued with a certificate even when there were proven cases of illegal logging taking place (N4, 2012).

These cases are explained as negotiation, persuasion and coercion in the IRR as one of the pathways in implementation (Figure 7.2). It could also be described as a means of hijacking the system of governance. The IRR framework found that a margin of manoeuvre existed outside the institutional regime when the level of integration in a regime was low but diminished with the increase in the level of integration (de Buren and Knoepfel, 2011). The margin of manoeuvre is complete in the case of non-existent regime; small in the case of a complex regime and non-existent in the case of an integrated regime (Figure 8.1)
Dovers (2005) highlighted some principles for natural resource management governance that relate directly to addressing corruption in peatland and peat swamp forest management in Peninsular Malaysia and other vulnerabilities that might be present. These are (i) legitimacy – the validity of an organisation’s authority to govern and for governing actors to exercise their authority with integrity, in that they declare any conflict of interest, behave honestly and do not seek to manipulate outcomes to their personal advantage; (ii) transparency – the visibility of the decision-making process, the clarity with which the reasoning behind decisions is communicated and the ready availability of relevant information about governance.
and performance in an organisation; (iii) accountability – the allocation and acceptance of responsibility for decisions and actions and the demonstration of whether and how these responsibilities have been met; (iv) inclusiveness – the opportunities available for stakeholders to participate in and influence decision-making processes and actions; and (v) fairness – the respect and attention given to stakeholders’ views, consistency and absence of personal bias in decision making, the consideration given to distribution of costs and benefits of decisions.

8.4 Conclusions

Most of the key informants felt that peatland and peat swamp forest regulations for peatland and peat swamp forest management were important, mainly because the peat environments provided valuable ecosystem services (water supply and regulation, biodiversity protection and climate regulation), were areas that required special management and provided valuable socio-economic opportunities. Several institutions played important advisory roles in the management of peat resources at the Federal level but there was a gap in the institutional arrangements at the State level. State Committees on Peatlands, which were to be formed under the National Steering Committee on Peatlands, have yet to be formed. Other mechanisms for management such as collaboration with NGOs, certification and REDD schemes, and mechanisms through ASEAN, have improved the management of peat fires and rehabilitation efforts. However, these networks have lacked the necessary influence for management of peatlands and peat swamp forests at the State level.

Some of the shortcomings alluded to by key informants were the non-inclusion of scientific discovery in policy decisions, the lack of transparency in decision making
processes, and that State Governments were not being penalised for flouting regulations relating to sustainable peatland management, or provided with incentives to retain peatland and peat swamp forests.

It was suggested that the policy formulation process for peatland and peat swamp forest management needed to be more consultative, involving the private sector and local communities, particularly when developing State land use policies. In general, there is a need for governments to shift to new ideas for governance with a greater level of integration, coordination and attention to spatial and temporal phenomena of environmental and natural resource policy regimes.

The next chapter is directed at addressing the hypotheses proposed in Section 2.6 by looking specifically at the case study sites.
Chapter 9  Towards an Integrated Regime: The Institutional Resource
Regime for Peatland and Peat Swamp Forest Management at the
Case Study Sites

Following a general analysis of the elements in the IRR framework in chapters four
to seven, this chapter is directed at addressing the hypotheses proposed in Section
2.6, looking specifically at the three case study sites. It starts by establishing the
uses of the peat resource at the case study sites and examines the rivalries that
exist. Then it describes the resource regime for peat resources and the
implementation of the regime at each site. Using maps of the case study sites from
Landsat-8, I then discuss the impact of the present regime on peat resource at the
sites, and probable trends in their future use, before drawing some conclusions.

9.1  Analysis of Uses and Rivalries at the Case Study Sites

A rivalry has been described by Aubin (2008) as a situation where there is
incompatibility between two users of their respective use of the resource, and where
at least one of the users’ needs is not being met by the other’s use of the resource.
The actual uses (in terms of goods and services) of the peat resource at the case
study sites were highlighted in Chapter 4, while the users and other actors were
analysed in Chapter 5. The section that follows highlights the uses and rivalries, and
refers to the users and other actors, with specific reference to the case study sites.

9.1.1  Uses and Rivalries at North Selangor Peat Swamp Forest

At the North Selangor Peat Swamp Forest, rivalries exist in the use of the peat
swamp forest and its adjacent areas. Some of the private oil palm companies and
smallholder farmers who pursue the planting of peat areas with oil palm and other cash crops such as rubber, vegetables and fruits have values and uses that conflict with the objectives currently embodied with the official tenure of the peat swamp forest, especially with regards to water management (Parish et al., 2008; Davies, 2011; Prentice, 2011; Lim et al., 2012; GEC, 2014b). Conservation organisations argue that to maintain the value of peat ecosystem services, the water level in peatlands needs to be kept at a level close to the peat surface. Rice farmers, who also depend on the peat swamp forest for their water supply, benefit when water levels remain high. However, plans for agricultural activity or increasing intensity and yield usually involve the lowering of the water level to between 50 cm and 75 cm below the surface (Davies, 2011). Optimum yields of oil palm are obtained when the water level is at least 70 cm below the surface (Davies, 2011; Lim et al., 2012; GEC, 2014b).

Similar water management issues arise in peatland areas used for clay and sand mining in the south-eastern corner of the peat swamp forest. In 2012, trees in the southern end of the Forest Reserve started dying when the water in the swamp was diverted by clay mining activities in the adjacent area (S1, S3, S6 and S7, 2012; GEC 2014b). The private company operating the clay mine was then instructed by the District Council to build a bund around the clay mining zone to ensure that the water table within the forest reserve was not affected by its activities. The affected peat swamp forest in the reserve is said to be recovering (S6 and S7, 2012) but other drained areas within and adjacent to the Forest Reserves that had been mined for clay and sand burnt during March and April 2014 (GEC, 2014b).
Other land uses such as clearing of peatlands for highway development and townships by the District Council and State Government are also in direct conflict with the conservation of peat swamp forests as they involve the complete clearing of forested areas. This will affect the ability of peatlands and peat swamp forests to provide ecosystem services to the same extent, and could lead to people experiencing flooding, water shortages, peat fires and haze.

9.1.2 Uses and Rivalries at Southeast Pahang Peat Swamp Forest

Rivalries in water management exist in the use of the Southeast Pahang Peat Swamp Forest between the need to maintain high water levels for conservation purposes and the water regimes being practiced for agricultural use in the peat swamp forests surrounding the reserved areas. The issues are similar to those in Selangor where forest has been cleared for agriculture in the peat area and drainage canals excavated to remove water before planting. These activities have come right up to the edge of the peat swamps and have disrupted the water balance. As a consequence, the capacity of the peat swamp to regulate water flows has been compromised and peat fires occur on an annual basis.

Another rivalry in this area occurs between the new uses of the peat swamp and the Orang Asli and the local community over use of the resources in the forested areas within the peat swamp forest complex. Traditionally local people roamed the forest reserves and obtained resources for their own use and for trading. Part of the areas from which they obtained resources has been converted to forest reserves where there are restrictions on what they can extract. Other parts have been converted to private land for conversion to agriculture. In these cases, the private land owners sometimes prevent the Orang Asli from roaming on their private land.
Rivalries also exist in the use of groundwater supply in the eastern side of the peat swamp, where groundwater is pumped into aquaculture ponds, interrupting the supply of water to the peat swamps. Villagers close to the aquaculture areas have reported increased salinity in their well water supply (N4, P4 and P5, 2012).

9.1.3 Uses and Rivalries at Ayer Hitam Forest Reserve

The area of peat swamp forest in Ayer Hitam Forest Reserve is smaller than the other case study sites in Selangor and Pahang but the issues that arise in its management are similar, especially the effects on water management of agricultural expansion in areas immediately adjacent to the peat swamp. Rivalry in terms of water level management is the main issue for the area, and is crucial as the area is naturally low-lying and prone to annual flooding. Drainage systems for agriculture were established to enable the land adjacent to the Forest Reserves to be cultivated but these drainage systems also cause water to drain out of peat areas, leading to subsidence and drying of the peat (N42, 2012). This has also affected the capacity of the peat to store water during periods of heavy rainfall (N42, 2012) and thus mitigate floods.

9.2 The Resource Regime at the Case Study Sites

This section is an analysis on the level of the main goods and services provided by the peat resource and of all regulations observable for the purpose of identifying existing and non-existing use rights attributed to specific user groups. The analysis identifies the general ownership and use rights of the uses at the case study sites as
described in Chapter 4 with the aim of identifying gaps and inconsistencies in policies and regulations.

The Ninth Schedule of the Malaysian Constitution contains three lists which identify responsibilities held at the Federal level, those held at State level and those which are held concurrently (Table 9.1). The Federal Government can make laws related to subjects on the Federal and Concurrent lists and State Governments may legislate on subjects included in the State and Concurrent Lists. While the Federal Parliament may also make laws on subjects included on the State List in order to promote uniformity of the laws between two or more States, for these laws to become effective, respective State Legislatures must adopt and gazette relevant legislation, usually in the form of State Enactments (Selangor State Forestry Department, 2000; UNDP/GEF, 2008a).

This research has identified that the Federal Government exerts influence over peat swamp and peat swamp forest management mainly through the Ministry of Natural Resources and Environment, focussing on policy implementation and management support through State Forestry Departments although Federal and State Forestry Departments share responsibility for management of Forest Reserves. The Federal Departments of Forestry, Environment, Wildlife and National Parks, Irrigation and Drainage, and Survey are the relevant administrative entities within this Ministry with the Forest Research Institute of Malaysia also playing an important advisory role.

At a State level, several agencies may be involved directly or indirectly in the management of land, forests and peat swamp forests. The State Executive Council is the highest authority on any matters related to land administration, provided the
decisions do not contravene Federal or State Laws. Most regulations related to user rights are enforced within the State Land Use Plans (guided by the State Structure Plans and Local District Plans) which come under the direct purview of the State Executive Council of the State Government. Use of forest reserves is managed primarily by the State Forestry Department through regulations and by-laws enacted under the *National Forestry Act 1976*, *State Land Act 1966* and *Local Government Act 1979*.

Table 9.1: Federal, State and Concurrent legislative responsibilities under the Malaysian Constitution relevant to peat swamp forest management

<table>
<thead>
<tr>
<th>Responsible party</th>
<th>Legislative powers related to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Government</td>
<td>Ports and harbours; foreshores; Federal works, including:</td>
</tr>
<tr>
<td></td>
<td>• Public works for Federal purposes</td>
</tr>
<tr>
<td></td>
<td>• Water supplies, rivers and canals, except those wholly within one State or regulated by an agreement between the States concerned</td>
</tr>
<tr>
<td></td>
<td>International conventions</td>
</tr>
<tr>
<td></td>
<td>Orang Asli development</td>
</tr>
<tr>
<td>State Government</td>
<td>Except for the Federal Territories of Kuala Lumpur and Labuan:</td>
</tr>
<tr>
<td></td>
<td>• Land, including land tenure, colonisation, land improvement, soil conservation and mining leases</td>
</tr>
<tr>
<td></td>
<td>• Agriculture and forestry</td>
</tr>
<tr>
<td></td>
<td>• Fishing and aquaculture</td>
</tr>
<tr>
<td></td>
<td>• Local government</td>
</tr>
<tr>
<td></td>
<td>• Mining</td>
</tr>
<tr>
<td>Both</td>
<td>Town and country planning except in the Federal Capital</td>
</tr>
<tr>
<td></td>
<td>Drainage and irrigation</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation of mining land and land degraded by soil erosion</td>
</tr>
<tr>
<td></td>
<td>National parks</td>
</tr>
<tr>
<td></td>
<td>Forest reserves</td>
</tr>
<tr>
<td></td>
<td>Disease control in agriculture and fisheries</td>
</tr>
</tbody>
</table>

At the district level, the District Councils function as local government and administer matters through District Offices related to development and disposal of land, land
registration, land revenue collection, socio-economic development and infrastructure projects. Their principal influence on peat swamps and peat swamp forests is through advice on development adjacent to the forests.

9.2.1 The Resource Regime at North Selangor Peat Swamp Forest

The main users of the peat swamp forests and its surrounding areas in the North Selangor Peat Swamp Forest can be categorized into the Federal and State Governments and their agencies and departments, private companies, smallholder farmers, urban dwellers, local communities and settlers, and NGOs (Table 9.2).

The Federal Government is a ‘user’ of the North Selangor Peat Swamp Forest only through its role as signatory to international conventions. Relevant global agreements to which Malaysia is signatory include the Convention on Biological Diversity and Convention on Wetlands of International Importance, which are administered by the Ministry of Natural Resources and Environment. The Ministry also has responsibility for the ASEAN Agreement on Transboundary Haze Pollution and the ASEAN Peatland Management Strategy, both of which call for integrated management of peatlands and peat swamp forest in Malaysia. Its responsibilities under these conventions are largely administered by the State Forestry Department.

The role of the Federal Ministry of Plantation Industries and Commodities in relation to peatland management is linked with the use of peatlands for oil palm plantations, mainly through research for increasing yield and for disease control. The Ministry also formulates policies on downstream processes for palm oil production and the collection of levies. The Federal Ministry of Energy, Green Technology and Water is another ‘user’ at the Federal level, through its objective to manage water resources to ensure continuity in the water supply; the area to the south of the North Selangor
Peat Swamp Forest has been designated as a catchment area for supplying water for the Klang Valley (GEC, 2014a).

For private companies, it is the State Government that has the authority to issue concessions, permits or contracts through a State-level agency (such as the Forestry Department or Economic Planning Unit) or through the District Council (in the case of contracts and permits) (N14, S10, P2 and P4; 2012). Companies that extract timber obtain logging concessions and those planting oil palm receive land concessions (N4 and S1, 2012). Private companies mining clay and sand operate under annually renewable permits while developers of smaller infrastructure are given contracts for specific projects; these permits and contracts are administered by the District Council (S7 and S8, 2012). Larger infrastructure development projects, such as housing for urban dwellers, are administered directly by the State Government (S1 and P3, 2012).

Smallholder farmers and rice farmers in the areas adjacent to the North Selangor Peat Swamp Forest area have been allocated land titles or temporary occupation licences by the State Government under settler and smallholder schemes (GEC, 2014a). The farmers have been allocated mini-estates and paddy fields as part of a larger complex, and provided with technical advice and facilities to improve yields. These schemes were set up by State-run companies such as the Integrated Agriculture Development Area (IADA) for rice cultivation and the Federal Land Development Authority (FELDA) for oil palm development. Both IADA and FELDA are Federal development agencies whose overall objective is to assist the State Government in fulfilling its socio-economic goals. As part of the land ownership agreement, the smallholder farmers are obliged to cultivate rice or oil palm as
advised by IADA and FELDA for a specified period of time, after which they can opt out of the government-linked schemes for agriculture (GEC, 2014b).

The urban residents of Selangor, Kuala Lumpur and Putrajaya make use of the forest in two ways: as a source of water and through its role in regulating flooding. The interests of water users are represented at the Federal level by the Ministry of Energy, Green Technology and Water and at the State level by the State Government under agreements with the Federal Government and water concessionaires. Flood mitigation comes under the purview of the Federal Department of Irrigation and Drainage, which are represented by offices at the State level.

Local community members also have use rights to catch fish on a subsistence basis. While commercial fishing is regulated by the Federal and State Departments of Fisheries, personal use is unregulated.

Two non-government groups influence administration of the forest outside the formal regulatory framework. The first group consists of some individuals living in local communities around the North Selangor Peat Swamp Forest who lack access to land, or feel they lack access to sufficient land, for agriculture. This group uses land in the Forest Reserves and abandoned Stateland around their homes for their livelihoods. Some of them are settlers from outside the area, including foreigners, who have cleared ostensibly unused land around the peat swamp illegally (GEC, 2014a). These individuals sometimes clear Forest Reserves and Stateland using fire, in the hope that they will be granted temporary occupation licences for the land they clear and occupy (GEC, 2014b). Some of them do indeed succeed in acquiring
temporary occupation licences but others have had their houses and agriculture destroyed by State level agencies (J4, 2012; S11, 2013).

Secondly a non-governmental organisation, the Global Environment Centre, is involved in conservation efforts at the site. Under a Memorandum of Understanding with the State Forestry Department, the Global Environment Centre is assisting rehabilitation of the peat swamp in North Selangor by blocking drainage canals and replanting trees (GEC, 2014a), management of the buffer zone (GEC, 2014b) and fire management in the area (GEC, 2014c).
Table 9.2: Analysis of users, use rights, regulations and regulators for North Selangor Peat Swamp Forest

<table>
<thead>
<tr>
<th>Main Uses</th>
<th>Users</th>
<th>Use rights</th>
<th>Regulations</th>
<th>Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging</td>
<td>Private logging companies</td>
<td>Logging concessions</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>State Government</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>State Government</td>
<td>State Forestry Department</td>
</tr>
<tr>
<td></td>
<td>Local communities and settlers</td>
<td>Encroachment of Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>State Forestry Department</td>
</tr>
<tr>
<td>Oil palm plantations</td>
<td>Private plantation companies</td>
<td>Land concessions for agricultural development</td>
<td>National Land Code</td>
<td>State Government</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>State Land Use Plans</td>
<td>Federal Ministry of Plantation Industries and Commodities</td>
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<td></td>
<td></td>
<td></td>
<td>National Agriculture Policy</td>
<td></td>
</tr>
<tr>
<td>Smallholder farmers</td>
<td></td>
<td>Land titles or temporary occupation licences</td>
<td>State Land Use Plans</td>
<td>State Government</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>National Agriculture Policy</td>
<td>FELDA</td>
</tr>
<tr>
<td></td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>State Land Use Plans</td>
<td>State Forestry Department</td>
</tr>
<tr>
<td>Agriculture (other than oil palm)</td>
<td>Smallholder farmers</td>
<td>Land titles or temporary occupation licences</td>
<td>State Land Use Plans</td>
<td>State Government</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>National Agriculture Policy</td>
<td>State Department of Agriculture</td>
</tr>
<tr>
<td></td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council</td>
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<tr>
<td></td>
<td></td>
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<td>State Land Use Plans</td>
<td>State Forestry Department</td>
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<tr>
<td>Main Uses</td>
<td>Users</td>
<td>Use rights</td>
<td>Regulations</td>
<td>Regulators</td>
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<tr>
<td>Rice cultivation</td>
<td>Rice farmers</td>
<td>Land titles, land concessions or temporary occupation licences</td>
<td>State Land Use Plans</td>
<td>State Government IADA FELDA Federal Department of Agriculture</td>
</tr>
<tr>
<td>Water supply</td>
<td>Rice farmers</td>
<td>Land titles, land concessions or temporary occupation licences</td>
<td>State Land Use Plans</td>
<td>State Government IADA Federal Department of Agriculture</td>
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<tr>
<td></td>
<td>Lumpur and Putrajaya</td>
<td></td>
<td>State Land Use Plans</td>
<td>District Council</td>
</tr>
<tr>
<td>Clay and sand mining</td>
<td>Private companies</td>
<td>Annual permits from District Council</td>
<td><em>State Land Act 1966</em></td>
<td>District Council</td>
</tr>
<tr>
<td>Biodiversity conservation</td>
<td>NGOs</td>
<td>Memorandum of Understanding/Agreement</td>
<td>National Forestry Policy</td>
<td>Federal and State Forestry Departments</td>
</tr>
<tr>
<td></td>
<td>Federal Government</td>
<td>Provision of technical advice to State Governments and its departments on</td>
<td><em>Federal Constitution</em></td>
<td>Federal Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>compliance with international agreements</td>
<td><em>National Forestry Act 1984</em></td>
<td></td>
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<tr>
<td>Main Uses</td>
<td>Users</td>
<td>Use rights</td>
<td>Regulations</td>
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</tr>
<tr>
<td>Townships/</td>
<td>Urban dwellers</td>
<td>Payment of assessment tax (payment by property owners to Local Authority for provision of road, electricity and water)</td>
<td><em>Local Government Act 1979</em></td>
<td>District Council</td>
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<tr>
<td>infrastructure</td>
<td></td>
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<tr>
<td></td>
<td>Private development companies</td>
<td>Contract</td>
<td><em>Local Government Act 1979</em></td>
<td>District Council</td>
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<td></td>
<td></td>
<td></td>
<td>State Land Use Plans</td>
<td></td>
</tr>
<tr>
<td>Fishing</td>
<td>Local communities</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td><em>National Forestry Act 1984</em></td>
<td>District Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and State Enactment State Land Use Plans</td>
<td></td>
</tr>
<tr>
<td>Flood mitigation</td>
<td>Residents of Kuala Lumpur, Selangor and Putrajaya</td>
<td>Provision of flood mitigation measures by peat swamp forests</td>
<td><em>Local Government Act 1979</em></td>
<td>State Governments Federal and State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Waters Act 1950</em></td>
<td>Departments of Drainage and Irrigation</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>District Council</td>
</tr>
</tbody>
</table>
9.2.2 The Resource Regime at Southeast Pahang Peat Swamp Forest

The main users in the Southeast Pahang Peat Swamp Forest and its adjacent areas are Federal and State Governments and their agencies and departments, private companies, smallholder farmers, urban dwellers, Orang Asli, local communities and settlers, the Forest Research Institute of Malaysia, scientists and researchers, and NGOs (Table 9.3).

As with Selangor, the Federal Government has an interest as a user of Southeast Pahang Peat Swamp Forest through its obligations under international treaties. These include the Convention on Biological Diversity and Convention on Wetlands of International Importance, as well as the ASEAN Agreement on Transboundary Haze Pollution and the ASEAN Peatland Management Strategy, which come under the administration of the Ministry of Natural Resources and Environment mainly through the State Forestry Department. The Federal Government is also involved through the Ministry of Plantation Industries and Commodities in the area of oil palm plantations, where it provides technical guidance on optimising yield and controlling diseases, downstream processing standards and levies.

The Federal Government has a special relationship with the Pahang State Government as the peat swamp here has been classified as an Environmentally Sensitive Area (Class 1) where no development activities should occur, and its role is in providing the technical support to the State Government and its agencies to ensure that the peat swamp is well managed (NPP-2, 2010). The department in charge of Orang Asli affairs, the Federal Orang Asli Development, has State and District level offices to administer Orang Asli matters on its behalf. Other important
departments at the Federal and State levels include the Departments of Agriculture, Fisheries and, Drainage and Irrigation.

Similarly, private companies have been given land concessions, licences and permits by the State Government (and its agencies) to carry out logging, develop oil palm plantations or establish aquaculture activities in and around the peat swamp area (N4, 2012). This is mainly carried out through the State Economic Planning Unit and administered through District Councils. Private companies have also been given contracts through the District Council to develop facilities such as construction of buildings (shop houses, playgrounds, bus stations, jetties, fish markets, etc.) around the townships of Pekan and Kuala Rompin according to Local District Plans (2007). The District Council has a role as the administrator of land matters at the local level.

Smallholder farmers around the Southeast Pahang Peat Swamp Forest have been given land titles or temporary occupation licences by the State Government and provided with technical advice by FELDA for planting their agricultural land with oil palm (P1, P2 and P4, 2012). Similar to the situation in Selangor, the federal agency FELDA assists smallholder farmer increase their yields to fulfil socio-economic goals.

Urban residents in the towns of Pekan, Rompin and Nenasi benefit from the ecosystem function of the peat swamp in mitigating floodwaters, and it is the mandate of the Federal and State Departments of Drainage and Irrigation to ensure proper drainage for the flow of floodwaters.
The Orang Asli, who live in 19 villages in and around the peat swamp, have been attributed special rights through the *Orang Asli Act* 1954 to roam, access and use the Forest Reserves for their subsistence, but their right to use the Stateland forest around the peat swamp is unclear (S1, S3, P2 and P4, 2012). There are Orang Asli Reserves and Orang Asli Areas within and adjacent to the Forest Reserves and Stateland Forests where they are allowed to practice agriculture and plant oil palm or other cash crops to supplement their income (*Aboriginal Peoples Act*, 1974). However, boundaries on the ground between the Orang Asli Reserves and Areas, and land licensed to private loggers and oil palm developers are disputed (P2 and P4, 2012). Within the Forest Reserves, the Orang Asli rights include the right to collect timber and NTFPs (including fish) from Forest Reserves for their own use (*Aboriginal Peoples Act*, 1974), but in recent years the Orang Asli have also exploited wildlife, fish and NTFPs to sell to middlemen, and it is unclear whether they have a right to do this (Rae *et al.*, 2011; P2 and P4, 2012).

As with Selangor, some local people and foreign migrants have settled in areas adjacent to the peat swamp forest, clearing land and encroaching on the Forest Reserves and Stateland around the peat swamps (UNDP/GEF, 2008a). Enforcement officers from State and district level government agencies have not been able to control land clearing activities by local communities and settlers because the area of land that has been cleared and abandoned is so large and because it is hard to differentiate between Orang Asli and other groups (N4, P2 and P4, 2012).
Other users include NGOs, scientists and researchers from the the Forest Research Institute of Malaysia, all of whom depend on the State Government for permission to access and use the peat swamp forests (S10, 2012).
<table>
<thead>
<tr>
<th>Uses</th>
<th>Users</th>
<th>Use rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging</td>
<td>Private logging companies</td>
<td>Logging concessions</td>
</tr>
<tr>
<td></td>
<td>Orang Asli</td>
<td>Right to roam, access and collect timber for subsistence in Forest Reserves</td>
</tr>
<tr>
<td></td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
</tr>
<tr>
<td></td>
<td>FRIM</td>
<td>To carry out research in Forest Reserves</td>
</tr>
<tr>
<td></td>
<td>Oil palm plantations</td>
<td>Land concessions for agricultural development</td>
</tr>
<tr>
<td></td>
<td>Orang Asli</td>
<td>Right to plant oil palm in areas allocated to them for agriculture</td>
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</tbody>
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<tr>
<th>Regulations</th>
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<td>National Forestry Act 1984 and State Enactment</td>
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<td>Aboriginal Peoples Act 1974</td>
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<td>National Forestry Act 1984 and State Enactment</td>
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<tr>
<td>National Forestry Act 1984 and State Enactment</td>
</tr>
<tr>
<td>National Land Code 1984</td>
</tr>
<tr>
<td>State Land Use Plans</td>
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<tr>
<td>National Agriculture Policy</td>
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<tr>
<td>Aboriginal Peoples Act 1974</td>
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<tr>
<th>Regulators</th>
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<tbody>
<tr>
<td>State Government</td>
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<tr>
<td>State Forestry Department</td>
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<tr>
<td>State Government</td>
</tr>
<tr>
<td>Federal Orang Asli Development Department</td>
</tr>
<tr>
<td>District Council</td>
</tr>
<tr>
<td>State Forestry Department</td>
</tr>
<tr>
<td>State Forestry Department</td>
</tr>
<tr>
<td>Federal Ministry of Plantation Industries and Commodities</td>
</tr>
<tr>
<td>Department of Agriculture FELDA</td>
</tr>
<tr>
<td>Uses</td>
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<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Smallholder farmers</td>
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<td></td>
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<tr>
<td>Local communities and</td>
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<tr>
<td>settlers</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Agriculture (other</td>
</tr>
<tr>
<td>than oil palm)</td>
</tr>
<tr>
<td>Orang Asli</td>
</tr>
<tr>
<td>Smallholder farmers</td>
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<td></td>
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<tr>
<td>Local communities and</td>
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<tr>
<td>settlers</td>
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<td></td>
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<tr>
<td>Aquaculture and</td>
</tr>
<tr>
<td>fishing</td>
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<td></td>
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<tr>
<td>Orang Asli</td>
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<td>Uses</td>
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<tr>
<td>Uses</td>
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<tr>
<td>Cultural identity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Biodiversity conservation</td>
</tr>
<tr>
<td>NGO</td>
</tr>
<tr>
<td>Scientists and researchers</td>
</tr>
<tr>
<td>Townships/Infrastructure</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Uses</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
</tbody>
</table>
| Collection of NTFPs| Orang Asli                 | Right to collect within Forest Reserves for subsistence | *National Forestry Act*  
1984 and *State Enactment*  
Aboriginal Peoples Act  
1974 | Federal Orang Asli Development  
State Forestry Department  
District Council |
| Water supply       | Private aquaculture companies | Agreement with State Government  | *Local Government Act*  
1979  
*Waters Act*  
1950 | State Government  
State Departments of Drainage and Irrigation  
District Council |
|                    | Orang Asli                 | Right to use rivers to supply water for daily use  | *Local Government Act*  
1979  
*Waters Act*  
1950 | State Government  
State Departments of Drainage and Irrigation  
District Council  
Federal Orang Asli Development Department |
|                    | Local communities          | Use of rivers to supply water, no use right        | *Local Government Act*  
1979  
*Waters Act*  
1950 | State Government  
State Departments of Drainage and Irrigation  
District Council |
| Flood mitigation    | Urban dwellers             | Provision of flood mitigation measures by peat swamp forests | *Local Government Act*  
1979  
*Waters Act*  
1950 | State Government  
Federal and State Departments of Drainage and Irrigation  
District Council |
|                    | Local communities          | Provision of flood mitigation measures by peat swamp | *Local Government Act*  
1979 | State Government  
Federal and State |
<table>
<thead>
<tr>
<th>Uses</th>
<th>Users</th>
<th>Use rights</th>
<th>Regulations</th>
<th>Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Orang Asli</td>
<td>Provision of flood mitigation measures by peat swamp forests</td>
<td><em>Waters Act 1950</em></td>
<td>Departments of Drainage and Irrigation District Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Local Government Act 1979</em></td>
<td>State Government</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Waters Act 1950</em></td>
<td>Federal and State Departments of Drainage and Irrigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Federal Orang Asli Development Department</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>District Council</td>
</tr>
</tbody>
</table>
9.2.3 The Resource Regime at Ayer Hitam Forest Reserve

Similar to the two other case study sites, use rights in the Ayer Hitam Forest Reserve are also mainly held by the Federal and State Governments and their agencies and departments, private companies, smallholder farmers, urban dwellers, local communities and settlers, and NGOs (Table 9.4).

The role of the Federal Government is similar to the sites in Selangor and Pahang, where provides technical guidance to the Johor State Government with regards to biodiversity conservation in accordance to international conventions such as the Convention on Biological Diversity, Convention on Wetlands of International Importance, ASEAN Agreement on Transboundary Haze Pollution and ASEAN Peatland Management Strategy.

The main Federal ministries involved are the Ministry of Natural Resources and Environment and Ministry of Plantation Industries and Commodities. Related Federal and State departments within these ministries are involved in the resource regime here include the Departments of Forestry, Drainage and Irrigation, and Agriculture.

It is the State Government that has the authority to provide land concessions and licences to logging and oil palm plantation companies to carry out their activities in the land areas adjacent to the Ayer Hitam Forest Reserve, in pursuit of revenue for the State through royalties and tax payments. Through the State Biotechnology Department, the State Government also grants contracts to private biotech companies involved in the use of natural products from the forests within the State
for commercial purposes. Another important regulator is District Councils that issue contracts related to urban development projects.

Smallholder farmers are land owners with land titles given by the State Government and who are provided with technical assistance by FELDA to develop oil palm plantations (J1 and J4, 2012). Local communities also clear abandoned land for agriculture, where they plant cash crops (vegetables and fruits) or oil palm. Some of these small-scale farmers have managed to get land titles or temporary occupation licence for the land they cultivate after a few years (J4, 2012). In addition, local communities and settlers also get their water supply and fish in the waters in and around the Ayer Hitam Forest Reserve. Although they don’t have personal use rights over the rivers for water or fishing, these uses are not regulated.

Urban dwellers, local communities and settlers also stand to benefit as users of the peat swamp because of the flood mitigation function it provides, as the Muar and Batu Pahat Districts are generally low lying and are prone to flooding.

Wetlands International, a local NGO, has also carried out a few studies in the Ayer Hitam Forest Reserve and has been collaborating with the State Government and the State Forestry Department regarding management options for the peat swamp in the Forest Reserve (J1, 2012). It works with scientists and researchers in universities to provide information on the site to relevant government agencies.
Table 9.4: Analysis of users, use rights, regulations and regulators for Ayer Hitam Forest Reserve

<table>
<thead>
<tr>
<th>Uses</th>
<th>Users</th>
<th>Use rights</th>
<th>Regulations</th>
<th>Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging</td>
<td>Private logging companies</td>
<td>Logging concessions</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>State Government State Forestry Department</td>
</tr>
<tr>
<td></td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council State Forestry Department</td>
</tr>
<tr>
<td>Oil palm plantations</td>
<td>Private plantation companies</td>
<td>Land concessions for agricultural development</td>
<td>National Land Code State Land Use Plans</td>
<td>State Government Ministry of Plantation Industries and Commodities</td>
</tr>
<tr>
<td></td>
<td>Smallholder farmers</td>
<td>Land titles or temporary occupation licence</td>
<td>State Land Act 1966</td>
<td>State Government FELDA</td>
</tr>
<tr>
<td></td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council State Forestry Department</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Smallholder farmers</td>
<td>Land titles</td>
<td>State Land Use Plans</td>
<td>Department of Agriculture FELDA</td>
</tr>
<tr>
<td>(other than oil palm)</td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council State Forestry Department</td>
</tr>
<tr>
<td></td>
<td>Private bio-technology companies</td>
<td>Land concessions for agricultural development related to bio-technology</td>
<td>State Land Use Plans</td>
<td>State Government Biotechnology Department</td>
</tr>
<tr>
<td>Fishing</td>
<td>Local communities and settlers</td>
<td>Encroachment into Forest Reserves and Stateland, no use rights</td>
<td>National Forestry Act 1984 and State Enactment</td>
<td>District Council Department of Fisheries</td>
</tr>
</tbody>
</table>
| Biodiversity conservation | NGO | Collaboration with government agencies for research and management | State Land Use Plans | State Government  
|----------------------------|-----|----------------------------------------------------------------|----------------------|------------------------  
| Scientists and researchers | Provision of technical advice | National Forestry Act 1984 and State Enactment | State Government  
| Federal Government | Provision of technical advice | Federal Constitution | Ministry of Natural Resources and Environment  
| Townships/infrastructure | Urban dwellers | Payment of assessment tax | Local Government Act 1979 | District Council  
| | Private development companies | Contract | Local Government Act 1979 | District Council  
| | | | State Land Use Plans |  
| Flood mitigation | Urban dwellers | Provision of flood mitigation measures by peat swamp forests | Local Government Act 1979  
| | | | Waters Act 1950 | District Council  
| | Local communities | Provision of flood mitigation measures by peat swamp forests | Local Government Act 1979  
| | | | Waters Act 1950 | State Government  
| | | | Federal and State Departments of Drainage and Irrigation |  
| Water supply | Local communities | Use of rivers to supply water, no use right | Local Government Act 1979  
| | | | Waters Act 1950 | State Government  
| | | | Federal and State Departments of Drainage and Irrigation |  
| | | | District Council |
9.3 The Impact of the Regime on the Peatlands and Peat Swamp Forests

9.3.1 Current Implementation of the Resource Regime

At the national level, there are no policies that regulate the rivalries discussed above for any of the case study sites. In addition, contradictions appear in existing policies.

The National Physical Plan and the National Biodiversity Policy outline the importance of the case study sites, with both the North Selangor and Southeast Pahang peat swamps being classified as Environmentally Sensitive Areas (Class 1 and 2), where no development is permitted, and the Ayer Hitam Forest Reserve classified as important for flood mitigation. However, the National Agriculture Policy aims to increase food productivity and, supported by other development policies, to boost palm oil production. While this helps strengthen the nation’s economy and align the States to Federal objectives, it also gives rise to risks that more peatlands and peat swamp forests are cleared and allocated by State Governments for agriculture development and palm oil production, which is in conflict with the National Biodiversity Policy and the National Physical Plan.

The issue of conflicting water requirements for agriculture and maintenance of peatlands (and reduction of fires and haze) is not considered in these policies. Land areas that have been designated or used for agricultural expansion have been demarcated adjacent to peatlands and peat swamp forests at the case study sites, with no indication that water level requirements of the two land uses differ. Water management is also not included in the National Forestry Policy when logging is carried out at the case study sites. Forestry management plans deal essentially with annual allowable cuts and cutting regimes, but do not consider water level management or regulate water levels in the drainage canals.
The Federal Government in Peninsular Malaysia in trying to regulate rivalries in land use has been the streamlining of all land use plans and activities with the National Physical Plan 2 (2010). State Structure Plans and Local Plans have been and are being reviewed and adjusted according to the NPP-2, and the document is increasingly influential as a national planning framework (N40 and N41, 2012). However, this prescription is yet to be absorbed into State Structure Plans and Local Plans and translated into action during implementation.

For all three case study sites the State Government, particularly the State Executive Council and its Chair, the Chief Minister of each State, appears to have the greatest influence over planning and management. The Federal Government attempts to deliver its obligations under international agreements through State bodies. Federal Councils that have been set up to mediate between rivalries in land use at the case study sites, such as the Federal Council on Biological Diversity, function only on an advisory basis and do not possess legislative authority. Similarly, the State departments of Forestry, Drainage and Irrigation, and Environment and the District offices are controlled by the State Government which make decisions about local land use and regulates its implementation. Critically, in every case, the regulation of the peat swamp forest reserves is undertaken in isolation from the surrounding peat swamp as a whole – there is no coherent regime for the peat dome. Rather each cadastral unit is regulated independently of the other units despite the interdependence, particularly in terms of the hydrological regime.

The lack of enforcement into encroachment into forest reserves at all three case study sites is another difficulty in attempts to regulate the rivalries that exist in the use of the peatlands and peat swamp forests at the case study sites.
9.3.2 The Impact and Trends of Current Resource Regime on Peat Resource

In this section, I used maps acquired from Landsat-8 (Figures 4-4, 4-7 and 4-9) to estimate percentages of the area in the unit of analysis of the case study sites for the main uses that were identified earlier. This helped provide an impression of the actual regulation of the peat resources, the level of the resource sustainability within the unit of analysis and of the sustainability of the uses of the various goods and services to get evidence of the status of peatlands at the three case study sites.

For the North Selangor site, almost half the area of the unit of analysis had been allocated for the forest reserve while about a third was being used for oil palm plantations (Table 9.5). The area of rice cultivation covered less than a fifth of the area of the unit of analysis while other development and townships covered a small area (about 5%).

Table 9.5: Estimated percentage of land use types at the three case study sites (based on calculations from Landsat 8 maps of the unit of analysis)

<table>
<thead>
<tr>
<th>Main Uses</th>
<th>North Selangor (%)</th>
<th>Southeast Pahang (%)</th>
<th>Ayer Hitam (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Reserve</td>
<td>48</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td>Oil Palm Plantations</td>
<td>32</td>
<td>38</td>
<td>65</td>
</tr>
<tr>
<td>Other Agriculture</td>
<td>16</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Other development – mining, aquaculture, fishing, flood mitigation measures</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Townships and infrastructure development</td>
<td>3</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Area</td>
<td>160,000 ha</td>
<td>179,000</td>
<td>54,000</td>
</tr>
</tbody>
</table>

The trend is the same for the Southeast Pahang site, with the area of forest reserve covering close to half the area of the unit of analysis and oil palm plantations more than a third the area (Table 9.5). Other agriculture and other development (such as fishing and aquaculture)
at the Southeast Pahang unit of analysis cover a smaller area while the percentage of area for townships which includes the Pekan and Nenasi townships area is larger than in North Selangor.

The Ayer Hitam unit of analysis covers an area that is smaller than North Selangor and Southeast Pahang but about two-thirds of the unit of analysis has been converted to oil palm plantations (Table 9.5). The portion of the peat resource that has been converted to other agriculture is about a fifth, while the area of forest reserve is less than a tenth of the peat resource. Townships have also been developed in the unit of analysis and covers close to a tenth of the area, while the percentage of the area for other development is small.

The trend in peat resource use at the case study sites seems to be consistent with trends in Peninsular Malaysia and in the Southeast Asian region, where peatlands and peat swamp forests are being used with increasing intensity until they cease to be peatlands at all. These peat areas would have been mostly forested but over the last two to three decades have been cleared of their forests and then converted to agriculture. In North Selangor and Pahang, the peat resource is being depleted and there are questions about whether it is possible to reverse the impacts of excessive logging activities and block the drainage canals that have been dug in the past (Selangor Forestry Department and DANCED, 2001; UNDP/GEF, 2008). Logging practices at the Southeast Pahang site could consider the hydrological features of the site to maintain the delicate hydrological balance of the area (UNDP/GEF, 2008). In the case of the Ayer Hitam site in Johor, clearing of the forests occurred before the 1960s and the area was converted for agricultural use in the 1970s, before changes that have taken place in North Selangor and Southeast Pahang, and the area that still remains as forest today is small. A small portion of the peat resource still
performs functions for flood mitigation as the area is generally low-lying, and peat has the ability to retain some of the flood waters for a longer time.

9.4 Peat Ecosystem as a Simple Resource Management Regime

The results show that the peat ecosystem in Peninsular Malaysia has a simple resource regulation regime. Only a few of the goods and services provided by the peatlands and peat swamp forests are regulated in a coordinated way with many of the uses unregulated (Gerber et al., 2009). This is mostly because peatlands and peat swamp forests are managed by the State and there are few State policies for managing these areas.

Gerber et al. (2009) explain that over-exploitation is most likely to occur in a simple regime if a few individual rights are well-coordinated but many other actual users and uses remain unregulated. The lack of regulation provides a wide scope of manoeuvre where regulations are manipulated to benefit specific powerful actors and stakeholders.

The overall regulation of the peat resource is leading to unsustainability because the uses of specific goods or services (such as the use of peatlands for agriculture) are being carried out at the expense of other uses (conservation and water supply) and resulting in depletion of the peat resource.

The policies are incoherent as they produce use regulations that are incompatible with each other; some offer protection and no development (National Physical Plan-2) while others promote the use of peatlands for agriculture and infrastructure. There is also incoherence in that policies at the Federal level address target groups (government institutions and agencies such as Forestry Department, Department of Environment, Drainage and Irrigation
Department etc.) that do not have use rights and whose changes in behaviour do not have any real effect on the actual use of the resource.

9.5 Conclusions

Based on the hypotheses that were developed earlier, the results of the analysis showed the following:

• Hypothesis 1.1: That effective regulation of peatland-user behaviour through peatland policies clarifying the relations of the Federal Government and the State Governments can lead to sustainable use.

The findings show that the ultimate authority over land matters, including forestry and land conversion, rests with the State Government and no other political force had any influence on State land use policies. It is the State Executive Council of the State Government, which is led by the Chief Minister, which plays the most important role in making key decisions about the use and management of peatlands and peat swamp forests. A large area of peatlands that lie outside Permanent Reserved Forests are managed by the State Government or private land owners (including oil palm and timber companies).

Governance in Peninsular Malaysia was found to be top down and hierarchical, where policies are made at the higher level in the political process and imposed onto the agencies further down in the government structure, with little opportunity for consultation. At the Federal level, there are overlapping powers and functions between several ministries which creates further challenges for peatland and peat swamp forest management.
In federal systems of government such as in Peninsular Malaysia, the issue of peatland management is challenging because of the constitutional separation of legislative and executive powers between the Federal and State Governments. The Federal Government is empowered to establish the general direction for the sustainable management and utilisation of peatlands and peat swamp forests through engagement with the private sector and international conventions. However, State Governments have a high level of power and influence over the use of peatlands and peat swamp forests. There tends to be more evidence of the challenges, rivalries and complexities of peatland management at the State than the Federal level. One of the preconditions for successful integrated planning is the common understanding and agreement of what is needed among the various managers, owners, occupiers and others whose activities link to or are affected by the peatlands, particularly a common vision between the Federal and State Governments.

Another motivation was the way in which State’s derived their revenue, with a strong incentive for resource development, from which the States derive royalties, as opposed to developing service industries from which the Federal Government garners income tax. There was lack of concern for environmental protection on the part of decision-making bodies at the State level in favour of economic and social development and that States were unrelenting in their pursuit of economic projects with minimal consideration of the environment. Federalism – where the power to govern is shared between Federal and State Governments - was said to be the reason environmental degradation continues to occur in some States despite the Federal Government’s stated commitment to environmental policies at the national level. The Federal Government needs to incentivise conservation to encourage State Governments to conserve their peatlands and peat swamp forests.
**Hypothesis 1.2:** That weak endowment in action resources of politico-administrative actors in charge of policy implementation, as well as the degree of coordination among the various actors/users, can affect integration of peatland management in Peninsular.

Some of the other factors influencing the implementation of policies were the clarity of policies and implementation arrangements; awareness, public interest and support; politics and political will; institutional capacity and coordination among agencies; and availability of resources.

The requirements for policy implementation were categorised as a clear implementation plan, capacity building measures, an institutional framework, increased knowledge and research, increased resources and stakeholder buy-in.

Long term plans were needed at the state level to implement peat-related policies, while enforcement should be strengthened and policies be validated on the ground before implementation. The training of civil servants is especially important for peatland and peat swamp forest management, especially with respect to water management, fire-fighting and biodiversity conservation, to empower them to provide better advice to State Governments. Government agency informants also alluded to the need for a dedicated unit for peatland and peat swamp forest management. This would need to be led by top management in both the Federal and State Governments if it is to get the attention needed. It was also proposed that a greater understanding of peat systems would feed through to better policy and improved policy implementation, not least because it would raise the profile of peatlands in the community. There was also a need for Government resources additional to annual operating costs in the form of finance, manpower and equipment, facilities and infrastructure,
if policies to improve peatland and peat swamp forest management are to be implemented. Finally, one reason given for the apparent failure of peat-related policy was a lack of consultation and buy-in from those who would have to implement it.

Policy implementation is also influenced by the lack of attention or resources given to arrangements for implementation, whether they are infrastructure or institutional mechanisms, of the associated policies and programmes. While a great deal of attention was given to land use policies, less attention is given to the infrastructure that facilitates implementation of the associated policies and programmes. Land administration systems are important facets of infrastructure that facilitate the implementation of these policies.

Institutional capacity and the ability to coordinate action between government agencies was identified as another factor influencing policy implementation, not just in terms of the agency’s support but also the leadership, commitment and size, skills for planning, climate and structure.

Finally, gaps in policies on peatland and peat swamp forests management and the lack of coordination among the various actors and users can explain why policies are not effective in Peninsular Malaysia currently.

These results lead to the following conclusion concerning the overall hypothesis:

**Hypothesis 1:** That the public policy implementation modalities of peatland management in Peninsular Malaysia and their effect on sustainability is dependent on the relations between the Federal State and the federated states, as well as on the weak endowment in action resources of politico-administrative actors in charge of policy implementation.
Sustainable use of peatlands and peat swamp forest in Peninsular Malaysia require regulations to address the gaps in policy, policies to address rivalries in the use of peatlands and peat swamp forests and the necessary institutional arrangements and resources for implementation of the policies.
Chapter 10 Conclusions

10.1 Introduction

The goal of this study is to analyse the policies on the management of peatlands in Peninsular Malaysia with respect to three main objectives:

i. to analyse the policies relating to the management of peatlands in Peninsular Malaysia (i.e. all the public law dispositions which regulate the uses of this resource);

ii. an analysis of the main implementation issues linked to the management of the resource in three specific perimeters in Peninsular Malaysia; and

iii. an evaluation of their effects in terms of sustainable management.

To meet these objectives, the study compares three conceptual frameworks to develop the framework for this analysis – the Public Policy Analysis (PPA) framework developed by P. Knoepfel and his colleagues, the Institutional Analysis and Development (IAD) framework developed by the late E. Ostrom, and the Institutional Resource Regime (IRR) framework which combines the analysis of public policy and property rights. The framework adopted by this analysis is a combination of the PPA and the IRR frameworks, where the PPA framework has been implemented but is influenced by some aspects of the IRR framework. The central hypothesis is developed based on the causal relationship between the institutional regime and its effect on the sustainable management of peatlands, and the explicative factors influencing the implementation of the regime.

The empirical analysis is essentially based on two qualitative methodologies, which are document analysis (laws, administrative reports, scientific studies and stakeholder stances)
and interviews (more than 60 informants) conducted with members of Government agencies, Government-linked agencies, NGOs, private companies and academic institutions. They are completed by catographic data and direct observations.

10.2 Summary of Chapters

Chapter 1 outlined the physical context for the discussion on policies relating to peatlands and peat swamp forests in Peninsular Malaysia, by describing the significance of tropical peatlands, the lack of a standard definition and their distribution in Peninsular Malaysia. It also discussed the problem the thesis intends to explore and listed the research questions using qualitative analysis.

Chapter 2 described and compared the three conceptual frameworks that were considered for the study – the Public Policy Analysis (PPA) Framework, the Institutional Analysis and Development (IAD) Framework and the Institutional Resource Regime (IRR) Framework. It was concluded that the thesis is an application of the PPA framework which is influenced by aspects of the IRR Framework, such as the uses, the use rivalries, the users and other stakeholder configurations, the public policies and their implementation issues.

Chapter 3 described the research methodology that was used based on the case study approach and the site selection criteria where three sites were selected – North Selangor Peat Swamp Forest in Selangor, Southeast Pahang Peat Swamp Forest in Pahang and Ayer Hitam Forest Reserve in Johor. It also discussed how the five groups of research participants were sampled and outlined the data collection methods. Issues related to validity and data analysis using the framework analysis method were also addressed in this chapter.
Chapter 4 analysed the main uses of peatlands and peat swamp forests based on information from documents and interviews with key informants. The main uses of peat resources were agriculture (particularly oil palm), timber extraction, biodiversity conservation and infrastructure. It also showed that trends in the peat resources of Peninsular Malaysia were consistent with those in the Southeast Asian region as a whole where activities in peatlands and peat swamp forests were shifting from non-extractive to more extractive with use intensity increasing many areas to such an extent that they ceased to be peatlands at all.

Chapter 5 analysed the main stakeholders of the peat resources in Peninsular Malaysia, both the users of the natural resource and the people who benefitted from them as well as the institutions and organisations involved with their management. The main stakeholders of the peatlands and peat swamp forests are the State Governments, the oil palm plantation companies, logging companies and smallholder farmers who are the land owners. It concluded that is the State Executive Council of the State Government, which is led by the Chief Minister, which has the final say in making key decisions about the use and management of peatlands and peat swamp forests.

Chapter 6 analysed the policies relating to the main uses and users of peatlands and peat swamp forest to identify gaps and inconsistencies in policies and regulations that might exist. It highlighted that policies relating to peat resources were formulated by the Federal Government but were meant for implementation by the State Government as matters pertaining to land administration came under the jurisdiction of the State, according to the Federal Constitution and the National Land Code. Several inconsistencies in policies also existed at the case study sites, in that activities in the areas immediately adjacent to the sites were not controlled and had an effect on the integrity of the peat swamps. Integrated
management involving all stakeholders was lacking, especially when peat swamps straddled various administrative zones.

Chapter 7 analysed one aspect of the implementation of the regime for peatland and peat swamp forest management - the interaction between the users and the political-administrative actors (i.e. governance) and the main inconsistencies in existing uses. Governance of peatlands and peat swamp forest in Peninsular Malaysia was found to be top down and hierarchical, where policies made at the higher levels in government are imposed onto agencies further down the government structure with little consultation. It also found that State Governments held the ultimate authority over land matters, including forestry and land conversion.

Chapter 8 analysed another aspect of implementation of the regime for peatland and peat swamp forest management - the attempts to regulate inconsistencies in uses (i.e. rivalries) and the institutional mechanisms for collective cooperation. While several institutions were found to play an important role for peatland and peat swamp forest management at the national level, there was a gap in the institutional arrangements at the State level. State Committees on Peatlands, which were to be formed under the National Steering Committee on Peatlands, especially in State where peatlands existed, have yet to be formed. The chapter also examined recommendations for improving the management of peat resources. These include the need to move from government to governance, to broaden stakeholder participation and to address vulnerabilities in the system.

Chapter 9 applied the field research procedure for the IRR framework at the three case study sites, analysing the uses and rivalries, the effect of the resource regime on the levels of goods and services provided by the peat resource, the implementation of the regime, the
institutional mechanisms that have been put in place and the impact of the regime on the status of peatlands and peat swamp forests in Peninsular Malaysia. The results suggest that, under the current regime, the peat resources at the case study sites are being used with increasing intensity and are likely to be converted to agriculture and other land uses until they cease to be peat at all, even though some are ostensibly reserved. It showed that peat ecosystem is a simple regime where only a limited number of the goods and services provided by the peat resource are regulated in a coordinated way while many of the uses are unregulated.

Chapter 10 presents a summary of findings from the analysis and the conclusions.

10.3 Summary of Findings in relation to the Research Questions

The summary of findings for this thesis in relation to the research questions are presented in Table 10.1.
Table 10.1 Summary of Findings based on the Research Questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Summary of Findings</th>
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<tr>
<td>1. What are the current uses for peatlands/peat swamp forests in Peninsular Malaysia and what is the current status of their management in the country?</td>
<td>The uses of peatlands and peat swamp forests were described in terms of supporting services, provisioning services, regulating services and cultural services as specified in the Millennium Ecosystem Assessment. Five main categories of land use were identified in a study by Wetlands International for the use of peatlands and peat swamp forest in Peninsular, i.e. agriculture (including oil palm plantations), undisturbed peat swamp forests, logging, infrastructure and as water bodies. The main uses identified in this study are for agriculture, particularly for oil palm, and timber extraction. Other uses, to a far lesser degree, include biodiversity conservation, fishing and agriculture, the collection of non-timber forest products (including medicinal and ornamental resources), for water supply, mineral extraction and hunting. There was limited recognition of uses such as regulation of climate, water flows and quality, recreation, ecotourism, education, research, infrastructure and as a symbol of cultural diversity. Over the last fifty years, there has been a shift in the nature of land use in peatlands in Southeast Asia from non-extractive to more extractive activities and the complete alienation of many areas. This intensification of land use has shifted from the extraction of NTFPs to logging (i.e. forestry) to large-scale agriculture through the drainage and clearing of peatlands and, in small areas, infrastructure development. There are presently few examples of undisturbed peatlands in Malaysia and less than 5% of peat swamp forests are currently protected. A total area of just 100 ha of peat swamp forests is fully protected in Virgin Jungle Reserves, about 66% is now in Permanent Reserved Forests which is available for logging, the rest is available for conversion to other land uses. The trend in Peninsular Malaysia seems to be consistent with trends in the region with peatlands being used with increasing intensity until they cease to be peatlands at all.</td>
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<tr>
<td>i. What are peatlands and peat swamp forests in Peninsular Malaysia currently being used for?</td>
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<td>ii. What are the main groups of people who use, have influence on or benefit from peatlands/peat swamp</td>
<td>Four main non-exclusive categories of stakeholders were identified as land owners, the appropriators, the producers and the final users and each category is associated with specific access and use rights as well as involvement with the management of peatlands and peat swamp forests.</td>
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<td>Research Questions</td>
<td>Summary of Findings</td>
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<td>forests in Peninsular Malaysia?</td>
<td>In the case of peatlands and peat swamp forests in Peninsular Malaysia, the most important land owners are the State Governments and other private owners, such as private companies who have been given land leases by the State Government (who own oil palm plantations and peat swamp forests meant for timber extraction) and smallholder farmers. The appropriators are Federal and State level government departments and agencies that have been given access and use rights through public policy. In Peninsular Malaysia, the two main ministries related to peatlands and peat swamp forests are the Ministry of Natural Resources and Environment and Ministry of Plantation Industries and Commodities. Many of their agencies and departments, namely the Departments of Forestry, Environment, Drainage and Irrigation are involved. The Department of Town and Country Planning under the Ministry of Urban Well-Being, Housing and Local Government is also relevant because it is the Department that is responsible for developing the spatial plans (National Physical Plan 2, State Structure Plans and Local Plans) and more recently, has been involved in managing the implementation of these plans. At the State level, forest departments answered to both Federal and State governments on different matters; the Federal Government was concerned with management of the resource, while the State Government were concerned with operations and enforcement, as well as revenue and royalty collection. Another important group of appropriators are the District Councils which are involved with administration and management of peatlands at the district level, and who issue permits approving activities on the ground. The producers are private companies and individuals who have the right to use and convert peatlands for economic benefits, namely for oil palm plantations, timber, mining and aquaculture. The final users are those who use a specific good or service provided by peatlands and peat swamp forests. A stakeholder analysis showed that for peatlands and peat swamp forests as a whole in Peninsular Malaysia, the main stakeholders are the Ministry of Natural Resources and Environment, State Governments, Forestry Department and Department of Environment. However, based on individual peatland or peat swamp forest plots, the main stakeholders are the State Governments, the oil palm plantation companies, logging companies and smallholder farmers as they are the land owners. The different values attached to the peat resource by the different stakeholders often leads to rivalries and conflicting land uses.</td>
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<td>Research Questions</td>
<td>Summary of Findings</td>
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<tr>
<td>iii. Who is managing the peatlands/peat swamp forests and how is this being done?</td>
<td>It is the State Executive Council of the State Government, which is led by the Chief Minister, which plays an important role in making key decisions about the use and management of peatlands and peat swamp forests. Other stakeholders under the category of owners, such as smallholder farmers and private oil palm plantation companies, are also powerful stakeholders who make their own decisions over the use and management of their peatlands and peat swamp forest. District Councils are also important because they oversee administrative matters concerning peatlands and peat swamp forests at the district level. At the Federal level, there are overlapping powers and functions between several ministries, such as the Ministry of Natural Resources and Environment, the Ministry of Plantation Industries and Commodities and the Ministry of Agriculture and Agro-based Industries. This overlap can prove challenging for peatland and peat swamp forest management. The current governance of peat resources is usefully considered separately for areas classified as Permanent Reserved Forests and those that lie outside this category. Peat swamps that are classified as Permanent Reserved Forests are managed by the Forestry Department using the National Forestry Act while those outside Permanent Reserved Forests are managed by the State Government or private land owners (including oil palm and timber companies). Governance in Peninsular Malaysia was found to be top down and hierarchical, where policies are made at the higher level in the political process and imposed onto the agencies further down in the government structure, with little opportunity for consultation. The ultimate authority over land matters, including forestry and land conversion, remained with the State Government and no other political force had any influence on State land use policies. The State Government does not rely on research to guide policy making.</td>
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<td>iv. What do you think is the most important issue relating to peatland/peat swamp forest management in Peninsular Malaysia?</td>
<td>Key issues relating to the use of peatlands and peat swamp forests that were highlighted by informants were lack of governance, conversion of peat resources to other uses, poor water management, peat fires and haze, lack of awareness, decline in biodiversity, GHG emissions and peat ecosystem loss. In federal systems of government such as in Peninsular Malaysia, the issue of peatland management is challenging because of the constitutional separation of legislative and executive powers between the Federal and State Governments. The Federal Government is empowered to establish the general direction for the sustainable management and utilisation of peatlands and peat swamp forests through engagement</td>
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with the private sector and international conventions. However, State Governments have a high level of power and influence over the use of peatlands and peat swamp forests. There tends to be more evidence of the challenges, rivalries and complexities of peatland management at the State than the Federal level. One of the preconditions for successful integrated planning is the common understanding and agreement that is needed between the various managers, owners, occupiers and others whose activities link to or are affected by the peatlands.

Peninsular Malaysia also abides by the centuries-old administrative culture by which the authority of line-ministries cannot readily be challenged; power and interest are inherent within various ministries and their line agencies and this inherent power becomes important when dealing with peatland and peat swamp forest management. For example, the Natural Resources and Environment Ministry and its agencies are viewed with apprehension as they are suspected of usurping or limiting the traditional functions of other line ministries and agencies such as the Ministry of Plantation Industries and Commodities and the Ministry of Agriculture and Agro-based Industries. These ministries can, in fact, act independently when dealing with issues related to the management of peatlands that have been used for oil palm plantations. The Ministry of Plantation Industries and Commodities can decide which tenet and principle of sustainability proposed by the Ministry of Natural Resources and Environment it chooses to adopt, thus appearing to have more autonomy and power than the Ministry of Natural Resources and Environment. The situation is sometimes exacerbated by ambiguous demarcation of overlapping powers and functions, as well as complex procedures.

Improved water management of peatlands was a critical step to support their sustainable management as water was the most fundamental component of a peatland; most peatlands being approximately 90% water. Fire-prone peatlands covered less than 10% of the total area of peatlands in Southeast Asia and that they were primarily those areas that have been opened up and drained, especially areas that may were not under prudent management. Once peatlands became significantly altered by fire and deforestation, they were susceptible to repeated burning. Peatland burning and drainage activities have led to massive increases in the emissions of greenhouse gases as well as contributing significantly to climate change. The use of peat as a substrate for horticulture was also a significant source of peatland
2. What are the current policies governing peatlands/peat swamp forests management in Peninsular Malaysia and the institutional arrangements to support implementation of these policies?

i. Can you tell us what policies relate to peatlands/peat swamp forests management in Peninsular Malaysia, especially those that relate to your work?

The main policies that relate to peatland and peat swamp forest and peat swamp forest management are the National Agriculture Policy, National Forestry Policy, National Policy on Biological Diversity, National Policy on Wetlands, National Policy on the Environment, National Water Resources Policy, National Mineral Policy, National Policy on Climate Change, National Solid Waste Management Policy, and Development Policies.


There are no policies in Peninsular Malaysia that directly concern the management of peatlands and peat swamp forests. Instead there are contradictions in existing policies with some containing principles that create risks to the persistence of the peat ecosystem if implemented. An example is the National Agricultural Policy which aims to increase food productivity and strengthen the oil palm sector to generate new sources of revenue. This is having a continuing impact on peatlands where the areas of food production and oil palm expand into peatland and peat swamp forest areas. Agriculture on peatlands, which normally involves drainage through the digging of canals, can also lead to either flooding or fires depending on the water management regime. Similarly, questions have been raised regarding the sustainability of management regimes imposed by the National Forestry Policy in Permanent Reserved Forests and whether they suit the special requirements of the peat ecosystem given that the management regimes proposed describe mostly dryland conditions. Additionally, peat swamp forests that are not classified as Permanent Reserved Forests are not subject to the same principles of management when logging is carried out or when these forests serve as catchment forests, wildlife sanctuaries or as forests for research.
## Research Questions

### Summary of Findings

Several inconsistencies also appeared when analysing the land use plans at the federal, state and district levels relating to the three case study sites for this study. While the National Physical Plan-2 identified the case study sites as Environmentally Sensitive Areas leading to the expectation that activities within the sites might be controlled, activities in the areas immediately adjacent to the sites are not controlled and will affect the integrity of the peat swamp. Integrated management involving all stakeholders is also lacking, especially when peat swamps are straddled between different administrative zones.

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<tr>
<td>ii. Which institutions/ agencies are involved in the implementation of these policies at national, state and provincial levels?</td>
<td>The most relevant agencies for peatland and peat swamp forest management are State Governments, District Offices, Ministry of Plantation Industries and Commodities, Ministry of Natural Resources and Environment, Department of Agriculture, Department of Forestry, Department of Environment, Department of Irrigation and Drainage, Department of Town and Country Planning, and Department of Wildlife and National Parks. For peat swamps in Peninsular Malaysia as a whole, the stakeholders with high power and interests were the Ministry of Natural Resources and Environment, State Governments, Forestry Department and Department of Environment and they represent the stakeholders who are important to fully engage and bring on board for improvements in peatland and peat swamp forest management. At the land tenure level (individual plots of peatland or peat swamp forest), the important stakeholders are the State Governments, the oil palm plantation companies, logging companies and smallholder farmers as they are the land owners (or are on long lease arrangements with the State Governments). The owners of these lands make decisions with regards to management and there are few regulations provided by the State Government with which they are obligated to abide. The main motivation for the State Government is to maximise profits from these lands, and they will try to make the situation conducive for these private companies to maximise their profits and therefore contribute to the economic development of the State. The Ministry of Natural Resources and Environment, the Forestry Department and the Department of Environment were less important as land management comes under the jurisdiction of the State Governments.</td>
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<td>iii. Can you think of other policies that might indirectly influence</td>
<td>Other policies that indirectly influence peatland and peat swamp forest management in Peninsular Malaysia are the Constitution of Malaysia, National Land Code, Land Capability Classification, National</td>
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### Research Questions

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<th>peatland/ peat swamp forest management in Peninsular Malaysia? If yes, what are they?</th>
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<tr>
<td><strong>Summary of Findings</strong></td>
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<td>Physical Plan, State Land Use Plans, National Action Plan on Peatlands and National Ecotourism Plan. The Constitution of Malaysia provides that the federated states have jurisdiction over land, forests, fishery, agriculture and water resources, and the power to decide on the use and allocation of resources. The National Land Code gives the ruler of the State the power of disposal of Stateland and reversion of alienated land. The Land Capability Classification ranks mining as the highest priority for land use, followed by agriculture, forestry and other uses. Many of the policies relating to peatlands and peat swamp forests are formulated by the Federal Government and meant for implementation by the State Government because matters pertaining to land administration come under the jurisdiction of the State, according to the Federal Constitution and the National Land Code. The National Physical Plan provides a spatial plan to complement development programmes and is an attempt to improve coordination in planning between federal and state agencies. The federated states pursue their own policies on land, forests and the environment and the State Executive Committee and the Chief Minister decide on land use matters. The National Action Plan on Peatlands and the National Ecotourism Plan provide guidelines on integrated peatland management and ecotourism development respectively.</td>
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<th>iv. Which institutions / agencies are involved in the implementation of these indirect policies at national, state and provincial levels?</th>
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<td>Other agencies involved are the Department of Fisheries, Department of Orang Asli Development, Ministry of Wellbeing, Housing and Local Government (Department of Town and Country Planning) and the Economic Planning Unit.</td>
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<th>v. What are the current peatland/peat swamp forest management policies which relate to enforcement, incentives and penalties?</th>
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<th>vi. Which government agency (ies)</th>
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<td>Several government departments were responsible for the enforcement of legislation pertaining to</td>
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### Research Questions

**vii. Are there any mechanisms outside the government institutions for peatland/ peat swamp forest management? If yes, what are they?**

There are limited mechanisms outside government for peatland and peat swamp forest management. Some of the mechanisms for management such as collaboration with NGOs, certification and REDD schemes, and mechanisms through ASEAN, have improved the management of peat fires and rehabilitation efforts. However, these networks have lacked the necessary influence for management of peatlands and peat swamp forests at the State level.

### Summary of Findings

**Peatlands and peat swamp forests including the Department of Forestry, Department of Environment, Department of Wildlife and National Parks, Department of Agriculture and the District Office. The role of the Local Authority on matters concerning land use at the local level, which come under the respective State Land Acts related to the National Land Code.**

While the duties of the Forestry Department, Department of Environment and the District Office were directly linked to peatlands and peat swamp forest management, the duties of the Department of Wildlife and National Parks, as well as the Department of Agriculture had little connection with their management.

**v. Do you think peatland/ peat swamp forest management is an important area in Peninsular Malaysia? If yes, why do you think so?**

Most of the key informants felt that peatland and peat swamp forest regulations for peatland and peat swamp forest management were important, mainly because the peat environments provided valuable ecosystem services (water supply and regulation, biodiversity protection and climate regulation), were areas that required special management and provided valuable socio-economic opportunities.

**ii. In your opinion, what factors influence whether peat related policies are implemented or not?**

Factors influencing the implementation of policies identified in this study as economics; clarity of policies and implementation arrangements; awareness, public interest and support; linkage between federal and state agencies; politics and political will; institutional capacity and coordination among agencies; and availability of resources.

**iii. Please provide reasons for why you think these factors are important.**

Socio-economic progress (i.e. economics) was the most important factor influencing policy and decision-makers and most other factors, such as the principles of institutional change for environmental sustainability were marginal to the overall pursuit of socio-economic progress. Malaysia’s lack of political commitment to sustainable development (or political will) was another influencing factor, which was attributed to the ideological stance of a former Prime Minister who believed that the concept was espoused.
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<td>by developed countries for ‘eco-imperialistic’ ends.</td>
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<td>Policy implementation is also influenced by the lack of attention or resources given to arrangements for implementation, whether they are infrastructure or institutional mechanisms, of the associated policies and programmes. While a great deal of attention was given to land use policies, less attention is given to the infrastructure that facilitates implementation of the associated policies and programmes. Land administration systems are important facets of infrastructure that facilitate the implementation of these policies.</td>
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<td>Another motivation was the way in which State’s derived their revenue, with a strong incentive for resource development, from which the States derive royalties, as opposed to developing service industries from which the Federal Government garners income tax. There was lack of concern for environmental protection on the part of decision-making bodies at the State level in favour of economic and social development and that States were unrelenting in their pursuit of economic projects with minimal consideration of the environment. Federalism – where the power to govern is shared between Federal and State Governments - was said to be the reason environmental degradation continues to occur in some States despite the Federal Government’s stated commitment to environmental policies at the national level. The Federal Government needs to incentivise conservation to encourage State Governments to conserve their peatlands and peat swamp forests.</td>
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<td>Institutional capacity and the ability to coordinate action between government agencies was identified as another factor influencing policy implementation, not just in terms of the agency’s support but also the leadership, commitment and size, skills for planning, climate and structure.</td>
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<td>Other factors were the non-inclusion of scientific discovery in policy decisions, the lack of transparency in decision making processes, and that State Governments were not being penalised for flouting regulations relating to sustainable peatland management, or provided with incentives to retain peatland and peat swamp forests.</td>
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4. How effective are the peat policies in addressing the key issues in peatland/peat swamp forest management in Peninsular Malaysia?

i. In your opinion, are the policies relating to peatland/peat swamp

The majority the respondents felt that policies are currently inadequate for peatland and peat swamp forest management. The research highlighted that gaps in policies exist in peat swamp forest management,
<table>
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<td>forest management adequate to address the main issues arising from peatland/ peat swamp forest management? Can you please identify where there are gaps, if any?</td>
<td>particularly in areas that fall under the category of Stateland and there are no policies being implemented at Federal or State level that relate directly to peatland and peat swamp forest management. Other gaps identified were those policies relating to natural resource (i.e. peatland and peat swamp forests) management (and carbon rights of peatlands and peat swamp forests), policies regarding peat as an ecosystem for sustaining the ecosystem goods and services provided by peat and policies relating to Orang Asli rights in natural resource management.</td>
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<td>ii. What other specific requirements (structure, procedures or skills) are needed for implementing the policies related to peatland/ peat swamp forest management?</td>
<td>The requirements for policy implementation were categorised as a clear implementation plan, capacity building measures, an institutional framework, increased knowledge and research, increased resources and stakeholder buy-in. Long term plans were needed at the state level to implement peat-related policies, while enforcement should be strengthened and that policies be verified on the ground for implementation. The training of civil servants was especially important for peatland and peat swamp forest management, especially with respect to water management, fire-fighting and biodiversity conservation, to empower them to provide better advice to State Governments. Government agency informants also alluded to the need for a dedicated unit for peatland and peat swamp forest management to be led by top management in both the Federal and State Governments if it were to get the attention it needed. It was also proposed that a greater understanding of peat systems would feed through to better policy and improved policy implementation, not least because it would raise the profile of peatlands in the community. There was also a need for Government resources additional to annual operating costs in the form of finance, manpower and equipment, facilities and infrastructure, if policies to improve peatland and peat swamp forest management are to be implemented. Finally, one reason given for the apparent failure of peat-related policy was a lack of consultation and buy-in from those who would have to implement it.</td>
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<td>iii. What are the benefits and challenges to implementing the current peat related policies?</td>
<td>The benefits highlighted by the key informants for the current peat-related policies are that people were able to utilise peatlands for agriculture for quick economic gains through oil palm plantations and other agriculture; that the forest management systems were more sustainable through certain guidelines such as the Malaysian Criteria and Indicators in the certification process; that the agencies’ ability to monitor peat fires in land that was unused for commercial purposes had increased; and that through a few national</td>
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</table>
projects there had been increased appreciation of the role of peat swamp forests as carbon sinks and this had managed to stop a plan to build a road through a peat swamp forest in Pahang.

Some of the main challenges of current peat-related policies acknowledged by informants were managing peatlands and peat swamp forests as integrated ecological units so that they met all the conflicting demands for land use; securing the support of states for policies that were formulated at the national level to meet international obligations; ensuring a more coordinated approach towards the management of peatlands and peat swamp forests when the issue was under the jurisdiction of three ministries currently the Ministry of Plantations and Commodities (for peatlands planted with oil palm), the Ministry of Agriculture (for peatlands planted with other crops) and the Ministry of Environment and Natural Resources (for other peatland areas).

The approach to governance and the management of peatlands in Peninsular Malaysia is similar to approaches and structures for other forms of management arrangements, in that it is top-down and hierarchical. There is little opportunity for consultation with the lower levels of management responsible for implementation of the policies or with the local people who will be affected by policy decisions. Policy formulation and execution are also seen as distinct activities in Peninsular Malaysia and not as an interactive process involving policy makers, implementers from various levels of government, and other actors. In addition, due to the need for bureaucratic accountability, there is little scope to change policy during implementation. The autonomy of the States in Peninsular Malaysia on matters concerning forest utilization meant that political forces outside of State’s boundaries, no matter how powerful they might be at the national level, had virtually no influence on State land use policies. The top down governance approach to natural resource management could also be the cause for the confusion and rivalries that exist in terms of establishing the future direction for peatland management in the country.

5. Would the involvement of multiple actors be useful for peatland/peat swamp forest management?

i. Should more actors be involved in peatland/peat swamp forest management to make it more

The majority of respondents felt that there was a need for more stakeholders to be involved in peatland and peat swamp forest management in Peninsular Malaysia. These include related government agencies, local communities and Orang Asli, the private sector, NGOs and researchers.
### Research Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>effective? If so who are the key actors who should be involved?</td>
<td>Several institutions played important advisory roles in the management of peat resources at the Federal level but there was a gap in the institutional arrangements at the State level. State Committees on Peatlands, which were to be formed under the National Steering Committee on Peatlands, have yet to be formed.</td>
</tr>
<tr>
<td>ii. How will the involvement of these actors assist in resolving the key issues related to peatland/peat swamp forest management in Peninsular Malaysia?</td>
<td>Research on land-use planning in peatlands has called for the involvement of all relevant sectors and major stakeholder groups from the outset of development planning. Intensive stakeholder consultations and consultative planning at the local level was needed if sustainable peat swamp forest management was going to be mainstreamed into local governance. Wise management of peatland ecosystems required a change of approach from single sector priorities to integrated, holistic planning strategies, involving all stakeholders to ensure that consideration was given to potential impacts on the peatland ecosystem as a whole. The hydrological vulnerability of peatlands and their ecological relationships with the surrounding habitats and land-uses should be considered in land-use planning involving peatlands; stakeholders who used these peatlands provided the information that was needed for the planning approach. Another recommendation for improving peatland and peat swamp forest management in Peninsular Malaysia deals with increased stakeholder participation (i.e. to involve the local communities and the private sector) and adopting a more consultative approach towards policy formulation.</td>
</tr>
<tr>
<td>iii. How can we make the involvement of these key actors part of present institutional arrangements and mechanisms for peatland/peat swamp forest management in Peninsular Malaysia?</td>
<td>See Question 2 (vii).</td>
</tr>
<tr>
<td>iv. Are there any changes that we will need to make to the present arrangements and if so, what are these changes</td>
<td>What is needed are new approaches to address environmental problems, and a shift from government to governance. The term “new governance” has emerged to describe “a mode of governing that shows a preference for collaborative approaches among government and non-government actors from the private sector and civil society”. New governance is especially evident in governing arrangements dealing with the issue of sustainability as it has an explicit connection with ethical concepts such as “participation,</td>
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</table>
### Research Questions

<table>
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<tr>
<th>Summary of Findings</th>
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<tr>
<td>responsibility, stewardship, and duty of care, and which makes novel demands on institutions and policy. The involvement of more actors in peatland management helps encourage the new concept of governance. One of the main vulnerabilities that exists in peatland and peat swamp forest management in Peninsular Malaysia is corruption. In terms of management of forests for logging, for example, forestry officers overseeing the implementation of regulations for ensuring sustainability of timber extraction methods can sometimes be rewarded with cash for turning a blind eye to logging contractors who flout the law during extraction. The IRR framework found that a margin of manoeuvre existed outside the institutional regime when the level of integration in a regime was low but diminished with the increase in the level of integration.</td>
</tr>
<tr>
<td>v. How can this be achieved in Peninsular Malaysia?</td>
</tr>
<tr>
<td>It was suggested that the policy formulation process for peatland and peat swamp forest management needed to be more consultative, involving the private sector and local communities, particularly when developing State land use policies. In general, there is a need for governments to shift to new ideas for governance with a greater level of integration, coordination and attention to spatial and temporal phenomena of environmental and natural resource policy regimes.</td>
</tr>
</tbody>
</table>
10.4 Potential Gaps in the Current Thesis

One of the greatest challenges for this thesis was applying some elements of the IRR framework in policy analysis in Peninsular Malaysia as there was no precedent to emulate for any common law country. The thesis, therefore, was not able to verify details of private law that existed between the State Government and private individuals and companies as these were considered private and confidential matters that were not available to the public. These included licences, permits and contracts for use of particular peatlands and peat swamp forest patches connected to the case study sites. In a civil law setting where the IRR framework has been applied in the past and where the primary source of the law has been codified into a system that can be easily referenced (e.g. Switzerland, France and Indonesia; de Bure and Knoepfel, 2011), such contracts and agreements have given a clearer depiction of the local regulatory arrangement at the case study sites. This has enabled a more accurate analysis of the current use and the future potential of natural resource management of a study area to be conducted.

Another area where the thesis lacks detail is in describing the informal factors (such as social norms) that might explain the discrepancies between actual use rights and formal property rights. I was not able to gain permission from the Forestry Department to visit the Forest Reserves at the case study sites, and I was not able to speak with the many communities living inside or at the edges of the Forest
Reserves, and nor would it necessarily have been useful to do so. Apart from the fact that some of these villages were in remote locations which would have required several days of travel, the short visits that I would have been able to make would have been unable to give the villagers the confidence in me they would have required to talk freely about their interactions with the peatlands and peat swamp forests. Future researchers might consider living in such areas for extended periods of time to gain a better understanding of these informal factors and links. Time spent in the field would also have helped to further verify some of the information collected from interviews and documents.

Some of the other reasons for the limited analysis of the case study sites include the difficulty to access the case study sites (i.e. the peatland area being very large), the sensitive nature of some of the data such as those concerning property rights (i.e. concessions) and the necessity of long term observations of autochthonous populations to be able to draw legitimate conclusions from the study. Therefore, it was not possible to provide a detailed analysis of the property rights and sustainability of the case study sites.

10.5 Areas of Potential Future Research
The further application of the IRR framework should be explored to include the issues of formal and informal use rights, as well as the local regulatory arrangements (LRAs) between actors and their effect on peatland management.
This would provide the necessary depth to harness the analytical potential of the IRR framework in Peninsular Malaysia, to see if it can truly be applied in a common law country. This study provides the basis for further investigation into such an analysis. Related to this, an analysis of the effects of the IRR on peatland sustainability, notably social and economic impacts, could also be carried out. A further extension of the study could include the role and the effects of land, forest, water or biodiversity property rights regimes on peatland use regulations and use rivalries.

Examining the mechanisms in which knowledge generated by scientists makes its way into national and international policy is the focus of a growing number of studies (Shaxson, 2005; Raymond et al., 2010; Stringer and Dougill, 2012; Bracken and Oughton, 2013). Natural resource management policy, in particular, has come under close scrutiny as national and international agencies aim to harness available information to support and validate efforts against climate change, biodiversity loss, water and land degradation, and natural resource depletion.

Research examining science-to-policy transitions concentrate more closely on formal channels of knowledge transfer; this includes clear ‘pathway’ mechanisms, such as policy briefings and national level conferences (Bracken and Oughton, 2013). Informal channels also exist; these are regarded as more complex than
formal channels and play an important part in shaping policy frames (Shaxson, 2005; Raymond et al., 2010; Stringer & Dougill, 2012).

Current uncertainties surrounding science-to-policy transitions suggest a need for greater reflection on the practical enablers (formal and informal) that allow research to better support policy, especially in relation to natural resource management in the developing world (Padfield et al., 2014). In the context of tropical peatland management in Malaysia, research to determine the processes and mechanisms in which knowledge – whether new or existing, formal or informal – generated by researchers makes its way into peatland policy and practice is needed (Padfield and Kumaran, in prep.). This exercise could help to identify the enabling actions and barriers to effective science-to-policy transitions, in the context of current policy developments in ASEAN, such as the ASEAN Peat Management Strategy and the National Action Plan for Peatlands for Malaysia.

There is also a need for coordinated research for the sustainable management of tropical peatlands, particularly for fundamental scientific research, with strong representation across the themes of environmental change, ecosystem services, and conversion, disturbance and degradation (Padfield et al., 2014).

The future management of Peninsular Malaysia’s peatlands and peat swamp forests depends on the availability of a ‘knowledge hub’ of researchers (Padfield et al.,
2014) for coordinating research agendas. This should include research areas such as strengthening the role of peatlands in land-use planning and development processes, policy with enhanced institutional mechanisms to support its implementation and enforcement, and bridging the divide between national and state-level governance. Integration of the total economic value of peatlands into existing planning regimes is also a priority.

The role of local knowledge in informing science and policy priorities also needs further attention. A draft national law on Access to Biological Resources and Benefit Sharing in Malaysia (Ministry of Natural Resources and Environment, 2014) would provide legal protection for genetic resource development in the context of traditional knowledge and therefore create more incentives for research. Strategies for data management and protection associated with traditional knowledge and biological diversity would also increase in importance to ensure equitable sharing of benefits.
REFERENCES


Beukering, P.V.; Schaafsma, M.; Davies, O. and Oskolokaite, I. (2008). The economic value of peatland resources within the Central Kalimantan Peatland Project in


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APPENDIX I   PLAIN LANGUAGE STATEMENT (Interviews)

PROJECT: Peat Resource Management in the Context of Climate Change in Malaysia

CHIEF RESEARCHER: Shashi Kumaran

ASSOCIATE RESEARCHERS: Associate Professor Dr Alexander K. Sayok, Universiti Malaysia Sarawak (UNIMAS)
Professor Stephen Garnett (CDU)

PURPOSE OF THE STUDY: The purpose of the study is to get a true understanding of the uses of peatlands in Malaysia as well as how they are governed in Malaysia. Seven groups of participants will be interviewed – politicians, government officers, organizations/ agencies working in peatland areas, the private sector, peatland scientists and experts, community leaders and representatives of non-governmental and community-based organizations. You have been selected for this research because you represent one of the participant groups. You are invited to assist us in the research by answering a set of questions related to peatland management in Malaysia. The information you provide will assist us in getting a comprehensive description of peatland management in Malaysia so we can make suggestions how maximum benefit could be gained from this resource for Malaysia.

BENEFITS OF THE STUDY: The study will provide you an opportunity to give your views about the current policies regarding peatland management and how it is being applied. The research will present a complete picture of the governance of peatlands in Malaysia and make suggestions about the management of peatlands, especially how the country can best gain both economically and ecologically from the present discussions on climate change.

WHAT WOULD BE EXPECTED OF YOU? If you decide to take part in this research you would be asked to select a convenient time and venue for the interview which the chief researcher will then confirm with you. At the appointed time, she will meet with you at the selected venue and will pose a few relevant questions according to a pre-tested questionnaire. You will be asked to answer the questions to the best of your knowledge. The chief researcher will note down your answers to the questions in a note book or using a tape recorder, which will be used as data for the purpose of this research. The information you provide will be used in a general analysis of specific issues related to peatland management in Malaysia.
DISCOMFORTS/ RISKS: There are no specific risks associated with this study. The only inconvenience is that the interview would most probably be carried out during your office hour and might take some of your work time.

The study is not seeking information regarding illegal activities. In the event that such information is divulged to the researcher, there may be a requirement for her to report such findings and the researcher might be required to seek legal advice.

CONFIDENTIALITY: All information collected will remain confidential. You will not be identified by anything that is written in the text of the research paper/ thesis. The researcher will use pseudonyms and coding to ensure that names and data cannot be easily linked by a person not involved in the research. The same care will be taken with the names of anyone you mention in the interview. Your name and address must be known to the researcher, so she can find you, but it will never be mentioned in the report of the research, and your personal details will be locked away, quite separate from the other material. No photographs of the interviewee will be taken during the interview.

YOUR PARTICIPATION: We would be grateful if you did participate in this research but participation is voluntary and you are free to refuse to participate. Even if you do decide to participate, you may withdraw from the research at any time during the interview. This can be done by stating to the chief researcher that you refuse to participate and do not wish to answer any further questions, and that you do not want any information you have provided to be used in the research. You can also withdraw subsequent to the interview by writing to the chief researcher.

RESULTS OF THE STUDY: The interview transcript will be made available to the participants of the study to ensure that the information recorded by the researcher is accurate and to allow the participants to review what they have said. Publications using information provided by the participants of this research will be shared with the participants by email or other media of your choosing.

PERSONS TO CONTACT: If you have any questions about the project, please contact the chief researcher Shashi Kumaran on mobile: +6012 2053224 or email shashi.kumaran@gmail.com. If you have any concerns before commencing, during or after the completion of the project, you are invited to contact the Executive Officer of the Charles Darwin University Human Research Ethics Committee on +1800 466 215 (toll free) or email cdu-ethics@cdu.edu.au. The Executive Officer can pass any concerns to appropriate officers within the University.

This information sheet is for you to keep.
APPENDIX II  Questionnaire

Name:
Organization:
Date:

1.  What are the current uses for peatlands/ peat swamp forests in Malaysia and what is the current status of their management in the country?
   i.  What are peatlands and peat swamp forests in Malaysia currently being used for?
   ii. What are the main groups of people who use, have influence on or benefit from peatlands/ peat swamp forests in Malaysia?
   iii. Who is managing the peatlands/ peat swamp forests and how is this being done?
   iv.  What do you think is the most important issue relating to peatland/ peat swamp forest management in Malaysia?

2.  What are the current policies governing peatlands/ peat swamp forests management in Malaysia and the institutional arrangements to support implementation of these policies?
   i.  Can you tell us what policies relate to peatlands/ peat swamp forests management in Malaysia, especially those that relate to your work?
   ii. Which institutions/ agencies are involved in the implementation of these policies at national, state and provincial levels?
   iii. Can you think of other policies that might indirectly influence peatland/ peat swamp forest management in Malaysia? If yes, what are they?
   iv.  Which institutions / agencies are involved in the implementation of these policies at national, state and provincial levels?
   v.  What are the current peatland/ peat swamp forest management policies which relate to enforcement, incentives and penalties?
vi. Which government agency (ies) is/ are involved with enforcement of the peatland/peat swamp forest management policy?

vii. Are there any mechanisms outside the government institutions for peatland/peat swamp forest management? If yes, what are they?

3. How do the peat policies relate to the needs/key issues of peatland/peat swamp forest management in Malaysia?
   i. Do you think peatland/peat swamp forest management is an important area in Malaysia? If yes, why do you think so?
   ii. In your opinion, what factors influence whether peat related policies are implemented or not?
   iii. Please provide reasons for why you think these factors are important.

4. How effective are the peat policies in addressing the key issues in peatland/peat swamp forest management in Malaysia?
   i. In your opinion, are the policies relating to peatland/peat swamp forest management adequate to address the main issues arising from peatland/peat swamp forest management? Can you please identify where there are gaps, if any?
   ii. What other specific requirements (structure, procedures or skills) are needed for implementing the policies related to peatland/peat swamp forest management?
   iii. What are the benefits and challenges to implementing the current peat related policies?

5. Would participation (in what?) of multiple stakeholders be useful for peatland/peat swamp forest management?
   i. Should more stakeholders be involved in peatland/peat swamp forest management to make it more effective? If so who are the key stakeholders who should be involved?
ii. How will the involvement of these stakeholders assist in resolving the key issues related to peatland/peat swamp forest management in Malaysia?

iii. How can we make the involvement of these key stakeholders part of present institutional arrangements and mechanisms for peatland/peat swamp forest management in Malaysia?

iv. Are there any changes that we will need to make to the present arrangements and if so, what are these changes?

v. How can this be achieved in Malaysia?

6. Are there other issues relating to peatlands/peat swamp forests in Malaysia that you think need to be discussed or changed?
The next set of questions will be used specifically for community people.

Name:

Organization:

Date:

1. What are the current uses for the peatlands/ peat swamp forests near where you live and what is the current status of peatland/ peat swamp forest management in your area?
   i. How do you or the people in your community use peatlands/peat swamp forests?
   ii. Who are the other groups of people who use, manage, have influence on or benefit from these peatlands/ peat swamp forests?
   iii. Who is responsible for making decisions about the peatlands/ peat swamp forests? How is this being done?
   iv. What do you think is the most important problem/ challenge facing the peatland/ peat swamp forest in your area?

2. What are the current policies governing peatland/ peat swamp forest management in Malaysia and the institutional arrangements to support implementation of these policies?
   i. Do you know of any policies, laws and/or regulations that affect your use of the peatlands/ peat swamp forests?
   ii. Which institutions/ agencies are involved in carrying out these policies, law and/or regulation in your area? Do you know who they report to?

3. How do the peat policies relate to the needs/ key issues of peatland/ peat swamp forest management in Malaysia?
   i. In your area are there and rules and regulations that people do not follow? Why do you think that is?
ii. Do you think that there should be more regulation for peatlands/peat swamp forests? If yes, why do you think so?

4. How effective are the peat policies in addressing the key issues in peatland/peat swamp forest management in Malaysia?
   
i. In your opinion, are the policies/ regulations for peatlands/peat swamp forests adequate? If not, how could they be improved?

   ii. Are there any additional rules needed to improve management of the peatlands/peat swamp forests?

   iii. Why might it sometimes be difficult to implement the policies, laws and/or regulations that affect peatlands/peat swamp forests?

   iv. Are there any incentives and penalties that affect local use of peatlands/peat swamp forests?

   v. Do you know which government agency (ies) is/are involved with ensuring that the regulations are followed?

5. Would participation (in what?) of multiple stakeholders be useful for peatland management?
   
i. Should more people be asked to be involved in looking after the peatlands/peat swamp forests? If so who should these people be?

   ii. How can their involvement help in managing peatlands/peat swamp forests in your area?

6. Are there other issues relating to peatlands/peat swamp forests in your area that you think need to be discussed or changed?
## APPENDIX III  LIST OF KEY INFORMANTS

<table>
<thead>
<tr>
<th>Code</th>
<th>Position</th>
<th>Organization/ Agency/ Department</th>
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<tbody>
<tr>
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<td>NGO</td>
</tr>
<tr>
<td>N2</td>
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N34  Scientist  Academic Institution
N35  Senior Manager  Private company
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N43  Senior Officer  Government agency

Selangor
S1  Senior Manager  NGO
S2  Senior Technical Manager  Private company
S3  Senior Technical Manager  NGO
S4  Employee  NGO
S5  Employee  NGO
S6  Employee  NGO
S7  Officer  Government agency
S8  Officer  Government agency
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</table>
Appendix IV   Government Departments, Agencies and Organizations
Interviewed

Ministries and Government Departments
Ministry of Natural Resources and the Environment
Ministry of Plantations and Commodities
Economic Planning Unit
Department of Wildlife and National Parks
Department of Environment
Department of Agriculture
Town and Country Planning Department
Drainage and Irrigation Department
Forestry Department of Peninsular Malaysia
Kuala Selangor District and Land Office
Selangor Forestry Department
Hulu Selangor District Forestry Office
Drainage and Irrigation Department Pekan
Forestry Department Kuantan/ Maran & Pekan Districts
Drainage and Irrigation Department Batu Pahat

Government-linked Agencies
Forest Research Institute of Malaysia
Malaysian Palm Oil Board
Malaysian Palm Oil Council
Malaysian Timber Certification Council
National Hydraulic Research Institute of Malaysia
UNDP-GEF Malaysia Peat Project (Former)
Selangor Agriculture Development Corporation
West Johor Development Project (Former)

Private Bodies and Agencies
Tradewind Plantations Bhd
United Plantations
Roundtable on Sustainable Palm Oil
Malaysian Palm Oil Association
UNDP Malaysia
ERE Consulting Group
MEC Consult
Mott MacDonald Consulting Group
PE Research Sdn Bhd
Aonyx Environmental
Param Agricultural Soil Surveys Sdn Bhd
Tropicorp Group

Non-governmental and Community-based Organisations
Global Environment Centre
Malaysian Nature Society
World Wide Fund for Nature –Malaysia
Traffic SEA
Wild Asia
Wetlands International
Friends of the Earth
Eco-Warriors
Friends of North Selangor Peat Forest
Centre for Orang Asli Concerns

Universities
Universiti Malaya
Alterra Wageningen University and Research
APPENDIX V CONSENT FORM

PROJECT: Peat Resource Management in the Context of Climate Change in Malaysia

I, _______________________________________ of _______________________

hereby consent to participate in the research to be undertaken by Ms Shashi Kumaran of Charles Darwin University.

I understand that the purpose of the research is to understand how peatlands are used in Malaysia as well as how they are governed in the country. I understand that the information provided will assist in getting a comprehensive description of peatland management in Malaysia to make suggestions for how maximum benefit could be gained from this resource for Malaysia.

I acknowledge that:

- The aims, methods and anticipated benefits have been explained to me by Ms Shashi Kumaran.
- I voluntarily and freely give my consent for my participation in the research.
- I understand that the interview transcripts will be made available to participants and that the results will be used for research purposes and may be reported in scientific and academic journals.
- Individual results will not be released in an identified form, and will not be made available to any person except at my request and on my authorisation.
The researcher will use pseudonyms and coding to ensure that names and data cannot be easily linked by a person not involved in the research.

- I am free to withdraw my consent at any time during the study, in which event my participation in the research study will immediately cease, and any information obtained will be returned to me or destroyed at my request.

- In the event that my identity cannot be confidential:
  - [ ] Yes, I agree to my identity being revealed.
  - [ ] No, do not want to reveal my identity.

Signature: _____________________________ Date: _______________________