

The Existing Legislative, Administrative and Policy Framework for the Mangrove Biodiversity Management & Conservation in Malaysia

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Abstract

The pertinent roles of mangroves have been clearly recognised particularly after the 2004 tsunami. Lots of interests have been created on the importance of sustainable management of mangrove biodiversity, which plays an important role to the environment as well as in the socio-economic growth in coastal zones. As the world's fifth largest, Malaysian mangroves are facing threats from anthropogenic activities such as deforestation, aquaculture, pollution run off and land development. A signatory to both the Convention of Biological Diversity and UNCLOS, Malaysia has to develop national strategies, plans and programmes by taking legislative, administrative and policy (LAP) measures for the conservation and sustainable use of mangrove biodiversity outlined by these two conventions. Sustainable management of mangrove biodiversity requires proper and effective LAP framework including clear allotment of jurisdictional boundaries between the various departments involved. The existing LAP framework in the management of mangrove biodiversity was examined where three problems were found to hinder the sustainable management of mangrove biodiversity in Malaysia namely the unclear policies, segmented laws and overlapping administrative jurisdictions. These problems collectively contribute to the insufficiency of the existing LAP framework to provide for the sustainable management of mangrove biodiversity in Malaysia.

Keywords: Malaysia, Mangrove biodiversity, Legislation, Policy, Administration

1. Introduction

Mangroves are essential constituent in coastal ecosystems with various ecological functions: buffer between sea and land; filtering system to protect coastal land by trapping debris and silt; nutrient filterer and producer; habitat to more than 1,300 species of flora and fauna; sources of wood; and other aesthetic values. Ecosystems can be divided into two: terrestrial and aquatic. Within the terrestrial ecosystems, forests are the major repository of biological diversity in almost over 90% (Grime, 1997). The aquatic ecosystems include both freshwater and marine environment such as coral reefs and coastal mangroves. Mangrove ecosystems are unique in the sense that they can be both terrestrial and aquatic: terrestrial because of the forests and aquatic because of the location in the coastal zones as well as the wetland status. The pertinent roles of mangrove have been clearly recognised particularly after

the 2004 tsunami, which has consequentially created lots of interests on the importance of sustainable management of mangrove biodiversity (Jusoff and Taha, 2008).

The Convention of Biological Diversity (CBD), which was adopted during the 1992 Earth Summit in Rio de Janeiro and came into force in 1993, establishes an integrated web of obligations on countries to conserve biological diversity, to use components of biodiversity in a sustainable way and to share the benefits arising out of the use of genetic resources. These obligations are derived from the objectives of CBD provided under Article 1, which are aimed to pursue firstly, the conservation of biological diversity; secondly, the sustainable use of its components; and thirdly, the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding. As a state party to CBD, Malaysia is obligated to develop national strategies, plans and programmes by taking legislative, administrative and policy (LAP) measures for the conservation and sustainable use of biological resources and diversity. For a country like Malaysia, which is one of the 12 mega-biodiversity countries of the world, an integrated approach to conservation is necessary to develop cornerstone biodiversity conservation. Mega-diverse countries are highly rich in environmental and natural resources and these 12 mega-diverse countries, according to EPU (2009), contribute about 75% of the world biological diversity.

The United Nation Convention of Law of the Sea (UNCLOS) is the international agreement resulted from the 3rd United Nations Conference on the Law of the Sea (UNCLOS III), which took place from 1973 through 1982. UNCLOS defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment as well as the management of marine natural resources. Coming into force in 1994, UNCLOS introduced a number of provisions and amongst the most significant issues covered was the protection of the marine environment. UNCLOS also set the limit of various areas, measured from a carefully defined baseline (normally the low water mark) and as far as mangrove is concerned, it may fall under the limit of either "internal waters", which cover all water and waterways on the landward side of the baseline, or "territorial waters", which is commonly defined as a belt of coastal waters extending 12 nautical miles (at most) from the baseline of a coastal state. For territorial waters, including internal waters, the rights to set laws, regulate use and use of any resources is exclusively vested with the coastal state.

Tropical mangrove forest ecosystems play an important role in coastal zones both in the biogeochemical cycle as well as in the socio-economic growth of the population (Phan and Populus, 2007). Mangroves are unique inter-tidal habitats (Norma-Rashid et al, 2009) and they represent a characteristic forest biotope in tropical river estuaries and tidal zones and constitute an incredible adaptation to the environmental conditions of saltwater and incursion of sweet river water (Adekanmbi and Ogundipe, 2009). Since mangroves are highly productive biotopes, they have a vibrant, rich and endemic biodiversity: mangrove forests and their connected salt marshes jointly provide food as well as homes for fish, shellfish, mollusks, wildfowl and an enormous variety of crabs. Apart from the abovementioned ecological roles performed by mangroves, they are also stabilizing lagoon shores, providing nurseries and protection for fish, helping in the continuous formation of soil as well as serving as an important migratory point for birds (Moses, 1985).

1.1 Management of Mangrove Biodiversity

The policy and management of mangrove forests have great impacts on the political, social, economic, ecological and environmental well-being (Jusoff and Taha, 2008). Proper management of mangrove biodiversity can proliferate *inter alia* timber for construction and furniture, charcoal for energy, food for livestock, fish for local consumption as well as sources of medicinal properties. Another important environmental service is building land and protecting the shoreline from being washed away in storms as big as tsunami: the mangrove roots and trunks break the force of the waves while the leaves and branches reduce the effects of the wind and rain (Savory, 1953). Mangroves also act as a filtering contrivance: when the city wastes run off and pollute the nearby coastal waters, the swamp filters the water, making use of the nutrients while absorbing toxics and leaving the water clean. Provided that the waste does not contain too much toxic substance, the mangroves are indeed an excellent waste treatment system. Nonetheless, anthropogenic activities over the past several decades have gradually been affecting mangroves globally. In Nigeria, which has the fourth largest mangroves area in the world, over-harvesting, freshwater diversion and development, aquaculture, fishing techniques using poison and dynamite, sewage and other pollutants including solid waste are contaminating and destroying this valuable ecosystem (Odum, 1975). This phenomenon is comparably similar in most developing countries where priority of necessity is given more to food production and socio-economic development, often at the expense of biodiversity conservation (Adeel & Caroline, 2002).

2. Material and Methods

The primary sources for this research are policies and legislations relating to mangrove biodiversity management in Malaysia. This study is qualitative in nature by employing analysis of the contents of the primary sources involved. The literal, golden, purpose and mischief interpretation of the related statutes are observed in order to analyze the meaning of the legal provisions involved and the reason why the provisions were written as such. Great assistance also comes from secondary sources such as journal articles and scholarly books as well as sources from the internet to collaborate the points in the discussion.

3. Result and Discussion

3.1 Status of Mangrove Biodiversity Management in Malaysia

Malaysia is surrounded by a 4,800km coastline, 15% of which is fringed by mangroves characteristically scarred by adjacent developments (Lim, 2007). As the fifth largest at 641,000 hectares (ITTO/ISME, 1993), Malaysian mangroves are facing threats from anthropogenic activities. As in other tropical countries, deforestation, aquaculture, pollution run off and land development are among the causes of mangroves degradation in Malaysia. Sustainable management of mangrove biodiversity requires proper and effective legislative, administrative and policy framework as well as clear allotment of jurisdictional boundaries between the various departments involved. In Malaysia, the Forest Department of Peninsular Malaysia is tasked with the responsibility to manage and safeguard mangrove resources (Jusoff and Taha, 2008). Nonetheless, other departments, through their respective segmented laws, namely the Department of Irrigation and Drainage (DID), the Department of Fisheries (DOF), the Department of Environment (DOE), the Department of Wildlife and National Parks (PERHILITAN), the Department of Town and Country Planning as well as the various local authorities and state water authorities are also stakeholders in the management of mangrove biodiversity. DID's jurisdiction is based on the fact that rivers and drainages are connected to the sea through coastal zones, which in Malaysia are largely covered with mangroves. Since mangroves are habitats to various species of fish and other aquatic species as well as grounds commonly used for aquaculture activities, the Department of Fisheries also has jurisdiction. The Department of Environment is also an interested party because anything that affect water, whether marine, estuarine or riverine, land and air falls within its jurisdictions. Since mangrove are habitats to more than 1,300 fauna species, most of them are wild, PERHILITAN is also a stakeholder. The state water authorities are also affected and lastly, the Department of Town and Country Planning and the local authorities also have jurisdictions because of the town and country planning and administration. The various departments as stakeholders, with their respective jurisdictions, may not work well in the sustainable management of mangrove biodiversity, which may as well as explain the high level of mangrove degradation in Malaysia.

Like any other state parties to the Convention of Biological Diversity (CBD), it becomes incumbent on Malaysia to develop a national framework on the sustainable management of mangrove biodiversity incorporating the three elements of Legislative, Administrative and Policy measures. According to Article 74 of the Federal Constitution, matters relating to land, rivers, forest, local government, and town and country planning, as listed in the State List under the 9th Schedule, are within the jurisdiction of the State Authorities (Ainul Jaria and Ibrahim, 2005). The respective State Legislative Assemblies have powers to make their own laws on these matters, which consequently often led to lack of uniformity between these state laws. This predicament causes flaw in several areas and points of environmental legislation where the states have little incentives and rarely relinquish control over matters relating to land, sea, mines and forest to the Federal government, or to acquiesce in the application of the federal legislation. The Federal government has the power to make laws in respect of all matters listed in the Federal List and the Concurrent List. However, the Federal government can introduce laws on state matters at the request of the state legislative assembly or for the purpose of ensuring and promoting uniformity between the laws of two or more states.

Prevention of mangrove biodiversity loss under the purview of CBD is not merely linked to deforestation, land conversion and reclamation, development as well as aquaculture but also to warrant its sustainable use and conservation and most importantly to allow fair and equitable sharing of the benefits arising out of the utilization of mangrove genetic resources by taking into considerations the four main aspects related to it i.e. traditional knowledge (TK) of mangrove inhabitants (the indigenous people), access and benefit sharing (ABS) of mangrove genetic resources, bioprospecting and biopiracy, which is the main threat to TK and ABS. Now that the pertinent environmental roles of mangroves, especially after the 2004 tsunami, have been widely recognized, proper and sustainable management of forest biodiversity is crucial. To realise this, having an effective and comprehensive LAP framework converging the various departments involved is vital.

As a signatory to both CBD and UNCLOS, Malaysia has to abide by the obligations set out by these two

conventions. Since mangroves are in the coastal zones, which may sometimes fall landward or seaward from the baseline set by UNCLOS, they still fall within the definition of territorial waters. Given that the jurisdictions over both internal waters and territorial waters fall exclusively with Malaysia as a coastal state, the power to formulate the necessary Legislative, Administrative and Policy (LAP) framework governing the management and use of mangrove biodiversity clearly lies with the Malaysian government. Parties to the CBD are in effect enjoined to institute LAP measures within their national jurisdiction with the purpose of protecting their biodiversity.

3.1.1 Malaysian Policies on Mangrove Biodiversity Management

1) National Forestry Policy 1978 (Revised 1993)

Since mangroves are considered to be part of Malaysian forests, the Malaysian National Forestry Policy (NFP) is the central policy concerned. NFP was introduced in 1978 to strengthen and uniformise the forest administration and management. Amended in 1993, in order to further enhance sustainable management of mangrove resources in the country pursuant to the UNCED Conference in Rio de Janeiro (1992), where CBD first sprouted. The objectives of the National Forestry Policy 1978 (Revised 1993) are to conserve and manage the forest through sustainable management and to protect the environment as well as to conserve biological diversity, genetic resources, and to enhance research and education without specific mention on mangroves. Out of the 17 objectives of the NFP, there is no mention about the third objective of CBD i.e. fair and equitable sharing of the benefits arising out of the utilization of forest genetic resources, which is in fact the cornerstone of CBD itself.

2) National Policy on Biological Diversity 1998

Mangrove biodiversity is also subjected to the National Policy on Biological Diversity (NPB), which was launched in 1998 and its declared vision is *“To transform Malaysia into a world center of excellence in conservation, research and utilization of tropical biological diversity by the year 2020”*. The Policy Statement of NPB manifests its intent ... *“to conserve Malaysia’s biological diversity and to ensure that its components are organized in a sustainable manner for the continued progress and socio-economic development of the nation”*.

Both the vision statement and the Policy statement undeniably emphasize Malaysia’s commitment towards the conservation and sustainable use of her biological diversity heritage for the sustainable progress of the nation [16]. Four of the 11 statements of principles warrant mention here, namely:

Principle (VI): It is the duty of the Government to formulate and implement the policy framework for sustainable management and utilization of biological diversity in close cooperation with scientists, the business community and the public”.

Principle (VII) : “The role of local communities in the conservation, management and utilization of biological diversity must be recognized and their rightful share of benefits should be ensured.”

Principle (IX) : “The interdependence of nations on biological diversity and in the utilization of its components for the well being of mankind is recognized. International cooperation and collaboration is vital for fair and equitable sharing of biological resources, as well as access to and transfer of relevant technology”.

Principle (XI) : “In the utilization of biological diversity, including the development of biotechnology, the principles and practice of biosafety should be adhered to.”

Among the six heads of objectives, three heads merit further deliberation. These are:

Objective (i): “to optimize economic benefits from sustainable utilization of the components of biological diversity”.

Objective (iv): “to ensure preservation of the unique biological heritage of the nation for the benefit of present and future generations”.

Objective (vi): “To emphasize biosafety considerations in the development and application of biotechnology”.

3) National Policy on the Environment

The National Policy on the Environment (NEP) aims at the continued economic, social, and cultural progress of Malaysia and enhancement of the quality of life of its people, through environmentally sound and sustainable development. NEP aims at achieving a clean, safe, healthy and productive environment

for present and future generations, the conservation of the country's unique and diverse cultural and natural heritage with effective participation by all sectors of society as well as a sustainable lifestyle and pattern of consumption and production. Among the emphasis of the NEP mostly related to mangrove biodiversity management are conserving the natural ecosystem to ensure the integrity of biodiversity and life support systems, managing natural resource utilisation to sustain the resource base and prevent degradation of the environment including integrating environmental dimensions in the planning and implementation of the policies, objectives and mandates of all sectors to protect the environment.

4) 3rd National Agricultural Policy

The 3rd National Agricultural Policy (NAP3), which sets the strategic directions for agricultural and forestry development to the year 2010, aims to set in place the enabling and supportive measures as well as a conducive environment to promote growth in the agricultural sector. The overriding objective of NAP3 is the maximization of income through the optimal utilization of resources in the sector. Specifically, among the objectives of NAP3 are to enhance food security, to increase productivity and competitiveness of the sector as well as to conserve and utilize natural resources on a sustainable basis.

5) National Wetlands Policy 2004

Passed by the Cabinet in 2004, the National Wetlands Policy (NWP) was adopted in 2004 with the general aim to ensure conservation and wise-use of the wetlands to benefit from its functions and to fulfill its obligation under the Ramsar Convention. The objectives are to protect and conserve wetlands as well as improve their management as well as to optimise socio-economic benefits of wetlands through sustainable harvesting of wetlands products. The NWP is also aimed to integrate wetlands conservation interest into overall natural resource planning, management and decisions by increasing scientific and technical knowledge on wetlands as well as by increasing public appreciation on the functions and benefits of wetlands and restoring degraded wetlands. To achieve these objectives, four strategies are outlined namely by ensuring adequate legislation for conservation and wise use; providing coordination for the efforts of all stakeholders; by encouraging research on local wetlands; and enhancing appreciation of the functions and benefits of wetlands respective to stakeholders.

These numerous policies with their distinct statements and objectives may not serve well to sustainably manage mangrove biodiversity in Malaysia. Apart from these policies, under the 10th Malaysian Plan, an Integrated Coastal Zone Management Policy (ICZMP) will be adopted to promote conservation and preservation of marine and coastal resources. The rehabilitation and improvement of the coastline will be intensified through regeneration and re-vegetation programmes. Under this policy, a comprehensive management plan for mangroves and coastal forests will be developed to arrest the mangrove depletion rate to ensure a continuous supply of resources as well as to mitigate the impact of coastal erosion and *tsunamis*, which have taken the centre stage after the 2004 tsunami. In addition, a Coastal Vulnerability Index will be developed to guide the design of programmes to enhance coastal zone management. Nonetheless, the status of this upcoming ICZMP is still at planning stage.

3.1.2 Malaysian Laws on Mangrove Biodiversity Management and Their Administration

The law with respect to the management of mangrove forests in Malaysia is basically under the jurisdiction of the states as provided under Schedule IX of the Federal Constitution. According to Article 74 of the Federal Constitution, matters relating to land, rivers, forest, local government, and town and country planning, as listed in the State List under Schedule IX, are within the jurisdiction of the State Authorities [17]. The respective State Legislative Assemblies have powers to make their own laws on these matters, which consequently often led to lack of uniformity between these state laws. In order to implement the obligations under CBD, Malaysia may face difficulty in formulating legislative as well as executive measures [18]. Under the principle of federalism, Parliament's powers to make laws are subject to the distribution of powers & jurisdiction between federal & the States as enshrined in the Federal Constitution. Under Article 73, Parliament may make laws for the whole or any part of the Federation as well laws having effect outside as well as within the Federation while the State Legislature may make laws for the whole or any part of that particular State only. Thus, in order to realise the covenants under CBD, which was signed by the Federal Government and not by the individual states in Malaysia, it is Parliament, which is obliged to make laws in line with CBD.

Although Parliament may only make laws with respect of matters in Schedule IX under the Federal List (First List) and Concurrent List (Third List) and the State Legislatures, on the other hand, may make laws for matters under the State List (Second List), which covers land matters as well as most other natural resources, there are still exceptional instances where the Parliament can still legislate on state matters. These exceptions will ensure that the Federal Government, can be empowered to honour their covenants under international treaties or convention such as CBD.

These exceptions, as provided under Article 76 of the Federal Constitution, empower the Parliament to legislate for States in certain cases and when it involves the obligation under CBD, these exceptions are especially useful when most of the natural resources are within the States' jurisdiction. Clause 1 of Article 76 allows Parliament to make laws under State List under three instances:-

- (a) For the purpose of implementing firstly any treaty, agreement or convention between the Federation and any other country, which includes CBD and secondly, any decision of an international organization of which the Federation is a member.
- (b) For the purpose of promoting uniformity of the laws of two or more States.
- (c) If so requested by the State Legislature Assembly of any state.

If a law is enacted by the Parliament for paragraph (a), the Federal Government must first consult the government of the state concerned if it relates to Islamic Law, Malay Customs and any matters of native law or custom in Sabah & Sarawak. Subject to Clause (4), any law made pursuant to paragraph (b) or (c) above cannot be enforced in any state unless adopted by a law made by the State Legislature Assembly of that state. After such adoption, the federal law shall become a state law and may accordingly be amended or repealed by a law made by the State Legislature Assembly. Examples are the National Forestry Act 1982 and Fisheries Act 1985, which are both enacted under Article 76(1) (b).

The uniformity of laws as targeted under Clause 1(b), however, may not happen easily now. This is because before the 12th General Election on 8th March 2008, almost all the states were controlled by Barisan Nasional (National Front), which was also the ruling Federal Government. Therefore, party allegiance would ensure that the states would not amend any of the Federal Laws adopted. However, the position at present may be different when four major states in the West Coast are now ruled by Pakatan Rakyat. Hence, there are possibilities that they will be amendments to Federal laws previously adopted by the states and in the end, uniformity of laws throughout the whole Federation may no longer be present. Nonetheless, the Federal Government can still overcome the problem by using the excuse of Article 76(1) (a), where only the Federal Government can pass law to honour an international treaty and under such situation, the state government cannot refuse to adopt, if the matter does not relate to Islamic Law, Malay Customs and any matters of native law or custom in Sabah & Sarawak, or amend the law.

The existing segmented and piecemeal federal laws relating to mangrove management are as follows:-

1. Forestry Act 1982
2. Fisheries Act 1985
3. Environmental Quality Act 1974
4. Protection of Wild Life Act 1972
5. Local Government Act 1976
6. Town and Country Planning Act 1976
7. Street, Drainage and Building Act
8. Water Enactment 1935
9. Land Conservation Act 1960

These laws, which are predominantly sector-based, are separately administered by the different government departments with their designated jurisdictions. Since land, water and other natural resources are under the jurisdictions of the states, the administration of these laws is carried out severally by the state level departments.

3.2 Shortcomings in the Existing Malaysian LAP Framework

As a signatory to both CBD and UNCLOS, Malaysia has to abide by the obligations set out by these two conventions. Since mangroves are in the coastal zones, which may sometimes fall landward or seaward from the baseline set by UNCLOS, they still fall within the definition of territorial waters. Given that the jurisdictions over both internal waters and territorial waters fall exclusively with Malaysia as a coastal state, the power to formulate the necessary Legislative, Administrative and Policy (LAP) framework governing the management and use of mangrove biodiversity clearly lies with the Malaysian government. Parties to the CBD are in effect enjoined to institute LAP measures within their national jurisdiction with the purpose of protecting their biodiversity. As far as management of mangrove biodiversity in Malaysia is concerned, its LAP framework is haywire as detailed below:

1) Unclear Policies

As far as the National Forest Policy is concerned, nothing is mentioned about the fair and equitable

sharing of the benefits arising out of the utilization of mangrove genetic resources. Apart from NFP, the management of mangrove biodiversity in Malaysia is also subjected to other national policies namely the National Policy of Biodiversity, the National Environmental Policy, the 3rd National Agricultural Policy and the National Wetlands Policy. All these different policies with their respective statements and objectives may not be able to streamline the sustainable management of mangrove biodiversity in this country.

2) Segmented Laws

Having a policy, or multiple policies in this case, is not sufficient because policy, at best, is only a statement of intent (Shaik and Wan Izatul). To have that intent implemented, it must be translated into laws to be followed by the ensuing administrative measures. In Malaysia, the existing piecemeal laws are all segmented and sector-based namely the Forestry Act 1982, Fisheries Act 1985, the Environmental Quality Act 1974, the Land Conservation Act 1960, the National Parks Act 1980, the Protection of Wild Life Act 1972, the Local Government Act 1976, Town and Country Planning Act 1976, the Street, Drainage and Building Act as well as the Water Enactments 1935. Needless to say these laws are all pre-CBD and did not incorporate any of the webs of obligations imposed by CBD on Malaysia as a State Party to conserve biodiversity, to use components of biodiversity in a sustainable way and to share the benefits arising out of the use of genetic resources.

Prevention of mangrove biodiversity loss under the purview of CBD is not merely linked to deforestation, land conversion and reclamation, development as well as aquaculture but also to warrant its sustainable use and conservation and most importantly to allow fair and equitable sharing of the benefits arising out of the utilization of mangrove genetic resources by taking into considerations the four main aspects related to it i.e. traditional knowledge (TK) of mangrove inhabitants (the indigenous people), access and benefit sharing (ABS) of mangrove genetic resources, bioprospecting and biopiracy, which is the main threat to TK and ABS. Now that the pertinent environmental roles of mangroves, especially after the 2004 tsunami, have been widely recognized, proper and sustainable management of forest biodiversity is crucial. To realise this, having an effective and comprehensive Legislative, Administrative and Policy (LAP) framework converging the various departments involved is vital.

3) Overlapping Administrative Jurisdictions

Before enacting a federal law under Article 76 (1)(a), the Malaysian Federal Government must first identify the jurisdictional boundaries between the respective administrative departments, which has common or uncommon interests in the mangroves, as well as the overlapping jurisdictions and powers between these departments. These discrepancies have been admitted (Jusof and Taha, 2008) to cause the effort for the sustainable management of mangrove biodiversity to be futile. Challenges to mangrove biodiversity management vary from *force majeure*s such as tsunami or earthquake to man-made or better known as anthropogenic such as unwise utilisation, conversion and coastal development and lack of capacity to rehabilitate.

Although challenges from *force majeure*s are not tenable, man-made challenges can still be dealt with by having proper LAP framework. Although administratively, mangrove falls within the jurisdiction of the forest departments, other departments i.e. Department of Irrigation and Drainage, the Department of Fisheries, the Department of Environment as well as the various local authorities are also interested parties in the management of mangrove biodiversity. This administrative difficulties of having too many departments as stakeholders, with their respective and overlapping jurisdictions, may not be able to effectively work toward the sustainable of mangrove biodiversity in Malaysia.

The silence of the National Forestry Policy 1978 (Revised 1993) on the fair and equitable sharing of the benefits arising out of the utilization of mangrove genetic resources, the absence of a comprehensive legislation for mangrove biodiversity management in Malaysia, the failure of existing laws to incorporate the integrated web of obligations imposed by CBD as well as UNCLOS on Malaysia as a State Party, and the overlapping jurisdictions and powers between various government departments collectively contribute to insufficiency of the existing LAP framework to provide for the sustainable management of mangrove biodiversity in Malaysia, which has the 5th largest mangroves in the world.

4. Conclusion

As the world's fifth largest, Malaysian mangroves are facing threats from anthropogenic activities including deforestation, aquaculture, pollution run off and land development. Being a signatory to both Convention of

Biological Diversity (CBD) and United Nation Convention of Law of the Sea (UNCLOS), Malaysia is obligated to develop national strategies, plans and programmes by taking Legislative, Administrative and Policy (LAP) measures for the conservation and sustainable use of mangrove biodiversity outlined by these two conventions. After 2004, coordinating efforts have been taken by the Ministry of Natural Resources and Environment but unfortunately, there exists entanglement between the existing policies, legal framework and administration. Sustainable management of mangrove biodiversity requires comprehensive and effective LAP framework including clear allotment of jurisdictions between the various departments involved.

Nonetheless, the existing National Forestry Policy 1978, introduced to strengthen and uniformise the forest administration and management, falls short in giving specific considerations for mangroves and has now been handicapped particularly on the fair and equitable sharing of the benefits arising out of the utilization of mangrove genetic resources, which is the cornerstone of CBD. The presence of four other national policies relating to mangroves namely the National Environmental Policy, the National Policy of Biodiversity, the 3rd National Agricultural Policy and the National Wetlands Policy, with their distinct policy statements and objectives, do not help. This handicap is further aggravated by the pre-CBD piecemeal laws, which are segmented and sector-based and continuously fail to incorporate the integrated web of obligations imposed by CBD to conserve biodiversity, to use components of biodiversity in a sustainable way and to share the benefits arising out of the use of genetic resources.

In addition to that, the administrative difficulties ensuing from overlapping jurisdictions between the various departments may exacerbate the sustainable management of mangrove biodiversity. Although mangroves are administered by the Forestry Department, other departments such as the Department of Irrigation and Drainage, the Department of Fisheries, the Department of Environment, the Department of Wildlife and National Parks, the Department of Town and Country Planning as well as the various local authorities and state water authorities are also stakeholders in the management of mangrove biodiversity. The various departments as stakeholders, with their respective and overlapping jurisdictions, may not work well in the sustainable management of mangrove biodiversity.

In the final analysis, it can be surmised that the three problems namely the unclear policies, the segmented laws as well as the overlapping administrative jurisdictions collectively hinder the efforts to provide for the sustainable management of mangrove biodiversity in Malaysia.

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Table 1. The Existing Malaysian Mangrove Biodiversity Management Lap Framework

