MoF-ITTO PROJECT RED PD 064/11 Rev. 2 (F)
Promoting Local Community Initiative on the Rehabilitation of
Mangrove Ecosystem with Demonstration Activities in Bintan Island
To Reduce Further Deforestation and Forest Degradation
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ACTIVITY REPORT

REVIEW AND POLICY ANALYSIS ON COMMUNITY-BASED MANGROVE ECOSYSTEM MANAGEMENT IN BINTAN DISTRICT

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EXCECUTIVE SUMMARY

REVIEW AND EVALUATION OF EXISTING REGULATIONS AND POLICIES ON COMMUNITY-BASED MANGROVE ECOSYSTEM MANAGEMENT IN BINTAN DISTRICT

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I. INTRODUCTION

Indonesia's region stretches about 5,000 km from the western tip of Sumatra to the eastern edge of Papua. This situation renders Indonesia the world's largest archipelago with total land and sea areas of about 7.7 million km2, containing 17,480 islands with the total coastline length of 95,181 km. In coastal areas, mangrove is one of the ecosystems that serve an important role in ecological, social, and economic sustainability. According to the Ministry of Forestry (MoF 2006), the total mangrove potential area in Indonesia is 7,804,444.80 ha, and an interpretation in 2010 gave a figure of 3,685,241.16 ha. Bakosurtanal (2009) stated that the areas of Indonesia's mangroves occupy about 3,244,018.46 ha. With the above total areas, Indonesia still has the world's largest area of mangroves. However, these mangrove areas are likely to decline in both quality and quantity because of land conversion (brackish-water aquaculture, settlement, and paddy field) and irresponsible timber harvesting (firewood, sapling, etc.). The tendency of mangrove forest being converted to other uses increases due solely to economic reason and lack of awareness of ecological and social sustainability. Presently, it is estimated that 50 to 60 percent of mangrove areas in Indonesia has been destroyed.

Mangrove is one of the biodiversity and ecosystem protection areas that have an important role and function for life support system. These benefits have been widely known and directly and indirectly perceived by community, such as a place to find fish, shrimp, crab, food, and medicinal sources. Physically, mangroves also protect shoreline and riverbanks and also prevent sea water intrusion into the land. Considering the above condition and facts, mangrove management efforts are needed, through its protection, conservation, and sustainable utilization for community welfare.

Consisting of hundreds of small islands, Bintan district has large coastal areas. Mangrove forest in Bintan covers an area of approximately 7,956 hectares, spreading over 10 subdistricts that is potential for the surrounding community's livelihood. As a coastal resource, Bintan's mangrove ecosystem which has an important role in development has undergone pressures related to changes in designation for development reason. Concerning the projected destruction of mangrove for various purposes, it requires a sustainable mangrove management in formulating the policy and involvement the community as the main actor in its implementation further.

Opportunities for surrounding community to obtain benefits for their welfare while preserving the forest need to be encouraged. The program of community forest (HKm) is a momentum to reveal to the public that community is able to manage forest sustainably. The success of HKm implementation depends on its farmers groups.

The policy strategies on mangrove ecosystem management that could overcome the problems and conflicts in particular controlling the mangrove land conversion in Bintan district need to be formulated as mandated in Presidential Decree No. 73/2012 on the National Strategy On Mangrove Ecosystem Management (SNPEM) Article 10 that in SNPEM's implementation, the regent stipulates the strategy on mangrove ecosystem management at district level.

This activity is intended to formulate the policy materials and regulations on the community-based mangrove ecosystem management in Bintan district. The objectives are to review and evaluate the policy associated with the community-based mangrove ecosystem management in Bintan district.

The scope of this activity is: (1) collection of information on the community-based mangrove ecosystem management policy (central and local Bintan district); (2) literature study related to the community-based forest management (central and local Bintan district); (3) evaluation and policy and regulation analysis on the community-based mangrove ecosystem management in Bintan district; (4) stakeholder analysis related to the community-based mangrove ecosystem management in Bintan district.

II. GENERAL CONDITIONS OF BINTAN DISTRICT

2.1. AREA AND GEOGRAPHIC

Bintan district covers a total area of 87,717.84 km^2, consisting land areas of 1,319.51 km^2 (1.50%) and sea areas of 86,398.33 km^2 (98.50%). Currently, Bintan has 10 subdistricts, i.e. Teluk Bintan, Sri Kuala Lobam, Bintan Utara, Teluk Sebong, Bintan Timur, Bintan Pesisir, Mantang, Gunung Kijang, Toapaya, and Tambelan. Geographically, Bintan area is situated between 0°06'17" - 1°34'52" North Latitudes and 104°12'47" East Longitudes in the western, - 108°02'27" East Longitudes in the eastern. Bintan district has 240 of big and small islands. That are only 49 inhabited islands, the remaining are uninhabited islands but have been utilized for agricultural activities especially for plantation. Topographical characteristic of the island very varies. Generally, it is formed by low rounded hills surrounded by swamp areas. Bintan regions area part of continental shelf, known as the Sunda shelf.

2.2. CLIMATE

Like other islands in Indonesia, Bintan district has a tropical climate. During the period of 2005-2010 the lowest average temperature was 23.9^o C and the highest average was 31.8^o C with humidity around 85%.

2.3. TOPOGRAPHY AND GEOMORPHOLOGY

In general, the topography of Bintan varies from flat, sloping, steep and very steep, which is dominated by relatively flat to sloping. Areas with steep and very steep topographies with slopes > 40% can only be found in the areas of Mount Bintan Besar, Mount Bintan Kecil, Mount Kijang and Mount Lengkuas. From the aspect of geomorphology, Bintan is generally divided into 3 morphological units, comprising: (1) Plain Morphology Unit, (2) Hilly morphological unit, (3) Mountainous morphological unit.

2.4. GEOLOGICAL AND HYDROGEOLOGICAL

Regionally, the Riau Islands are a part of continental shelf, known as the Sunda shelf (Sunda Platform). The created islands are erosion residuals or outcrops of a Pre-Tertiary

land arcing from Malaysian Peninsula in the north to Bangka Island. Water in Bintan can still be derived from surface water (rivers, swamps/lakes) and groundwater, be it shallow groundwater, deep groundwater, and springs. To meet the need for drinking water, people generally utilize the river water and wells (shallow groundwater). In areas of plain morphology, in general, dug wells have depths ranging from 3.5 to 5 meters with sand and clay lithology and proper water quality to be consumed. In slightly undulating hills areas, unconfined groundwater can also still be found with relatively deeper water table.

2.5. HYDROLOGY OF WATERSHED AREAS

According to the identification results of Potential Water Resources Potential in Bintan district (Department of Public Works and Environment of Riau Islands Province, 2005)[1], Bintan island is divided into 26 Watershed areas (DAS), with five major watersheds, i.e. DAS Jago, DAS Ekang Anculai, DAS Bintan, DAS Kangboi, and DAS Kawal. The results of the study revealed the potential of surface water resources in the above watersheds in the form of the total direct discharge about 10.72 m^3/ sec.

A bit large rivers, namely Rivers Jago and Kawal, have been used for a long time by most of the community as water sources (drinking water, agriculture, bathing-washing, etc.). Other rivers used by the community include: River Gesek, River Sumpat, River Pengundang, River Dompak, River Galang Tua and River Seipulai.

2.6. SOIL

Soil types in Bintan is dominated by Hapludox - Kandiudult - Dystropets (USDA system), which is equal to Yellow Red Podsolic in PPT Bogor system, and in some coastal areas Sulfaquents-Hydraquens-Tropquepts (alluvial hydromorph and humic gley) are identified.

2.7. FLORA CONDITIONS

The total areas of Bintan's mangrove are about 7,956 Ha. Mangrove vegetations in Bintan have a quite high diversity, it is identified 50 species of 27 families spread in Siolong Island, Kelong Island, and Teluk Bakau. Commonly found plant species in Mangrove ecosystem are *Avicenia mariana, A. officionalis, A. alba, Bruguera gymnarrhiza, B. parviflora, B. sexangula, Rhizophora apiculata, R. mucronata, Sonneratia alba, S. caseolaris, Excoecaria agalloca, Xylocarpus granatum, X. moluccensis, Nypa fruticans*, etc. The associated mangrove species are also commonly to be found like hibiscus, tropical almond, coconut, *Barringtonia asiatica*, and other species.

2.8. FAUNA CONDITIONS

The observed wildlife during the field observation is very few and rare to be found. For Aves class, there are some species are found such as green pigeon (*Treron* sp) and swamp hawk (*Circus cyaneus*). The long-tailed macaque group (*Macaca fascicularis*) is found in some regions like Lagon. Commonly found reptile species are paddy snake (*Phyton* sp.), lizard (*Varanus* sp.), hawk (*Circus cyaneus*), green pigeon (*Treron* sp.) and owl.

[1] *Dinas Pekerjaan Umum dan Lingkungan Hidup Provinsi Kepulauan Riau. Studi Identifikasi Potensi Sumber Daya Air di Pulau Bintan (Tanjung Pinang: 2005)*

2.9. SOCIO-ECONOMIC CONDITIONS

According to the Indonesia population census 2010, the total population reached 142,281 inhabitants in 547 households. In 2005, Bintan had a population of 117,825, showing the population growth rate of 2.98%. With the total of land area of 1,319.51 km^2, the average population density (people per sq. km of land area) of Bintan in 2010 was 107 inhabitants/km^2.

The 2010 HDI in Bintan was 75.03, consisting of 82.97 of education index, 74.50 of health index, and 79.61 of purchasing power. The health index of Bintan was 73.88 and 74.50 in 2005 and 2010 respectively, or an increase of 0.62 points. This condition indicates that the quality of life of Bintan people is realtively going to be improved.

The total population attained their education level in 2009 was 102.997 people or representing 72.39% of the total population. Whereas the population number that have not attained yet or not completed the level of elementary school or Islamic elementary school/madrasah ibtidaiyah (SD/MI) was 17,828 people or 12.53%. The greatest attained education level was from senior high school or equivalent madrasah reaching 35,869 people or 25.21%, while the smallest attained education level was from Diploma I/II which was only 1,537 people or 1.08%.

Based on data collected from the Central Statistics Agency (BPS), in 2005 GDRP based on actual price in Bintan was worth 2.961 trillion rupiah, and then increased up to 4.002 trillion rupiah in 2009, that were measured from nine sectors, i.e. Agriculture; Mining and Quarrying; Electricity Processing Industry, Gas and Water Supply; Building/Construction, Trade, Hotels and Restaurants; Transportation and Communications; Finance, Leasing and Business Services and Services. Other performance indicators related to the GDRP value is GDRP per capita. Over the last five years, GDRP per capita has increased every year. GDRP per capita was worth only 20.63 million rupiah in 2005, however in 2010 GDRP per capita reached 25.30 million rupiah or increased to 22.64 percent.

2.10. SPATIAL STRUCTURE PLAN, SPATIAL PATTERN PLAN, AND STRATEGIC AREAS PLAN OF BINTAN DISTRICT

According to the spatial structure plan, spatial pattern plan, and strategic areas plan of Bintan district 2011-2031, some directions of spatial utilization that can be integrated into the Regional Medium Term Development Plan of Bintan district of 2011-2015 are as follows:

(a) Spatial Structure Plan of Bintan district

Spatial Structure Plan of Bintan district covers transportation system development plan, land transportation system plan**,** marine transportation system plan, air transportation system plan, power network system development plan, water resources network system development plan, and other infrastructure system development plan.

(b) Spatial Pattern Plan of Bintan District

Spatial pattern Plan of Bintan district is a distribution plan of spatial uses within district region, consisting spatial uses plan for protection and cultivation functions. Spatial uses for protection functions are such as protected forest, areas serving to protect adjacent areas, areas conserved to protect local natural features, nature sanctuaries and reserves, areas prone to natural disasters, and other protection areas. Based on the existing criteria and laws as well as adjustments to the development needs of Bintan, the protected forest

areas in Bintan covers ± 4,229.15 ha. Area that provides protection to the adjacent areas in Bintan includes water catchment areas and mangrove forests, while areas conserved to protect local natural features are such as coastal areas, river basins, areas surrounding natural and artificial lakes. The total area conserved to protect local natural features is 8,848 ha.

Bintan district is planning to stipulate a marine nature reserve zone in Tambelan as Tambelan Marine National Park with an area of ± 1,212,214.75 hectares. In addition, there are also the Regional Marine Conservation Area (KKLD) and Marine Protected Areas (DPL), i.e. Tambelan and the eastern coasts of Gunung Kijang and Bintan Timur subdistricts.

The planned cultivation areas are located outside protected areas. These areas include limited production forest of about 9,019 hectares, agricultural areas (agriculture and animal husbandry), plantation areas, fisheries areas, mining areas, industrial areas, tourism areas, residential areas, and other designation areas. Entirely, the planned protected areas consist of protected and cultivation areas of 45,765 ha and 86,186 ha respectively.

(c) Spatial Pattern Plan of Bintan District

Some areas considered as potential strategic areas are in the free trade zone and outside the free trade zone.

III. DATA COLLECTION METHOD AND ANALYSIS

3.1. LOCATION

Data were collected in Jakarta and Bintan district, Riau Islands Province.

3.2. TIME OF ASSESSMENT

The activity was run in two months from mid of May to mid of June 2013. The activity starts from preparation, data collection, field visit, evaluation and analysis, and report writing.

3.3. DATA COLLECTION

To understand the existing policy and strategy on the community-based mangrove ecosystem management, data collection was carried on variety of policies and regulations of central and local governments to further analyzed. Variety of policies consists of Laws, Government Regulation (PP), Presidential Decree, Presidential Regulation, Ministerial Decree, Director General Decree, Local Government Regulation, and Regent Decree. Types of data collected consist of secondary data and primary data.

3.4. DATA ANALYSIS METHOD

Policy analysis in this study was conducted as one of the enabling factors in implementing the research recommendations in order to achieve the project objectives. To formulate community-based mangrove ecosystem management model, it requires a policy analysis associated with the relevant aspects and other related policies. The results of policy review would identify policies and related stakeholders in terms of community-based mangrove management. Based on the assessment results, the stakeholders' roles and obligations would be synchronized and synergized, both horizontally and vertically, to avoid authority overlapping from happening.

Policy analysis in this study was conducted as one of the enabling factors in implementing the research recommendations in order to achieve the project objectives. In

addition, policy analysis would also indirectly show the stakeholders' role analysis in the mangrove management in Bintan Island.

To formulate community-based mangrove ecosystem management model and carbon potential, it requires a policy analysis at least on these two aspects and other related policies. The results of policy review would identify policies and related stakeholders in terms of community-based mangrove management. Based on the assessment results, the stakeholders' roles and obligations would be synchronized and synergized, both horizontally and vertically, to avoid authority overlapping from happening. Furthermore, after the harmonization in distribution of tasks and authority, the policy would be internalized in the local policy operationally through formulating strategic plan or action plan.

Stakeholder analysis was carried out on the stakeholders related to the mangrove ecosystem management in Bintan district. Stakeholders are actors/institutions that are able to influence the process of achieving the outputs and objectives of the program or could also be defined as the affected parties by the program implementation. The objective of stakeholder analysis is to identify stakeholders related to the issues of the program, their roles and interests, and the impacts affected by the stakeholders on the issues; also by this identification, the program manager would become sensitive to the stakeholders' interests; and in the long-term could create a strategy to obtain supports from certain stakeholders.

IV. POLICY AND REGULATION ANALYSIS OF MANGROVE ECOSYSTEM MANAGEMENT

4.1. INTRODUCTION

The basic rules related to mangrove have existed in the forms of the laws concerning the law of the sea, environmental protection and biological resources conservation. Like the adopted approaches in some countries, the development and implementation of policy associated with mangrove resources is mostly carried out by various sectoral agencies.

The elements of official policy and regulation related to mangrove management exist in several sources, including the basic principles contained in the 1945 Constitution and Pancasila, policy guidance adopted as part of the development planning process; law making, activities on regulation and administration, as well as customary laws.

The most underlying law sources on laws system in Indonesia is the state ideology Pancasila, comprising five principles that aims to guarantee a consensus of social and political stability, for economic and welfare development purposes. The principle of just and civilized humanity could be defined as a basis for maintaining a healthy environment and sustainable natural resources.

4.2. POLICY GUIDE

Aspects concerning environmental protection and natural resources management are now more getting included into the Indonesian government policies, including legislation. Many of the detailed policy making were derived from policy statements which were adopted from a high level and stated through the presidential decree or joint ministerial decree. Some of the most important policies can be found in the State Policy Guidelines (GBHN), the Long-Term Development Plan, the 5-Year Development Plan (Repelita), the National Development Program (Propenas), the Annual Development Plan (Repeta) and now

the National Long Term Development Plan (RPJPN 2005-2025) and the National Medium Term Development Plan II (RPJM 2009 - 2014).

The National Long Term Development Plan 2005–2025 is a continuation of the previous development to achieve the development goals as stated in the Preamble to the 1945 Constitution of the Republic of Indonesia. Therefore, in the upcoming 20 years, it is essential and urgent for Indonesia to reestablish various measures, such as, on natural resources management, human resources development, environment and institutional capacity.

The National Long Term Development Plan provides guidance on the preparation of the National Medium Term Development Plan. The stages of the National Development Planning are established in each period of the national RJPM in line with vision, mission, and programs of the President who is directly elected by the people. The National RJPM contains a strategy of national development, public policy, ministries/agencies program, regional and cross-regional, as well as the macro-economic framework that includes the entire economic overview, including the direction of fiscal policy in the work plan of indicative framework of regulation and funding.

The government formulated and elaborated the Vision and Mission of 2009-2014 into a number of more operational priority action programs, in order to make them easier to implement and quantify the level of success achieved. The eleven national priorities below aim to face a number of challenges to the nation in the future. Most of the resources and policies will be prioritized to ensure the implementation of eleven national priorities, comprising: (1) bureaucratic and governance reform, (2) education, (3) health, (4) poverty alleviation, (5) food resilience, (6) infrastructure, (7) investment and business climate, (8) energy, (9) environment and disaster management, (10) management of backward areas and border areas, as well as post-conflict efforts and (11) culture, creativity and technological innovation.

In the ninth priority (Environment and Disaster Management), it is stated that the conservation and utilization of natural environment supports the economic growth and sustainable prosperity, along with the disaster risk control and management to address climate change. Hence, the core substance of the action program on the environment and disaster management are as follows: (1) Climate Change, (2) Controlling damaged environment, (3) Early Warning System, and (4). Disaster management.

Regarding the national law of the sea, the basic regulations include: Law No. 4/ 1960, which was expanded into the national territorial regulation throughout the archipelago and also the surrounding waters, beyond a distance of 12 nautical miles; Law No. 1/1963 demanding the continental shelf boundary of 200 m in depth; and Law No. 521/1983 about the resources management regulation within the 200-nautical-mile-wide exclusive economic zone. Most of these laws have been implementing the Indonesia's strength and resilience as an archipelagic state under the international law of the sea which is still developing.

Concerning environment protection, Law No 32/2009 on environmental protection and management serves as a legal base. As the basis regulation, Law No 32 of 2009 is still very general in stipulating the policies for sustainable development, ecosystem maintenance, environmental impacts controlling, and protection against pollution, which have to be implemented by various agencies that have equal authorities. This law has been partially stipulated through the adoption process of the Environmental Impact Assessment (EIA)

under the Government Regulation No. 27, which revised the previous government regulations No. 51/ 1993 and No. 29/1986. Currently there is no proper guideline for EIA specifically for mangrove forest areas.

Regarding the conservation of biological resources, Law No. 5/1990 on "Biological Resources Conservation and their Ecosystems" adopts the concepts of ecosystem integrity and sustainable utilization. This law also provides the basis for establishing and operating protected natural areas, including coastal zone. Law No. 5/1990 is becoming increasingly important in supporting Law No. 26/2007 that combines other management functions in the context of the overall spatial management. The law provides mechanism to identify the options for sustainable land use in the provinces and districts, as well as embracing all regulations to observe the implementation that appropriate with the spatial planning.

The basic regulations are used as the guidelines in preparing the National Strategy of Mangrove Ecosystem Management in Indonesia are as follows: (1) The 1945 Constitution of the Republic of Indonesia Article 33 Paragraph 3, (2) Law No. 5/1960 on Basic Principles on Agrarian (Basic Agrarian Law), (3) Law No. 5/1974 on Regional Government Principles, (4) Law No. 9/1985 on Fisheries, (5) Law No. 5/1990 on Conservation of Biological Resources and their Ecosystems, (6) Law No. 5/1994 on the Ratification of the United National Convention on Biological Diversity, (7) Law No. 6/1994 on Convention on Climate Change, (8) Law No. 41/1999 on Forestry, (9) Law No. 7/2004 on Management of Water Resources, (10) Law No. 32/2004 on Regional Governance, (11) Law No. 33/2004 on Fiscal Balance between the Central and Regional Governments, (12) Law No. 17/2007 on RPJPN 2005-2025, (13) Law No. 26/2007 on Spatial Planning, (14) Law No. 27/2007 on Management of Coastal Zone and Small Islands, (15) Government Regulation No. 18/1994 on Natural Tourism Enterprise, (16) Government Regulation No. 45/2004 on Forest Protection (including its changes on Government Regulation No.60/2009), (17) Government Regulation No. 15/1990 on Fisheries (including its changes), (18) Government Regulation No. 6/2007 on Forest Administration and the Formulation of Plan for Forest Management as well as Forest Utilization, (19) Government Regulation No. 26/2008 on National Spatial Plan, (20) Government Regulation No. 76/2008 on Forest Rehabilitation and Reclamation, (21) Government Regulation No. 15/2010 on Spatial Planning Implementation, (22) Government Regulation No. 38/2007 on Distribution of Functions among Central, Province and District/City Governments, (23) Presidential Decree No. 32/1990 on Management of Protected Areas, (24) Presidential Decree No. 77/1990 on National Marine Council.

Above regulations revealed that the basic regulations associated with the coastal environment have existed in Indonesia in the forms of regulations concerning the law of the sea, environmental protection and biological resources conservation. Until now, the management of mangrove is still based on the above regulation; although in fact the basic regulations that were particularly made for the coordination and sustainable mangrove management have existed, most of regions have not implemented them yet. Having a lot of similarities, all the existing regulations are of mutual support. However, some regulations have different understanding and interpretations. Issues relating to regulations and laws become the background in formulating this strategy.

National Strategy for Mangrove Ecosystem Management in Indonesia stated in Presidential Decree No. 73/2012 provides the guidelines for local government (provincial, district/city) in the management of mangrove ecosystems appropriate with each regional characteristic. This National Strategy aims to assist and to inform related stakeholders in the

management of mangrove ecosystems, whose objectives are: (1) to improve the capacity of the parties in the management of mangrove ecosystems appropriate with the carrying capacity of the environment, and based on valid scientific data and information, and (2) to improve and to enhance the benefits and functions of mangrove ecosystems for life support systems.

The stipulated National strategies for Mangrove Ecosystem Management are inspired by the Mangrove Charter, comprising: (1) control the utilization and conversion of mangrove ecosystem based on the sustainability principles (no net loss), (2) improve the function of mangrove ecosystems in biological diversity protection, coastal line and coastal resources protection, and improve the products as income sources for the state and community, (3) mangrove ecosystem management integrated with the coastal zone area and watershed management, (4) strong political commitment and support of the government (local government and related stakeholder), (5) coordination and cooperation among institutions and stakeholders vertically and horizontally to ensure the implementation of the national strategies policy of mangrove ecosystems management, (6) community-based management to improve and to preserve the important values on ecological, economic and socio-cultural, in order to increase community's income and support a sustainable development, (7) increase the capacity of local government in implementing the authority and obligation on mangrove ecosystem management in line with local conditions and aspirations, (8) develop research, science, technology, and information systems needed to strengthen the sustainable management of mangrove ecosystem, (9) manage the mangrove ecosystem through collaborative partnership approach among government, local governments, businesses entities, and communities with the support of institutions and the international community, as part of efforts to achieve the global environmental commitment.

4.3. MANAGEMENT OF MANGROVE ECOSYSTEM IN BINTAN DISTRICT

The islands in Bintan district including Bintan Island with areas around 115,764 ha which is the largest island in this district are categorized as small islands that have limitations and characteristics such as having a number of endemic species, typical and high-value diversity, and relatively small catchment areas that causes most of their surface water and sediment flow into the sea. Small islands are also very vulnerable to changes in particular ecosystem changes.

Mangrove areas in Bintan district located inside and outside forest areas. The forests of Bintan district consist of three forest areas based on their function, i.e. Protected Forest (HL), Limited Production Forest (HPT) and Convertible Production Forest (HPK). Protected forest area has a specific characteristic that is able to protect its surrounding areas as well as its downstream areas. The total of protected forest in Bintan district is 4,299.15 ha based on the criteria and on the basis of the existing laws, as well as with an adjustment to the development needs. The protected area serving to protect its downstream areas in Bintan district consists of water catchment areas and mangrove forest areas. In general, water catchment areas in Bintan district are included as a protected forest area and also along the Watersheds areas (DAS) of Busung Jago, Ekang Anculai, Cikolek-Kangboi, Galang Batang, and Bukit Lagoi. The local conserved areas are 8,848 hectares or 6.71% of the total area of Bintan, divided into 3 types: (1) coastal areas, (2) river basins and (3) artificial lakes.

The production forest area in the spatial planning of Bintan district falls into limited production forest (HPT), mostly in the mangrove forest. The stipulated areas are aimed to utilize forest products in limited scheme, in which the exploitation activities are carried out

by selective logging and re-planting. The areas spread in sub-districts of Bintan Pesisir, Bintan Timur, Mantang, Teluk Sebong, Seri Koala Lobam, Gunung Kijang, Bintan and Teluk Bintan. Based on Paduserasi, the total areas of HPT in Bintan district are ± 9,019 hectares. Up to now, HPK that has been released for non-forest activities in Bintan Island covering an area of 28,640.66 hectares, comprising: (1) Integrated Tourism Area of PT Buana Megawisatama in Lagoi of 21,417.34 hectares (Mof decree No 687/Kpts-II/1997, October 10 1997); (2) Industrial Estate of PT Surya Bangun Pertiwi in Lobam of 3,532.26 hectares (Mof decree No 686/Kpts-II/1997 October 10 1997); (3) Pineapple Plantation of PT Sunny Mas Prima Agung in Subdistrict of Gunung Kijang of 3,691.06 hectares (Mof decree No 578/Kpts-II/1990 October 6 1990).

The Vision of Bintan district of year 2011-2015 is "**Towards a Developed, Prosperous, and Cultured Bintan**". While, The missions are: (1) to continue the efforts to improve the quality of human resources: intelligent, healthy, competitive, cultured and faithful and devoted to God Almighty, (2) to achieve regional economic development based on the development of marine resources and fisheries, (3) to continue the development of tourism and agribussiness potential, (4) to continue the efforts to create good governance, democratic and responsible, supported by law certainty and human rights enforcement, (5) to continue the fair and equitable development by increasing the quality and quantity of infrastructure and facilities that support the development in the entire Bintan, (6) to continue the development and community empowerment efforts by adopting local knowledge and mainstreaming gender issues, (7) to create an environmentally sustainable development

Regional regulation of Bintan district No. 2/2012 contains the spatial plan of Bintan district year 2011 – 2031. In the spatial policy concerning on mangrove ecosystem is in the point (d) that is optimizing the utilization of cultivated areas and protected areas in an efficient, harmonious, and balanced fashion, according to the needs of development and region capacity. Policy point (d) as defined above is carried out by strategies aim to maintain and preserve the mangrove forests areas.

One of the strategies above on point (d) of Article 6 is to maintain and preserve the mangrove forests areas. Obviously this strategy requires an extra attention from Bintan district government, particularly with the urgent needs of development in coastal areas. Reclamation plan, dam construction at a river mouth and resorts establishments in coasts with mangrove are challenges to maintaining and preserving the mangrove forest.

The regional Spatial Plan includes urban system plans and system network for infrastructure. On the development of urban system, the center of local activity is located in Bandar Seri Bentan, Tanjung Uban and Kijang. The center of Local Events Promotion lies in Teluk Sekuni. Service Center area is in Teluk Lobam, Kota Baru, Tembeling Tanjung, Kawal, Kelong and Mantang. The centers for environmental services are in Sebong Pereh, Malang Rapat, Kuala Sempang, Sri Bintan, Air Glubi, Mantang Baru, Berakit, Numbing, Penaga, Toapaya Selatan and Taopaya Asri.

Spatial pattern plans in Bintan district consists of the management of protected areas and cultivation areas. In the Article 66 of the Regional Spatial Regulation, it is mentioned that the general provisions of the zoning regulations for protected areas include: a. protected forest areas; b. catchment area; c. mangrove forest; d. coastal areas; e. river basins; f. areas surrounding natural and artificial lakes; g. marine reserves and others; h. and areas prone to natural disasters. General provisions of the zoning regulations for the cultivation areas

consist of: a. production forest areas, b. agricultural areas; c. plantation areas; d. animal husbandry areas, e. fisheries areas; f. mining areas; g. industrial areas; h. tourism areas; i. residential areas, and j. other designation areas.

Mangrove ecosystem management as referred to Article 51 paragraph (2) is carried out by: a. Rehabilitation and protection of river basins and coastal areas, b. Stabilization and preservation of mangrove forests. General provisions of the mangrove forest area zoning regulations stipulate: a. prohibit doing farming activities that causes a decrease in the function of the area, b. prohibit poaching activities on protected wildlife, c. research activities and limited tourism are allowed in mangrove coastal areas.

4.4. POLICY ANALYSIS OF COMMUNITY FOREST (HKM), FOREST VILLAGE (HD) AND PARTNERSHIP

Community empowerment policy is regulated in PP No. 6/2007 which was later revised to PP. 3/2008. This regulation mandates the empowerment of local communities that is primarily aimed to improve the community welfare through fair and optimal utilization of forest resources. The empowerment of rural forest communities has two main points that are considered very important, i.e. capacity improvement and providing access for surrounding community to the forest resources. According to these regulations, empowering the local community is an obligation of the government (central, province, and district /municipality) with the head of Forest Management Units (KPH) as the responsible party for its implementation.

Empowerment of rural forest communities come in three scheme types. The first type is Community Forest (HKm), the second is the Village Forest (HD) and the third is the Partnership Models. All the scheme types can be implemented in all forest areas, except conservation areas which their empowerment model will be regulated in a separate regulation. To implement community development schemes mentioned before, the Ministry of Forestry issued Decree No. PP.37/Menhut-II/2007 concerning Community Forest and PP.49/Menhut-II/2009 about Village Forest. As for Partnership model, there is no implementation regulation up to now.

In order to support the acceleration of HKm and HD, MoF in 2010 also issued the revised government regulations concerning HKm and HD, i.e. PP. 13/2010 on HKm and PP. 14/2010 about HD. These revised regulations are aimed to simplify the license application procedures and the process of stipulation for HKm and HD areas.

For the above reason, local government plays a very important role in HKm and HD policy. As mandated on PP. 6/2007 (PP. 3 of 2008), local governments not only have the authority to issue the utilization permit but also obligate to facilitate the development of HKm and HD in the region, i.e. from the beginning of planning, initiation, supervising, recommendation and financing.

Implementation of the scheme HKm and HD as regulated in MoF regulations PP. 37/Menhut- II/2007 about HKm and PP No.49/Menhut-II/2008 about HD can be divided into 3 levels: First, the stipulation issued by central government (MoF). Second, the permit issued by regional government (regent for community forest and governor for village forest); Third, the field implementation carried out by community groups of the permit holders of community forest and village forest.

So far, various obstacles are found at at all levels, at central, regional as well as at the group level. The main constraints at the national level are related to the complexity of the

license stipulation procedures, while issuance uncertainty of utilization permit by regent and or governor becomes an obstacle at region level. Meanwhile, the constraint at group level is a limited resources availability who can facilitate and assist community in developing and implementing operation plans of HKm and HD.

Resources availability (human and financial) is limited, compared to planned targets. Limitation on human resources in particular is found at the stages of verification and mapping, whereas so far the proposed application of HKm and HD has only reached about 30 percent, fall far short of the official target of 500,000 hectares annually.

4.5. SUSTAINABILITY OF MANGROVE ECOSYSTEM MANAGEMENT IN BINTAN DISTRICT

Policies on the sustainable management of mangrove in Bintan district is required, considering that Bintan district consists of small islands that have important functions and benefits for life support systems of coastal areas, as well as the values of mangrove ecosystems existences needed for surrounding community. The scoring of sustainability status is based on 49 attributes through data and stakeholders' opinions. The analysis results show that the management of mangrove areas in Bintan district has not been sustainable yet. Out of five analyzed dimensions in determining the sustainability status of mangrove management in Bintan district, all the five dimensions are categorized as unsustainable (score < 75), i.e. dimensions of ecological, economic, social, institutional, and technological.

Based on the analysis of the five dimensions that determine the sustainability status of mangrove management in Bintan, it was identified that unsustainable management are more influenced by weak institutional coordination among responsible institutions; high environmental pressures in the forms of erosion and sedimentation, liquid and solid waste, tidal flooding, sea water intrusion; social pressures (poverty, lack of awareness and participations) as well as lack of development of various technologies concerning mangrove management.

V. STAKEHOLDERS ANALYSIS ON THE MANGROVE ECOSYSTEM MANAGEMENT IN BINTAN DISTRICT

5.1. PRELIMINARY ANALYSIS

The first step in stakeholder analysis is to create a list of stakeholders that includes all relevant stakeholders related to Bintan's mangrove management, from international to local levels. At this stage, all those who affect and are affected, either directly or indirectly, from varying levels are included in the list.

5.2. ANALYSIS OF STAKEHOLDER INTERESTS

Stakeholders associated with the management of mangrove ecosystems in Bintan can be classified into three groups, i.e. direct primary stakeholders are stakeholders that receive direct benefits; indirect primary stakeholders are stakeholders that receive indirect benefits; secondary stakeholders are stakeholders that are not included in the first two groups, but have an interest.

Those categorized as direct primary stakeholders are at the level of local community. Local community obtains benefits both directly and indirectly from the existence of mangrove ecosystem in their areas. The obtained direct benefits are such as employment opportunity, training, supervising, stimulants, education/training facility, and share benefit.

Thus, the conditions, government policy, and local government would greatly affect the community interests on mangrove management in this area. The village government is also classified into direct primary stakeholders through the absorbing of local workforce that would affect as an increase to the community income.

Indirect primary stakeholders are such as services providers, traders and local government. Services providers obtain benefits of business opportunities due to the existence of management and utilization of mangrove, creating the surrounding economic growth would be developed. Furthermore, traders would also gain benefits due to the variety of mangrove management-based businesses. Thus the utilization would be developed and traders could reap profits. Local government would also receive indirect benefits through the paid tax of existing utilization business, reduced unemployment number, and local economic development.

Secondary stakeholders are such as universities and international communities. Universities do not obtain direct benefits but have an interest in the existence of mangrove ecosystem, such as associated with sustainable mangrove management and research so that mangrove management could be in line with principles of sustainable natural resources. Similarly, although the international communities do not obtain directly and indirectly any benefits, they have an interest in the mangrove sustainability. International communities' interests are, for example, aspects of environmental sustainability, workforce protection, human right protection, etc.

Once the interest and influence are identified, the next step is stakeholder mapping based on interest level, involvement and influence level of mangrove management. Based on the identification results of role and interest, stakeholders can be categorized into: (1) Stakeholders with high interest but low influence such as regional revenue and financial management agency as well as services provider. For instance, this agency has an interest to earn local revenues but has relatively small influence, (2) Stakeholders with high interest and high influence, such as Ministry of Home Affairs, Ministry of Forestry, Ministry of Marine Affairs and Fisheries, Ministry of Environment, Government of Riau Islands Province, regent, Development Planning Agency (Bappeda), Local Government Task Force (SKPD), subdistrict government, village government, regional development bank, surrounding community, and community organization, (3) Stakeholders with high influence but low interest, such as United Nations (PBB), National Land Agency (BPN), Local House of Representatives (DPRD), international communities, national and international NGOs, security officials, universities, and press/mass media. (4) Stakeholders with low levels of interest and influence.

VI. CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

1. The total area of mangrove in Bintan District is 7,956 hectares that is potential in its development. Most of the mangrove area is in protected areas, therefore its utilizations should be limited into such utilizations as environmental services, ecotourism and non-timber forest products.
2. The important values of mangrove management in Bintan are more directed to the considerations of environmental improvement, biological resources conservation, and sea laws. This could be seen from some policies at national level, e.g. existing

laws, government regulations, and presidential decrees. The latest mangrove management policy which is comprehensively mandated stakeholders to formulate a strategic plan in mangrove ecosystem management is Presidential Decree No. 73/2012. In regard to community-based mangrove management plan, there are some proposed community-based schemes, such as HKm (Regulation of MoF No. 37/2007) and HD (regulation of MoF No 49/2009). However, a policy implementation analysis study resulted that HKm and HD schemes have not optimally worked in particular in the license service schemes.

3. Up to now, Bintan's mangrove management has not been sustainable yet on aspects of ecology, economic, social, institutional, and technology, because from an assessment of 49 attributes, the score resulted is less than 75. According to a sustainability analysis on the mangrove management in Bintan, the following score results for each dimension are: ecological (39.6), economic (38.18), social (46.40), institutional (47.11), and technological (49.33).
4. There are 31 stakeholders on mangrove management in Bintan, from governmental institutions, local government, NGO, university, community institutions, international institutions (levels of international, national, provincial, district/city), to community groups. Based on the identification results of role and interest, stakeholders can be categorized into:
    a. Stakeholders with high interest but low influence such as regional revenue and financial management agency as well as services provider
    b. Stakeholders with high interest and high influence, such as Ministry of Home Affairs, Ministry of Forestry, Ministry of Marine Affairs and Fisheries, Ministry of Environment, Government of Riau Islands Province, regent, Development Planning Agency (Bappeda), Local Government Task Force (SKPD), subdistrict government, village government, regional development bank, surrounding community, and community organization
    c. Stakeholders with high influence but low interest, such as United Nations (PBB), National Land Agency (BPN), Local House of Representatives (DPRD), international communities, national and international NGOs, security officials, universities, and press/mass media.
    d. Stakeholders with low levels of interest and influence

6.2. RECOMMENDATIONS

1. As mandated in Presidential Decree No. 73/2012, strategic plans for mangrove ecosystem management in Bintan district needs to be formulated by considering potential conditions (physical, socioeconomic, and culture), existing policies and regulations, problems identifications (analysis of management sustainability dimension), and stakeholder supports.
2. To support the implementation of the strategic plans for regional mangrove ecosystem management, the followings need to be strengthened:
    a. Institutionality on mangrove management, by establishing the local mangrove working groups and formulating the strategic plans for community-based mangrove ecosystem management in Bintan district

b. Encourage community-based mangrove management unit (HKm and HD) with still taking care of its sustainability, such as for tourism, food alternatives, environmentally friendly cultivation (floating net cage (KJA), crab trap, Soft Shell Crab, etc), environmental, etc.

ACKNOWLEDGEMENTS

All praises and thanks to the God, the Almighty, for his blessing and mercy so this Report Document of Review and Policy Analysis on the Community-Based Mangrove Ecosystem Management in Bintan District can be completed. This activity was carried out to analyse the policy gap on the community-based mangrove ecosystem management in Bintan district.

This report comprises study scope, general condition of location, policy and regulation analysis, stakeholders analysis, conclusion and recommendation. The assessment results are expected to help in formulating policy materials of the community-based mangrove ecosystem management in Bintan district.

My thanks go to all the people who have supported me to complete the Report Document of Review and Policy Analysis on the Community-Based Mangrove Ecosystem Management in Bintan District, as well as for the trust and good cooperation.

Jakarta, July 2013

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Consultant of ITTO Policy

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

1.1. BACKGROUND

Indonesia's region stretches about 5,000 km from the western tip of Sumatra to the eastern edge of Papua. This situation renders Indonesia the world's largest archipelago with total land and sea areas of about 7.7 million km^2, containing 17,480 islands with the total coastline length of 95,181 km. In coastal areas, mangrove is one of the ecosystems that serve an important role in ecological, social, and economic sustainability. According to the Ministry of Forestry (MoF 2006), the total mangrove potential area in Indonesia is 7,804,444.80 ha, and an interpretation in 2010 gave a figure of 3,685,241.16 ha. Bakosurtanal (2009)[1] stated that the areas of Indonesia's mangroves occupy about 3,244,018.46 ha. With the above total areas, Indonesia still has the world's largest area of mangroves. However, these mangrove areas are likely to decline in both quality and quantity because of land conversion (brackish-water aquaculture, settlement, and paddy field) and irresponsible timber harvesting (firewood, sapling, etc.). The tendency of mangrove forest being converted to other uses increases due solely to economic reason and lack of awareness of ecological and social sustainability. Presently, it is estimated that 50 to 60 percent of mangrove areas in Indonesia has been destroyed.

The rapid economic development and high population growth over recent decades has accelerated the destruction of natural habitat and biodiversity. The destruction could mostly be seen in coastal areas where the population growth is twice as high as the average national growth. Based on historical facts, the economy in the coastal areas developed through trading and fisheries. Nowadays, the economy of the coastal areas comprises varying sectors: oil and mineral mining, agricultural cultivation, forestry, recreation and tourism. The community's diverse needs particularly in the western part of Indonesia now has been restricted by the carrying capacity of the coastal resources and the limited ability of coastal ecosystem to absorb the waste resulted by human activities.

Mangrove is one of the biodiversity and ecosystem protection areas that have an important role and function for life support system. These benefits have been widely known and directly and indirectly perceived by community, such as a place to find fish, shrimp, crab, food, and medicinal sources. Physically, mangroves

[1] *Bakosurtanal. Pemetaan Mangrove Indonesia (Bogor: 2009)*

also protect shoreline and riverbanks and also prevent sea water intrusion into the land. Considering the above condition and facts, mangrove management efforts are needed, through its protection, conservation, and sustainable utilization for community welfare.

The Presidential Decree No. 73/2012 on the national strategy for mangrove ecosystem management is formulated as an effort in the form of policy and program to achieve a sustainable mangrove management and prosperous community. This presidential decree mandated that in the implementation of the said national strategy, the local governments both of province as well as district formulate the local strategy on mangrove ecosystem management.

Consisting of hundreds of small islands, Bintan district has large coastal areas. Mangrove forest in Bintan covers an area of approximately 7,956 hectares, spreading over 10 subdistricts that is potential for the surrounding community's livelihood. As a coastal resource, Bintan's mangrove ecosystem which has an important role in development has undergone pressures related to changes in designation for development reason. Concerning the projected destruction of mangrove for various purposes, it requires a sustainable mangrove management in formulating the policy and involvement the community as the main actor in its implementation further.

Opportunities for surrounding community to obtain benefits for their welfare while preserving the forest need to be encouraged. The program of community forest (HKm) is a momentum to reveal to the public that community is able to manage forest sustainably. The success of HKm implementation depends on its farmers groups.

The policy strategies on mangrove ecosystem management that could overcome the problems and conflicts in particular controlling the mangrove land conversion in Bintan district need to be formulated as mandated in Presidential Decree No. 73/2012 on the National Strategy On Mangrove Ecosystem Management (SNPEM) Article 10 that in SNPEM's implementation, the regent stipulates the strategy on mangrove ecosystem management at district level.

1.2. PURPOSE AND OBJECTIVE

This activity is intended to formulate the policy materials and regulations on the community-based mangrove ecosystem management in Bintan district. The objectives are to review and evaluate the policy associated with the community-based mangrove ecosystem management in Bintan district through:

a. Formulating policy and regulations assessment on the community-based mangrove ecosystem management;
b. Formulating sustainable ecosystem mangrove management assessment based on ecological, economic, social, institutional and technological dimensions;
c. Formulating stakeholder analysis on mangrove management at local level.

1.3. SCOPE

The scope of this activity is:

1. Collection of information on the community-based mangrove ecosystem management policy (central and local Bintan district);
2. Literature study related to the community-based forest management (central and local Bintan district);
3. Evaluation and policy and regulation analysis on the community-based mangrove ecosystem management in Bintan district;
4. Stakeholder analysis related to the community-based mangrove ecosystem management in Bintan district.

1.4. DEFINITIONS

- Mangrove ecosystem is an association between mangrove vegetation with fauna and micro-organisms so that can grow and develop along the coastal areas particularly in tidal areas, lagoons, estuaries that are protected with a substrates of mud or sandy mud in formulating the balanced environmental sustainably (Presidential Regulation 73/2012).
- Sustainable management of mangrove ecosystem is all efforts of protection, preservation and sustainable utilization through an integrated process to

achieve sustainability of the mangrove ecosystem functions for community welfare.

- Community-based mangrove ecosystem management is dynamic and sustainable processes that unify various interests (government and community, science and management, and sectoral and public community). Community-based management in this report refers that the primary user of the resources is the community, and they have to be the main manager of mangrove resource.
- Social forestry is a state forest whose main utilization aims to empower local communities (Regulation of MoF No. 37/2007). Local community empowerment is an effort to improve the ability and self-reliance of local communities to obtain forest resources benefits optimally and fairly through capacity building and access facilitation in order to improve the welfare of local communities (Regulation of MoF No. 37/2007).
- Local community is a social unit consisting of citizens of the Republic of Indonesia who live in and/or around the forest that have a social group with similar livelihoods that depend on the forest and whose activities can affect forest ecosystem (Regulation of MoF No. 37/2007).
- Stakeholders are actors/institutions that are able to influence the process of achieving the outputs and objectives of the program or could also be defined as the affected parties by the program implementation.
- Policy analysis is an applied social science discipline that employs a variety of research methods and arguments to produce and transfer the information related to policies so that can be utilized to solve policy problems at the political level (Dunn 1998).

1.5. OUTPUT

The expected outputs of this activity are a review report and policy analysis on the community-based mangrove ecosystem management in Bintan district.

II. GENERAL CONDITIONS OF BINTAN DISTRICT

2.1. AREA AND GEOGRAPHIC

Bintan district covers a total area of 87,717.84 km^2, consisting land areas of 1,319.51 km^2 (1.50%) and sea areas of 86,398.33 km^2 (98.50%). Currently, Bintan has 10 subdistricts, i.e. Teluk Bintan, Sri Kuala Lobam, Bintan Utara, Teluk Sebong, Bintan Timur, Bintan Pesisir, Mantang, Gunung Kijang, Toapaya, and Tambelan. Administratively, the boundaries of Bintan district are:

- North : Anambas District
- South : Lingga
- West : Batam City and Tanjungpinang City
- East : West Kalimantan Province

Geographically, Bintan area is situated between 0°06'17" - 1° 34'52" North Latitudes and 104°12'47" East Longitudes in the western, - 108° 02'27" East Longitudes in the eastern. Bintan district has 240 of big and small islands. That are only 49 inhabited islands, the remaining are uninhabited islands but have been utilized for agricultural activities especially for plantation. Topographical characteristic of the island very varies. Generally, it is formed by low rounded hills surrounded by swamp areas. Bintan regions area part of continental shelf, known as the Sunda shelf.

The land morphology in Bintan does not show far differences in height, i.e. 0-350 meters asl. Peaks of the hills are such as Mount Bintan with 348 meters and Mount Bintan Kecil about 196 meters. The rest of the hills are below 100 meters. These hills are upstream area from where rivers flow mostly to the north and to the south in sub-parallel pattern, while their tributaries make sub-radial pattern. These rivers are commonly short, shallow, and narrow.

2.2. CLIMATE

Like other islands in Indonesia, Bintan district has a tropical climate. During the period of 2005-2010 the lowest average temperature was 23.9^o C and the highest average was 31.8^o C with humidity around 85%.

Bintan district has four types of wind direction change, i.e.:

- December - February : Northern wind
- March - May : Eastern wind
- June - August : Southern wind
- September-November : Western wind

The highest wind speed is 9 knots occurs during December to January, while the lowest wind speed occurs from March to May.

2.3. TOPOGRAPHY AND GEOMORPHOLOGY

In general, the topography of Bintan varies from flat, sloping, steep and very steep, which is dominated by relatively flat to sloping. Areas with steep and very steep topographies with slopes > 40% can only be found in the areas of Mount Bintan Besar, Mount Bintan Kecil, Mount Kijang and Mount Lengkuas.

From the aspect of geomorphology, Bintan is generally divided into 3 morphological units, comprising:

1). Plain morphological unit

Plain morphological unit scatters along the coast with the altitude ranging 0 – 3 meters asl and field slope < 3%. Bintan's plain morphological unit covers around 25% of the total areas.

2). Hilly morphological unit

Hilly morphological unit is lightly undulating and located in the central part of Bintan and covers around 60% of the total area with field slope ranging from 3% to 20%.

3). Mountainous morphological unit

Mountainous morphological unit can be found only in separated parts in the northern, central, and southern Bintan which are mountainous with field slope > 40%.

Images of topographic condition of Bintan district is presented in the contour map (see Figure 2.1.)

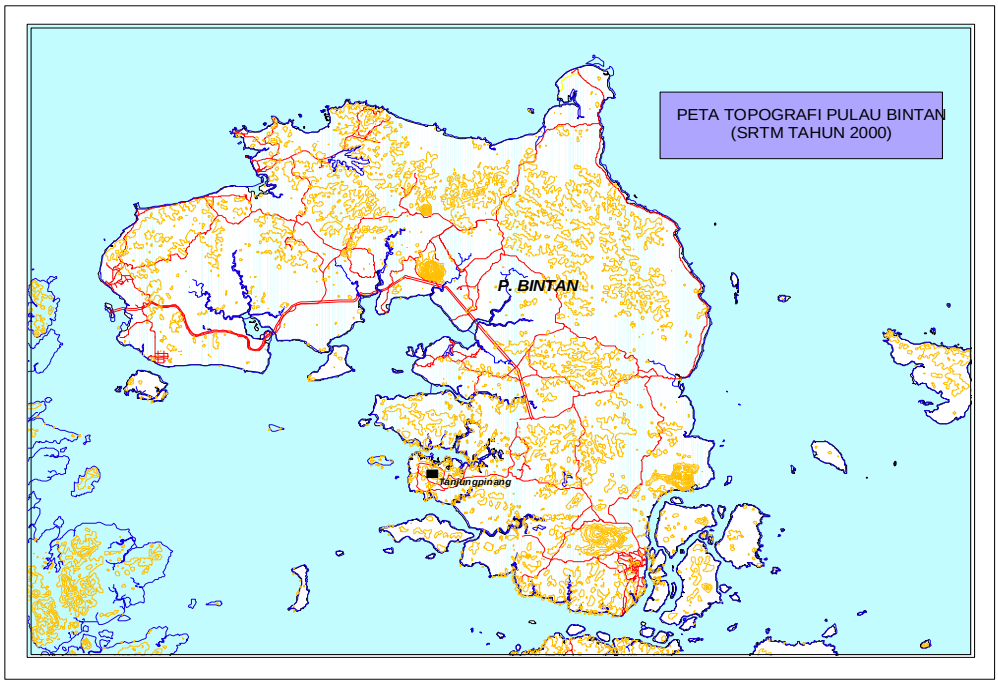

Figure 2.1. Topographic of Bintan District

2.4. GEOLOGY AND HYDROGEOLOGY

2.4.1. Geology

Regionally, the Riau Islands are a part of continental shelf, known as the Sunda shelf (Sunda Platform). The created islands are erosion residuals or outcrops of a Pre-Tertiary land arcing from Malaysian Peninsula in the north to Bangka Island.

The rocks forming the islands in Bintan district consisting of sedimentary and intrusive rocks, are as follows:

a. Alluvial (Qa) Sediments

Alluvial sediments composed of clay, silt, gravel, plant residues, peat, coral reefs, silica sand, granite rocks residues, and uncompacted conglomerate. In general, the sediments spread in the coastal areas of Bintan and along the banks of River Anculai.

b. Goungon (GTg) Formation

Goungon formation is the dominant rock in Bintan, composed of white, medium-fine-grained tuffaceous sandstone; parallelly laminated; common silt; sandy tuff; and white, fine-grained lithic tuff interspersed with reddish white tuff sandstone and carbonaceous gray silt. This formation is spread widely in the central part of Bintan Island from Tanjung Uban to Kawal in a Fluviatile environment, reaching a thickness of 200 meters with Plio-Pleistocene age.

c. Tanjung Kerotang (Tmpt) Formation

Tanjung Kerotang Formation is a conglomerate with a variety of rocks composed of granite, quartz sandstone, feldspar, and silty metamorphic in a well consolidated coarse sandstone matrix, layered and intertwined, which generally can be found in the inland and coastal areas. This formation is not exposed at the surface and is of Plio-Pliocene age.

d. Andesite (Tma) Intrusive Rocks

Andesite intrusive rock consists of gray Andesite, composed of plagioclase, hornblende and biotite, showing porphyritic texture with the base mass of feldspar microcrystal, quite fractured and generally fresh. These rocks can be found in the areas of Mount Bintan Besar, Mount Kijang and Mount Lengkuas.

e. Intrusive Granite (Tlg) Rocks

Granite Intrusive rocks looks reddish-greenish gray, coarse grained, composed of feldspar, quartz, hornblende, and biotite. The minerals are generally primarily textured and form large outcrops of pluton batholit, one of which is known as Kawal granitic pluton found in the area from Kijang to Berakit. These intrusive granite rocks can be found in most areas of Tanjung Uban and Lagoi regions.

2.4.2. Hydrogeology

Water in Bintan can still be derived from surface water (rivers, swamps/lakes) and groundwater, be it shallow groundwater, deep groundwater, and springs. To meet the need for drinking water, people generally utilize the river water and wells (shallow groundwater).

The result of hydrogeological investigations conducted by the Riau Islands District Mining Agency (2005)[2] showed that the major rivers in Tanjung Uban areas is used by regional drinking water company (PDAM) as standard water sources, while other small rivers categorized as intermittent rivers with small water flow are used by the community and some others are used for sale. Other water sources such as lake / abandoned sand quarry pit water are also used by community to fulfill the water needs of their households.

Field investigation results carried out by Mining Agency revealed that both unconfined and confined groundwater could still be found in nearly all the parts of Bintan. In areas of plain morphology, in general, dug wells have depths ranging from 3.5 to 5 meters with sand and clay lithology and proper water quality to be consumed. In slightly undulating hills areas, unconfined groundwater can also still be found with relatively deeper water table.

Field observation indicated that the deep groundwater quality from drilled wells (15-30 meters) is not better than dug wells. The water quality of drilled wells have a lot of contamination of mud, while some springs that can be found in Bintan generally have relatively small discharge (<5 liters/sec).

2.5. HYDROLOGY OF WATERSHED AREAS

According to the identification results of Potential Water Resources Potential in Bintan district (Department of Public Works and Environment of Riau Islands Province, 2005)[3], Bintan island is divided into 26 Watershed areas (DAS), with five major watersheds, i.e. DAS Jago, DAS Ekang Anculai, DAS Bintan, DAS Kangboi, and DAS Kawal. The results of the study revealed the potential of surface water resources in the above watersheds in the form of the total direct discharge about 10.72 m^3/ sec. From the above study, the watershed areas in Bintan Island are divided into some watershed areas shown in Figure 2.2.

[2] *Dinas Pertambangan Kabupaten Kepulauan Riau. Penyelidikan dan Pemetaan Hidrogeologi di Kecamatan Bintan Utara dan Teluk Bintan serta Pembuatan Sumur Pantau di Lobam dan Lagoi, Kecamatan Bintan Utara, Kabupaten Kepulauan Riau (Tanjungpinang: 2005)*

[3] *Dinas Pekerjaan Umum dan Lingkungan Hidup Provinsi Kepulauan Riau. Studi Identifikasi Potensi Sumber Daya Air di Pulau Bintan (Tanjung Pinang: 2005)*

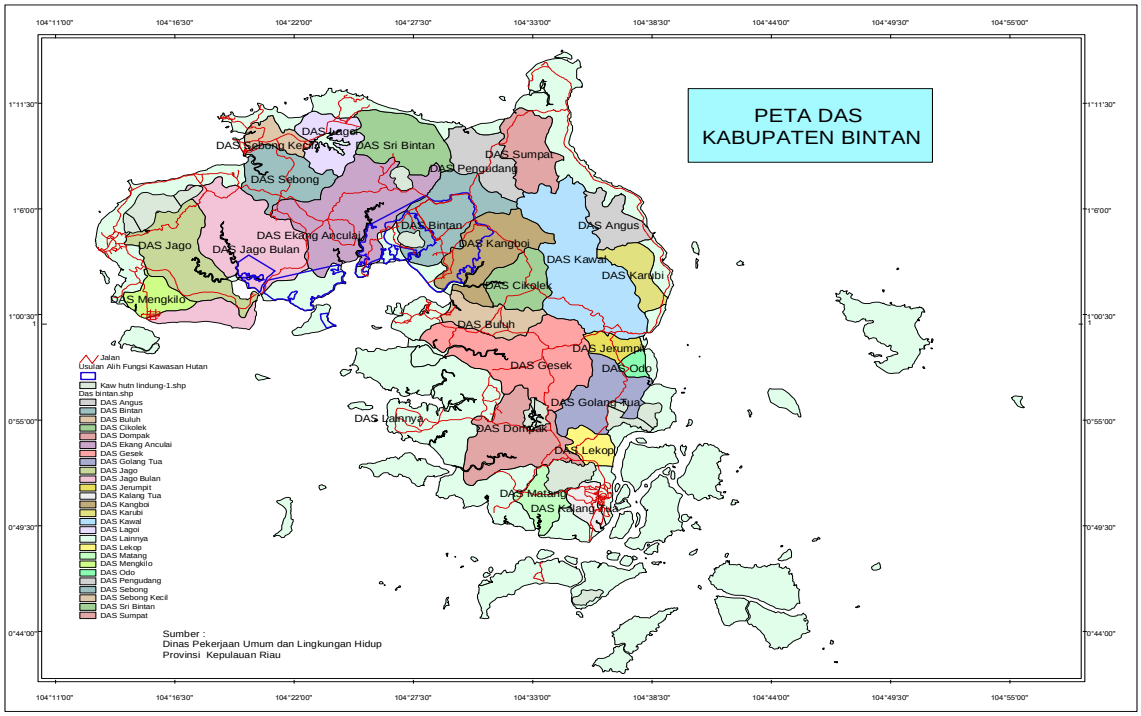

Figure 2.2. Watershed Areas in Bintan District

Hydrological system in Bintan is characterized by the absence of large, long enough river, because of the characteristics of Bintan district as a small-island ecosystem. The rivers are generally short, shallow and narrow thus it could not be used for shipping transportation. In general, the rivers are only used for water drainage from certain swamps.

A bit large rivers, namely Rivers Jago and Kawal, have been used for a long time by most of the community as water sources (drinking water, agriculture, bathing-washing, etc.). Other rivers used by the community include: River Gesek, River Sumpat, River Pengundang, River Dompak, River Galang Tua and River Seipulai.

Generally, the watershed drainage density of Bintan district is categorized as low, i.e. 0.31. This low value indicates that the flow of surface drainage systems in Bintan is unfavorable. If raining, it could not flow directly through drainage/existing rivers, causing the surface flow to be inundated/flooding.

2.6. SOIL

Soil is a physical factor of watershed areas that has an important role in hydrological processes. Its role is related to its ability to infiltrate the fallen rainwater. This ability does vary and depends on the difference in soil characteristics and soil surface conditions. Several soil characteristics referred to are texture, structure and depth of solum.

Soil types in Bintan is dominated by Hapludox - Kandiudult - Dystropets (USDA system), which is equal to Yellow Red Podsolic in PPT Bogor system, and in some coastal areas Sulfaquents-Hydraquens-Tropquepts (alluvial hydromorph and humic gley) are identified.

The Yellow Red Podsolic soil is characterized by light gray to yellowish color, agglomerate structure, low permeability, low aggregate stability, low organic matter and composed of siliceous sediment rock, marl, sandstone, and clay. Whereas alluvial soil and humic gley are characterized by poor drainage, dark colored surface horizon and acid reaction.

2.7. FLORA CONDITION

The total areas of Bintan's mangrove are about 7,956 Ha. Mangrove vegetations in Bintan have a quite high diversity, it is identified 50 species of 27 families spread in Siolong Island, Kelong Island, and Teluk Bakau. Commonly found plant species in Mangrove ecosystem are *Avicenia mariana, A. officionalis, A. alba, Bruguera gymnarrhiza, B. parviflora, B. sexangula, Rhizophora apiculata, R. mucronata, Sonneratia alba, S. caseolaris, Excoecaria agalloca, Xylocarpus granatum, X. moluccensis, Nypa fruticans*, etc. The associated mangrove species are also commonly to be found like hibiscus, tropical almond, coconut, *Barringtonia asiatica*, and other species.

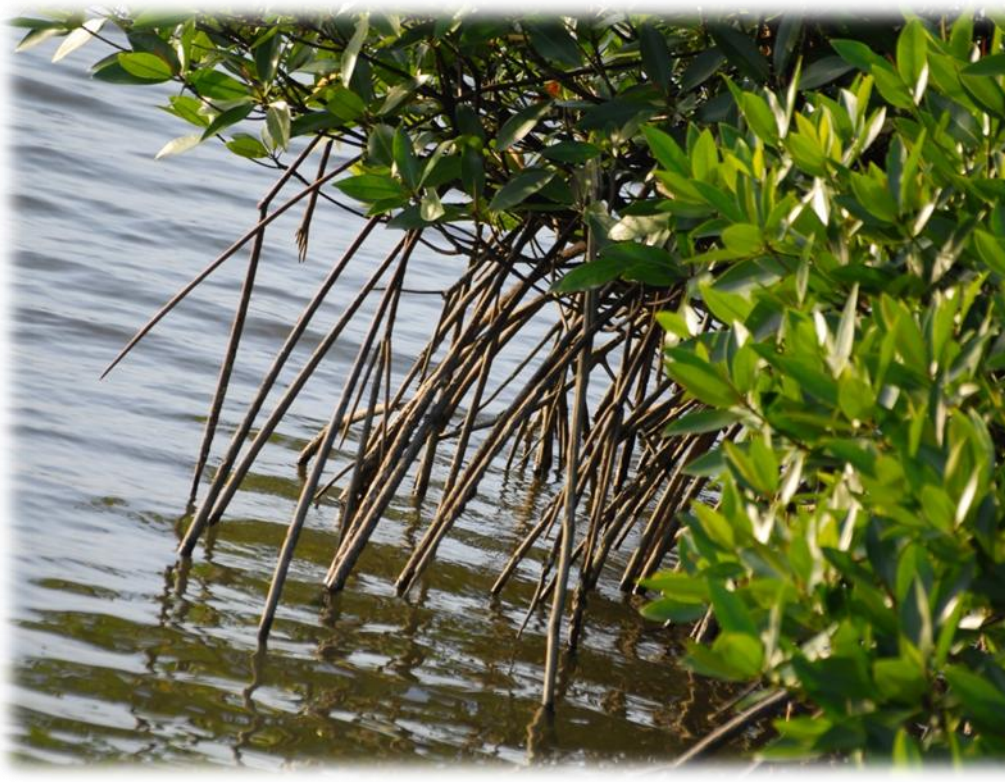

Figure 2.3. Mangrove Condition Found in Bintan District

Mangrove forest in Bintan serves a protection and buffer zones. However, mangroves are also used as wood materials and households purposes, aquaculture ponds, ports, settelement, and industrial so that it is feared that the excessive exploitation would occur. Therefore, the protection efforts of the mangrove ecosystem need to be improved so that the existence and its sustainability are maintained.

2.8. FAUNA CONDITION

The observed wildlife during the field observation is very few and rare to be found. For Aves class, there are some species are found such as green pigeon (*Treron* sp) and swamp hawk (*Circus cyaneus*). The long-tailed macaque group (*Macaca*

fascicularis) is found in some regions like Lagon. Commonly found reptile species are paddy snake (*Phyton* sp.), lizard (*Varanus* sp.), hawk (*Circus cyaneus*), green pigeon (*Treron* sp.) and owl.

Figure 2.4. Fauna Mangrove in Bintan District

2.9. SOCIO ECONOMIC ASPECT

2.9.1. Population

According to the Indonesia population census 2010, the total population reached 142,281 inhabitants in 547 households. In 2005, Bintan had a population of 117,825, showing the population growth rate of 2.98%.

With the total of land area of 1,319.51 km^2, the average population density (people per sq. km of land area) of Bintan in 2010 was 107 inhabitants/km2.

Table 2.1. Number of Population by Age Group in Bintan District, 2005-2010

No	Age groups	Year					
		2005	2006	2007	2008	2009	2010
1.	0-4	12,171	11,079	11,560	14,760	12,208	16,533
2.	5-9	10,858	11,687	11,048	12,465	12,457	14,783
3.	10-14	10,015	11,163	11,628	11,725	10,808	11,553
4.	15-19	8,441	9,764	9,677	10,968	10,755	10,258
5.	20-24	12,199	11,291	11,014	12,454	9,543	13,189
6.	25-29	14,054	14,150	14,344	13,586	13,504	16,889
7.	30-34	12,713	10,456	11,245	13,009	12,047	15,537
8.	35-39	9,753	10,392	10,258	10,409	10,946	12,065
9.	40-44	7,714	8,561	7,868	7,769	9,076	9,092
10.	45-49	6,231	7,942	6,183	5,859	7,839	6,858
11.	50-54	3,682	4,646	5,549	4,299	5,297	4,994
12.	55-59	4,073	3,074	3,690	2,937	4,175	3,614

No	Age groups	Year					
		2005	2006	2007	2008	2009	2010
13.	60-64	2,878	2,669	3,374	1,933	3,338	2,575
14.	65-69	1,704	1,472	2,341	1,279	2,311	1,963
15.	70+	1,339	1,482	1,533	1,606	3,073	1,252
	Total	117.825	117,825	121,303	122,677	125,058	127,404
Source: BPS of Bintan District in 2011							

While, up to 2010, the sex ratio of Bintan reached 107 and 0.48 of dependency ratio, meaning for every one productive-age population support less than 1 dependent person (0.48).

In 2010, the population structures by age group in Bintan were 95,071 persons in productive age (15-64 years old) or 66.82 %, and 34,531 persons in non-productive age or 33.18 %. Currently, the proportion of the male population tends to increase, this is estimated because there have been many job seekers come to Bintan. If its population pyramid is viewed, Bintan has a quite large workforce potential, dominated by the age group of 24-39 years old (details in following figure).

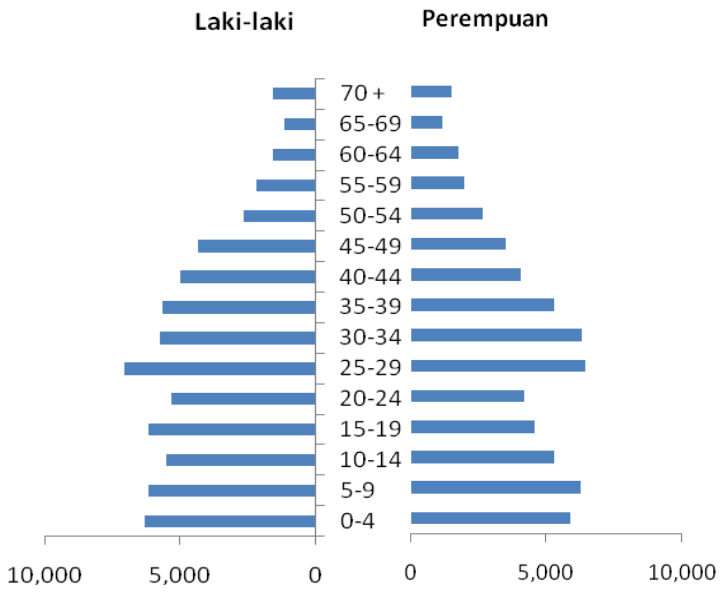

Figure 2.5. Population Structure in Bintan District by Age Group in 2010

Table 2.2. Number of Population by Subdistrict in Bintan Distirict in 2010

Subdistrict	Population			Sex Ratio
	Male	Female	total	
Teluk Bintan	4,755	4,179	8,934	114
Bintan Utara	10,644	10,550	21,194	101
Teluk Sebong	8,257	7,472	15,999	114
Seri Kuala Lobam	8,029	9,603	17,632	84
Bintan Timur	20,319	18,687	39,006	109
Gunung Kijang	6,573	5,434	12,007	121
Mantang	2,128	1,768	3,896	120
Bintan Pesisir	4,390	3,615	8,005	121
Toapaya	5,731	4,902	10,633	117
Tambelan	2,568	2,407	4,975	107
Bintan	**73,664**	**68,617**	**142,281**	**107**
Source: BPS of Bintan District in 2011				

2.9.2. Human Development Index

The human resources quality of a region can be seen from its Human Development Index (HDI). HDI shows the efforts of a region to improve its human resources; higher HDI meaning better efforts done. Regarding these efforts, the government of Bintan has improved the human development through various development programs aimed at improving the standard of living in terms of purchasing power, health, and education. The 2010 HDI in Bintan was 75.03, consisting of 82.97 of education index, 74.50 of health index, and 79.61 of purchasing power.

a) Health Aspect

The health index of Bintan was 73.88 and 74.50 in 2005 and 2010 respectively, or an increase of 0.62 points. This condition indicates that the quality of life of Bintan people is realtively going to be improved, meaning an increased of government success on improving the quality of life of Bintan's people. This is shown on the life expectancy from the age of 69.33 years in 2005 to 69.70 years in 2010. This figure indicates that in average there will increase of life expectancy from 69 years and 3 months to 69 years 7 months.

Table 2.3. Development of Life Expectancy and Health Index in Bintan District, 2005-2010

No.	Year	Life Expectancy	Health Index
1.	2005	69.33	73.88
2.	2006	69.50	74.17
3.	2007	69.57	74.28
4.	2008	69.61	74.35
5.	2009	69.69	74.48
6.	2010	69.70	74.50
Source: BPS and Health Agency of Bintan District in 2011			

b) Education Aspect

Education index combines indicators of literacy rate and mean years of schooling. These indicators represent the quality of human resources and years spent in school. In 2010, the percentage of literacy rate of 15+ years age group reached 98.09% with mean years of schooling of 7.91 years.

Table 2.4. Development of Mean Years of Schooling and Education Index in Bintan District, 2005-2010

No	Year	Mean Years Of Schooling	Education Index
1.	2005	6.67	80.16
2.	2006	7.03	80.52
3.	2007	7.15	80.92
4.	2008	7.76	82.41
5.	2009	7.82	82.76
6.	2010	7.91	82.97
Source: Education Agency of Bintan District, 2011			

The total population attained their education level in 2009 was 102.997 people or representing 72.39% of the total population. Whereas the population number that have not attained yet or not completed the level of elementary school or Islamic elementary school/madrasah ibtidaiyah (SD/MI) was 17,828 people or 12.53%. The greatest attained education level was from senior high school or equivalent madrasah reaching 35,869 people or 25.21%, while the smallest attained education level was from Diploma I/II which was only 1,537 people or 1.08%.

Table 2.5. Population Percentage on Age 10+ by Education Attainment in Bintan District, 2005-2010

Certificate Level	Total					
	2005	**2006**	**2007**	**2008**	**2009**	**2010**
1. Not/never been to school	5.37	7.36	5.28	7.50	7.88	15.08
2. Not/never been graduated from elementary school	19.09	21.18	21.70	26.25	31.21	12.53
3. SD/MI (elementary school/ equivalent madrasah)	25.89	25.98	25.62	22.26	26.36	20.82
4. SMP/MTs (yunior high school/ equivalent madrasah)	18.64	14.98	19.48	18.65	13.33	17.79
5. SMA/MA (senior high school/ equivalent madrasah)	20.48	22.80	18.36	16.33	13.64	25.21
6. SMK Vocational High School	7.48	4.70	5.80	3.45	3.33	3.37
7. D I/II	1.83	1.03	0.73	1.47	0.91	1.08
8. D III	0.33	1.07	1.11	1.05	0.61	1.85
9. D IV/S1/S2/S3	0.88	0.90	1.92	3.04	2.73	2.27
Source: BPS of Bintan District, 2011						

c) Purchasing Power Aspect

The purchasing power of the population in Bintan in 2010 was afffected by policy changes in the economic sector due to fuel price increase in 2008, causing the real average annual income per capita in 2010 increased only amount of Rp.644.470,-.

Tabel 2.6. Purchasing Power the People of Bintan 2005-2010

No.	Year	Purchasing Power (Rp)
1.	2005	623,000.-
2.	2006	626,220.-
3.	2007	637,000.-
4.	2008	641,600.-
5.	2009	643,000.-
6.	2010	644,470.-
Source: BPS of Bintan District, 2011		

d) Security and Order

In general, the security and order in Bintan is relatively conducive for community activities. Various crimes can be solved by the security alertness to detect and overcome early signs of security and public disorder. Although an effort

to security, public order and crime prevention continues to be carried out, total security and order still cannot be realized entirely. It is reflected by the growing social issues and social sickness, such as drug abuse, gambling, theft and violence, although all are still in a controllable scale.

The performance for security, peace and order strengthenings and crime mitigation can be measured from the number of security and public order disturbances based on occurrence. In 2006, the crime victim index (base year 2005) in Bintan was 54.84% and the crime index on the dominant criminal activities was 81.84%. This number increased in 2009, reaching 112.10% of crime victim index and 112.96 % of the crime index on the dominant criminal activities.

Although the crime index in Bintan tends to increase, but thanks to rapid handling by security officers and local governments as well as public awareness, this problem does not lead to a bigger social unrest. This has been realized thanks to efforts in establishing synergy between community leaders and government officials at every level.

2.9.3. Local Economy

An important indicator to measure economic condition in a region during period of time is from the value of the Gross Regional Domestic Product (GRDP). GRDP is the amount of additional value resulted by all business units in a certain region or the number of goods and services produces by all economic units. GDRP based on actual price displays the additional values of goods and services calculated using the actual price that is used for giving insight on the economic movement and economic structure of a region. While, GDRP based on constant price displays the additional values of goods and services using the applicable price during a certain year as a basis (2000 as basis year). GDRP based on constant price aims to measure the rate of economic growth of the region.

The development of general economic conditions in Bintan is a macro performance of governance and development that in the last few years have shown a positive development, despite the fact that the national condition development still has a dynamics on the regional economy, including Bintan district. Economic condition in a region can be measured by the value of GRDP, which displays added values of goods and services producedby all economic units in a region during a

period of time. An increased economic growth means there is an increase in the added value of the goods or services in certain period of time.

Tabel 2.7. Gross Regional Domestic Product (GRDP) at Constant Price (2000) by Industrial Origin, 2005-2010

Industrial Origin	2005	2006	2007	2008	2009	2010
1. Agriculture	114.36	124.85	139.41	150.22	162.55	175.37
2. Mining & Quarrying	254.22	266.89	277.44	292.80	307.06	325.84
3. Manufacturing Industry	1,336.40	1,392.96	1,441.85	1,502.41	1,562.13	1,634.16
4. Electricity, Gas & Water Supply	6.52	6.87	7.40	7.72	8.05	8.38
5. Construction	66.44	72.00	78.92	84.96	90.69	96.90
6. Trade, Hotel & Restaurant	435.04	467.20	506.33	540.08	576.17	615.25
7. Transport & Communication	83.50	88.76	95.02	100.54	106.55	112.77
8. Finance, Leasing & Business Services	36.11	37.86	40.04	42.88	45.78	48.65
9. Services	67.97	71.83	77.11	82.30	88.07	93.47
GRDP	**2,400.56**	**2,529.22**	**2,663.52**	**2,803.91**	**2,947.05**	**3,110.79**
Source: BPS of Bintan District, 2011						

Tabel 2.8. Growth Rate on Each Sector in Bintan District by Industrial Origin, 2005-2010

Industrial Origin	Growth Rate (%)					
	2005	2006	2007	2008	2009	2010
1. Agriculture	7.37	9.17	11.67	7.75	8.2	7.89
2. Mining & Quarrying	4.52	4.99	3.95	5.54	4.87	6.11
3. Manufacturing Industry	4.77	4.23	3.51	4.2	3.98	4.61
4. Electricity, Gas & Water Supply	4.05	5.47	7.68	4.3	4.27	4.1
5. Construction	5.61	8.37	9.61	7.65	6.75	6.85
6. Trade, Hotel & Restaurant	7.79	7.39	8.37	6.67	6.68	6.78
7. Transport & Communication	4.84	6.29	7.05	5.81	5.98	5.84
8. Finance, Leasing & Business Services	3.24	4.85	5.77	7.1	6.75	6.28
9. Services	0.94	5.68	7.35	6.74	7.01	6.12
Source: BPS of Bintan District, 2011						

Based on data collected from the Central Statistics Agency (BPS), in 2005 GDRP based on actual price in Bintan was worth 2.961 trillion rupiah, and then increased up to 4.002 trillion rupiah in 2009, that were measured from nine sectors, i.e. Agriculture; Mining and Quarrying; Electricity Processing Industry, Gas and Water Supply; Building/Construction, Trade, Hotels and Restaurants;

Transportation and Communications; Finance, Leasing and Business Services and Services.

In line with the GRDP indicator, this macro performance indicator represents the success or failure of the government of Bintan running its mission to improve the welfare of the Bintan people. GDRP based on actual price of Bintan represents contribution of each sector in regional economic structure based on the actual price that has included the factor of macro inflation of Bintan.

Considering that GDRP based on actual price contains macro inflation factor, the percentage is likely to be more influenced by inflation level within the related period. Therefore, GDRP based on actual price does not represent the real economic growth of Bintan. To measure the real economic growth, Bintan District government uses the GDRP based on constant price which does not include the changes of price or inflation due to using the applicable price during a certain year as a basis. Based on preliminary data of Bintan BPS, in 2009 GDRP based on constant price (year 2000 as the basis year) reached 2.935 trillion rupiah, a fluctuating figure within the period of 2005–2009. In 2009, the economy of Bintan had a high pressure compared to previous years. In 2009, the economic growth slowed down from 4.68% (2005) to 5.28%. Furthermore, the growth of primary sector had increased up to 4.93% and 4.11% for secondary sector.

If viewed sector by sector, the economic growth rates widely vary. There are some sectors with significant growth such as agriculture, animal husbandry, forestry, and fisheries that rose from 7.37% in 2005 to 8.20% in 2009. Electricity sector increased from 4.05% in 2005 to 4.27% in 2009. Building and construction sector is included in the relatively high economic growth category, from 5.61% in 2005 to 6.75% in 2009. The same for transport and telecommunications sector which grew from 4.84% in 2005 to 5.98% in 2009. The sector of finance, leasing, and business service also increased from 3.24% in 2005 to 6.75% in 2009. The service sector, which is the third-largest sector in creating employment after agriculture and trading sectors, increased significantly from 0.94% in 2005 to 7.01% in 2009.

Sector of trade, hotels, and restaurants plays an important role for the regional economic with a quite significant in creating employment. However, the rate of this sector growth decreased from 7.79% in 2005 to 5.39% in 2009. Similarly, the rate of growth of the industrial sector which usually has a quite high

rate also declined from 4.77% in 2005 to 3.96% in 2009. The slow growth of these sectors particularly was caused by the growing issues of global diseases such as swine flu and avian flu as well as global economic crisis that hit the developed countries which greatly affected the number of international tourist arrivals and foreign investment in Bintan district.

2.9.4. Income Per Capita

Other performance indicators related to the GDRP value is GDRP per capita. GDRP per capita represents the average income received by each inhabitant and can represent the community welfare level in Bintan. GDRP per capita is one of indicator of the region development. GDRP per capita based on actual price is gross domestic product using the actual price divided by midyear population. Over the last five years, GDRP per capita has increased every year. GDRP per capita was worth only 20.63 million rupiah in 2005, however in 2010 GDRP per capita reached 25.30 million rupiah or increased to 22.64 percent.

2.10. SPATIAL STRUCTURE PLAN, SPATIAL PATTERN PLAN, AND STRATEGIC AREAS PLAN OF BINTAN DISTRICT

According to the spatial structure plan, spatial pattern plan, and strategic areas plan of Bintan district 2011-2031, some directions of spatial utilization that can be integrated into the Regional Medium Term Development Plan of Bintan district of 2011-2015 are as follows:

(a) Spatial Structure Plan of Bintan district

Spatial Structure Plan of Bintan district covers transportation system development plan, land transportation system plan**,** marine transportation system plan, air transportation system plan, power network system development plan, water resources network system development plan, and other infrastructure system development plan.

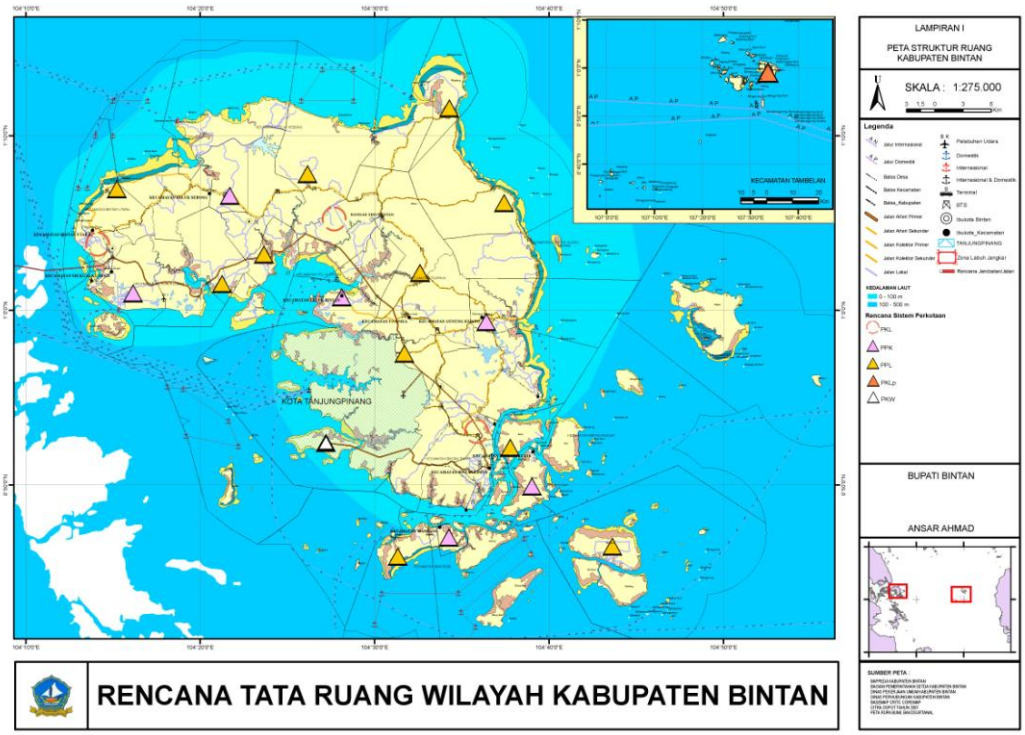

Figure 2.6. Spatial Structure Plan of Bintan District

(b) Spatial Pattern Plan of Bintan District

Spatial pattern Plan of Bintan district is a distribution plan of spatial uses within district region, consisting spatial uses plan for protection and cultivation functions. Spatial uses for protection functions are such as protected forest, areas serving to protect adjacent areas, areas conserved to protect local natural features, nature sanctuaries and reserves, areas prone to natural disasters, and other protection areas.

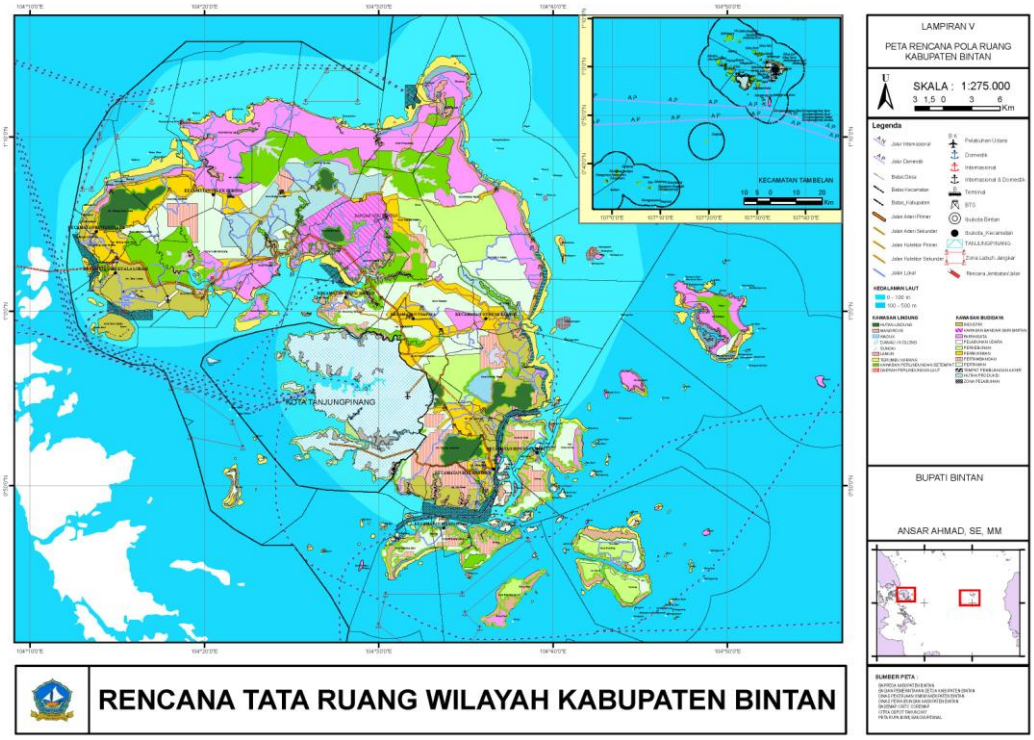

Figure 2.7. Spatial Pattern Plan of Bintan District

Protected forest areas are forest areas that have specific characteristics that serves as a protection to the adjacent areas. Based on the existing criteria and laws as well as adjustments to the development needs of Bintan, the protected forest areas in Bintan covers ± 4,229.15 ha.

Area that provides protection to the adjacent areas in Bintan includes water catchment areas and mangrove forests, while areas conserved to protect local natural features are such as coastal areas, river basins, areas surrounding natural and artificial lakes. The total area conserved to protect local natural features is 8,848 ha.

Marine and other waters nature reserves are defined as protection on other marine and other waters nature reserves in order to protect biota diversity, ecosytem type, natural phenomena for germplasm purpose, scientific and tourism purposes. Based on the prepared plan, marine and other waters nature reserves are proposed to be located in the surroundings of Bintan and Tambelan Island Group. An exception to the above conditions is if any big potential for fishing or tourism area is identified and there are existing farming activities, then they should not affect negatively on the sustainability of the protected areas.

Bintan district is planning to stipulate a marine nature reserve zone in Tambelan as Tambelan Marine National Park with an area of ± 1,212,214.75 hectares. In addition, there are also the Regional Marine Conservation Area (KKLD) and Marine Protected Areas (DPL), i.e. Tambelan and the eastern coasts of Gunung Kijang and Bintan Timur subdistricts. The total areas of Bintan's mangrove are ± 7,956 Ha. Mangrove vegetations in Bintan have a quite high diversity; it is identified that 50 species of 27 families spread over Bintan district.

Cultivation areas are areas designated with the main function for cultivation purpose, considering natural resources condition and potential, human resources, and artificial resource. The planned cultivation areas are located outside protected areas. These areas include limited production forest of about 9,019 hectares, agricultural areas (agriculture and animal husbandry), plantation areas, fisheries areas, mining areas, industrial areas, tourism areas, residential areas, and other designation areas. Entirely, the planned protected areas consist of protected and cultivation areas of 45,765 ha and 86,186 ha respectively.

(c) Strategic Areas Plan of Bintan District

Some areas are considered as potential strategic areas, i.e.:

a) In the Free Trade Zone
- Lobam Industrial Estate;
- Galang Batang Industrial Estate, covering 1,775 Ha;
- Bintan Timur Maritime Industrial Estate, covering 812 Ha;
- Sebong Pereh Tourism Area;
- Sebong Lagoi Tourism Area;
- Bintan's Capital City of Bandar Sri Bentan;
- Kuala Sempang Tourism Area.

b) Outside the Free Trade Zone
- Lagoi Tourism Area;
- Trikora Tourism Area, covering 1,800 Ha;
- Toapaya Agropolitan Area;
- Toapaya Marine Park;
- Tambelan Island Marine Park, subdistrict Tambelan;

- Minapolitan Areas in the subdistricts of Mantang, Bintan Pesisir and Bintan Timur;
- Tambelan Strategic Area (areal development center, PPK)

Based on the stipulated considerations and criteria, so overall the proposed Bintan district strategic areas are divided into:

a) Strategic areas for economic growth purposes, comprising:

- Lobam Industrial Estate is a part of the free trade zone in Bintan, covers 678 ha and is located in the subdistrict of Seri Kuala Lobam. This area is a national strategic area which is also proposed to be a district strategic area, with the main purpose on industrial sectors under the authority of the district government.
- Galang Batang Industrial Estate is a part of the free trade zone in Bintan, covers 1,775 ha and is located in the subdistrict of Gunung Kijang. This area is a national strategic area which is also proposed to be a district strategic area, with the main purpose on industrial sectors under the authority of the district government.
- Maritime Industrial Estate is a part of the free trade zone in Bintan, covers 812 ha and is located in the subdistrict of Bintan Timur. This area is a national strategic area which is also proposed to be a district strategic area, with the main purpose on industrial sectors under the authority of the district government.
- Toapaya Agropolitan Area is an area that need to be prioritized its development due to the economic value. Therefore, it is proposed to be a district strategic area.
- Trikora Beach Tourism Area is one of the potential tourism areas in the eastern coast of Bintan with an area of 1,800 Ha, located in the subdistrict of Gunung Kijang. Trikora beach Tourism areas has been developed and now has become one of tourism areas that is visited by many tourists. The research found that Trikora beach does not have a significant economic value, yet it is prospective to be a tourism area that has an economic strategic value. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.

- Lagoi Tourism Area is one of the potential tourism areas in the northern coast of Bintan and located in the subdistrict of Teluk Sebong. Currently, this area has become one of tourism areas that is visited by many tourists. The research found that Lagoi Tourism area does not have a significant economic value, yet it is prospective to be a tourism area that has an economic strategic value. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.
- Sebong Pereh Tourism Area is one of the potential tourism areas in Teluk Sebong subdistrict. Currently, this area has become one of tourism areas. The research found that Lagoi Tourism area does not have a significant economic value, yet it is prospective to be a tourism area that has an economic strategic value. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.
- Sebong Lagoi Tourism Area is one of the potential tourism areas in Teluk Sebong subdistrict. Currently, this area has become one of tourism areas. The research found that Lagoi Tourism area does not have a significant economic value, yet it is prospective to be a tourism area that has an economic strategic value. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.
- Kuala Sempang Tourism Area is one of the potential tourism areas. Currently, this area has become one of tourism areas. The research found that Lagoi Tourism area does not have a significant economic value, yet it is prospective to be a tourism area that has an economic strategic value. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.
- Bandar Sri Bentan District Capital Region is a newly developed area as Bintan's district capital. The research revealed obviously that this area does not have a significant economic value but this is one of the areas which is directed as the new Bintan District Government Center area. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.
- Minapolitan area in Mantang is an area for agrominapolitan development in Bintan district. The research revealed that this area has a quite significant

value, therefore in an effort to boost the existing potentials of marine and fisheries, this area is proposed to be a district strategic area.

- Strategic area (PPK) of Tambelan is a strategic area for development center in Bintan district. The research revealed that this area does not have a significant economic value but this area is directed to be a center for local promotion. Therefore, in an effort to boost its development, this area is proposed as one of the district strategic areas.

b) The strategic area which is an area that has strategic values on the aspects of function and environment carrying capacity is Tambelan Marine Park.

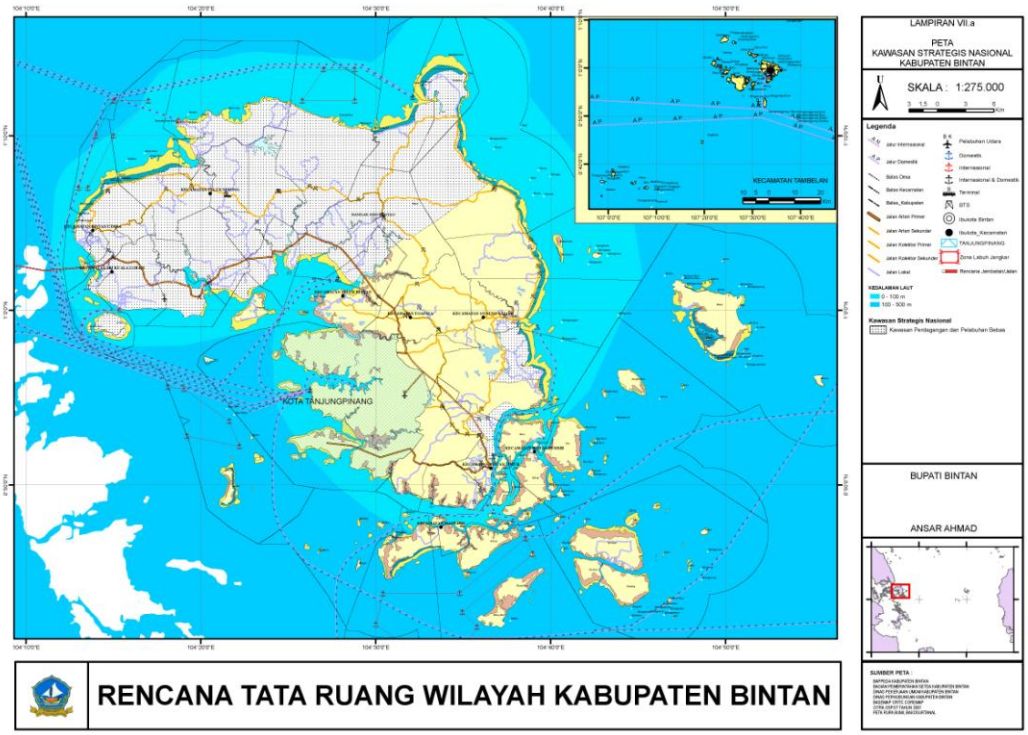

Figure 2.8. Strategic Areas Plan of Bintan District

III. DATA COLLECTION METHOD AND ANALYSIS

3.1. LOCATION

Data were collected in Jakarta and Bintan district, Riau Islands Province.

3.2. TIME OF ASSESSMENT

The activity was run in two months from mid of May to mid of June 2013. The activity starts from preparation, data collection, field visit, evaluation and analysis, and report writing.

3.3. DATA COLLECTION

To understand the existing policy and strategy on the community-based mangrove ecosystem management, data collection was carried on variety of policies and regulations of central and local governments to further analyzed. Variety of policies consists of Laws, Government Regulation (PP), Presidential Decree, Presidential Regulation, Ministerial Decree, Director General Decree, Local Government Regulation, and Regent Decree. Types of data collected consist of secondary data and primary data.

(1) Secondary Data Collection

The secondary data was collected through literature review to examine the policy of central and local governments, as well as measures on mangrove management in Bintan district that have been and will be implemented. Also it aims to examine the research results on biophysical and socio-economic that have been done in mangrove areas in Bintan district. Sources of secondary data include:

- Map of research location;
- Assessment results associated with biophysical, socio-economic, and institutional from various stakeholders (government, NGOs, educational institution, and research institution);
- Data on policy and regulation on mangrove management both in central level as well as local level.

(2) Primary Data Collection

The collection of primary data was done through survey method using field observation, focus group discussion (FGD), interview, and discussion with related stakeholders in terms of mangrove ecosystem management in Bintan district.

a. Field observation

Field observation is essential to be carried out in order to observe the real condition on mangrove ecosystem management in order to:

a. Ensure the obtained data is same or at least not so different from the real situation
b. Generate deeper information through direct field observation on many issues related to socio-economic conditions in and around the mangrove ecosystem

b. Focus Group Discussion (FGD)

Focus Group Discussion (FGD) was conducted to gather information, problems, wishes, community expectations on the sustainable mangrove management in Bintan distict. FGD was conducted at the district level and at the village level.

FGD at district level FGD at village level

Figure 3.1. FGD at District Level and Village Level

c. **Interview**

The interview carried out using two approaches i.e. structured and semi structured interviews.

Structured interview

The structured interview is carried out using questionnaire as interview guidance. Respondents were selected through stratified random sampling

technique. Sugiarto et al (2001)[6] defines stratified random sampling is a sampling technique in which the entire population is divided into groups, or strata, and then taking randomly selects the sample from the different strata.

Semi-structured interview

The semi structured interview is carried out with key informant. Semi structured interview only needs an interview guidance, not a detailed questionnaire. Interviews with key informant was conducted to gain deeper on related to issues appropriate with an expertise or authority of each respondent that being key respondent. Therefore, key informants were selected more appropriate through purposive sampling and not random sampling. The number of respondent in each level varies depend on the needs. The following steps are used to determine key informants:

- Identification of the most influential person or the most relevant person related to the assessment topic;
- Previous key informant input is used as considerations to select the next key informant; this respondent determination known as snowball method is the most appropriate to determine a respondent;
- To maintain the balance in the number of respondents based on expertise or competency aspects, key informants are selected through purposive sampling combined with quota control system. Quota control system is needed to avoid too many respondents with the same expertise or competency but lack in other expertise or competencies.

The following figure illustrates the selection process of respondent to be key informant in the interview using snowball method (Figure 3.2.)

[6] *Sugiarto, dkk.Teknik Sampling (Jakarta: Gramedia Pustaka Utama).*

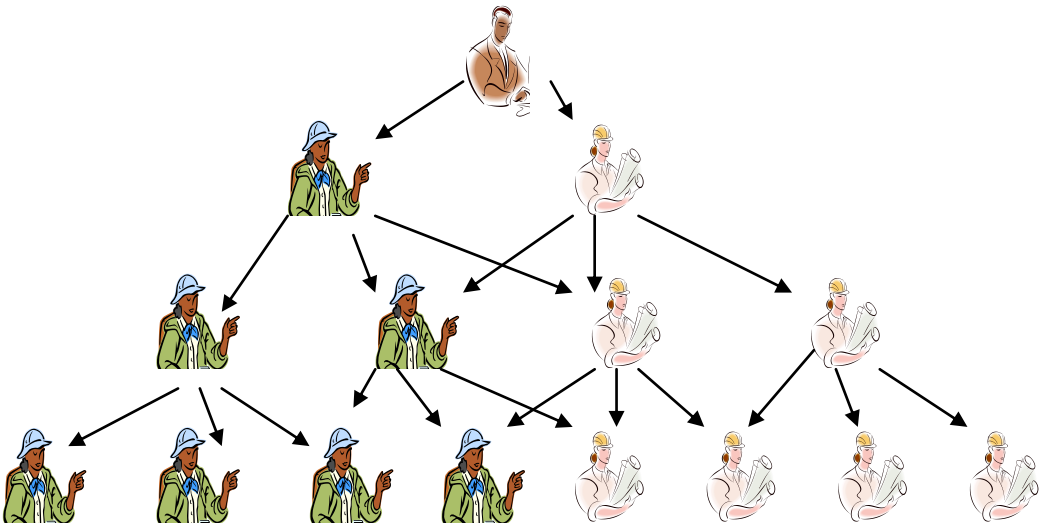

Figure 3.2. Respondent's Selection Using Snowball Method

3.4. DATA ANALYSIS METHOD

3.4.1. Policy Analysis Method

Policy analysis in this study was conducted as one of the enabling factors in implementing the research recommendations in order to achieve the project objectives. To formulate community-based mangrove ecosystem management model, it requires a policy analysis associated with the relevant aspects and other related policies. The results of policy review would identify policies and related stakeholders in terms of community-based mangrove management. Based on the assessment results, the stakeholders' roles and obligations would be synchronized and synergized, both horizontally and vertically, to avoid authority overlapping from happening.

Policy is series of actions that stipulated and implemented or not implemented by the government with an objective or oriented for certain objective for public benefits[7]. Policy analysis is an applied social science discipline that employs a variety of research methods and arguments to produce and transfer the information related to policies so that can be utilized to solve policy problems at the political level (Dunn 1998). According to Dunn[8], there are three types of policy analysis:

[7] *M. Irfan Islamy, Prinsip-Prinsip Perumusan Kebijaksanaan Negara, (Jakarta: Bina Aksara, 1988)*
[8] *William N. Dunn, Pengantar Analisis Kebijakan Publik, (Yogyakarta: Gajah Mada University Press, 2000)*

1. Prospective policy analysis is a policy analysis that examines the consequences of policy before implemented. This model is known as predictive model.
2. Retrospective policy analysis is a policy analysis that examines the impacts of policy after implemented. This model is known as evaluative model.
3. Integrative policy analysis is a policy analysis that integrates the prospective and retrospective policy analyses.

Prospective policy analysis has weaknesses due to only focus on analyzing the consequences of policy before implemented. Similarly, with retrospective policy analysis that focuses only on the impacts of policy after implemented. Therefore, the policy analysis should apply the integrative policy analysis that combines prospective and retrospective policy analysis.

Policy analysis in this study was conducted as one of the enabling factors in implementing the research recommendations in order to achieve the project objectives (Figure 3.3.). In addition, policy analysis would also indirectly show the stakeholders' role analysis in the mangrove management in Bintan Island.

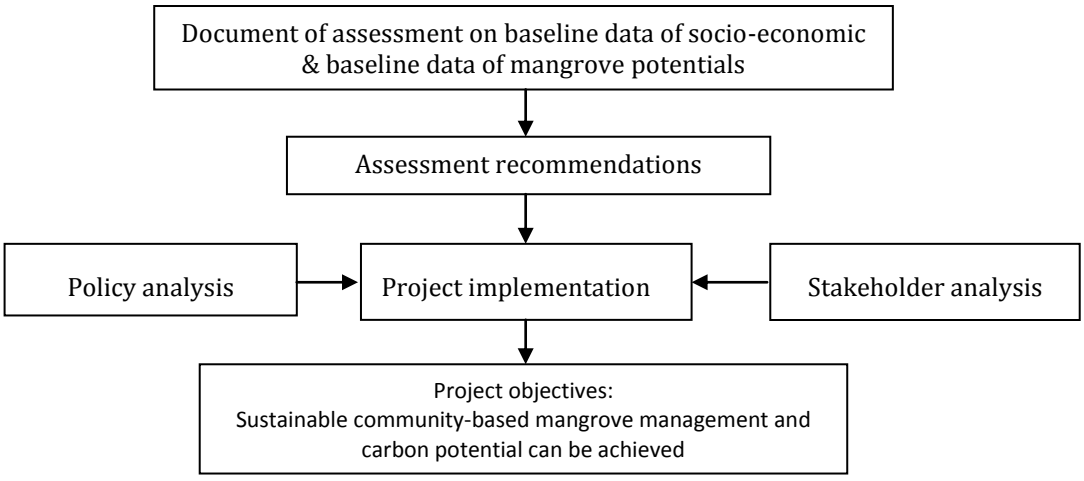

Figure 3.3. Linkages between Assessment of Baseline Data and Policy Analysis

To formulate community-based mangrove ecosystem management model and carbon potential, it requires a policy analysis at least on these two aspects and other related policies. The results of policy review would identify policies and related stakeholders in terms of community-based mangrove management. Based on the assessment results, the stakeholders' roles and obligations would be synchronized and synergized, both horizontally and vertically, to avoid authority overlapping from happening. Furthermore, after the harmonization in distribution of tasks and authority, the policy would be internalized in the local policy

operationally through formulating strategic plan or action plan. Figure 3.4. shown the framework of policy analysis as mentioned above.

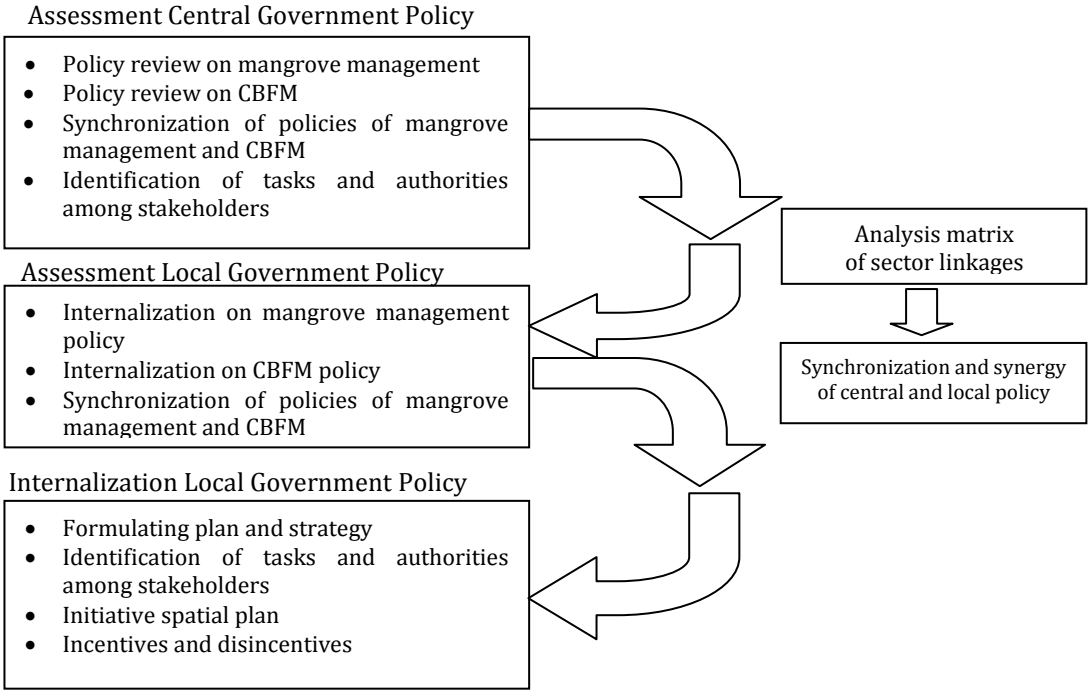

Figure 3.4. Framework of Policy Analysis Review and Formulating the Strategy Draft on Community-Based Mangrove Management in Bintan District

Based on the abovementioned analysis framework, the policy analysis should be done initially with the following steps:

- Literature study associated with mangrove management (both central and local)
- Literature study associated with Community Based Forest Management (both central and local)
- Conduct assessment of mangrove management implementation program and community empowerment activity at the local level (policy gap analysis and implementation)
- Figure out constraints on policy implementation related to mangrove management

3.4.2. Stakeholders Analysis Method

Stakeholder analysis was carried out on the stakeholders related to the mangrove ecosystem management in Bintan district. Stakeholders are actors/institutions that are able to influence the process of achieving the outputs

and objectives of the program or could also be defined as the affected parties by the program implementation. The objective of stakeholder analysis is to identify stakeholders related to the issues of the program, their roles and interests, and the impacts affected by the stakeholders on the issues; also by this identification, the program manager would become sensitive to the stakeholders' interests; and in the long-term could create a strategy to obtain supports from certain stakeholders. The concepts and methods of stakeholder analysis have been developed by many institutions. One of the methods employed in this assessment is that of DfID[9] which uses three important stages of stakeholder analysis as follows:

1. Creating stakeholder table, consisting of:
    a. Identifying and listing stakeholders;
    b. Mapping the level of stakeholders' interest in a project.
2. Assessing stakeholders' levels of influence and interests, comprising:
    a. Assessing project's influence;
    b. Assessing the importance of the project's success;
    c. Combining the influence and the importance of the project.
3. Identifying assumptions and risks that affect the project design and participation level, comprising:
    a. Identifying assumptions and risks concerning stakeholder;
    b. Identifying the appropriate level of stakeholder participation.

[9] *Department for International Development. Guidance note on how to do stakeholder analysis of aid projects and programmes, UK Department for International Development, (London: 1995)*

IV. POLICY AND REGULATION ANALYSIS OF MANGROVE ECOSYSTEM MANAGEMENT

4.1. INTRODUCTION

The basic rules related to mangrove have existed in the forms of the laws concerning the law of the sea, environmental protection and biological resources conservation. Like the adopted approaches in some countries, the development and implementation of policy associated with mangrove resources is mostly carried out by various sectoral agencies.

4.1.1. Existing Policy and Law

The elements of official policy and regulation related to mangrove management exist in several sources, including the basic principles contained in the 1945 Constitution and Pancasila, policy guidance adopted as part of the development planning process; law making, activities on regulation and administration, as well as customary laws.

4.1.2. Law Sources

The most underlying law sources on laws system in Indonesia is the state ideology Pancasila, comprising five principles that aims to guarantee a consensus of social and political stability, for economic and welfare development purposes. The principle of just and civilized humanity could be defined as a basis for maintaining a healthy environment and sustainable natural resources.

4.2. POLICY GUIDANCE

Aspects concerning environmental protection and natural resources management are now more getting included into the Indonesian government policies, including legislation. Many of the detailed policy making were derived from policy statements which were adopted from a high level and stated through the presidential decree or joint ministerial decree. Some of the most important policies can be found in the State Policy Guidelines (GBHN), the Long-Term Development Plan, the 5-Year Development Plan (Repelita), the National Development Program (Propenas), the Annual Development Plan (Repeta) and now the National Long Term Development Plan (RPJPN 2005-2025) and the National Medium Term Development Plan II (RPJM 2009 - 2014).

The National Long Term Development Plan 2005–2025 is a continuation of the previous development to achieve the development goals as stated in the Preamble to the 1945 Constitution of the Republic of Indonesia. Therefore, in the upcoming 20 years, it is essential and urgent for Indonesia to reestablish various measures, such as, on natural resources management, human resources development, environment and institutional capacity.

The National Long Term Development Plan provides guidance on the preparation of the National Medium Term Development Plan. The stages of the National Development Planning are established in each period of the national RJPM in line with vision, mission, and programs of the President who is directly elected by the people. The National RJPM contains a strategy of national development, public policy, ministries / agencies program, regional and cross-regional, as well as the macro-economic framework that includes the entire economic overview, including the direction of fiscal policy in the work plan of indicative framework of regulation and funding.

The National Medium Term Development Plan as mentioned above is explained in the Government Work Plan (RKP), a national annual development plan, presenting the priorities of national development, design of macro-economic framework which contains the whole economic overview, including the direction of fiscal policy in the work plan of indicative framework of regulation and funding.

The government formulated and elaborated the Vision and Mission of 2009-2014 into a number of more operational priority action programs, in order to make them easier to implement and quantify the level of success achieved. The eleven national priorities below aim to face a number of challenges to the nation in the future. Most of the resources and policies will be prioritized to ensure the implementation of eleven national priorities, comprising: (1) bureaucratic and governance reform, (2) education, (3) health, (4) poverty alleviation, (5) food resilience, (6) infrastructure, (7) investment and business climate, (8) energy, (9) environment and disaster management and (10) management of backward areas and border areas, as well as post-conflict efforts and (11) culture, creativity and technological innovation.

In the ninth priority (Environment and Disaster Management), it is stated that the conservation and utilization of natural environment supports the economic

growth and sustainable prosperity, along with the disaster risk control and management to address climate change. Hence, the core substance of the action program on the environment and disaster management are as follows:

1. Climate change: Improving the strengthening of peat-land management, increasing the rehabilitation areas into 500,000 ha per year, combating the deforestation seriously through the cooperation between related ministries as well as the optimization and efficiency of funding sources, such as Right of Forest Utilization (HPH), Forest Resources Rent Provision (PSDH), and the Reforestation Fund (DR).
2. Controlling damaged environment: reducing environmental pollution through wastewater pollution and emission control compliance monitoring at 680 industrial and service activities in 2010 and its continuation; decreasing the number of forest fire hotspots by 20% annually and decreasing pollution level entirely by 50% in 2014, halting environmental destruction in eleven disaster-prone watersheds from 2010 onwards;
3. Early warning system: guaranteeing the proper functioning of Tsunami Early Warning Systems (TEWS) and Meteorological Early Warning System (MEWS) from 2010 onwards, as well as Climate Early Warning Systems in 2013.
4. Disaster management: Improvement of the capacity on disasters management through: 1) capacity strengthening of government officials and people in the efforts of risk mitigating and disaster management, as well as forest fire hazard in 33 provinces, and 2) creating a rapid response team (special unit for handling disaster) with the supporting tools, equipment and proper transportation in two strategic locations (Jakarta and Malang) that can reach across Indonesia.

4.2.1. The Law of the Sea

Regarding the national law of the sea, the basic regulations include: Law No. 4/ 1960, which was expanded into the national territorial regulation throughout the archipelago and also the surrounding waters, beyond a distance of 12 nautical miles; Law No. 1/1963 demanding the continental shelf boundary of 200 m in depth; and Law No. 521/1983 about the resources management regulation within the 200-nautical-mile-wide exclusive economic zone. Most of these laws have been

implementing the Indonesia's strength and resilience as an archipelagic state under the international law of the sea which is still developing.

4.2.2. Environmental Protection

Concerning environment protection, Law No 32/2009 on environmental protection and management serves as a legal base. As the basis regulation, Law No 32 of 2009 is still very general in stipulating the policies for sustainable development, ecosystem maintenance, environmental impacts controlling, and protection against pollution, which have to be implemented by various agencies that have equal authorities. This law has been partially stipulated through the adoption process of the Environmental Impact Assessment (EIA) under the Government Regulation No. 27, which revised the previous government regulations No. 51/ 1993 and No. 29/1986. Currently there is no proper guideline for EIA specifically for mangrove forest areas.

4.2.3. Biological Resources Conservation

Regarding the conservation of biological resources, Law No. 5/1990 on "Biological Resources Conservation and their Ecosystems" adopts the concepts of ecosystem integrity and sustainable utilization. This law also provides the basis for establishing and operating protected natural areas, including coastal zone. Law No. 5/1990 is becoming increasingly important in supporting Law No. 26/2007 that combines other management functions in the context of the overall spatial management. The law provides mechanism to identify the options for sustainable land use in the provinces and districts, as well as embracing all regulations to observe the implementation that appropriate with the spatial planning.

The basic regulations are used as the guidelines in preparing the National Strategy of Mangrove Ecosystem Management in Indonesia are as follows:

1. The 1945 Constitution of the Republic of Indonesia Article 33 Paragraph 3
2. Law No. 5/1960 on Basic Principles on Agrarian (Basic Agrarian Law)
3. Law No. 5/1974 on Regional Government Principles
4. Law No. 9/1985 on Fisheries
5. Law No. 5/1990 on Conservation of Biological Resources and their Ecosystems

6. Law No. 5/1994 on the Ratification of the United National Convention on Biological Diversity
7. Law No. 6/1994 on Convention on Climate Change
8. Law No. 41/1999 on Forestry
9. Law No. 7/2004 on Management of Water Resources
10. Law No. 32/2004 on Regional Governance
11. Law No. 33/2004 on Fiscal Balance Between the Central and Regional Government
12. Law No. 17/2007 on RPJPN 2005-2025
13. Law No. 26/2007 on Spatial Planning
14. Law No. 27/2007 on Management of Coastal Zone and Small Islands
15. Government Regulation No. 18/1994 on Natural Tourism Enterprise
16. Government Regulation No. 45/2004 on Forest Protection (including its changes on Government Regulation No.60/2009)
17. Government Regulation No. 15/1990 on Fisheries (including its changes)
18. Government Regulation No. 6/2007 on Forest Administration and the Formulation of Plan for Forest Management as well as Forest Utilization
19. Government Regulation No. 26/2008 on National Spatial Plan
20. Government Regulation No. 76/2008 on Forest Rehabilitation and Reclamation
21. Government Regulation No. 15/2010 on Spatial Planning Implementation
22. Government Regulation No. 38/2007 on Distribution of Functions Among Central, Province and District/City Government
23. Presidential Decree No. 32/1990 on Management of Protected Areas
24. Presidential Decree No. 77/1990 on National Marine Council

Above regulations revealed that the basic regulations associated with the coastal environment have existed in Indonesia in the forms of regulations concerning the law of the sea, environmental protection and biological resources conservation. Until now, the management of mangrove is still based on the above regulation; although in fact the basic regulations that were particularly made for the coordination and sustainable mangrove management have existed, most of regions have not implemented them yet. Having a lot of similarities, all the existing regulations are of mutual support. However, some regulations have different

understanding and interpretations. Issues relating to regulations and laws become the background in formulating this strategy.

The observed issues in formulating and implementing protection policy include the coastal ecosystems conservation, in particular mangrove forests and coral reefs. In addition, the lack of inventory, monitoring and other positive functions, and resources management are examined with a limitation to their implementation due to economic and social factors.

4.2.4. Silviculture System of Mangrove Forest

Mangrove ecosystem management in Indonesia have a quite long history, such as the utilization of mangrove trees as a raw material to produce charcoal in Riau and Batu Ampar (Kalimantan Barat) that has been running for ± 100 years, and this is coincident with the coming of Chinese people to Indonesia that also brought the charcoal production technology. The management of mangrove forest in the form of forest concessions (HPH) has been running since 1967, when for the first time, the private sector managed the forest management activities until 1982. Since 1982 up to now, it has no longer been allowed for the utilization of mangrove wood in the form of log to be exported. Therefore, the utilization of mangrove timber could only be carried out by a company that already has a processing industries, such as wood chips or charcoal industry.

Regarding the charcoal industry, the permit granted by the related government body, i.e., Ministry of Forestry (MoF) is given in the form of Forest Product Extraction Permits (HPHH) with an area of 100 hectares each and a volume which is stipulated appropriate with the stand potential. The permit holder has no obligation after logging; leading to many not-well-maintained logged over areas. In Bengkalis, there have ever been obligations for the permit holder to plant four trees for one felled mangrove tree.

The utilization of production forest of mangrove since 1978 until now is regulated in the decree No. 60/1978 concerning guidelines for silviculture in forest areas of brackish water. For the mangrove forest managed under the Forest Concession and Commercial Timber Utilization Permit in Natural Forest, the management is based on the seed-trees method. This system requires a 30-year rotation with cutting diameter ≥ 10 cm, retaining 40 mother trees per hectare with an average distance of 17 meters. Prior to 1978, there were no written regulations

about the utilization procedures of the mangrove production forest; there was only a recommendation from the Forestry Research and Development Agency to use the strip system.

With the development of legislations on forestry and environment, and considering the science and technology in mangrove management, then it is now the time to improve the current silviculture system that has been applied since 1978. By this improvement, it is expected to create more applicable, efficient, effective and measurable performances of silviculture system stage.

Based on the experience and research conducted by Firus Mulia since 1982, the current silviculture system practiced has ensured the sustainable productivity of mangrove forests; however it still needs to find a silviculture system that is more efficient and effective, such as clear-cutting system applied in Malaysia, with some modifications needed.

4.2.5. Issues in Indonesia's Mangrove Ecosystem Management

There are four main issues related to mangrove ecosystem management:

1. Ecological Issues

a. More than 50 % of total mangrove areas are in critical conditions, causing a decrease in biodiversity and environmental services of mangrove ecosystems due to land-use changes that increase the risk of disaster
b. Many efforts have been taken to conserve and rehabilitate the mangrove ecosystem, but the outputs have not balanced the occurred damage
c. Disaster-prone and climate change impacts in the coastal areas of Indonesia

2. Socio-Economic Issues

a. Differences in understanding the values, function of mangrove ecosystems and the importance of rehabilitation
b. Lack of local participation in planning and implementation of mangrove management
c. Most of the people living surrounding the mangrove ecosystem are poor
d. Environmentally-friendly activities have not developed yet
e. Population and economic growth have triggered land conversion and mangrove ecosystem destruction

3. Institutional issues

a. Lack of coordination between related institutions
b. Lack of synergy across sector regarding policy on mangrove management
c. Government and community institution for mangrove management exist but have not optimally functioned
d. Lack of capacity of central, regional and stakeholders in interpreting and implementing policy on mangrove management
e. Mangrove related data have not nationally integrated yet.

4. Legislation Issues

a. Regulation on mangrove ecosystem management has not yet been implemented and integrated optimally
b. Law enforcement on mangrove ecosystem management has not been effective yet

4.2.6. National Strategy of Indonesia's Mangrove Ecosystem Management

National Strategy for Mangrove Ecosystem Management in Indonesia stated in Presidential Decree No. 73/2012 provides the guidelines for local government (provincial, district/city) in the management of mangrove ecosystems appropriate with each regional characteristic.

This National Strategy aims to assist and to inform related stakeholders in the management of mangrove ecosystems, whose objectives are:

a. To improve the capacity of the parties in the management of mangrove ecosystems appropriate with the carrying capacity of the environment, and based on valid scientific data and information
b. To improve and to enhance the benefits and functions of mangrove ecosystems for life support systems

The stipulated National strategies for Mangrove Ecosystem Management are inspired by the Mangrove Charter, comprising:

a. Control the utilization and conversion of mangrove ecosystem based on the sustainability principles (no net loss)
b. Improve the function of mangrove ecosystems in biological diversity protection, coastal line and coastal resources protection, and improve the products as income sources for the state and community

c. Mangrove ecosystem management integrated with the coastal zone area and watershed management
d. Strong political commitment and support of the government (local government and related stakeholder)
e. Coordination and cooperation among institutions and stakeholders vertically and horizontally to ensure the implementation of the national strategies policy of mangrove ecosystems management
f. Community-based management to improve and to preserve the important values on ecological, economic and socio-cultural, in order to increase community's income and support a sustainable development
g. Increase the capacity of local government in implementing the authority and obligation on mangrove ecosystem management in line with local conditions and aspirations
h. Develop research, science, technology, and information systems needed to strengthen the sustainable management of mangrove ecosystem
i. Manage the mangrove ecosystem through collaborative partnership approach among government, local governments, businesses entities, and communities with the support of institutions and the international community, as part of efforts to achieve the global environmental commitment

4.3. MANAGEMENT OF MANGROVE ECOSYSTEM IN BINTAN DISTRICT

4.3.1. Forest Administration

The islands in Bintan district including Bintan Island with areas around 115,764 ha which is the largest island in this district are categorized as small islands whose area is less than 10,000 km^2 or 1,000,000 hectares based on the decree of Ministry of Marine and Fisheries No. 42/2000. Furthermore, based on this decree, small islands have limitations and characteristics such as having a number of endemic species, typical and high-value diversity, and relatively small catchment areas that causes most of their surface water and sediment flow into the sea. Small islands are also very vulnerable to changes in particular ecosystem changes.

The forests of Bintan district consist of three forest areas based on their function, i.e. Protected Forest (HL), Limited Production Forest (HPT) and Convertible Production Forest (HPK). Protected forest area has a specific

characteristic that is able to protect its surrounding areas as well as its downstream areas. Based on the criteria and on the basis of the existing laws, as well as with an adjustment to the development needs, hence the protected forest areas in Bintan district can be seen in Table 4.1 below:

Table 4.1. Location and Area of Protected Forest in Bintan District

Subdistrict	Protected Forest (HL)	Area (Ha)	%
1. Teluk Bintan	- HL Bintan Besar	± 280.00	6.51
2. Bintan Timur	- HL Sungai Pulai	±249.75	5.81
	- HL Gunung Lengkuas	± 1,071,80	24.93
3. Gunung Kijang	- HL Gunung Kijang	± 760.00	17.68
4. Teluk Sebong	- HL Bintan Kecil	± 308.00	7.16
5. Bintan Utara	- HL Sei Jago	± 1,629.60	37.91
Total		± 4,299.15	100,00

Source: The proposed of *Paduseradi (*harmonization of Consensus Forest Land Use Plan (TGHK) and the Provincial Level Spatial Planning Process (RTRWP)) of Riau Islands Province, 2010

The protected area serving to protect its downstream areas in Bintan district consists of water catchment areas and mangrove forest areas. In general, water catchment areas in Bintan district are included as a protected forest area and also along the Watersheds areas (DAS) of Busung Jago, Ekang Anculai, Cikolek-Kangboi, Galang Batang, and Bukit Lagoi. The local conserved areas are 8,848 hectares or 6.71% of the total area of Bintan, divided into 3 types: (1) coastal areas, (2) river basins and (3) artificial lakes.

Marine and other waters nature reserve areas are defined as the protection of marine and other waters nature reserve areas in order to protect biota diversity, ecosystem type, natural uniqueness for germplasm protection, tourism and scientific purposes. Based on the prepared plan, it is recommended that a marine and other waters nature reserve be located in the surroundings of Bintan and Tambelan island group. An exception to the above conditions is if any big potential for fishing or tourism area is identified and there are existing farming activities, then they should not affect negatively on the sustainability of the protected areas.

As for the uninhabited small islands with areas less than 10 hectares each will be stipulated as protected areas. This stipulation is caused by the restrictions in coastal areas and other protected areas, leading the area for cultivation to be very

small and not feasible because it is predicted that it could disrupt the ecosystem balancing.

Bintan district plans to stipulate the marine nature reserve zone in Tambelan as Marine National Park with an area of ± 1,212,214.75 hectares. In addition, there are also the Regional Marine Conservation Area (KKLD) and Marine Protected Areas (DPL), i.e. Tambelan and eastern coast of Gunung Kijang and East Bintan sub-districts.

Production forest area has a main function of generating forest products. The production forest area in the spatial planning of Bintan district falls into limited production forest (HPT), mostly in the mangrove forest. The stipulated areas are aimed to utilize forest products in limited scheme, in which the exploitation activities are carried out by selective logging and re-planting. The areas spread in sub-districts of Bintan Pesisir, Bintan Timur, Mantang, Teluk Sebong, Seri Koala Lobam, Gunung Kijang, Bintan and Teluk Bintan. Based on *Paduserasi*, the total areas of HPT in Bintan district are ± 9,019 hectares.

Up to now, HPK that has been released for non-forest activities in Bintan Island covering an area of 28.640,66 hectares, comprising:

(1) Integrated Tourism Area of PT Buana Megawisatama in Lagoi of 21,417.34 hectares (Mof decree No 687/Kpts-II/1997, October 10 1997);

(2) Industrial Estate of PT Surya Bangun Pertiwi in Lobam of 3,532.26 hectares (Mof decree No 686/Kpts-II/1997 October 10 1997);

(3) Pineapple Plantation of PT Sunny Mas Prima Agung in Subdistrict of Gunung Kijang of 3,691.06 hectares (Mof decree No 578/Kpts-II/1990 October 6 1990).

4.3.2. Direction and Development Policy of Bintan District

a. Vision of Bintan District

The Vision of Bintan district of year 2011-2015 is "**Towards a Developed, Prosperous, and Cultured Bintan**".

b. Mission of Bintan District

The mission of the Bintan local government in the period 2011 - 2015 is directed to achieve the vision. The following missions in 2011 – 2015 are:

1. To continue the efforts to improve the quality of human resources: intelligent, healthy, competitive, cultured and faithful and devoted to God Almighty
2. To achieve regional economic development based on the development of marine resources and fisheries
3. To continue the development of tourism and agribussiness potential
4. To continue the efforts to create good governance, democratic and responsible, supported by law certainty and human rights enforcement
5. To continue the fair and equitable development by increasing the quality and quantity of infrastructure and facilities that support the development in the entire Bintan
6. To continue the development and community empowerment efforts by adopting local knowledge and mainstreaming gender issues
7. To create an environmentally sustainable development

4.3.3. Spatial Plan of Bintan District

Regional regulation of Bintan district No. 2/2012 contains the spatial plan of Bintan district year 2011 – 2031. The spatial plan of Bintan, hereinafter mentioned as RTRW of Bintan district, is the spatial plans containing spatial structure and pattern plan of Bintan district. The spatial planning objectives are to create Bintan district as a Free Trade Zone on based on industry, tourism, marine, and fisheries through the Integrated Land Use Optimization and considering the Environmental Carrying Capacity.

Policies on Bintan Spatial plans consist of:

a. realization of Bintan development integrated with the small islands nearby
b. development of economic functions of Bintan to accommodate the needs of Bintan as a Free Trade Zone and Free Port (KPBPB);
c. utilization of natural resources potential to boost the regional economic development by infrastructure and supporting facilities provision;
d. optimizing the utilization of cultivated areas and protected areas in an efficient, harmonious, and balanced fashion, according to the needs of development and region capacity; and
e. increasing the function of the area for the national defense and security

Policy point (d) as defined above is carried out by the following strategies:

a. realization of the utilization of cultivated areas in an efficient, harmonious, and balanced fashion based on land suitability;

b. realization of protected areas on at least 30% percent of the total area in Bintan as appropriate with the ecosystem conditions;

c. restoring and improving the function of the declining protected areas due to the development of cultivation activities, in order to create and maintain ecological balance of the area;

d. maintaining and preserving the mangrove forests;

e. implementation of integrated efforts to preserve the environment function mainly in water catchment areas, coastal areas, rivers, lakes/artificial lakes, springs, marine areas;

f. prevent actions that may directly or indirectly cause physical changes on environment that create disturbances to environmental functions

g. control the natural resources utilizations wisely for the sake of present and future generations;

h. manage non-renewable natural resources to ensure their wise utilizations and renewable natural resources to guarantee their continuous availability through maintaining and improving their qualities and diversity.

One of the strategies above on point (d) of Article 6 is to maintain and preserve the mangrove forests areas. Obviously this strategy requires an extra attention from Bintan district government, particularly with the urgent needs of development in coastal areas. Reclamation plan, dam construction at a river mouth and resorts establishments in coasts with mangrove are challenges to maintaining and preserving the mangrove forest.

The regional Spatial Plan includes urban system plans and system network for infrastructure. On the development of urban system, the center of local activity is located in Bandar Seri Bentan, Tanjung Uban and Kijang. The center of Local Events Promotion lies in Teluk Sekuni. Service Center area is in Teluk Lobam, Kota Baru, Tembeling Tanjung, Kawal, Kelong and Mantang. The centers for environmental services are in Sebong Pereh, Malang Rapat, Kuala Sempang, Sri Bintan, Air Glubi, Mantang Baru, Berakit, Numbing, Penaga, Toapaya Selatan and Taopaya Asri.

Spatial pattern plans in Bintan district consists of the management of protected areas and cultivation areas. In the Article 66 of the Regional Spatial Regulation, it is mentioned that the general provisions of the zoning regulations for protected areas include: a. protected forest areas; b. catchment area; c. mangrove forest; d. coastal areas; e. river basins; f. areas surrounding natural and artificial lakes; g. marine reserves and others; h. and areas prone to natural disasters. General provisions of the zoning regulations for the cultivation areas consist of: a. production forest areas, b. agricultural areas; c. plantation areas; d. animal husbandry areas, e. fisheries areas; f. mining areas; g. industrial areas; h. tourism areas; i. residential areas, and j. other designation areas.

Mangrove ecosystem management as referred to Article 51 paragraph (2) is carried out by: a. Rehabilitation and protection of river basins and coastal areas, b. Stabilization and preservation of mangrove forests. General provisions of the mangrove forest area zoning regulations stipulate: a. prohibit doing farming activities that causes a decrease in the function of the area, b. prohibit poaching activities on protected wildlife, c. research activities and limited tourism are allowed in mangrove coastal areas.

4.4. POLICY ANALYSIS OF COMMUNITY FOREST (HKm), VILLAGE FOREST (HD) AND PARTNERSHIP MODELS

4.4.1. Strategies and Polices of Empowerment of Community Surrounding Forest Areas

Community empowerment policy is regulated in PP No. 6/2007 which was later revised to PP. 3/2008. This regulation mandates the empowerment of local communities that is primarily aimed to improve the community welfare through fair and optimal utilization of forest resources. The empowerment of rural forest communities has two main points that are considered very important, i.e. capacity improvement and providing access for surrounding community to the forest resources. According to these regulations, empowering the local community is an obligation of the government (central, province, and district /municipality) with the head of Forest Management Units (KPH) as the responsible party for its implementation.

Empowerment of rural forest communities come in three scheme types. The first type is Community Forest (HKm), the second is the Village Forest (HD) and the third is the Partnership Models. All the scheme types can be implemented in all

forest areas, except conservation areas which their empowerment model will be regulated in a separate regulation. To implement community development schemes mentioned before, the Ministry of Forestry issued Decree No. PP.37/Menhut-II/2007 concerning Community Forest and PP.49/Menhut-II/2009 about Village Forest. As for Partnership model, there is no implementation regulation up to now.

In order to support the acceleration of HKm and HD, MoF in 2010 also issued the revised government regulations concerning HKm and HD, i.e. PP. 13/2010 on HKm and PP. 14/2010 about HD. These revised regulations are aimed to simplify the license application procedures and the process of stipulation for HKm and HD areas.

Below scheme shows sets of legislation regulations related to HKm and HD schemes.

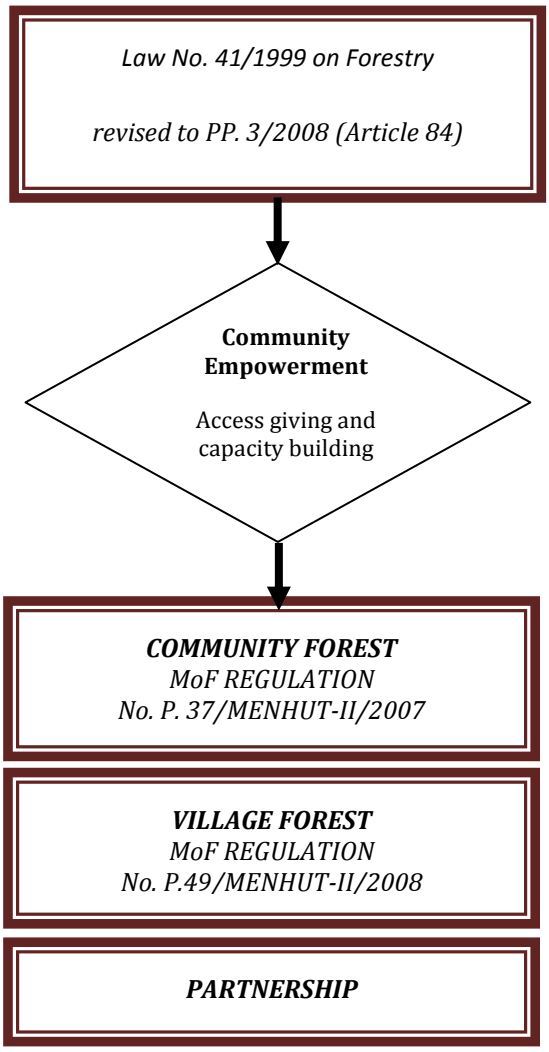

Figure 4.1. Set of Regulations related to Community Empowerment in Forestry Sector

For the above reason, local government plays a very important role in HKm and HD policy. As mandated on PP. 6/2007 (PP. 3 of 2008), local governments not only have the authority to issue the utilization permit but also obligate to facilitate the development of HKm and HD in the region, i.e. from the beginning of planning, initiation, supervising, recommendation and financing.

In the view of the central government, in this case MoF, such a significant role is deemed reasonable, because the local government is the political and administrative entity that is directly responsible for the community welfare. Therefore, HKm and HD programs should be viewed as opportunities to improve the community welfare, so the financing should be viewed as an investment, not as a cost. But in fact, the local government assumes HKm and HD program as a central (MoF) program. Thus, the funding – they argue – should be provided entirely by the central government. So far, some regions are willing to allocate budget for HKm and HD but it is in relatively small amount. The authority and obligations as mandated by Regulation 6/2007 have not automatically been able to encourage a proactive response to HKm and HD programs, although in substance local governments recognize that both programs provide a great opportunity for communities and forest conservation benefit. For local governments, the mandate from PP 6/2007 and other regulations for the implementation of HKm and HD are not considered to have the force of law structurally. For them, the structural policy which deemed to have the force of law is the product of a policy issued by Ministry of Home Affairs and/or President.

In general, policies that structurally have a force of law would be followed by program creating and significant amount of budget allocation. The policies of HKm and HD which are still structural is the major constraint to mobilize and consolidate large and cross-interest natural resources.

As a comparison, the National Movement for Forest and Land Rehabilitation Program (GERHAN) could mobilize and consolidate significant resources because it was supported by a strategic policy that has the same level as a presidential decree. A slow pace performance of HKm and HD, directly or indirectly, is closely related with constellation and strategic policies undertaken by MoF all this time. Policy options of HKm and HD are considered not strategic enough to be able to support large targets as declared since 2007, realization of 500,000 hectares per year of stipulated land for HKm and HD.

4.4.2. Implementation and License of HKm and HD

Implementation of the scheme HKm and HD as regulated in MoF regulations PP. 37/Menhut- II/2007 about HKm and PP No.49/Menhut-II/2008 about HD can be divided into 3 levels: First, the stipulation issued by central government (MoF). Second, the permit issued by regional government (regent for community forest and governor for village forest); Third, the field implementation carried out by community groups of the permit holders of community forest and village forest.

So far, various obstacles are found at at all levels, at central, regional as well as at the group level. The main constraints at the national level are related to the complexity of the license stipulation procedures, while issuance uncertainty of utilization permit by regent and or governor becomes an obstacle at region level. Meanwhile, the constraint at group level is a limited resources availability who can facilitate and assist community in developing and implementing operation plans of HKm and HD.

The common constraints found in Jakarta are many kinds of problems that are related to permit procedures on stipulation of HKm and HD. As regulated in both government regulations, the applications proposal regarding the stipulation of HKm and HD are submitted by local government to central government, in this case is MoF. The license application procedures are regulated as illustrated in two charts below. For both HKm and HD, the application procedures have to begin from the community groups as managing candidates.

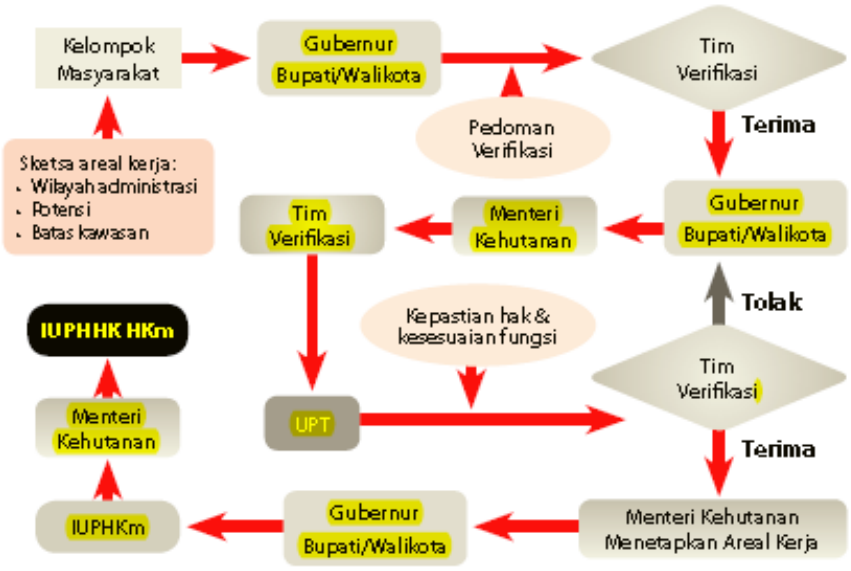

Figure 4.2. License Procedures of HKm

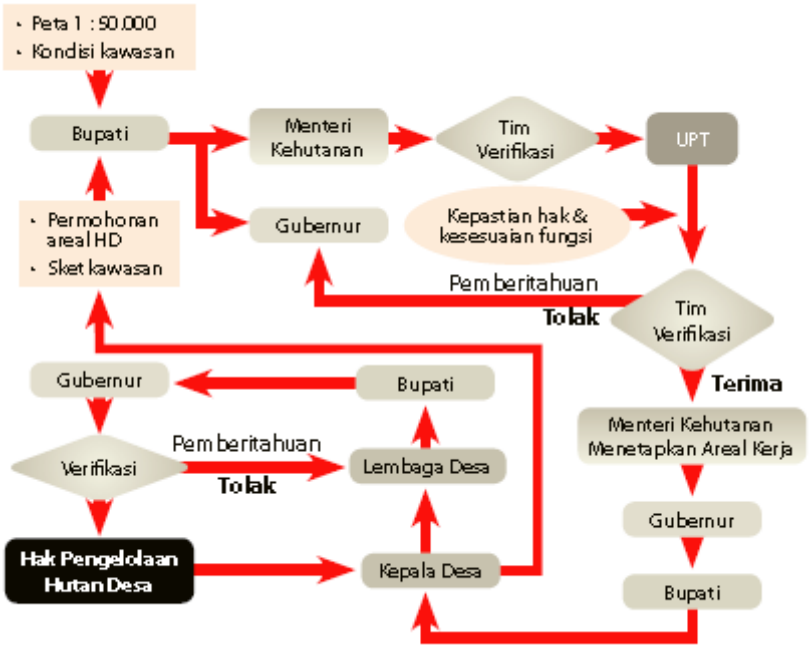

Figure 4.3. License Procedures of HD

The license process of the stipulation of HKm areas is regulated in Regulation of Director General No. 07/2009 stating that the permit for HKm stipulation takes at least 90 working days for issuance. This regulation was later revised by Regulation of Director General No. 10/2010 which shortens the permit services into 60 days. Meanwhile, the same deadline of 60 days is also applied for

HD which is regulated in the Regulation of Director General No. 11/2010. Mechanism and time frame of license application procedures are shown in the following chart:

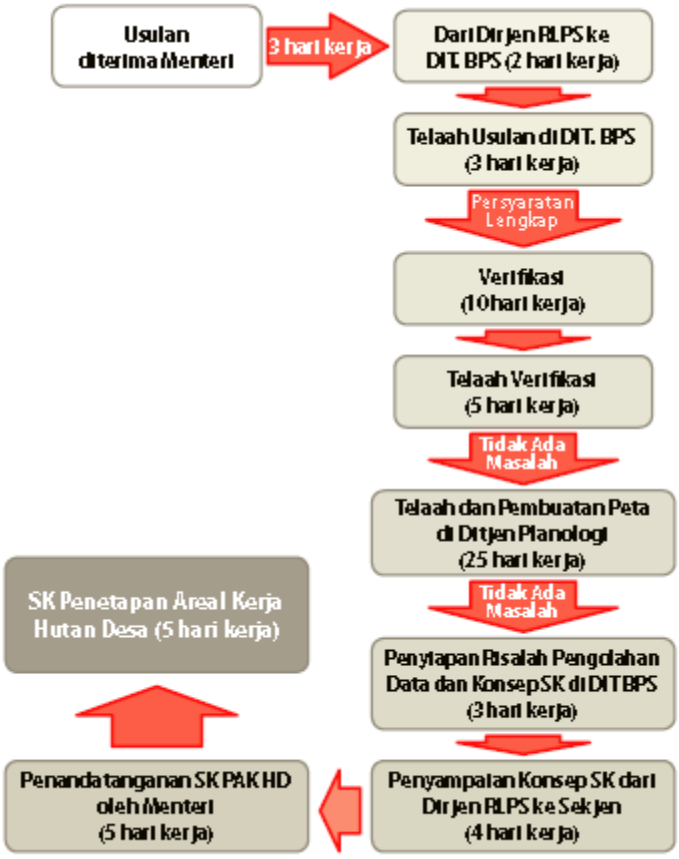

Figure 4.4. 60-Day Services Scheme of HKm and HD License Stipulation

However, in reality, the target of 90 or 60 days has never been achieved. So far, the time required to obtain a decree from MoF regarding working areas stipulation for HKm and HD is much longer than the targeted time as mentioned above. For example, the license process of the stipulation of HKm area requires 180 days (case in Lubuk Beringin, Jambi), and even 1,080 days (case in Merangin, Jambi). The fastest application process was mainly due to specific reasons such as the launching of HD program. Inefficient service for HKm and HD permits is caused by some obstacles that have not been overcome well so far.

Some of these obstacles are due to the use of bureaucratic mechanisms on license procedures that cause a long procedure. In detail, services for HKm license application procedures of HKm and HD in MoF consist of three stages: pre-

verification, verification and post-verification that take a long time and a long institutional path.

Another problem is that the services mechanisms have not been based on a measured check list yet, but still refer to certain opinions growing at public level. For instance, when peat land utilization became a media highlight, suddenly the MoF postponed the area stipulation process of HKm and HD that by coincidence were located on peatland forest areas, regardless that the proposal materials have been submitted for a long time. The same thing also occurred suddenly when an indication had appeared that the particular stipulated working areas of HKm and HD have been transferred unilaterally by community. Such opinions often occur with various issues and sometimes it is hard to verify the truth.

Weak coordination between institutions of different sectors/work units also become a constraint, whereas the licensing involves various sectors, e.g. social forestry, mapping, and law. Considering those reasons, therefore, although community forest and village forest have been stipulated by MoF as one of strategic priorities and programs, the reality on the ground just position HKm and HD as programs of the Directorate General of Watershed Management and Social Forestry (BPDAS-PS), causing lack of supports from other sectors.

Resources availability (human and financial) is limited, compared to planned targets. Limitation on human resources in particular is found at the stages of verification and mapping, whereas so far the proposed application of HKm and HD has only reached about 30 percent, fall far short of the official target of 500,000 hectares annually.

4.5. SUSTAINABILITY OF MANGROVE ECOSYSTEM MANAGEMENT IN BINTAN DISTRICT

4.5.1. Sustainability Status of Mangrove Ecosystem in Bintan District

Policies on the sustainable management of mangrove in Bintan district is required, considering that Bintan district consists of small islands that have important functions and benefits for life support systems of coastal areas, as well as the values of mangrove ecosystems existences needed for surrounding community.

The mangrove condition continues to undergo pressures, whether from land (pollution, destruction, and encroachment) and from the sea (abrasion and

contamination). Indications of the increasing pressure on the mangrove ecosystem can be seen from the decrease of mangrove areas, flooding caused by tidal flood, and decreasing of biological diversity.

The socio-economic of coastal community is also in a miserable condition due to limited space for settlement and employment. The population growth is increasing and the population density has achieved a high level.

On the other hand, mangrove areas in Bintan district are more attractive for the growth of modern settlement, business, tourist nature parks and tourism. This leads to the reclamation activities which if not implemented carefully could threaten the sustainability of mangrove ecosystems.

In response to obtain an optimal solution against the occurred impacts, it is necessary to apply sustainable development concepts. These concepts need to be applied in managing the mangrove areas in Bintan district so that their implementation can be sustainable.

In the framework of sustainable mangrove management in Bintan district, the sustainability criteria need to be concerned are that the sustainable areas should: not use the resources faster than its substitution ability, not pollute faster than the ability to neutralize naturally, increase people income and regional economic growth, and decrease the gaps and conflict potential, as well as involve all parties.

The scoring of sustainability status is based on 49 attributes through data and stakeholders' opinions. The analysis results show that the management of mangrove areas in Bintan district has not been sustainable yet. Out of five analyzed dimensions in determining the sustainability status of mangrove management in Bintan district, all the five dimensions are categorized as unsustainable (score < 75), i.e. dimensions of ecological, economic, social, institutional, and technological.

The score of ecological dimension with eleven attributes is 39.6, categorized as not sustainable. The following are some identified conditions:

(1) An increase level of water contamination or a decline in water quality of mangrove areas and other fresh water due to poor environmental sanitation

(2) Conservation functions do not run well yet. Irresponsible mangrove utilization occurs until now, i.e. timber harvesting, some land is utilized for settlement,

resort, reclamation activities, also indicating an increased pressure on mangrove ecosystem

(3) Erosion and sedimentation that still occur in some mangrove coastal areas

(4) An increase of global warming impacts perceived by an increase of tidal flooding intensity, an increase of inundation in some locations, and sea water intrusion increasingly heading upstream

The score of economic dimension with eleven attributes is 38.18, categorized as unsustainable. This is indicated by lack of government budget, low employment related to mangrove, high poverty level, and low income.

The score of social dimension with ten attributes is 46.40, categorized as unsustainable. It is caused by lack of community awareness, policies have not fully supported community welfare, and lack of community participations in mangrove management.

The institutional dimension with 9 attributes has a score of 47.11, categorized unsustainable. It is caused by separated mangrove management – or still lack of synergy – among related institutions. Several measures to integrate mangrove areas management planning and institutions have not shown maximum results. Besides, there are lacks of coordination between institutions. Specific strategies regulating the management of mangrove have not existed; leading to its management has not been optimal yet. Some of the driving factors of the situation are sectoral egoism in each actor, fear of loss of role (for government institution), increase in management costs (for private), and dependence in managing their own land, and decline in obtained results. In other words, the absence of institutions that integrate the management of mangrove or weak coordination, lack of program synergy among stakeholders, and partial visions and strategies of mangrove management among stakeholders have triggered unsustainability in the institutional dimension of the mangrove management in Bintan district.

The technological dimension has a score of 49.33 from nine attributes, considered unsustainable. It is caused by inadequate use of seawater intrusion prevention technology and inadequate waste treatment technology. Figure 4.5 illustrates the sustainability status of mangrove area management in Bintan district.

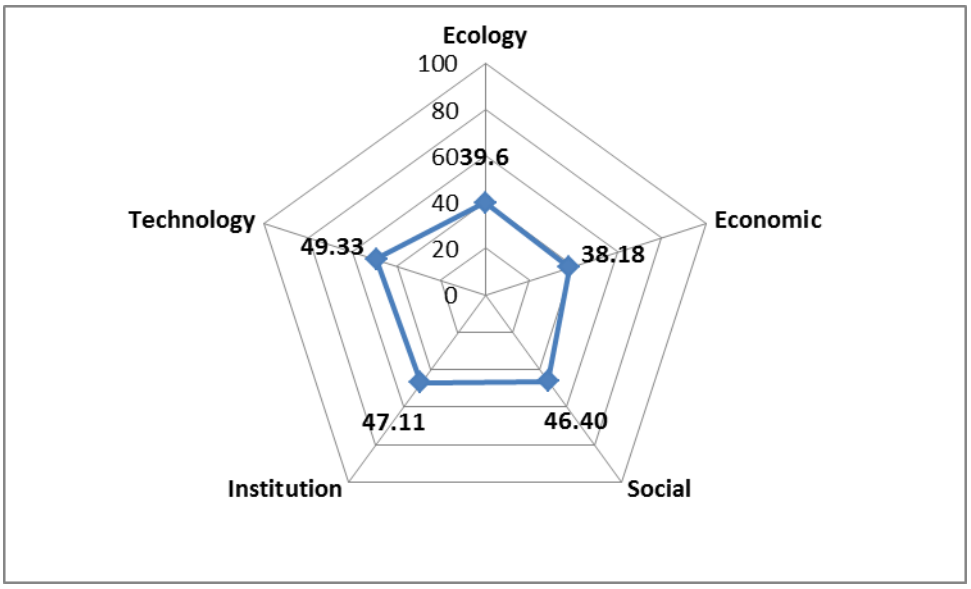

Figure 4.5. Sustainability Status of Mangrove Management in Bintan District

Based on the analysis of the five dimensions that determine the sustainability status of mangrove management in Bintan, it was identified that unsustainable management are more influenced by weak institutional coordination among responsible institutions; high environmental pressures in the forms of erosion and sedimentation, liquid and solid waste, tidal flooding, sea water intrusion; social pressures (poverty, lack of awareness and participations) as well as lack of development of various technologies concerning mangrove management.

4.5.2. Leverage Factors of the Sustainability of Mangrove Management in Bintan District

(1) Ecological Dimension

The management of Bintan mangrove ecological dimensions needs to be conducted by paying attention to the attributes acting as leverage factors, for efficiency and effectivity purposes. Out of eleven attributes, the leverage factors that need to be concerned by the government are high pressures on the mangrove existences either by conversion or for other uses, high abrasion, not-optimal conservation functions, poor environmental sanitation, and sedimentation.

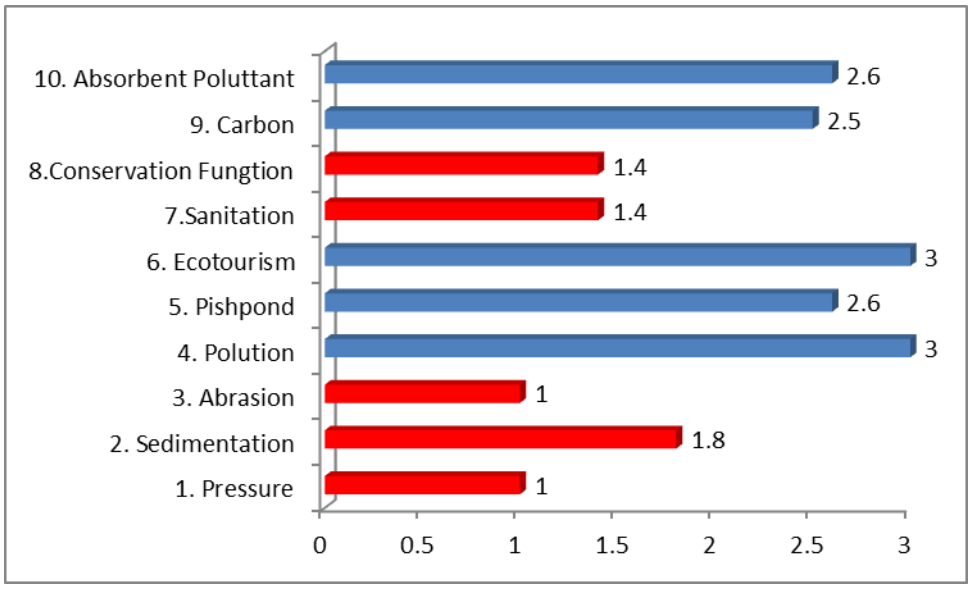

Figure 4.6. Attributes of Ecological Dimension which being Leverage Factors of the Sustainability of Mangrove Management in Bintan District

Maintenance of rivers and city drainage is still not optimal, causing tidal-flooded and inundated areas can still be found, particularly in high tides. Accumulations of household waste at rivers mouths and in the rivers themselves have reduced water drainage capacity. In addition, issues related to flood controlling are related to facilities and infrastructures provisions (polders, drainage canals, and so on).

(2) Economic Dimension

The sustainability index for economic dimension has a score < 75.0 and is categorized to be unsustainable yet. Of the 11 attributes of economic dimensions that define the management sustainability, there are six attributes that are leverage factors. These factors are the limited government budget, limited employment directly related to mangrove management, undevelopment of community-based programs such as HKm and HD, poverty, direct/indirect benefits unknown to stakeholders, and optimally unexploited tourism potential (see Figure 4.7.).

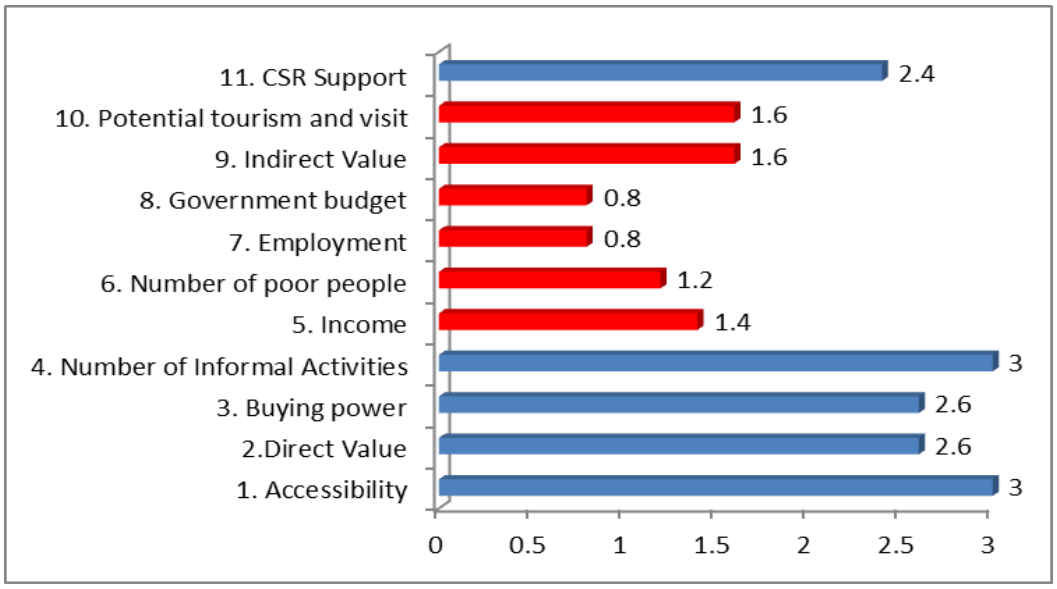

Figure 4.7. Attributes of Economic Dimension which being Leverage Factors of the Sustainability of Mangrove Management in Bintan District

The budget needed for Bintan mangrove comes from the state (central government) and local (district and provincial governments) budget. The current state budget is not adequate for sustainable management activities. This is because the conditions of management infrastructure, human resources, management services, areal maintenance, and management coordination have not been optimal, and it still needs a lot of budget to address the demanding needs of the community. Inequality between the current management conditions and the demands for sustainability is still high. Therefore, the current state and local budgets need to be increased, including private sector roles in supporting the sustainable mangrove management.

(3) Social dimension

The social dimension has not been sustainable, with its sustainability index of < 75.0. Therefore, the management of the economic dimension of Bintan mangrove needs to be conducted by concerning leverage factors for efficiency and effectiveness purposes. In this study, there are 11 attributes that define the social dimension of sustainability management and three attributes as leverage factors, i.e. low public awareness, low community participation in mangrove management, and the existing polices have not yet accommodated the interest for improving the community welfare (see Figure 4.8.).

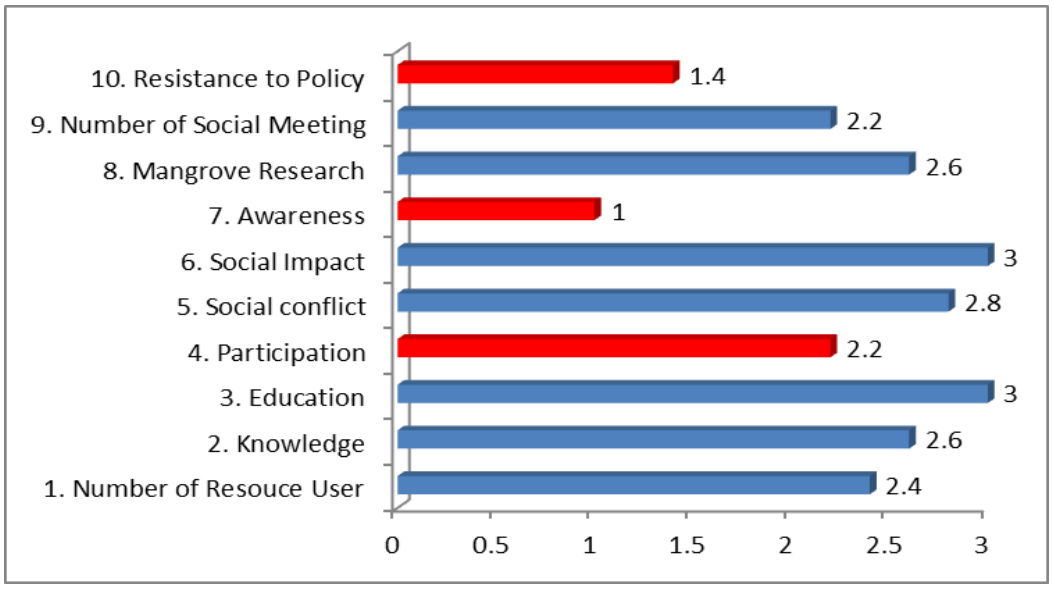

Figure 4.8. Attributes of Social Dimension which being Leverage Factors of the Sustainability of Mangrove Management in Bintan District

(4) Institutional dimension

The institutional dimension has not been sustainable, with its sustainability index of < 75.0. Therefore, the management of the economic dimension of Bintan mangrove needs to be conducted by concerning leverage factors for efficiency and effectiveness purposes. In this study, there are nine attributes that define the institutional dimension of sustainability management and three attributes as leverage factors, i.e. low law enforcement, low areal legality, and the lack of programs integration (see Figure 4.9.).

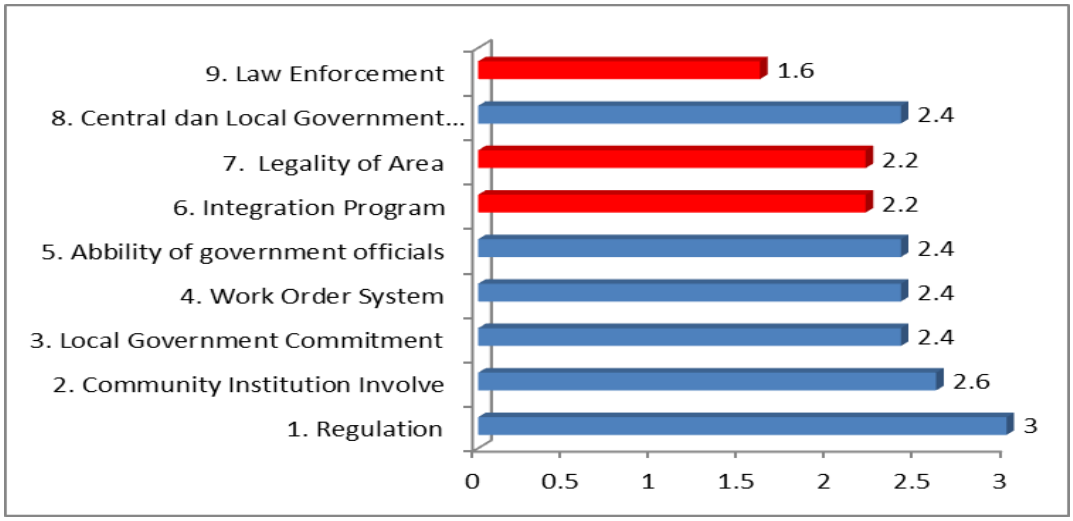

Figure 4.9. Attributes of Institutional Dimension which being Leverage Factors of the Sustainability of Mangrove Management in Bintan District

The program integration is a constraint in Bintan considering the absence of institutions that specifically manage the mangrove, i.e. working group at regional level as mandated in Presidential decree No. 32/2012. In this Presidential Decree, the working group formulates strategy on regional mangrove management and in Bintan this strategies have not been formulated yet.

(5) Technological dimension

The technological dimension has not been sustainable with its sustainability index of < 75.0. Therefore, the management of the economic dimension of Bintan mangrove needs to be conducted by concerning leverage factors for efficiency and effectiveness purposes. In this study, there are nine attributes that define the technological dimension of sustainability management and four attributes as leverage factors, i.e. intrusion mitigation technology, waste management, contamination mitigation, and technologies to prevent and mitigate abrasion and (tidal) flooding.

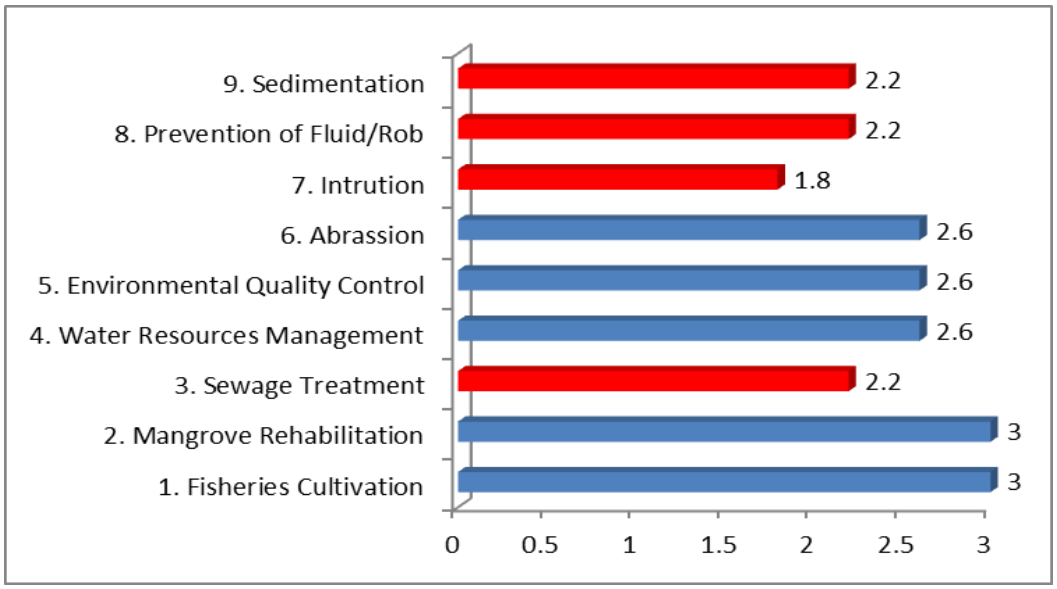

Figure 4.10. Attributes of Technological Dimension which being Leverage Factors of the Sustainability of Mangrove Management in Bintan District

V. STAKEHOLDER ANALYSIS ON THE MANAGEMENT OF MANGROVE IN BINTAN DISTRICT

5.1. PRELIMINARY ANALYSIS

The first step in stakeholder analysis is to create a list of stakeholders that includes all relevant stakeholders related to Bintan's mangrove management, from international to local levels. At this stage, all those who affect and are affected, either directly or indirectly, from varying levels are included in the list. The results of preliminary identification were listed in Table V-1.

Table V-1. Potential Stakeholders Identified related to Mangrove Ecosystem Management in Bintan District

Institutional level	Stakeholders
International	1. UN/UNEP 2. ITTO 3. Global Community 4. International Non-Governmental organizations (NGOs)
National	Central Government
Province	Government of Riau Islands Province
District	1. Regional Representatives Council (DPRD) of Bintan District 2. Regent of Bintan District 3. Development Planning Board (BAPPEDA) of Bintan District 4. Regional Revenue and Financial Management Agency of Bintan District 5. Forestry and Agriculture Agency of Bintan District 6. Fisheries and Marine Agency of Bintan District 7. Regional Environment Board of Bintan District 8. Tourism and Cultural Agency of Bintan District 9. Cooperative, Small and Medium Enterprises, Industry and Trade Agency of Bintan District 10. Community and Women Empowerment and Family Planning Board of Bintan District 11. Police Office of Bintan District 12. Universities 13. NGOs 14. Press/Media
Subdistrict	Subdistrict Leadership Assembly (Muspika)
Local	1. Local Government 2. Village Consultative Board (BPD) 3. Community Groups 4. Community Organizations 5. Services Providers
Private	Business Entities

5.2. ANALYSIS OF STAKEHOLDER INTERESTS

Stakeholders associated with the management of mangrove ecosystems in Bintan can be classified into three groups, i.e. direct primary stakeholders are stakeholders that receive direct benefits; indirect primary stakeholders are stakeholders that receive indirect benefits; secondary stakeholders are stakeholders that are not included in the first two groups, but have an interest. The classification of stakeholders' interest can be seen in Table V-2.

Those categorized as direct primary stakeholders are at the level of local community. Local community obtains benefits both directly and indirectly from the existence of mangrove ecosystem in their areas. The obtained direct benefits are such as employment opportunity, training, supervising, stimulants, education/training facility, and share benefit. Thus, the conditions, government policy, and local government would greatly affect the community interests on mangrove management in this area. The village government is also classified into direct primary stakeholders through the absorbing of local workforce that would affect as an increase to the community income.

Indirect primary stakeholders are such as services providers, traders and local government. Services providers obtain benefits of business opportunities due to the existence of management and utilization of mangrove, creating the surrounding economic growth would be developed. Furthermore, traders would also gain benefits due to the variety of mangrove management-based businesses. Thus the utilization would be developed and traders could reap profits. Local government would also receive indirect benefits through the paid tax of existing utilization business, reduced unemployment number, and local economic development.

Secondary stakeholders are such as universities and international communities. Universities do not obtain direct benefits but have an interest in the existence of mangrove ecosystem, such as associated with sustainable mangrove management and research so that mangrove management could be in line with principles of sustainable natural resources. Similarly, although the international communities do not obtain directly and indirectly any benefits, they have an interest in the mangrove sustainability. International communities' interests are, for example, aspects of environmental sustainability, workforce protection, human right protection, etc.

Stakeholders have variety of interests in mangrove ecosystem management in Bintan. To make easier analysis, only the main interests are included so that it is easier to determine the levels of interest and influence. The levels of interest and influence of stakeholders were presented in Table V-2.

Table V-2. Stakeholders and their Main Interests on Mangrove Ecosystem Management in Bintan District

Stakeholders	Main Interest	Perception
I. Direct Primary		
Local Government	1. Employment opportunity 2. Poverty alleviation through alternatives livelihoods 3. Revenue sources for village's treasury 4. Facilities establishment	Support
Village Representative (BPD)	5. Employment opportunity 1. Poverty alleviation	Support
Community/Community Groups	1. Socio and economic benefits 2. Livelihood (socio, economic, and basic needs)	Support
II. Indirect Primary		
Regent	Administrative areas management Success on leadership and political supports	Support
Non-Sectoral Board of Local Government (BAPPEDA, Research & Development Board (Litbang), Community Empowerment, Economic Division, Law Division)	Regional Development and Community Empowerment	Support
Local Government Task Force (SKPD) of Bintan District	Mangrove management in each sector	Support
Local NGOs	Program cooperation Material and non-material supports	Support
III. Secondary		
Central Government	Revenue from taxes Sustainability development National stability	Support
Security Officers	Areas secured Security working task, security operations patrol	Support
Universities	Sustainable mangrove management,	Support

Stakeholders	Main Interest	Perception
	research, technology and information transfer, field practice area	
National and International NGOs	Social control Program cooperation	Support
Mass Media	News sources and social control	Support
International Community	Environment management, community empowerment, and human rights protection	Support

Once the interest and influence are identified, the next step is stakeholder mapping based on interest level, involvement and influence level of mangrove management. Table V-3 is the matrix mapping of the levels of influence and interest.

Table V-3. Stakeholder's Map by Interest and Influence on Sustainable Mangrove Ecosystem Management

No	Stakeholders	Stakeholders mapping			
		High interest – low influence (Column A)	**High interest – high influence (Column B)**	**Low interest – low influence (Column C)**	**Low interest – high influence (Column D)**
1	UN				√
2	ITTO				√
3	Global Community				√
4	International NGOs				√
5	Ministry of Home Affairs		√		
6	Ministry of Forestry		√		
7	Ministry of Marine Affairs and Fisheries		√		
8	Ministry of Environment		√		
9	National Land Agency (BPN)				√
10	Government of Riau Islands Province		√		
11	DPRD of Bintan District				√
12	Regency of Bintan District		√		
13	BAPPEDA of Bintan District		√		
14	Regional Revenue Agency (Dispenda) of Bintan District	√			
15	Forestry and Agriculture Agency of Bintan District		√		
16	Fisheries and Marine		√		

No	Stakeholders	Stakeholders mapping			
		High interest – low influence (Column A)	**High interest – high influence (Column B)**	**Low interest – low influence (Column C)**	**Low interest – high influence (Column D)**
	Agency of Bintan District				
17	Regional Environment Board of Bintan District		√		
18	Tourism and Cultural Agency of Bintan District		√		
19	Cooperative, Small and Medium Enterprises, Industry and Trade Agency of Bintan District		√		
20	Community and Women Empowerment and Family Planning Board of Bintan District		√		
21	Police Office of Bintan District				√
22	Universities				√
23	NGOs				√
24	Press/Mass Media				√
25	Subdistrict Leadership Assembly (Muspika)		√		
26	Village Government		√		
27	BPD		√		
28	Community/community groups		√		
29	Community organization and youth organization		√		
30	Services providers	√			
31	Private entities		√		

In column A, there are stakeholders with high interest but low influence such as regional revenue and financial agency as well as services provider. For instance, this agency has an interest to earn local revenues but has relatively small influence.

In column B, there are stakeholders with high interest and high influence such as Ministry of Home Affairs, Ministry of Forestry, Ministry of Marine Affairs and Fisheries, Ministry of Environment, Government of Riau Islands Province, regent, Development Planning Board (Bappeda), Local Government Task Force (SKPD), subdistrict government, village government, regional development bank, surrounding community, and community organization. For this stakeholders group,

a good coordination is required to achieve an integrated mangrove management for increasing the local revenues (PAD) and regional development. On the other side, the regent also has high influence due to authority and political power.

Column D presents stakeholders with high influence but low interest, such as United Nations (PBB), National Land Agency (BPN), Local House of Representatives (DPRD), international communities, national and international NGOs, security officials, universities, and press/mass media. It can be interpreted that stakeholders' interest in this groups is not the target of the activities of achieving the activity objectives. This stakeholder group is deemed as a source of risk of the activities failures. For example, mass media has not a direct interest on mangrove management; however its role in informing the news would be very influential in creating a public image. Similarly with the universities, although they do not have a direct interest, but the scientific research and assessment would greatly influence the mangrove management in Bintan district.

Column C lists stakeholders with low level of interest and influence. Usually, this group does not need to be intensively involved in achieving the activity objectives, but if possible it requires to be monitored and evaluated periodically to identify its interest level development. However, this stakeholder is not a priority.

VI. CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

1. The total area of mangrove in Bintan District is 7,956 hectares that is potential in its development. Most of the mangrove area is in protected areas, therefore its utilizations should be limited into such utilizations as environmental services, ecotourism and non-timber forest products.
2. The important values of mangrove management in Bintan are more directed to the considerations of environmental improvement, biological resources conservation, and sea laws. This could be seen from some policies at national level, e.g. existing laws, government regulations, and presidential decrees. The latest mangrove management policy which is comprehensively mandated stakeholders to formulate a strategic plan in mangrove ecosystem management is Presidential Decree No. 73/2012. In regard to community-based mangrove management plan, there are some proposed community-based schemes, such as HKm (Regulation of MoF No. 37/2007) and HD (regulation of MoF No 49/2009). However, a policy implementation analysis study resulted that HKm and HD schemes have not optimally worked in particular in the license service schemes.
3. Up to now, Bintan's mangrove management has not been sustainable yet on aspects of ecology, economic, social, institutional, and technology, because from an assessment of 49 attributes, the score resulted is less than 75. According to a sustainability analysis on the mangrove management in Bintan, the following score results for each dimension are: ecological (39.6), economic (38.18), social (46.40), institutional (47.11), and technological (49.33).
4. There are 31 stakeholders on mangrove management in Bintan, from governmental institutions, local government, NGO, university, community institutions, international institutions (levels of international, national, provincial, district/city), to community groups. Based on the identification results of role and interest, stakeholders can be categorized into:
    a. Stakeholders with high interest but low influence such as regional revenue and financial management agency as well as services provider

b. Stakeholders with high interest and high influence, such as Ministry of Home Affairs, Ministry of Forestry, Ministry of Marine Affairs and Fisheries, Ministry of Environment, Government of Riau Islands Province, regent, Development Planning Agency (Bappeda), Local Government Task Force (SKPD), subdistrict government, village government, regional development bank, surrounding community, and community organization

c. Stakeholders with high influence but low interest, such as United Nations (PBB), National Land Agency (BPN), Local House of Representatives (DPRD), international communities, national and international NGOs, security officials, universities, and press/mass media.

d. Stakeholders with low levels of interest and influence.

6.2. RECOMMENDATIONS

1. As mandated in Presidential Decree No. 73/2012, strategic plans for mangrove ecosystem management in Bintan district needs to be formulated by considering potential conditions (physical, socioeconomic, and culture), existing policies and regulations, problems identifications (analysis of management sustainability dimension), and stakeholder supports.
2. To support the implementation of the strategic plans for regional mangrove ecosystem management, the followings need to be strengthened:
   a. Institutionality on mangrove management, by establishing the local mangrove working groups and formulating the strategic plans for community-based mangrove ecosystem management in Bintan district
   b. Encourage community-based mangrove management unit (HKm and HD) with still taking care of its sustainability, such as for tourism, food alternatives, environmentally friendly cultivation (floating net cage (KJA), crab trap, Soft Shell Crab, etc), environmental, etc.