



STUDY ON SOCIO-ECONOMIC COMMUNITY-BASED MANGROVE ECOSYSTEM MANAGEMENT AT BINTAN REGENCY – RIAU ISLANDS PROVINCE JULY 2013

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*

DIRECTORATE GENERAL OF WATERSHED MANAGEMENT AND
SOCIAL FORESTRY DEVELOPMENT
MINISTRY OF FORESTRY





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I. INTRODUCTION

I.1. Background

Indonesia is an archipelago consisting of 17,500 + islands, with a very long coastline of about 95.181 km, Indonesia has a condition that causes a complex problem in extending the area of the beach. In the management of the coastline outside the forest area is managed by a multi-stakeholder, such as the Ministry of Public Works, Ministry of Forestry, Ministry of Maritime and Fisheries, Ministry of Home Affairs, Provincial Government, District Government and other parties. Shoreline areas in Indonesia consisting of mangrove ecosystems, coral reefs, seagrass beds and coastal forest vegetation. Ministry of Forestry considers coastal areas as part of the Watershed (DAS) which is dominated by the downstream mangrove forest and coastal vegetation / forest.

Indonesia as an archipelago consisting of 28 major islands and 92 smaller outer islands , so it has the potential for considerable mangrove spread in 257 districts / cities and 32 provinces. Based on the results of the inventory and identification conducted in 2006 by the Directorate General of Land Rehabilitation and Social Forestry (RLPS) , Ministry of Forestry , Indonesia's mangrove forests cover an area of more than 7.7 million ha spread across the island of Sumatra : 4,174,041 ha , Java : 338 243 ha , Bali , West Nusa Tenggara and East Nusa Tenggara : 61 214 ha , Sulawesi : 201 266 ha , Kalimantan : 1.3733 million ha , Maluku and Papua : 1,610,343 ha . Mangrove areas continue to decline, a result of lack of attention to the aspects of management and utilization. Of the total area of mangroves in Indonesia, 7.7 million ha, 3.25 million ha (41.9 %) suffered serious damage to an area of 2.13 million ha (27.4 %) out of order and only 2.38 million ha (30.7 %) in good condition. Approximately 70 % of mangrove ecosystems damaged by conflicts of land ownership, land conversion of mangroves into fishponds and other use, licensing conflicts; also use mangrove wood and crop.

Mangrove forests have many functions. Mangrove forests prevents abrasion (Kathiresan and Bingham, 2001); reduce tsunami impact (Brown, 2004); ecosystems for flora and fauna

(Feller and Sitnik, 1996). Kirui, et al. (2006) explains that an important function is as a place of mangrove carbon traffic. Macintosh and Ashton (2002) suggest conversion of mangroves into fishponds and more and more the case that led to the shrinking of the mangrove forest area in Indonesia.

Mangrove forest is one of the coastal resources which play an important role in development. See symptoms of mangrove forest destruction for various purposes such it was necessary to sustainable management of mangrove ecosystems. To be able to do the sustainable mangrove ecosystem management necessary socio-economic baseline data on the community as a mangrove ecosystem management and strategic value of the presence of mangrove ecosystems for the benefit of all stakeholders, especially the local community.

I.2. Objective

The objective of the implementation of this study is to collect data and complete and valid information related to community-based management of mangrove ecosystems in Bintan regency, Riau Islands Province. Results of this study will be used as one of the reference materials for the preparation of the draft policy on community-based mangrove ecosystem management Bintan regency, Riau Islands Province.

I.3. Output

The output of this study is the availability of data and information about community-based mangrove ecosystem management through the collection of data and information on the socio-economic conditions of the community in Bintan regency, Riau Islands province, particularly in the study location.

II. METHODS

II.1. Location Study

The study was conducted in 8 villages, the Busung village, Kuala Sempang village, Penaga village, Pengujan village, Bintan Buyu village, Tembeling village, Mantang Baru village and Sebong Lagoi village. Special to the Sebong Bintan village, this study focused on the location of PT Bintan Resorts Cakrawala (BRC) or referred to the Bintan Resorts. The eight locations spread across 3 districts and 4 at Bintan island (Table 1 and Figure 1).

Table 1. Location study on socio-economic of community-based mangrove ecosystems management in Bintan regency, Riau Islands Province.

| No | Name of Village | Sub-district | Island |
|----|-------------------------------|------------------|----------|
| 1 | Busung | Seri Kuala Lobam | Bintan |
| 2 | Kuala Sempang | Seri Kuala Lobam | Bintan |
| 3 | Penaga | Teluk Bintan | Penaga |
| 4 | Pengujan | Teluk Bintan | Pengujan |
| 5 | Bintan Buyu | Teluk Bintan | Bintan |
| 6 | Tembeling | Teluk Bintan | Bintan |
| 7 | Mantang Baru | Mantang | Mantang |
| 8 | Sebong Lagoi (Bintan Resorts) | Teluk Sebong | Bintan |

Study site selection was based on several factors, including the condition of the mangrove ecosystem, socio-economic conditions of the community, the potential development of mangrove ecosystems, as well as the encouragement of communities to manage community-based mangrove ecosystem through community forestry program (*Hutan Kemasyarakatan/HKm*) and Village Forest (*Hutan Desa/HD*).

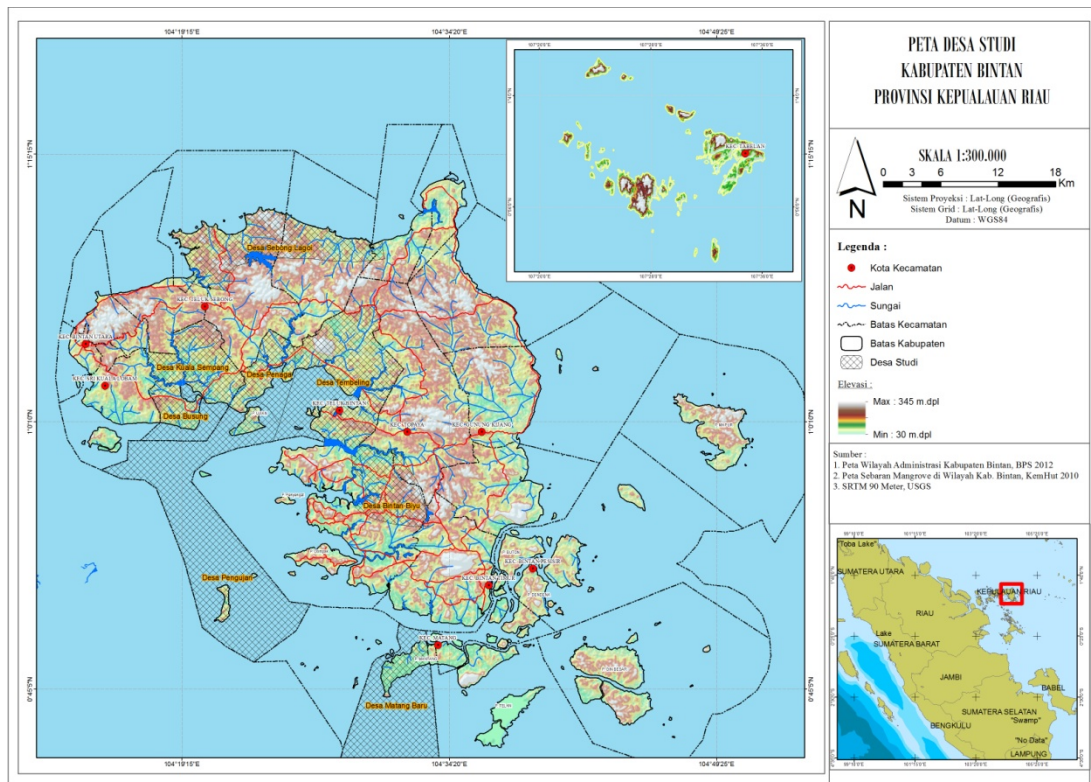


Figure 1. Map location of study in Bintan regency, Riau Islands province.

II.2. Time Frame

The activities conducted in May-July 2013, which starts from the preparation of studies, field visits, and preparation of reports. Secondary data collection conducted in Jakarta/Bogor and on-site assessment. Field trips done in 2 stages during the project period:

1. Stage 1 (16 – 18 May 2013).

At this stage the review team to collect secondary data from various government agencies such as the Watershed Management Center (BP DAS) of Riau Islands province, Department of Agriculture and Forestry of Bintan regency, Department of Marine and Fisheries of Bintan regency, Community Development Agency of Bintan regency, The Environment Agency of Bintan regency, Central Bureau of Statistics, and some other relevant government agencies. The study team also conducted interviews with government officials and community leaders in several rural villages such as in the village such as in Busung village and Kuala Sempang village. In

addition, the review team also visited some mangrove areas are managed by the community in Busung village and Kuala Sempang village.

2. Stage 2 (7 – 11 June 2013)

The second stage is a continuation of Phase 1 visit. The purpose of this second phase of the visit is more focused on collecting primary data by conducting interviews and focused group discussion (FGD) with community and several local government agencies in 8 village studies. FGD at Busung village attended 67 participants comprising representatives of the Busung villagers and Kuala Sempang village and also representatives of several local government agencies such as the Watershed Management Center (BP DAS) of Riau Islands province, Department of Agriculture and Forestry of Bintan regency, Department of Marine and Fisheries of Bintan regency, Community Development Agency of Bintan regency, The Environment Agency of Bintan. Meanwhile , in Pengujan village, FGD followed by 50 participants consisting of community representatives from Pengujan village, Penaga village, Tembeling village and Bintan Buyu village, as well as representatives of several local government agencies such as the Watershed Management Center (BP DAS) of Riau Islands province, Department of Agriculture and Forestry of Bintan regency, Department of Marine and Fisheries of Bintan regency, Community Development Agency of Bintan regency, The Environment Agency of Bintan. FGD in Mantang Baru village attended by 15 participants from community representatives, government officials of village and government officials of sub-district.

While in Sebung Lagoi village (Bintan Resorts), FGD were attended by 7 participants from the tour manager of PT Bintan Resorts Cakrawala (BRC). Special to the Sebung Lagoi village, study team made a visit to Bintan Resorts as one of the tourist sites to obtain data and information on experiences and lessons learned from the manager of Bintan Resorts in managing the mangrove ecosystem as a tourist destination. The study team also visited several locations mangrove ecosystems that are managed by the community in the study villages.

II.3. Data Collection Method

II.3.1. Primary Data Collection Methods

To obtain a description of data and information for the social aspect, it is necessary to collect primary data through data mining by category descriptive assessment survey method through observation and interviews. For interviews with villagers and representatives of local government agencies, the selection of respondents was calculated using the selected sample (purposive sampling). This method was chosen to achieve the level of representation of the object to be assessed and able to represent the information extracted from the object.

The stages of data collection for social secondary are:

- In-depth interviews (in-depth interview). This activity is conducted to collect data and information directly to the respondents who have a fairly high heterogeneity of the problems being faced. Questionnaires prepared to guides the assessor asks questions relevant to respondents.
- Focused Group Discussion (FGD). This method is carried out to establish the facts through a larger group and get the important variables of the problem are being explored. FGD is also used as a tool to verify some of the findings made during the interviews and field observations. FGD purpose of which is to identify and explore information about the beliefs , attitudes and behavior of certain groups with specific issues , generate ideas for more in-depth study and cross checked against data from other sources or by other methods.
- Field observations. These activities include direct observation of the facts in the field and connected with the question or hypothesis that has been formulated.

The discussions at the FGD in some villages the studies are presented in Figure 2, Figure 3 and Figure 4.



Figure 2. FGD at Busung village and Kuala Sempang village, held in Busung village.



Figure 3. FGD at Pengujan village and Penaga village and Bintang Buyu village, held in Pengujan village.



Figure 4. FGD at Mantang Baru village.

II.3.2. Secondary Collection Methods

Secondary data drawn from sources directly related to the main topic of study, such as:

- Map the location of the study;
- The results of the study and from previous studies;
- Document the social, economic and cultural obtained from various parties: the government, NGOs, educational institutions, and research institutes;
- Central Bureau of Statistics (Province in Figures, Regency in Figures, Sub-District in Figures)
- Monograph villages;
- Questionnaires and recorder/recorder.

II.4. Data Analysis Methods

II.4.1. Sustainable Livelihood Analysis

Sustainable livelihoods analysis methods (sustainable livelihood) used in this study are based on Livelihoodyang Sustainable Framework developed by the Department for International Development (DfID) or also called Pentagon Asset. Based on the Sustainable Livelihood Framework, there are five sources of life possessed by every individual or social unit in its efforts to develop its life, that is :

1. Human capital: owned capital in the form of skills , knowledge , labor , and health;
2. Social capital: community-owned social wealth such as network, membership of groups, relationships based on trust which encourages the exchange of rights to cooperatives and also reduce transaction costs as well as the basis of a system of informal social safety net;
3. Natural capital: the stock of natural resources such as land, forests, water, air quality, protection against erosion, biodiversity, and others;
4. Physical capital, is the basic infrastructure of roads, irrigation channels, means of communication, sanitation and adequate water supply, access to communication, etc.
5. Financial capital: the financial resources that are used by community to achieve life goals such as cash , inventory and distribution of regular money .

II.4.2. Local Institutional Methods

Based on Afiff (2007), there are four dimensions of institutions developed in the context of the management and utilization of forest -based communities. The four dimensions are (1) tenurial arrangement, (2) land tenure arrangement, (3) production arrangement, and (4) consumption arrangement.

1. Development of institutions associated with tenurial arrangement and land tenure. Any certainty of access to and control over land and forest resources is the most significant issue raised in the many programs that encourage community-based forest management. The certainty of access or utilization is one of the important prerequisites for sustainable forest management. Overlapping tenure, among others, is the cause of the uncertainty of land tenure in the area managed by the community. Tenure and tenure uncertainty, public access to the forest is often seen as one of the reasons why community are often not too keen on finding natural resource management strategies for long-term goals.
2. Development of institutions related to the production system. When the certainty of tenure can be obtained, then the next challenge is to develop institutions related to the production arrangement. There are two levels of development strategies that should be considered are: (i) strategy development in production level or community groups, and (ii) production system development strategies at the household level. These two strategies clearly interrelated. Production planning strategies at the level of the group or community is basically looking for a form of joint venture involving all members of the group. While the strategy of development for production planning at the level of households, the approach is driven by many NGOs in forest communities is to encourage the growth of other types of household economic enterprises that aim to mengurangi farmers' dependence on forests.
3. Development institutions associated with consumption management. Changes in consumption patterns generally have a big impact on how community assess the natural resources. With the growing importance of the currency in community's lives in the countryside, then a little too much influence on the way they assess and

interpret the natural resources that they own or manage. Land or forest or agricultural land was originally not a commodity economy for rural communities. With the change in this values, then the land or the land now turned into a commodity that has economic value that the object of buying and selling.

Efforts and development strategies at the local level institutions are basically influenced by three main factors, namely the physical condition and local natural resources; political economy factors at the international, national, and regional as well as social and political factors of local dynamics. Institutional development at the local level by a variety of factors that affects the aim to achieved sustainable management of the environment and social justice. For more details can be seen in Figure 5 below.

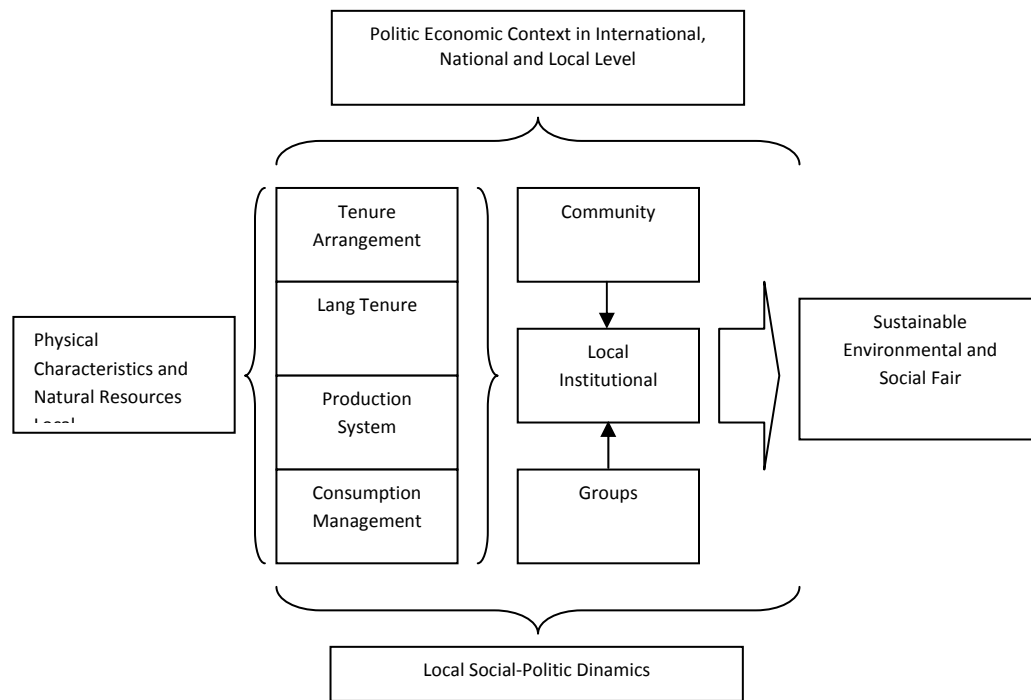


Figure 5. Local Institutional Framework (Afiff, 2007)

II.4.3. Analysis Method of Business Development

Development of analytical methods based on the findings made in the field such as interviews, focus group discussions and field observations associated with business development potential of mangrove ecosystem management are managed by the community. Analytical methods development effort is also made by processing the data available from several local government agencies such as the the Watershed Management Center (BP DAS) of Riau Islands province, Department of Agriculture and Forestry of Bintan regency, Department of Marine and Fisheries of Bintan regency, Community Development Agency of Bintan regency, The Environment Agency of Bintan and some other relevant government institutions. Data and information collected is then processed and analyzed using descriptive analysis.

III. GENERAL CONDITIONS

III.1. Riau Islands Province

Location

Riau Islands Province is located between 0°29' South Latitude and 04°40' North latitude, and 103°22' East to 109°4' East Longitude. Since 2008, the Riau Islands province is divided into 5 districts and 2 cities, namely Karimun regency, Bintan regency, Natuna Regency, Lingga regency, and Anambas Islands regency, as well as the city of Batam and Tanjungpinang. Riau Islands Province is one of the maritime provinces in the Republic of Indonesia. Riau Islands Province is surrounded by sea and land is made up of many islands. Based on identification of Bakosurtanal, recorded 394 inhabited islands, while the other 1,401 are uninhabited. With the location, of course, require special handling associated with local authority boundaries, especially those directly adjacent to another country.

Wide

The total area of Riau Islands Province is 251,810.71 km² consisting of 5 districts and 2 cities. However, as the islands, the sea area owned Riau Islands Province approximately 95.79% or an area of 241,215.30 km². While the remainder is 4.21% or area of 10,595.41 km² is land.

Karimun district has the largest land with the percentage 27.12 % of the land area of Riau Islands province or area of 2,873.20 km², followed Lingga 19.99 % (2,117.72 km²), and Bintan amounted to 18.36 % (1946.13 km²). Tanjungpinang city and Batam city each only has vast percentage of respectively 7.27% (770.27 km²) and 2.26 % (239.20 km²), but is the center of almost all economic activity in the Riau Islands. Even Batam is an international beskala industrial center. The next is the breadth Natuna 19.43 % (2,058.45 km²) and Anambas Island with an area of approximately 5.57% (590.14 km²). Each regencies has a number of different islands. Highest number of islands located in the

Lingga regency with 531 islands and at least as many as nine islands located in Tanjungpinang (Table 2) .

Table 2. Island Number Verification Results by Regency/City, 2011

| No. | Regency/City | Islands | | Total |
|-------|-----------------|-----------|-------------|-------|
| | | Inhabited | Uninhabited | |
| 1 | Karimun | 73 | 178 | 251 |
| 2 | Bintan | 48 | 193 | 241 |
| 3 | Natuna | 35 | 140 | 175 |
| 4 | Lingga | 76 | 455 | 531 |
| 5 | Anambas Islands | 27 | 190 | 217 |
| 6 | Batam | 133 | 238 | 371 |
| 7 | Tanjungpinang | 2 | 7 | 9 |
| Total | 2011 | 394 | 1.401 | 1.795 |
| | 2010 | 394 | 1.401 | 1.795 |

Population

Total population in 2011 calculated from projected results based on the Population Census and other surveys in the Central Bureau of Statistics. This is done because the population census to count the population of Indonesia, including in Riau Islands Province only once in 10 years. From the results of population projections Riau Islands Province shows that the distribution of the population by regency/city by 56.63 % concentrated in the city of Batam, as many as 992,425 peoples, Karimun regency of 223,397 peoples (12.66 %) , as many as 196,910 peoples lives in Tanjungpinang (11.16 %), Bintan regency about 149,554 peoples (8.47 %), Lingga regency of 90,641 peoples (5.14 %), Natuna regency of 72,521 peoples (4.11 %), and Anambas Island regency of 39,318 peoples (2.23%).

Education

Government of Riau Islands Province has supported communities to learn from an early age by actively encouraging people to establish Early Childhood Education (PAUD). In addition, one of the first steps of a child stepping into the world of formal education is to learn in kindergarten (TK) which has been available and spread throughout the Riau Islands province. In 2011 the number increased to 508 units kindergarten, from 467 in

2010, the highest number in Batam (294 units) and the least in Lingga regency which recorded only 12 units.

Health

Riau Islands Province in 2011 has had 26 hospitals, which in 2010 provided 24 units and more than half, to 14 units located in Batam city that has the largest population in the Riau Islands. Number of health centers also increased to 68 units, from the previous 66 units in 2010. With the highest number in Batam, which is 15 units, and at least in Tanjungpinang, which recorded only 6 units.

As a mobile health center where the islands of the sea (PKL) is very important to serve the community. Has available 35 units spread throughout the province with the highest number in Batam, which is 13 units followed in Anambas Islands region that has 8 units of PKL. The existences of these street vendors are very useful for people who live in coastal areas. But the increasing number of health service is not offset by an increase in the number of medical personnel. According to data from the Department of Health Riau Islands Province, the number of medical workers dropped dramatically. The Doctor who totaled 805 in 2010, to only 579 physicians in 2011. Nurses in 2010 totaled 3,119 peoples, being only 2,382 nurses by 2011.

Religious

The majority of residents of Riau Islands province embraced Islam. It is closely related to the local culture that has its roots in Malay culture. Adherents of Islam reached 1,515,961 peoples or 77.21% of the total population according to the records of the Regional Office of the Department of Religious of Riau Islands Province. The rest embraced Buddhism of 7.85%; Protestants of 12.11%; Catholics of 4.47%; Hindus of 0.11% and Confucianism about 0.23%.

III.2. Bintan Regency

Geographic Location

Bintan district lies between 0°6'17" North Latitude - 1°34'52" north latitude and 104°12'47" East longitude in the west - 108°2'27" East longitude in the east. Bintan

regency is part of the famous continental exposure with the name "Sundaland". The islands are scattered in this area are the remnants of erosion or arcing pre-Tertiary land area, the area stretching from the northern part of Peninsular Malaysia on the island of Bangka and Belitung up in the South.

Bintan regency is bordered by:

North: District Natuna

South: Lingga regency

West: Tanjungpinang and Batam

East: West Kalimantan Province

Wide

The total area of 88,038.54 km² reach Bintan regency, but its land area is only 2.21%, 1,946.13 km² only. Widest sub-district is Gunung Kijang sub-district with 503.12 km² and the smallest sub-district is Tambelan sub-district, which is 169.42 km². Bintan regency currently consists of 240 large and small islands. Only 39 pieces of which are inhabited, while the rest are uninhabited although some have been used for agricultural activities, especially already plantation.

Administration Areas

Administratively, Bintan regency in 2011 was composed of 10 sub-districts with 36 villages and 15 urban villages such status. The sub-districts are Teluk Bintan, Seri Kuala Lobam, Bintan Utara, Teluk Sebong, Bintan Timur, Pesisir Bintan, Mantang, Gunung Kijang, Toapaya, and Tambelan (Table 3).

Table 3. Sub-district, Name of capital of sub-district, and Vilages in Bintan Regency

| No | Sub-district | Number of Village | Number of Village (Kelurahan) | Amount |
|----|------------------|-------------------|-------------------------------|--------|
| 1 | Teluk Bintan | 5 | 1 | 6 |
| 2 | Seri Kuala Lobam | 3 | 2 | 5 |
| 3 | Bintan Utara | 1 | 4 | 5 |
| 4 | Teluk Sebong | 6 | 1 | 7 |

| | | | | |
|-------------|----------------|-----------|-----------|-----------|
| 5 | Bintan Timur | 0 | 4 | 4 |
| 6 | Bintan Pesisir | 4 | 0 | 4 |
| 7 | Mantang | 4 | 0 | 4 |
| 8 | Gunung Kijang | 3 | 1 | 4 |
| 9 | Toapaya | 3 | 1 | 4 |
| 10 | Tambelan | 7 | 1 | 8 |
| 2011 | | 36 | 15 | 51 |
| 2010 | | 36 | 15 | 51 |
| 2009 | | 36 | 15 | 51 |
| 2008 | | 36 | 15 | 51 |
| 2007 | | 36 | 15 | 51 |
| 2006 | | 29 | 13 | 42 |

Source: Central Bureau of Statistics of Bintan, 2012

Population

Welfare of the population is the main target of development. Development is carried out in order to form a complete Indonesian man of all Indonesian people. Therefore, the government has undertaken various efforts in order to solve the population problems. One attempt to reduce the government's rate of population growth through family planning programs (KB).

In 2011 the population of 149,554 inhabitants with Bintan recorded density of 64 people per km². Compared to 2010, the population increased by 7,254 persons or an increase of 5.09%. Total population is so large and continues to grow every year is not matched with the population distribution. Recorded the highest population in the Bintan Timur sub-district about 40,994 peoples, while the most densely is the Bintan Utara sub-district with density 92 peoples per km². Sub-districts with the fewest residents are Mantang sub-district, the 4,094 peoples. Detail area, number of households, and the number of mid-year population in Bintan regency in 2011 presented in Table 4.

Table 4. Areas, Households, and Number of Population in Bintan Regency, 2011

| No | Sub-district | Areas (Km ²) | Households | Populations | | |
|----|------------------|--------------------------|------------|-------------|--------|--------|
| | | | | Man | Women | Amount |
| 1 | Teluk Bintan | 185,00 | 2.564 | 4.997 | 4.392 | 9.389 |
| 2 | Seri Kuala Lobam | ¹⁾ | 4.946 | 8.438 | 10.093 | 18.531 |

| | | | | | | |
|-------------|----------------|--------------------|---------------------|---------------|---------------|----------------|
| 3 | Bintan Utara | 219,25 | 6.256 | 11.186 | 11.088 | 22.273 |
| 4 | Teluk Sebong | 408,34 | 5.254 | 8.962 | 7.874 | 16.836 |
| 5 | Bintan Timur | 461,00 | 10.499 | 21.355 | 19.640 | 40.994 |
| 6 | Bintan Pesisir | ¹⁾ | 2.228 | 4.614 | 3.799 | 8.413 |
| 7 | Mantang | ¹⁾ | 1.134 | 2.236 | 1.858 | 4.095 |
| 8 | Gunung Kijang | 503,12 | 3.127 | 6.910 | 5.709 | 12.619 |
| 9 | Toapaya | ¹⁾ | 2.876 | 6.023 | 5.152 | 11.175 |
| 10 | Tambelan | 169,42 | 1.266 | 2.699 | 2.530 | 5.229 |
| 2011 | | 1.946,13 | 40.150 | 77.420 | 72.134 | 149.554 |
| 2010 | | 1.946,13 | 36.589 ^r | 73.665 | 68.635 | 142.300 |
| 2009 | | 1.946,13 | 33.803 | 73.665 | 66.679 | 139.407 |
| 2008 | | 1.946,13 | 32.343 | 70.097 | 66.124 | 136.221 |
| 2007 | | 1.946,13 | 31.904 | 69.373 | 63.638 | 133.011 |

Note:

r = revision number

¹⁾ = still join with mani sb-district

Educartion

One of the successes of development in a country is when they are supported by qualified human resources through education. Government seeks to produce and improve the quality of human resources. 6-year compulsory education, followed by the 9-year compulsory education and other educational programs are a form of government efforts to create quality human resources, which in turn will create formidable human resources who are ready to compete in the era of globalization.

Availability of good educational facilities and infrastructure facilities will support in improving the quality of education. One of the fundamental measured of education is illiteracy. According to data from the National Socioeconomic Survey (SUSENAS) 2011, the percentage of the population aged 10 years and over who recorded 96.52% literate and the illiterate are still about 3.48%.

Health

Health development concerning all aspects of human life. When properly managed health development will directly improve people's welfare. In addition it also includes the quality of health development and health efforts are greatly influenced by the availability of health facilities Dangan creating a basic health care services backed by

adequate resources such as hospitals, health centers, health personnel, and the availability of drugs.

In 2011, health care facilities located in Bintan include 1 unit of a hospital, health center of 12 units, health centers of 29 units, 10 mobile health units, and 7 clinics units. The health workers are human resources needed because with the help of their many possible diseases that can be cured. Number of physicians in 2011 there were 6 pediatricians, 42 general practitioners and 15 dentists. While the number of paramedics as much as 234 people.

Religious

Physical development in the field must be balanced and equipped with the mental and spiritual development in the field, so hopefully there will be a balance and harmony between worldly and hereafter. Religious life of harmony between religious communities in this area has been firmly established.

Based on the results of Census 2000, the population composition of Bintan based on the religion that 86.47% of Muslim; 2.04% of Catholic; 3.74% of Protestant, 0.27% of Buddhist; 7.34% of Hindu, and other religious of 0.15%. Data sourced from the Ministry of Religious Affairs said that in 2011 the percentage of the religion that 84.96% of Muslim; 2.68% of Catholic; 5.33% of Protestant; 5.35% of Buddhist; 0.46% of Hindus, and 1.22% of Confucianism.

III.3. Study Villages

Wide

Socio-economic study was conducted in eight villages namely Busung village, Kuala Sempang village, Pengujan village, Penaga village, Tembeling village, Bintan Buyu village, Mantang Baru village and Sebong Lagoi village. For Sebong Lagoi village, Study team visits to tourist sites at PT Bintan Resorts Cakrawala (PT BRC). Based on the data Sub-district in Figures (2012), published by the Central Bureau of Statistics, Sebong Lagoi village flawed that has the largest land area among the other villages is 54 km². While the village of Mantang Baru village has the smallest land area of 11 km², but has

an area of 223.25 km² sea area. Among the 8 study villages, only Mantang Baru village that has sea area (Table 5).

Table 5. Boundary and Wide of Study Villages in Bintan Regency.

| No | Name of Village | Sub-district | Boundary | Areas (km ²) | |
|----|-----------------|------------------|---|--------------------------|--------|
| | | | | Land | Sea |
| 1 | Busung | Seri Kuala Lobam | North: Kuala Sempang South: Laut Bidai West: Teluk Lobam East: Laut Busung | 21,9 | - |
| 2 | Kuala Sempang | Seri Kuala Lobam | North: Teluk Sebong sub-district South: Pengujan West: Busung East: Penaga | 35,1 | - |
| 3 | Pengujan | Teluk Bintan | North: Penaga South: Pangkil West: Sri Kuala Lobam East: Tembeling Tanjung | 21,7 | - |
| 4 | Penaga | Teluk Bintan | North: Bintan Buyu South: Pengujan West: Sri Kuala Lobam East: Tembeling | 43,3 | - |
| 5 | Tembeling | Teluk Bintan | North: Bintan Buyu South: Tembeling Tanjung West: Tembeling Tanjung East: Toapaya | 20,1 | - |
| 6 | Bintan Buyu | Teluk Bintan | North: Telok Sebong South: Tembeling West: Penaga East: Toapaya | 49,2 | - |
| 7 | Mantang Baru | Mantang | North: Gunung Lengkas, Bintan Timur South: Senayang, Lingga Regency West: Dendun East: Mantang Besar | 11 | 223,25 |
| 8 | Sebong Lagoi | Teluk Sebong | Not available | 54 | - |

Source: Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).

Demography

Based on Sub-district in Figure (2012) published by the Central Statistics Agency (BPS), from 8 study villages, a population based household is highest in the Sebong Lagoi

village of 904 families or about 3,714 peoples. While the Busung village has the smallest number of souls that 856 people (Table 6).

Table 6. Population in Study Villages in Bintan Regency.

| No | Name of Village | Population | | | |
|----|-----------------|------------|-------|--------|------------|
| | | Man | Women | Amount | Households |
| 1 | Busung | 435 | 421 | 856 | 334 |
| 2 | Kuala Sempang | 876 | 844 | 1.720 | 434 |
| 3 | Penaga | 898 | 794 | 1.692 | 435 |
| 4 | Pengujan | 715 | 669 | 1.384 | 393 |
| 5 | Bintan Buyu | 1.279 | 1.207 | 2.486 | 646 |
| 6 | Tembeling | 701 | 610 | 1.311 | 339 |
| 7 | Mantang Baru | 458 | 443 | 901 | 275 |
| 8 | Sebong Lagoi | 1.993 | 1721 | 3.714 | 904 |

Source: *Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).*

Accessibility

Based on Sub-district in Figure (2012) published by the Central Statistics Agency (BPS), from 8 study villages, obtained information that the village has a closest distance to the Capital district is Lagoi Sebong village (1 km) while the capital district is furthest from the village Pengujan (57 km). While the village has the farthest distance of the Capital Sub-district is Pengujan village and nearby is the Bintan Buyu village (44 km). See Table 7.

Table 7. Distance the Study Villaves to Capital of Sub-district and Capital of Regency.

| No | Name of Village | Distance to capital of sub-district (km) | Distance to capital of regency (km) |
|----|-----------------|--|-------------------------------------|
| 1 | Busung | 13 | 65 |
| 2 | Kuala Sempang | 14 | 64 |
| 3 | Penaga | 46 | 74 |
| 4 | Pengujan | 57 | 83 |
| 5 | Bintan Buyu | 28 | 44 |
| 6 | Tembeling | 26 | 47 |
| 7 | Mantang Baru | 5 | 55 |
| 8 | Sebong Lagoi | 1 | 77 |

Source: *Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).*

Education

Based on Sub-district in Figure (2012) published by the Central Statistics Agency (BPS), from 8 study villages, information was obtained that all communities have the means of education at the primary level by varying amounts. Penaga village has a primary school education facilities compared to other villages. Meanwhile, in all the study villages found no educational facilities at the high school (Table 8). If there are children of the villagers who will school level, they will go to the city that there is a means of education at the high school in the Tangjungpinang city.

Table 8. Educational facilities available in the villages studied in Bintan.

| No | Village | Pre-school | | Primary school | | Junior school | | High school | |
|----|---------------|------------|---|----------------|---|---------------|---|-------------|---|
| | | N | S | N | S | N | S | N | S |
| 1 | Busung | - | - | 1 | - | 1 | - | - | - |
| 2 | Kuala Sempang | - | - | 2 | - | - | - | - | - |
| 3 | Penaga | - | - | 4 | - | - | - | - | - |
| 4 | Pengujan | - | - | 2 | - | 1 | - | - | - |
| 5 | Bintan Buyu | 1 | - | 3 | - | 1 | - | - | - |
| 6 | Tembeling | - | - | 2 | - | - | - | - | - |
| 7 | Mantang Baru | - | - | 1 | - | 1 | - | - | - |
| 8 | Sebong Lagoi | - | 1 | 1 | 1 | - | - | - | - |

Source: *Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).*

Health

Related to health, based on the data in Figures (2012), published by the Central Statistics Agency (BPS), from 8 village studies, obtained information that facilities such as hospitals and health clinics are not available in all the study villages. Meanwhile, for health facilities such as health centers and village health clinic available in all villages except in the Sebong Lagoi village (**Table 9**). This suggests that health facilities are available at the village level.

Table 9. Health facilities in the villages studied in Bintan regency, Riau Islands Province.

| No | Name of village | Hospital | Health center | Health center branch | Clinics | Clinics | |
|----|-----------------|----------|---------------|----------------------|---------|---------|--------|
| | | | | | | private | Public |
| 1 | Busung | - | - | 1 | | | - |
| 2 | Kuala Sempang | - | - | 1 | | | - |
| 3 | Penaga | - | - | | 3 | - | - |
| 4 | Pengujan | - | - | | 2 | - | - |
| 5 | Bintan Buyu | - | - | | 4 | - | - |
| 6 | Tembeling | - | - | | 2 | - | - |
| 7 | Mantang Baru | | - | - | 1 | - | - |
| 8 | Sebong Lagoi | - | 1 | - | - | - | - |

Source: Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).

Religious

Based on secondary data and interviews with village chief in 8 villages of the study, information was obtained that the majority religion is Islam in all villages, or about 79-98%. Meanwhile there is a small portion of residents in the villages studied have Protestant, Catholic, Buddhist and Confucian. Islam dominates in all the villages because of the history, the religion of Islam has long been embraced by the community residents in Bintan. It can also be seen from the Central Statistics Agency (BPS) in the Bintan regency in the year 2012 figures associated with places of worship in each of the villages studied (Table 10).

Table 10. Facilities of worship in the villages studied in Bintan regency, Riau Islands Province.

| No | Name of village | Mosque | Small mosque | Church | | Temple | Monastery |
|----|-----------------|--------|--------------|----------|------------|--------|-----------|
| | | | | Catholic | Protestant | | |
| 1 | Busung | 2 | 1 | - | - | - | 1 |
| 2 | Kuala Sempang | 5 | 2 | - | - | - | 2 |
| 3 | Penaga | 5 | 2 | - | - | - | - |
| 4 | Pengujan | 3 | 1 | - | - | - | - |
| 5 | Bintan Buyu | 8 | 1 | - | - | - | - |
| 6 | Tembeling | 5 | 1 | - | - | - | 2 |
| 7 | Mantang Baru | 3 | 1 | - | - | - | - |

| | | | | | | | |
|---|--------------|---|---|---|---|---|---|
| 8 | Sebong Lagoi | 5 | 4 | 1 | - | 1 | 2 |
|---|--------------|---|---|---|---|---|---|

Source: *Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).*

Economic

Means the economy is one of the indicators of economic progress of a region. Related to this aspect of the economy, based on the data in Figures (2012), published by the Central Statistics Agency (BPS), from 8 villages of the study, information was obtained that in all the villages of the study found food stalls, shops and the usual stalls. For banking facilities, only village that has Sebong Lagoi Bank, while other villages are not available Bank. Village Unit Cooperatives (KUD) also only found in two villages: Busung village and Tembeling village. Nevertheless, in almost all the villages studied have economic means such as non-cooperative in the form of cooperatives or joint venture group (Table 11). These conditions indicate that the level of the economy towards the villages visited relatively varied economy level.

Table 11. Economic facilities in the villages studied in Bintan regency, Riau Islands Province.

| No | Name of village | Bank | KUD | Cooperative Non-KUD | Mini Market | Shop | Food stalls | Restourant |
|----|-----------------|------|-----|---------------------|-------------|------|-------------|------------|
| 1 | Busung | - | 1 | - | - | 19 | 12 | |
| 2 | Kuala Sempang | - | - | 1 | - | 15 | 3 | |
| 3 | Penaga | - | - | 1 | - | 21 | 2 | 1 |
| 4 | Pengujan | - | - | - | - | 19 | - | 2 |
| 5 | Bintan Buyu | - | - | 3 | - | 15 | 3 | - |
| 6 | Tembeling | - | 1 | 1 | - | 12 | - | - |
| 7 | Mantang Baru | | | 1 | | 4 | | |
| 8 | Sebong Lagoi | 1 | - | 1 | 1 | 27 | 3 | 6 |

Source: *Seri Kuala Lobam in Figure (2012), Teluk Bintan in Figure (2012), Mantang in Figure (2012), Teluk Sebong in Figure (2012).*

PT Bintan Resorts Cakrawala (PT BRC)

Based on information on PT BRC website (www.bintan-resorts.com), the company located just 45 minutes via a catamaran ride from Singapore, Bintan Resorts is a multi-

award winning, integrated tropical beach resort destination with world-class facilities. “Bintan Resorts” refers generally to the area on the entire northern coast of the Indonesian Island of Bintan which is master-planned and managed by PT Bintan Resorts Cakrawala. There are currently five independently owned and operated beach resorts, four designer golf courses, as well as a range of recreational facilities and attractions located within it.

Bintan Resorts International (BRI) conducts investment and destination marketing for the destination, and together with travel trade members and media, promotes the destination internationally. PT Bintan Resort Cakrawala (BRC) is the operational arm of Bintan Resorts International. Its roles include estate management, utilities provision, operations management and community development.

Both Bintan Resorts International and PT Bintan Resort Cakrawala are subsidiaries of Gallant Venture Ltd, a company listed on the Singapore Stock Exchange. As the developer, master planner and operator of the popular holiday destination Bintan Resorts, Bintan Resorts International and PT Bintan Resort Cakrawala have extensive experience in destination & investment marketing, resort development, operations, infrastructure development and management.

As the master developer of Bintan Resorts, our objective at PT Bintan Resort Cakrawala (PT BRC) is to build and maintain a stable, harmonious and healthy relationship with the local community living in the vicinity of our resorts. Through the PT BRC Community Development Programme, we are committed to collaborating with the local government and other volunteer organisations to provide assistance and support to the local community, especially those subsisting below the poverty line.

PT BRC glad that our initiatives are bringing continuous benefit to the community around us. PT BRC conducted this through:

- Employment opportunities at our resorts

- Opportunities and means to create and provide a sustainable livelihood for local families through tourism-linked activities
- Financial assistance for the younger generation in the areas of education and skills acquisition to prepare them for future employment at the resorts
- Programmes that enhance the general health and well-being of the people
- A better understanding of the nature of our business through numerous education and social events and activities.

Community development projects focus on these broad areas:

- Education Assistance
- Employment Assistance
- Micro Business Enterprises
- Bhakti Sosial Charity Projects – medical, dental and eye-care projects

Additionally, Bintan Resorts hotels also run their own community development programmes.

IV: RESULTS AND ANALYSIS

IV.1. Mangrove Ecosystem Conditions

IV.1.1. Mangrove Ecosystem Conditions at Bintan Regency

According to the Presidential Regulation (PP) No. 73/2012 on National Strategy Mangrove Ecosystem Management, mangrove ecosystems are coastal wetland resources and life support systems and natural resources whose value is very high, therefore it needs the protection, conservation and sustainable use of welfare of the community. Meanwhile, the mangrove ecosystem is a unity between the communities associated with mangrove vegetation, fauna and micro-organisms that can grow and develop in areas along the coast, especially in tidal areas, lagoons, estuaries are protected with a substrate of mud or sandy mud in shaping environmental balance sustainable.

Sustainable management of mangrove ecosystems is the protection, preservation and sustainable use through an integrated process to achieve sustainability of the mangrove ecosystem functions for the welfare of the community. One form of management of the mangrove ecosystem is a community-based management of mangrove ecosystems. According to Government Regulation No. 73/2012, the policy of community-based management of mangrove ecosystems is to improve and preserve important ecological values, socio-economic and cultural, in order to increase incomes and support sustainable development. Mangrove ecosystem management through a partnership between the government, local governments, businesses and communities with the support of institutions and the international community, as part of efforts to achieve global environmental commitment.

Based on Regulation of Bintan Regency No. 2/2012 on Spatial Planning of Bintan Regency on 2011-2031 (*Peraturan Daerah Kabupaten Bintan No. 2 Tahun 2012 tentang Rencana Tata Ruang Wilayah Kabupaten Bintan Tahun 2011 – 2031*), spatial planning policy strategy

aimed at maintaining and preserving mangrove forests. Area that provides protection subordinates area is water catchment areas and mangrove forests. Mangrove ecosystem management is done through the rehabilitation and protection of riparian and coastal border, and the establishment and preservation of mangrove forests.

General provisions of the zoning regulations mangrove forest area shall be as follows:

- a. not allowed to do farming activities that result in decreased function of the area;
- b. not allowed to do hunting protected wildlife laws;
- c. mangrove forest in the coastal region is still allowed to do research activities and nature on a limited basis.

Based on the interpretation map of the distribution of mangrove ecosystems in Bintan (MoF, 2010), obtained the data and information that the extensive mangrove ecosystem in Bintan regency is 7,972.221 ha. Mangrove ecosystem is located in a forest area that functions Areal Other Uses (APL), Protected Forest (HL), Forest Production (HP), convertible production forest (HPK) and Limited Production Forest (HPT). The largest area of mangrove ecosystems are HPK area which is about 45% and the smallest was in production forest which is about 2.6%. While the density of the mangrove ecosystem conditions most (99%) in the less dense condition and only 1% have a high density conditions (Table 12 and Figure 6). The density of the mangrove ecosystem is calculated based on the calculation that is in the Minister of Environment Decree No. 201/2004 on the Criteria and Guidelines for Determining Damage Raw Mangrove.

Table 12. Conditions based on the function of mangrove ecosystems in the region of Bintan.

| No | Function | Density | Wide (Ha) | % |
|----|----------|--------------|-----------|--------|
| 1 | APL | Low density | 1.010,912 | 12,68% |
| 2 | HL | Low density | 1.423,666 | 17,86% |
| 3 | HP | Low density | 206,887 | 2,60% |
| 4 | HPK | High density | 119,456 | 1,50% |
| | | Low density | 3.512,096 | 44,05% |
| 5 | HPT | Low density | 1.699,204 | 21,31% |

| No | Function | Density | Wide (Ha) | % |
|-------|----------|---------|-----------|---------|
| Total | | | 7.972,221 | 100,00% |

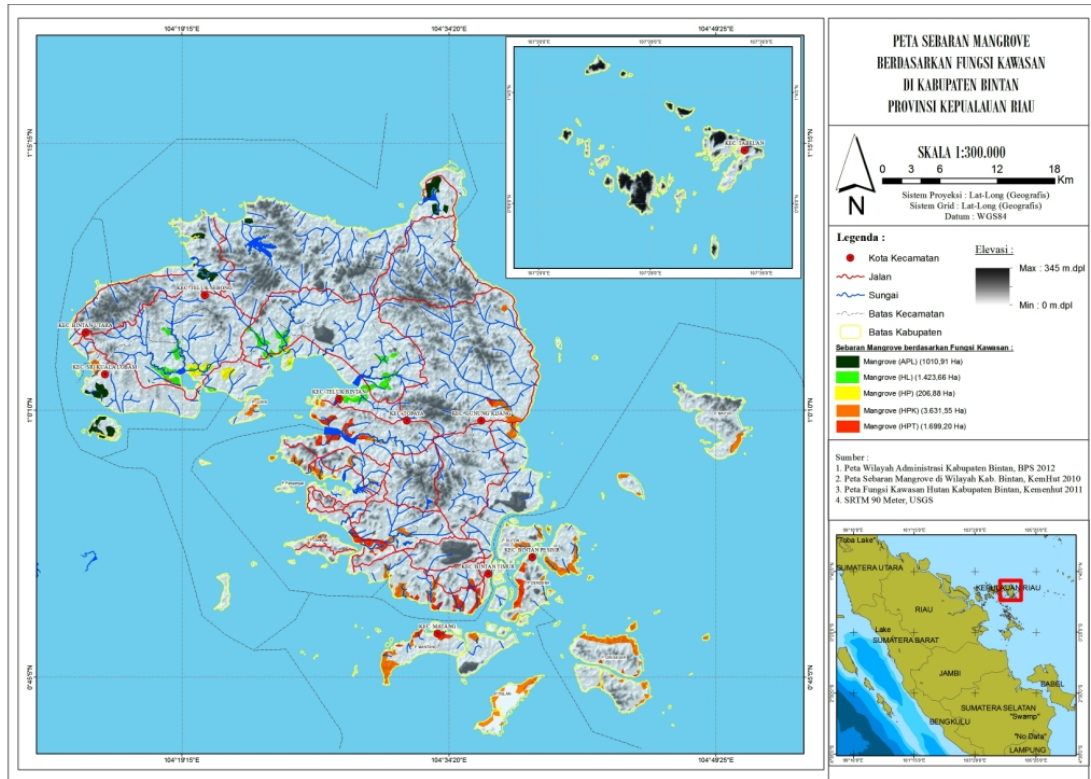


Figure 6. Distribution of mangrove ecosystem condition based on function of the area in Bintan regency, Riau Islands Province.

Meanwhile, when the extent of mangrove ecosystems is calculated based administration area sub-districts in Bintan regency, Teluk Bintan sub-district has the largest area of ecosystems that 16.22% or approximately 1,326.065 ha compared with 9 other sub-districts. Meanwhile, Bintan Utara sub-district only has 0.27% or approximately 21.808 ha or has the smallest area compared to 9 other sub-districts in the Bintan Regency (Table 13 and Figure 7).

Table 13. Mangrove ecosystem conditions by sub-district administration in the area of Bintan Regency.

| No | Sub-district | Density | Wide (Ha) | % |
|--------------|-----------------|--------------|-----------------|----------------|
| 1 | Bintan Timur | Low density | 778,34 | 9,52% |
| 2 | Bintan Utara | Low density | 21,80 | 0,27% |
| 3 | Bintang Pesisir | High density | 116,78 | 1,43% |
| | | Low density | 1.321,89 | 16,17% |
| 4 | Gunung Kijang | Low density | 445,02 | 5,44% |
| 5 | Mantang | High density | 2,67 | 0,03% |
| | | Low density | 1.030,23 | 12,60% |
| 6 | Sri Kuala Lobam | Low density | 1.232,08 | 15,07% |
| 7 | Teluk Bintan | Low density | 1.326,06 | 16,22% |
| 8 | Teluk Sebong | Low density | 729,69 | 8,93% |
| 9 | Topaya | Low density | 45,94 | 0,56% |
| 10 | Tanjung Pinang | Low density | 1.122,68 | 13,74% |
| Total | | | 8.173,20 | 100,00% |

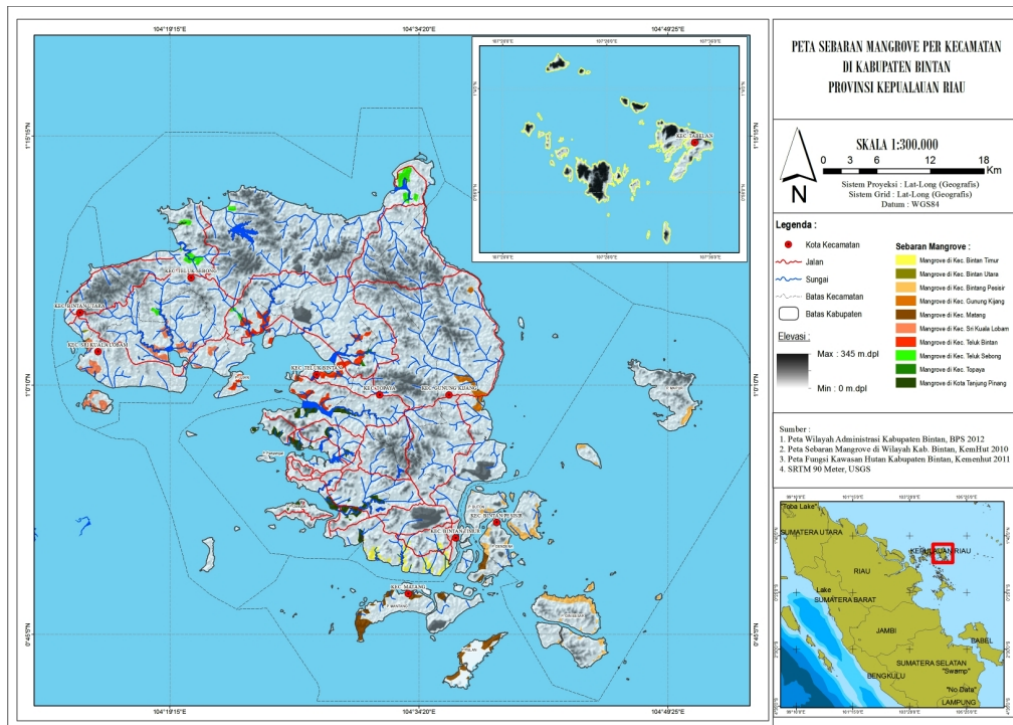


Figure 7. Distribution of mangrove ecosystem conditions based administration area districts in Bintan, Riau Islands Province.

IV.1.2. Mangrove Ecosystem in Study Areas

Mangrove ecosystem conditions that are in 8 villages studies also have varied extents. Based on the interpretation map (MoF, 2010), data showed that Tembeling largest mangrove ecosystem has vast areas of mangrove ecosystems than in other villages. Extensive mangrove ecosystem in Tembeling village around 785.12 ha or 28.5% of the total number of 8 villages. Meanwhile, Pengujan village has smallest area of about 109.76 ha (3.98%) compared with 7 other villages. Mangrove ecosystem conditions in all locations examined in low dense conditions (Table 14, Figure 8, Figure 9, Figure 10 and Figure 11).

Table 14. Mangrove ecosystem conditions based administration area of study villages in Bintan regency.

| No | Name of village | Density | Wide(Ha) | % |
|--------------|-----------------|-------------|-----------------|----------------|
| 1 | Bintan Biyu | Low density | 136,57 | 4.96% |
| 2 | Busung | | 174,79 | 6.35% |
| 3 | Kuala Sempang | | 489,66 | 17.78% |
| 4 | Matang Baru | | 385,66 | 14.00% |
| 5 | Penaga | | 432,59 | 15.70% |
| 6 | Pengujan | | 109,76 | 3.98% |
| 7 | Sebong Lagoi | | 240,48 | 8.73% |
| 8 | Tembeling | | 785,12 | 28.50% |
| Total | | | 2,754.63 | 100.00% |

Based on the data in Table 14 above, it is seen that all the villages where the study still has the potential for mangrove ecosystem management. In the study villages, especially those that have been and are working on community forestry programs (HKm) and HD, directed the management pattern in the form of community-based management of mangrove ecosystems or in a broader sense can be said to form community-based forest management (community-based forest management).

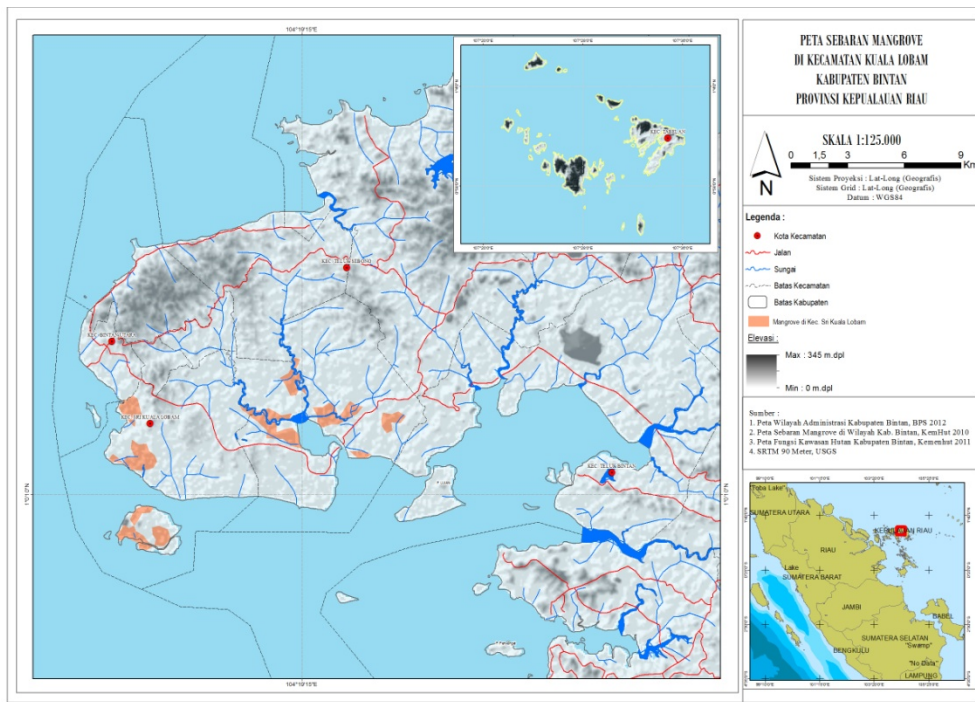


Figure 8. Distribution of mangrove ecosystem conditions in the Seri Kuala Lobam sub-district, Bintan regency, Riau Islands Province

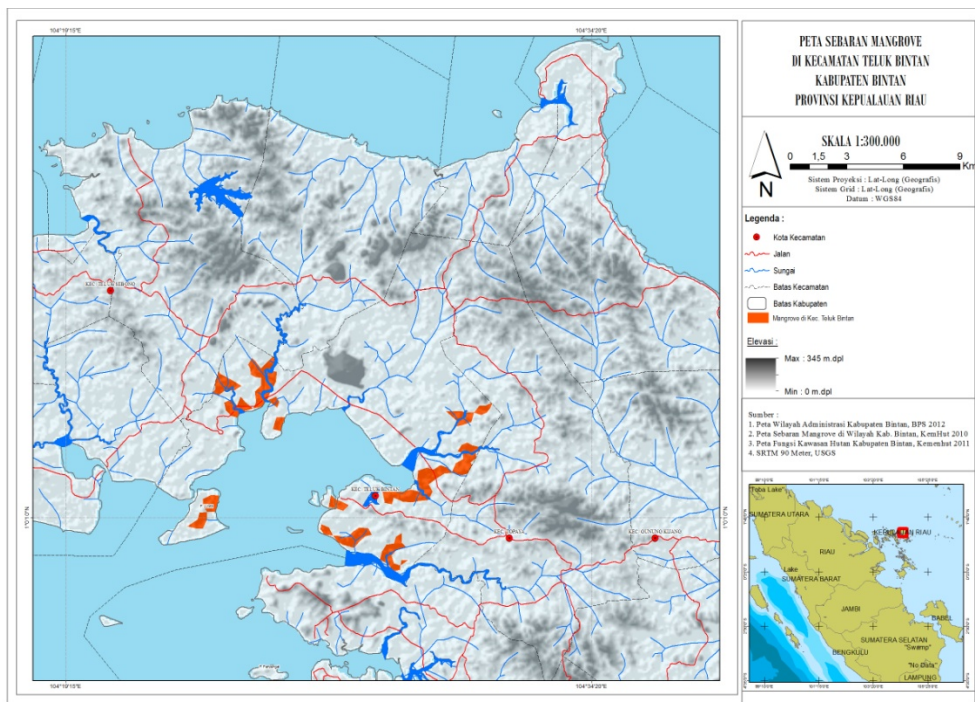


Figure 9. Distribution of mangrove ecosystem conditions in the Teluk Bintan sub-district, Bintan regency, Riau Islands Province

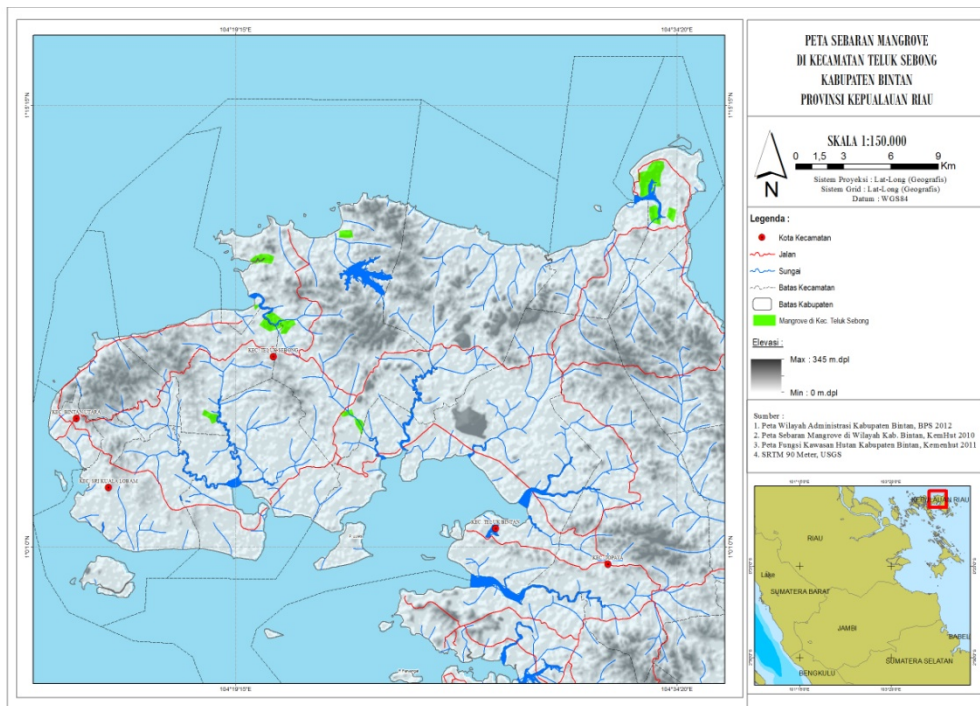


Figure 10. Distribution of mangrove ecosystem conditions in the Teluk Sebong sub-district, Bintan regency, Riau Islands Province

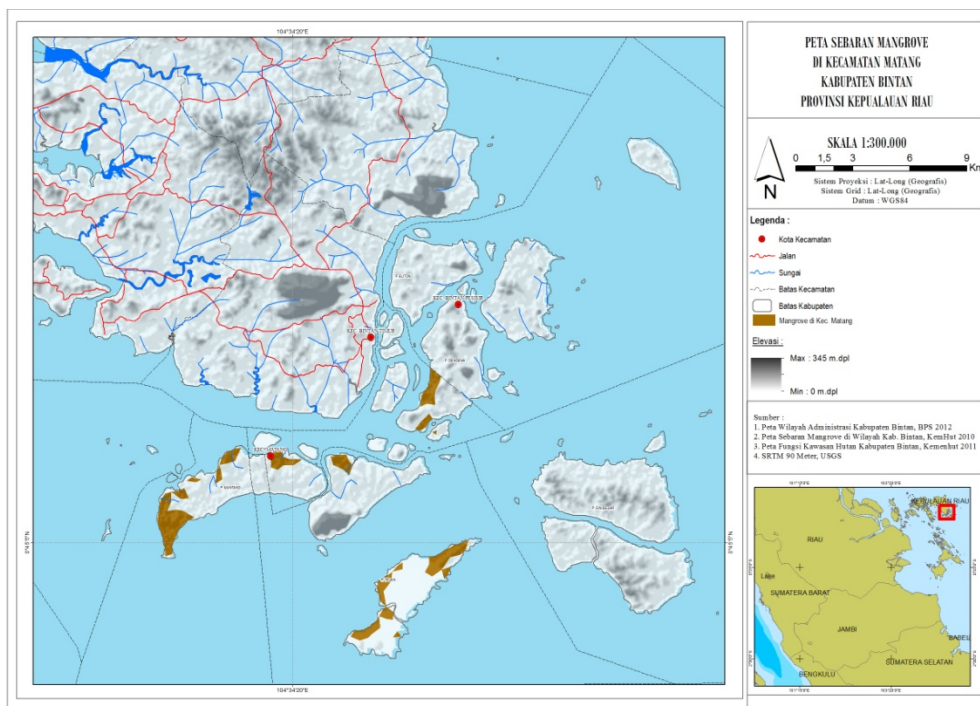


Figure 11. Distribution of mangrove ecosystem conditions in the Mantang sub-district, Bintan regency, Riau Islands Province

Community-based forest management (CBFM) is a necessity that must be done at this time by all parties on the path to sustainable forest management and responsible. According to Raharjo (2003), referring to the meaning of that "community-based" is the process of a paradigm shift in forestry development, to shift the change in attitude and orientation, institutional and administrative mechanisms, and management methods need to be prepared so that the practices of community-based forest management, such as Community Forests, Forest Village, Indigenous Forests, the system of local management and social forestry. Several important issues related to community-based forest management are:

1. Certainty of long-term management area.

Certainty associated with land management area and public access to areas currently declared as State Forest, as well as status and function of land and or region. Certainty management area is not handing out land ownership (ownship) but rather on ensuring access to long-term management. Certainty governance issues has yet to be resolved by the Government, such forms of community management is mandated under Act 41/1999.

2. CBFM institutional business unit.

Institutional business unit becomes very important as evidence that the CBFM can have clear rules and to establish mechanisms of accountability over management rights are granted. This aspect is a prerequisite that must be developed based on local institutional practices of community-based forest management. Clarity governance rights, obligations and responsibilities as well as incentives in sustainable forest management, the basis for developing a business unit CBFM institutional capacity.

3. Certainty of CBFM as a form of business unit management.

Certainty associated with the business unit in which the economic scheme of capital, local knowledge, access to information, the development of commodity, and the market became the basic substance in CBFM practices in the field. Certainty of the business unit as well as the instruments used in conducting viable economic

enterprises to manage and provide certainty of outcome and economic improvement of community.

4. Human resource capacity.

CBFM in the human resource development managers and technical assistant to be a strong need, either from skill practice practice economy, ecology and equity (in the sharing of risks and benefits). Preparation in human resource capacity building is an absolute prerequisite for community-based management is now no longer just for their subsistence needs of the community but more on improving people's welfare.

5. Land dispute resolution mechanisms and social in providing certainty and protection of rights management and business unit management. Disputes resolutions relating to public access in resource management can be instrument to undertake a shift change in attitude and orientation, institutional and administrative mechanisms, and management methods.

6. Policies that promote and protect the rights of certainty and long-term management incentives. CBFM is also faced with an increasingly limited resource conditions and fulfill their duty to repair the damage from the damage that has occurred.

Meanwhile, according to LEI (2001), the principal policies which prerequisite towards sustainable CBFM is:

1. Certainty in the determination or the determination of the spatial region in an environmental area (region) specific. Determination of the joint region will clearly determine which areas are designated as forestry cultivation area, non-cultivated forest area, and protected areas.
2. Lack of certainty over land tenure.
3. Protection of local knowledge (indigenous intellectual property rights) related to CBFM; ranging from aquaculture systems, processing products (products processing), to marketing.
4. Protection against intervention, domination, and the monopoly of large -scale enterprises in the production and trading system both at national and international level;

5. Encourage fair competition, transparency, and fairness in the trading system of forest products.
6. Eliminate procedural barriers (barrier bureaucracy) in trading products CBFM. In addition to a number of policy interventions, in the context of the development of CBFM also required intensive process of community assistance, both by government agencies and non- governmental. Community assistance is needed to cover the weaknesses in the matter of determination of the region, the fulfillment of sustainability criteria for sustainable forest management, to encourage the policy makers to give birth to a number of policies that can optimize the results and benefits of CBFM.

IV.1.3. Sustainable Livelihoods in Community-Based Mangrove Ecosystem Management

1. Natural Asset

Based on the results of interviews and focus group discussions with community acquired information that the potential of mangrove ecosystems in every village where the study is large enough to be developed into a community-based mangrove ecosystems management, especially for Busung village, Kuala Sempang village, Penaga village, Pengujan village, Tembeling village and Bintan Buyu village. Considerable potential of this nature will be even better when the public also has an umbrella of legality in the management of the mangrove ecosystems. Although mostly located within the protected area (catchment areas), but people can still utilize and collect non-timber forest products (NTFPs) such as the fruit of mangrove trees that can be used as materials for a snack or cake, for marine aquaculture, for tourism and for environmental education.

Based on the results of data collection that information obtained from the 8 study villages, there are 6 villages that have been filed by the management of mangrove ecosystems through community forestry schemes (HKm) and Village Forest (HD). Busung village, Kuala Sempang village, Penaga village, and Pengujan village used HKm scheme, while for Tembeling village and Bintan Buyu village use HD scheme. Both of these schemes in principle have the same goal of forest management is located in the forest area of the

country that have not burdened the rights that are utilized for the welfare of the community. Only, from the management side, HKm more emphasis on group-based management, while for HD with more emphasis on village-based management. Proposed extensive mangrove ecosystem into HKm and HD ranges from 120 ha - 300 ha (Table 15). The area of the proposed scheme is based on the geographical location and the condition of local social, economic and culture, including the characteristics of the peoples in each villages.

Table 15. Community-based mangrove ecosystems management scheme proposed by the community in the form of Community Forest (HKm) and Forest Village (HD) in Bintan Regency.

| No | Name of Community Group | Name of Village and Sub-district | HKm/HD | Land Status | Proposed wide (ha) |
|----|-------------------------|----------------------------------|--------|----------------|--------------------|
| 1 | Ketapang Putih | Busung, Seri Kuala Lobam | HKm | Protected area | 138,19 |
| 2 | Medang Kenanga | Kuala sempang, Seri Kuala Lobam | HKm | Protected area | 147,58 |
| 3 | Melayu Bersatu | Penaga, Teluk Bintan | HKm | Protected area | 300 |
| 4 | Tunas Harapan | Pengujan, Teluk Bintan | HKm | Protected area | 150 |
| 5 | Bintan Lestari | Bintan Buyu, Teluk Bintan | HD | Protected area | 140 |
| 6 | Bintan Jaya | Bintan Buyu, Teluk Bintan | HD | Protected area | 140 |
| 7 | Harapan Baru | Tembeling, Teluk Bintan | HD | Protected area | 120 |

Source: Watershed Management Center of Riau Islands Province (BP DAS Kepulauan Riau, 2013)

Based on field observations seen that there are many locations mangrove ecosystem is quite good and has a high potential to be developed further. Considerable potential of this nature is the main capital in a community-based management of mangrove ecosystems. Through the mangrove ecosystems, communities can develop materials for the manufacture of food, aquaculture, tourism and environmental education. Mangrove ecosystem conditions in some villages visited are presented in Figure 12.



Figure 12. Mangrove ecosystem conditions in Busung village (left picture) and Pengujan village (right picture).

Meanwhile, Mantang Baru village has no initiation of community or local governments to use the community forest management schemes (HKm) and Forest Village (HD). Based on the results of interviews and focus group discussions with communities in Mantang Baru village, they are interested in participating in community forestry program or Forest Village (HD) with the help of mentoring and coaching of local government as is done in 6 villages. They also hope to obtain complete information about the community forest program and HD from the relevant parties, particularly from the Agriculture and Forestry Agency of Bintan regency and Watershed Management Center (BPDAS) of Riau Islands province . At the time of the study, the community still do not know the benefits and functions of mangrove ecosystems, both in economic and environmental terms. They are quite serious about developing antusius and mangrove ecosystems that exist at the village level and is expected to be an example for other villages in one sub-district (Mantang sub-district). Mantang sub-district consists of four villages namely Mantang Baru, Mantang Lama, Mantang Besar and Dendun. This district is located in a region of the island which is separated from the island of Bintan. Based on field observations shows that the potential of mangrove ecosystem in Mantang Baru relatively still looks good even though it was low dense (Figure 13) .



Figure 13. Mangrove ecosystem conditions in the Mantang Baru village, Mantang sub-district, Bintan regency, Riau Islands Province.

For Sebung Lagoi village, especially those in the tourist area of Bintan Resorts, this location is fully managed by the private sector. Natural potential of mangrove ecosystem in the form of the existing area under mangrove tours are only used for tourist purposes (Figure 14). The management did not have plans to utilize timber forest products, such as fruit of mangrove trees for the manufacture of foodstuffs. According to the manager, they are interested to cooperate with the public related to the provision of food ingredients derived from the fruit of mangrove trees. It also shows the company's commitment to the partnership with the community, in addition to partnerships that had been done by the manager.



Figure 14. The condition of the entrance to the area of mangrove tours in Bintan Resorts (left) and the mangrove ecosystem conditions that are within the area of Bintan Resorts as a tourist destination (right).

Mangrove ecosystems that are in the villages studied did not escape from the threat. Based on the results of interviews and focus group discussions with the community in mind that some of the threats to the existence and preservation of mangrove ecosystems such as mangrove ekosietm the conversion into residential population, the use of timber from mangrove trees for charcoal, illegal or illegal mining and illegal felling of mangrove trees or wild. The community hope that the local government immediately bring order and enforce the laws for environmental damage makers are detrimental to community and the environment itself. Also expect the local government to make regulations on the sustainable management of mangrove ecosystem mangrove remaining so the data is still saved and can be utilized for the improvement of social welfare and environmental improvement.

2. Human Asset

Based on the results of interviews and focus group discussions with the community revealed that the understanding and awareness of the diverse mangrove ecosystem. To the community in Mantang Baru village, understanding and awareness of the importance of mangrove ecosystem management is still lacking. They still do not have a complete knowledge and understanding of the sustainable management of mangrove ecosystems. Community still think that the only mangrove tree or wood can be used only for the manufacture of wood charcoal. According to the community, they are still limited

knowledge and awareness about mangrove ecosystem because there is no socialization or assistance from outsiders. It is also experienced by people in Penaga village, Pengujan village, Tembeling village and Bintan Buyu village despite his knowledge of the ecosystem slightly better than the people in Mantang Baru village. They expect to socialize and intensive assistance on the development of mangrove ecosystems in each region in order to provide income for the increase and improvement of the mangrove ecosystems. Through the development of the mangrove ecosystems are also expected to open employment opportunities for the community. Development of mangrove ecosystem for the manufacture of food, aquaculture, tourism and environmental education is expected to create new employment opportunities for the community. These opportunities can be created when they have gained enough training to be developed in each of their village areas.

However, for Busung village and Kuala Sempang village, some residents are more aware of benefits and functions of mangrove ecosystems compared to other villages. Both villages are more advanced compared to other villages because they get assistance and guidance from some parties, especially from the Agriculture and Forestry Agency of Bintan regency, Community Development Agency and Watershed Management Center (BPDAS) of Riau Islands province. Both villages are also a pioneer in proposing HKm schemes for mangrove ecosystem in Bintan regency (Table 16).

Table 16. The level of knowledge and awareness of mangrove ecosystems based on the results of focus group studies in 8 villages in Bintan regency, Riau Islands Province.

| No | Name of Village | Knowledge and Awareness of mangrove ecosystems | | |
|----|--|--|------------|----------|
| | | Good | Sufficient | Not good |
| 1 | Busung | √ | | |
| 2 | Kuala Sempang | √ | | |
| 3 | Pengujan | | √ | |
| 4 | Penaga | | √ | |
| 5 | Tembeling | | √ | |
| 6 | Binyan Buyu | | √ | |
| 7 | Mantang Baru | | | √ |
| 8 | Sebong Lagoi (<i>Bintan Resorts</i>) | √ | | |

Meanwhile, for Bintan Resorts, for purely managed by the private sector, knowledge and awareness of the benefits and functions of the mangrove ecosystem is much better compared to other villages. According to the manager, knowledge and awareness about mangroves are the main capital to sell the mangrove tour. The tour guide must be provided with sufficient information to explain in detail and complete information about the benefits and functions of mangrove ecosystems to the tourists, both local tourists and foreign tourists as from Singapore. The tour guides are also given sufficient training on mangrove ecosystems so that they have a good knowledge and understanding of the benefits and functions of the mangrove ecosystem.

Knowledge and understanding of the good and intact mangrove ecosystem management will provide better awareness for the community. Socialization and development activities with the aim of empowering the community shall be the duty of all parties, especially the local government has the authority to determine the policy direction of the management of mangrove ecosystems in Bintan regency.

3. Financial Asset

Based on the results of interviews and focus group discussions with the community in mind that most of the people residing in the villages who have studied the main livelihood as farmers and fishermen. Different types of activities undertaken by people who work as fishermen such as fish, crabs and shrimp in the sea as well as grouper cultivation using cages. The fishing activities carried out in the waters around mangrove ecosystem using various methods and fishing gear. They also use boats for transportation to look for fish, crabs, shrimp, bark and so on. Most people in Busung village and Kuala Sempang village also utilize mangrove fruit to be used as food ingredients such as pastries and breads, and beverages such as juice and syrup. Food and beverage manufacturing is done by mothers who are members of a group or PKK. According to them, the manufacture of food and beverage activities derived from the mangrove trees can provide a positive impact for the community because it can menciptakan jobs and increase revenue. However, food and beverage production is still limited and has not been done on a large scale.

Based on the results of focus group discussions with people in the villages studied, they look very enthusiastic to know more about the development of the mangrove ecosystem, especially those who have a concern for the environmental sustainability of coastal areas remaining mangrove ecosystem around it. The mangrove ecosystem development will also be a positive impact on community. According to the community, the preservation of mangrove ecosystems around the village will be able to provide many benefits which are able to utilize the fruit of mangrove trees for a variety of food that can be sold and profitable. In addition to the mangrove ecosystem is still good to use as a place of aquaculture such as grouper, crabs and other marine animals. Tourism is also one of the benefits that can be used by communities to improve incomes and rural communities around the arrival of tourists to see and recreation to tourist destinations mangrove.

According to the community, Bintan Resorts is a tourist destination that is managed by the private sector which is located in the village of Sebung Lagoi can be used as an example of

the management of mangrove ecosystems as a tourist destination. However, people in the villages of other studies that assess the management of tourism requires substantial capital and skills are adequate. Local government and relevant parties are expected to provide assistance in the form of guidance, coaching or even capital to develop the tourism potential villages to be developed, such as in Busung village. Thus, the development of the mangrove ecosystem in one place can be developed according to the characteristics of the social, cultural and economic communities.

In addition to the economic conditions of households and groups, the economy at the village, sub-district and district levels also play an important role in the development of mangrove ecosystems in a region. The economic development of a region is determined by the availability of support facilities such as facilities and trade finance. A market where financial transactions and become one of the central circulation of money. In addition to the market, the transaction can also occur in the shop or store that sells a variety of goods. Based on information obtained field data pengggalian that in all study villages have markets, except in Mantang Baru village.

Based on the results of secondary data analysis (BPS, 2012), most of the villages studied have had cooperative. According to the community, in developing its business, cooperatives often face major obstacles are internal weaknesses in the capital. Venture capital is a means of driving more economic resources in business activities. Therefore capital for cooperative development should be prioritized both from within and from outside the cooperative. Cooperatives can also be used as an alternative institutional forms that can be encouraged to be a driving force in the management and development of community-based ecosystem.

4. Social Asset

Based on the results of interviews and focus group discussions with community acquired information that all the villages visited had formed groups at the village level. For Busung village, Kuala Sempang village, Pengujan village and Penaga village, formation of groups influenced by the needs of the community to apply for mangrove ecosystem management through community forestry schemes. Meanwhile, for Tembeling village and Bintan Buyu village, it will propose schemes Village Forest (HD). For Bintan Resorts, the area is managed entirely by the private sector and also in partnership with surrounding villages (Table 17). However, for Tembeling village and Bintan Buyu village still in the process of group formation. As for Mantang Baru village already formed groups, but not for filing scheme HKm and HD.

Table 17. Form of government programs and group name in the 8 study villages in Bintan regency, Riau Islands Province

| No | Name of Village | Program | Name of Group |
|----|---|---------|------------------------------|
| 1 | Busung | HKm | Ketapang Putih |
| 2 | Kuala Sempang | HKm | Medang Kenanga |
| 3 | Pengujan | HKm | Tunas harapan |
| 4 | Penaga | HKm | Melayu Bersatu |
| 5 | Tembeling | HD | Harapan Baru |
| 6 | Binyan Buyu | HD | Bintan Lestari & Bintan Jaya |
| 7 | Mantang Baru | Not yet | Mandiri |
| 8 | Sebong Lagoi (<i>Bintan Resorts</i>) | Private | Managed by private |

Based on the results of focus group in Busung village and and Kuala Sempang village, they have done at least one group meeting once a month. The topic of conversation and discussion at the meeting include the mangrove ecosystem management and development opportunities. Community are also talking about the development of the application and submission HKm program. According to group members, they pay dues around IDR 5000.00 - 10,000.00 per person per month. Fees are used for the needs of particular groups for

group administration and group meetings for consumption. Communities have benefited from the group. They argue that with the group to establish silaturahmi between members. Through the group can also be used as a means of information among group members. Groups can also facilitate the formation of government in fostering and guidance. Based on the results of focus group discussions, people judge that until now there is no problem experienced by the group.

Meanwhile, for Penaga village, Pengujan village, Tembeling village, Bintan Buyu village, and Mantang baru village, yet optimal group formation. They are still relatively new to the formation of this group that has not felt the direct run private benefits that can be obtained with the group. Nevertheless, according to the group formation is expected to be a forum for people to exchange information and coming up with ideas that benefit the community.

Especially for Bintan Resorts, according to the manager, they cooperate with the surrounding community. This partnership is a form of concern to the manager of the local community. According Yethas staff (one of the community agencies that partner Bintan Resorts), for cooperating with Bintan Resorts, they derive a lot of benefits. Some of the benefits to the community such as job creation, opening up access for tourists heading to the village, and can increase incomes. Community recognizes the existence of this community Bintan Resorts find it and gain knowledge about the management of mangrove ecosystems. Communities expect better cooperation with the Bintan Resorts so that people can better economy rate.

5. Phisical Asset

Based on the results of interviews and focus group discussions with community acquired information that the condition of infrastructure in the villages studied different. Busung village, Kuala Sempang village, Tembeling village, Bintan Buyu village, and Sebong Lagoi village can be passed by using the road. Meanwhile, for Pengujan village, Penaga village and Mantang Baru village impassable by boat because they have to cross the sea to get to the island (Table 18).

Table 18. Distance and condition of transportation to get to the capital of sub-district and capital of regency at 8 study villages in Bintan regency.

| No | Name of village | Distance to capital sub-district (km) | Distance to capital of regency (km) | Transportation facility |
|----|-----------------|---------------------------------------|-------------------------------------|-------------------------|
| 1 | Busung | 13 | 65 | By road |
| 2 | Kuala Sempang | 14 | 64 | By road |
| 3 | Penaga | 46 | 74 | By roat and sea |
| 4 | Pengujan | 57 | 83 | By road and sea |
| 5 | Bintan Buyu | 28 | 44 | By roat |
| 6 | Tembeling | 26 | 47 | By road |
| 7 | Mantang Baru | 5 | <i>Not available data</i> | By road and sea |
| 8 | Sebong Lagoi | 1 | 77 | By roat |

Sumber: BPS (2012)

Based on the table above, Pengujan village has farthest distance with the capital sub-district and the village nearby Bintan Buyu village has nearest distance with the capital sub-district. However, based on field observations, when the team made a visit to the village of Mantang Baru village, it takes about 45 minutes to cross the sea from the pier on the island of Bintan Island heading to Mantang Baru village. Compared with other villages also have to cross the sea, the village of Mantang Baru village is the farthest village of Bintan Island pier leading to the Mantang Baru village (Mantang Island) (Figure 15).



Figure 15. Transportation conditions to the village of Mantang Baru village from Bintan Islands by ship or boat (left) and dock conditions in Mantang Baru village (right).

Based on the data and explanations above, physical assets such as infrastructure will affect the development and management of mangrove ecosystems. Villages close and still be on the island of Bintan will be easier access than villages to sea menyebang may want to head to the village. Busung village and Kuala Sempang village have benefited in terms of infrastructure. Location of mangrove ecosystems in both villages can easily be passed to use the roads with greater development potential than the other villages, especially for tourism purposes.

Communication access through mobile phones is to be enjoyed in all the study villages. Wireless communication is one of the physical assets that are important to the development of the region. For example, the location Mantang Baru village relatively far from the center of the economy (Bintan Island) led to communication access is still limited and has not been smooth compared to other villages. Community hopes Mantang Baru village get the attention of the local government related to community economic development and preservation of mangrove ecosystems.

IV.1.4. Local Institutions in Community-Based Mangrove Ecosystem Management

To determine the development of local institutions in the management of community-based mangrove ecosystem, there are four dimensions of institutional development is the tenure arrangement and land tenure, production arrangement, and consumption arrangements.

1. Tenure Arrangement and Land Tenure

The issue of certainty in gaining access to and control over mangrove ecosystem is the most prominent issue in community. The certainty of access or utilization of the mangrove ecosystem is one of the important prerequisites for mangrove ecosystem management towards a fair and sustainable. Certainty of tenure issues largely questioned in the area managed by the community indicates overlap with areas claimed by the state as forests or protected areas (catchment areas) most of which are coastal areas. Mangrove ecosystem conditions that are mostly located in protected areas causes a different perception between the public and the government. Peoples considered that they had been living and lived in the area and have made use of mangrove ecosystems. While the government has determined that the area is an area of environmental protection as a buffer area surrounding environment. For example, several years ago a lot of people who seek mangrove trees for charcoal making. The charcoal obtained from mangrove ecosystems which are located around the village. Seeing an enormous impact on the mangrove ecosystem damage in Bintan due to the use of mangrove trees as materials for charcoal, then the local government then banned the public and employers to make the mangrove trees as raw material for charcoal. It is then the momentum for the community and the government to try to preserve the mangrove ecosystem located in Bintan regency.

Land tenure overlap area is also the cause of the uncertainty of land tenure in the area managed by the community. Tenure and tenure uncertainty, public access to the mangrove ecosystem is often seen as one of the reasons why people are often not too keen on finding natural resource management strategies in particular mangrove ecosystem for long-term goals. Given the overlapping problems of the governance of land tenure, it should be

necessary to find the right strategy so that there is certainty of tenure for people to be able to properly manage the mangrove ecosystem and sustainable. According to Afiff (2007), the scope of the problem is the certainty of tenure included the assurance of security of tenure and access to community forest around their lives. Therein also related to how important a determinant of the development model of commodity agreements and resource management, time certainty effort, and benefit-sharing agreements forest products more equitably.

Based on the results of focus group discussions with people in the villages of the study, obtained the data and information that most people have chosen the pattern of mangrove ecosystem management through community forestry program (HKm) and Village Forest (HD). The main objective of the program is to assist the public in obtaining access rights to forest resources, forest resources and achieve sustainability improvements in public welfare. For the 2 villages namely Busung village and Kuala Sempang village, they utilize HKm program. While, for Pengujan village, Penaga village, and Bintan Buyu village, will propose HKm program. As for Tembeling village and Bintan Buyu village, HD program will apply. Former Mantang Baru village does not have a program like the other study villages. This is due to access to information and sosialisasi received by people associated with the government program for the Community Forest (HKm) and HD not running optimally. As for the Bintan Resorts is located in Bintan, they have acquired leasehold permits (HGU) from the government to pursue an area of approximately 23,000 ha of mangrove conservation and tourism purposes (Table 19).

Table 19. Model of arrangement of tenure and land tenure in managing the mangrove ecosystem in the 8 study villages in Bintan regency, Riau Islands province.

| No | Name of village | Legality | Objectives | | |
|----|--|---------------------|--------------------------------|------------------------------|---------|
| | | | Sustainable mangrove ecosystem | Access to mangrove ecosystem | Welfare |
| 1 | Busung | HKm | √ | √ | √ |
| 2 | Kuala Sempang | HKm | √ | √ | √ |
| 3 | Pengujan | On process (HKm) | √ | √ | √ |
| 4 | Penaga | On process (HKm) | √ | √ | √ |
| 5 | Tembeling | On process (HD) | √ | √ | √ |
| 6 | Binyan Buyu | On process (HKm/HD) | √ | √ | √ |
| 7 | Mantang Baru | Not yet | - | - | - |
| 8 | Sebong Lagoi (<i>Bintan Resorts</i>) | Private | √ | √ | √ |

Source: Primary data

Bintan Resorts is located in Sebong Lagoi village can serve as best practices related to the system of land tenure and land use regulation, because it has been able to capitalize on the area cultivated for the purpose of tourism and conservation of mangrove ecosystem. It can be used as an example for other villages in the study and management of mangrove ecosystem development.

2. Production Arrangement

If the certainty of tenure can be obtained by the public, then the next challenge is to develop institutions related to the production arrangement. There are two levels of institutional development strategies related to production arrangement is, first, the development strategy of the production system at the level of the group or community, and secondly, the production system development strategies at the household level (Afiff, 2007).

Production planning strategies at the level of the group or community is basically looking for a form of joint venture involving all members of the group. Based on the results of FGD

note that all villages have done HKm and HD programs have had their respective groups. This group should be formed by the people because it is one of the requirements in filing HKm and HD programs. Number of group members varies between 8 - 15 peoples per group (Table 20). Formation of this group is based on similar needs and interests of the community. They form a group and the group agreed on the rules to be obeyed and complied with.

Table 20. Forms of production arrangement at the level of the study group in 8 villages in Bintan regency, Riau Islands Province.

| No | Village | Program | Community group | Number of member | Benefit |
|----|-------------------------------|---------|------------------------------|------------------|------------------------------|
| 1 | Busung | HKm | Ketapang Putih | 10 | NTFPs & Environment services |
| 2 | Kuala Sempang | HKm | Medang Kenanga | 10 | NTFPs & Environment services |
| 3 | Pengujan | HKm | Tunas harapan | 10 | NTFPs & Environment services |
| 4 | Penaga | HKm | Melayu Bersatu | 10 | NTFPs & Environment services |
| 5 | Tembeling | HD | Harapan Baru | 15 | NTFPs & Environment services |
| 6 | Binyan Buyu | HD | Bintan Lestari & Bintan Jaya | 16 | NTFPs & Environment services |
| 7 | Mantang Baru | Not yet | Mandiri | 10 | Not yet |
| 8 | Sebong Lagoi (Bintan Resorts) | Private | Manage by company | - | Environment services |

Location HKm and HD programs located in the protected area (catchment areas) so that its use is limited to non-timber forest products (NTFPs) and environmental services, such as tourism. For Busung village and Kuala Sempang village, the group has several activities like making cookies with raw materials from mangrove trees. Several times the group members have attended training on mangrove development as a source of food. Sempang also exist in the form of leisure tourism using a modified boat and in it can be used for eating and drinking places such as restaurants go. Local community called it by *pokcai*. This *pokcai* can load about 6-8 people with mangrove forests that surround these were around the village.

However, at the time of the study, this *pokcai* been sold by the owner so there is no more sea transportation/rivers that are used for tourism facilities. Utilization *pokcai* only last up to 8 months. This is because there is no support from the party, including for the promotion.

For Mantang Baru village is no programs that go into the village associated with the development of mangrove ecosystems. Based on the results of focus group discussions with people in the village, they do not know the benefits and functions of mangrove ecosystem for community and for the environment. So far they only utilize mangrove for firewood or charcoal-making raw material.

Meanwhile, in Bintan Resorts has been professionally managed by the private sector. In the tourist area of approximately 23,000 ha are hotels and sights including mangrove tours (Figure 16). Based on interviews with managers of Bintan Resorts, mangrove attraction is mostly visited by tourists coming from Singapore. Only few of the domestic tourists who come to tour the mangroves.



Figure 16. The condition of the entrance to the mangrove tourist sites in Bintan Resorts.

Bintan Resorts is also working with local communities that are adjacent to mangrove tours, such as working with Yethas (Yethas Ecotourism Tours & Services). The partnership program is conducted as a form of management kepedualian Bintan Resorts to the surrounding community. Usually the people help in terms of providing the operator to deliver a boat with tourists who come to the site to tour around the mangrove ecosystem. The community also offers seafood dishes (seafood) which is located alongside a mangrove as well as several other activities such as village tours, fishing, and planting mangroves (Figure 17).



Figure 17. Mangrove ecosystem conditions in the area of Bintan Resorts is used for tourism purposes.

As for production planning development strategies at the household level, the approach taken is to encourage the growth of other types of household economic enterprises that aims to increase revenue by leveraging the fruit of mangrove trees to be used as food and drinks such as the manufacture of various kind cake, juice and syrup making. In some locations also found a community that has developed the cultivation of fish and crabs as an alternative income or even as a main livelihood. Aquaculture development is intended to reduce the damage caused by the conversion of mangrove forests of mangrove ecosystems to residential and illegal mining. This activity is intended to save the mangrove ecosystem that has been or is being pioneered by the communities and local government.

3. Consumption Arrangement

Changes in consumption patterns generally have a big impact on how people assess the natural resources. With the growing importance of the currency in people's lives in the countryside, then a little too much influence on the way they assess and interpret the natural resources that they own or manage. Sale and purchase of land, for example, is one example of the changes taking place at this time in the life of the rural communities most affected by the influx of this money culture. Land or forest or agricultural land was originally not a commodity economy for rural communities. With the change in this value, then the land or the land now turned into a commodity that has economic value that the object of the sale and purchase (Afiff, 2007).

The necessities of life reasonably be met initially by way of barter is now replaced with a medium of exchange money to get it. Swift current of modernization that goes to the countryside has changed lifestyles and consumption patterns of the village community. Changes in lifestyles and consumption patterns will usually encourage an increase in the exploitation of natural resources which can threaten the sustainability of natural resources and sustainability of forest ecosystem services to community itself.

Based on the results of focus group discussions and interviews with people in the study villages, public awareness of the importance of ecosystem protection and kelestaraian magrove is still low. This is evident by the lack of rules regarding pengalihfungsian mangrove forest into other functions such as mining and settlement. In real terms, due to the destruction of mangrove forests perceived by the fishing community with a potential decline in fisheries. Community tends to perform actions according to their short-term economic benefits without taking the risks of long-term ecological and economic.

Efforts and strategies for developing local institutions strongly influenced by at least three major factors, namely:

1. Factors and the physical condition of the local natural resources.

Model development and institutional management of mangrove ecosystems are built by communities can vary from one place to another place. It is very dipengaruhi by the

physical and natural resources are in place (Afiff, 2007). For example, opportunities and challenges made by the people in Busung village and Mantang Baru village in mangrove tourism development will be different. This difference will be affected by the physical condition of the Busung village is relatively close to the capital of the district and can be traversed by road. Meanwhile, to get to Mantang Baru village, it takes about 1 hour from the capital of the sub-district and continued with the first sea crossing approximately 45 minutes. This is due to the location of Mantang Baru village was an island separated from the Island of Bitan as the main island.

2. Political economy factors at the International level, national and regional.

In the context of political economy at the national and local levels that are considered important in influencing the dynamics of institutional development at the local level is the absence of some of the policies that are considered strong enough to support models of community-based forest management (Afiff, 2007). At the national level, the central government has issued Presidential Regulation (PP) No. 73/2012 on National Strategy Mangrove Ecosystem Management. Issuance of Government Regulation No. 73/2012, was intended to seek the protection, preservation and utilization of mangrove ecosystem for the well-being of community as a mangrove wetland resources and coastal areas as the system peyanga life endowed value is very high. PP is a legal umbrella for mangrove ecosystem management at the national level which is an integral part of the management area pesisir integrated with watershed management (DAS).

Meanwhile, at the local government level Bintan regency, there is no policy on mangrove which is a translation of the PP No. 73/2012. However, based on Regional Regulation No. 2/2012 on Spatial Planning of Bintan regency for 2011-2031, local government has incorporated some important aspects related to the mangrove ecosystem. In statergi spatial planning policy, for example, is directed at maintaining and preserving mangrove forests. Area that provides protection subordinates area is water catchment areas and mangrove forests. Mangrove ecosystem management is done through the rehabilitation and protection of riparian and coastal border, and the establishment and preservation of mangrove forests. Meanwhile in the general provisions of the zoning regulations established mangrove forests are not allowed to do

farming activities that result in decreased function of the area, are not allowed to do hunting protected species legislation, and in the coastal mangrove forest still allowed conducted research activities and nature are limited. To that end, local governments should be able to take the initiative in making rules that strengthen the regional position or the legitimacy of particular mangrove ecosystem management in Bintan regency. This effort is expected to involve the community so expect to provide benefits for the local community interest.

According to Afiff (2007), in addition to government policies, other factors which affect, among others, fluctuations in commodity prices, market demand, trade regulation, and changes in leadership at the regional and national levels. For it to be considered, the mapping macro factors and political economy at the national and regional levels to see how far effects against local institutional empowerment in the region.

3. Local social and political dynamics.

Local social and political dynamics differ from one place to another place. The existence of local community leaders are charismatic and clearly akuntabilitasnya on local people, for example, is often an important factor in developing local institutions. According to Afiff (2007), in this case including the characteristics of the communities that became the basis of organizing. These differences will affect the models of motion and local institutions are built. In contrast, the development of local institutions will be difficult and will take a long time when the people had different interests.

History of land claims and the mangrove forest resources by the community also affects their struggle to gain recognition and bid on mangrove forest management model that will be advocated. Alliances and conflicts between communities and other stakeholders such as government private sector, and the NGOs also affect the development of local institutions. Social and political dynamics that exist in this area will affect the development of local institutions.

IV.1.5. Potential Development of Enterprises in Community-based Mangrove Ecosystem Management

Based on the results of interviews and focus group discussions with people, known have some potential of mangrove ecosystem that can be developed in the villages studied. Potential that can be developed mangrove ecosystems such as mangroves for food, mangroves for aquaculture, mangroves for tourism, and mangroves to environmental education.

1. Mangrove for Food

Based on the results of interviews and focus group discussions with the studied villages, mangrove ecosystems are in all these villages have great potential to be developed into food. Several types and benefits of mangrove trees that used by the public is presented in Table 21.

Table 21. Types and benefits of fruit and trees of the mangrove ecosystems utilized by the public at 8 study villages in Bintan regency, Riau Islands Province.

| No | Village | Type and benefits |
|----|---------------|--|
| 1 | Busung | <ul style="list-style-type: none"> • <i>Nipah</i> as an ingredient for the manufacture of milk, juice, syrup, flour, brown sugar • <i>Berembang</i> as an ingredient for the manufacture of flour for a lunkhead, syrup, juice • <i>Perepat</i> as an ingredient for the manufacture of soap, shampoo, antiseptic, etc. • <i>Boros</i> as the material for the manufacture of paints, lunkhead, colors for clothing, pudding • <i>Tumu</i> as a material for the manufacture of lunkhead, flour |
| 2 | Kuala Sempang | |
| 3 | Penaga | <ul style="list-style-type: none"> • <i>Nipah</i> as an ingredient for the manufacture of roofs, walls, fruit for syrup • <i>Berbang</i> as an ingredient for the manufacture of salad • Mangrove wood as a material for the manufacture of fire • <i>Ambang-ambang</i> as an ingredient for the manufacture of drugs after delivery |
| 4 | Pengujan | |
| 5 | Tembeling | |
| 6 | Bintan Buyu | |

| No | Village | Type and benefits |
|----|----------------------------------|-------------------|
| 7 | Mantang Baru | Undeveloped |
| 8 | Sebong Lagoi (Bintan Resorts) | Tourism |

Benefits of this mangrove tree varied and have different functions. Mangrove tree species are often used include palm (*Nypa fruticans*), berembang or brembang (*Sonneratia caseolaris*), perepat (*Sonneratia alba*), Tumu (*Buguiera gymnorhiza*), and mangrove (*Rhizophora* spp.). Meanwhile, from the fruit of the tree can be used for a variety of food and beverages, including for the manufacture of paints, natural clothing dyes, antiseptics, shampoos and soaps. Based on the table above shows that in Busung village and Kuala Sempang village has been able to take advantage of the fruit and the tree of the mangrove ecosystem more than the other villages. Both these villages have several times attended training on the use of mangrove tree fruit as a food ingredient. Trainees more dominated by the mothers of the two villages. The training was organized by the relevant agencies such as the Agriculture and Forestry Agency of Bintan regency. Training followed by practice is guided directly by the resource persons and mentors who are competent and experienced are imported from outside the region such as from Surabaya, East Java. According to the community, they have benefited greatly from the presence of such training. In addition to gain knowledge and experience, the public is also able to independently apply the science in a way that has been acquired during the training and mentoring. This is the main capital for the community to continue to improve the knowledge and experience in the development of mangrove tree to be used as food or drink (Figure 18).



Figure 18. Serving food with raw materials from mangrove fruit made by residents and presented at the time of FGD at Busung village.

In contrast to the Busung village and Kuala Sempang village, Mantang Baru village peoples do not optimally utilize the fruit of mangrove trees as was done in Busung village and Kuala Sempang village. This is due to the lack of socialization and training related to the use and development of mangrove fruit as food and beverages as well as other benefits. Based on the results of focus group discussions also revealed that during the public still do not know the benefits and functions of mangroves, both from the aspect of environmental and economic aspects. The community hopes to gain adequate knowledge and skills in both the development of mangrove fruit as food and beverages so as to keep the mangrove ecosystem and increase incomes.

Meanwhile, for Bintan Resorts, since one focus of management is a tourist destination that has not been developed mangrove mangrove fruit as food and beverages. Based on the results of interviews and focus group discussions with the manager of Bintan Resorts obtained information that the manager would like to work together with other villagers to provide products such as food and beverages produced from mangrove fruits. Foods and

beverages derived from mangrove fruit processed will be presented at the time there are guests or tourists who come to Bintan Resorts. Provision of food and drink is also a positive impact on the manager for collaboration or partnership with the community and supporting the location of other mangrove conservation. This is a potential cooperation should be followed up and developed by the people in the other villages as part of the business opportunities in the development of mangrove ecosystems in the region, respectively. However, according to the manager of Bintan Resorts, food and drinks produced from mangrove fruit should be no quality assurance and health issued by the local government. It is necessary to provide guarantees to every person who enjoys food and drink will be health and food safety.

2. Mangrove for Aquaculture

Based on interviews and focus group discussions in the 8 study villages, Busung village has the potential of aquaculture in the mangrove ecosystem is better than the other villages. This is due to farmer groups (Ketapang Putih) situated in the village is quite active in the development of aquaculture, particularly grouper aquaculture. They are also often invited to fish farming training, both for marine fish and freshwater fish conducted by several government agencies, especially the Marine and Fisheries Agency of Bintan regency. The training is not only done at the local level but has reached the outside area (Java). It also encourages the community to develop the potential of aquaculture, especially those located in the territorial waters around mangrove ecosystem because it has to know and understand the benefits and functions of mangroves as a source of income from fish farming in the area around the mangrove ecosystem.

Aquaculture around the mangrove areas is done by making cages. Cages made by community still shaped rectangular box that contains 4 holes with materials such as wood and nets are obtained by purchase. Cage size varies but usually measuring about 2.5 mx 4 m. According to the community in Busung village, fish or shrimp farming requires considerable capital. Largest capital used to purchase fingerlings. High quality seeds have a much more expensive price than the low quality. The seed quality will affect the crops as

they relate to the quality of life of each seed is bred. In addition, feed the fish also play an important role in aquaculture. Feed consumed fish should also be of good quality because it affects the health of fish and harvest volume. Community hopes to get financial aid and guidance from the local government for the development of aquaculture.

However, in some other villages like in Penaga village and Pengujan village also found community who do aquaculture around the mangrove areas. Based on the results of interviews and focus group discussions with Pengujan villagers, they also never get help and guidance from the Maritime and Fisheries Agency related to aquaculture. Meanwhile, for Bintan Resorts, according to the manager of aquaculture programs are not developed. They still focus on the mangrove ecosystem as a tourist destination.

Based on the information gathered, all the study villages have the potential for development of aquaculture around the mangrove areas or called wanamina system (Silvofishery). Silvofishery system is one alternative aquaculture breeding menadukan mangrove ecosystem with a pool that is around the mangrove ecosystem. Some types of animals that can be cultivated by using Silvofishery system include fish, shrimp and crabs, and the bark (Figure 19). Aquaculture development around the mangrove ecosystem should refer to the principles of sustainability (sustainable) including aquaculture (sustainable aquaculture). This meant that the sustainability of aquaculture management must be able to ensure the passage of the cycle and mutually beneficial interaction in a mangrove ecosystem.



Figure 19. One type of marine animal (bark) that has been processed and presented by the public at the time FGD at Busung village.

3. Mangrove for Tourism

Mangrove ecosystem development for the purpose of tourism is an alternative management of mangrove ecosystems. As in Bintan Resorts is one of the concession (HGU) is privately-managed mangrove ecosystem to take advantage of tourist destinations. Bintan Resorts is a large investor who not only manage the mangrove ecosystem but there are also manages hotels and other tourism facilities with a concession area of approximately 23,000 ha. With the breadth of managed areas, mangrove ecosystem is one of the important part as a tourist destination. Many tourists who come to the sites to see and observe the mangrove while along the edge of the mangrove ecosystem in the sea and river by boat. The tourists are accompanied by tour guide who are trained and professional. Most tourists who come to the site of mangrove derived from abroad, especially from Singapore. This can happen because the location of Singapore is relatively close to Bintan Island (Figure 20). According to the manager, the number of tourists most usually on Saturday, Sundays and national holidays. They usually take along a family or group of agency / company specific. They are still meeting up the coast mangrove trees. When it's time to eat, usually tourists are invited to enjoy seafood dishes (seafood) at the location of the restaurant is located alongside the beach or around the mangroves. This is the main attraction for tourists

because in addition to enjoying the beauty of the mangrove ecosystem, they can also enjoy the fresh catch or aquaculture fish from around the mangrove ecosystem.



Figure 20. Foreign tourists (Singapore) who are enjoying the mangrove boat tour with a tour guide in Bintan Resorts.

In contrast to the Bintan Resorts, other villages undeveloped mangrove ecosystem as a tourist destination. However, a few years ago has never been a resident of Kuala Sempang village (Mr Amran, Chairman of Farmers Group of Medang Kenanga) is trying to find business opportunities through mangrove tourism. Tours offered is the boat ride in which there are tables and chairs as restaurants surrounding the beach is still there mangroves surrounding the village. The boat is usually called pokcai. Pokcai is one of the sea or river transportation commonly used by community to cross from one island to another (Figure 21). However, for Mr Amran, pokcai modified and utilized for tourism facilities in Busung village and Kuala Sempang village. Kuala Sempang village is an expansion of Busung village and located side by side or directly adjacent.



Figure 21. *Pokcai* condition ever used by community in the Busung village as a means of transportation as well as tourism.

This activity was running about 8 months, but due to lack of promotion so that tourists who come steadily decreasing. In addition, there has been no guidance and coaching of relevant agencies such as the Tourism Agency of Bintan regency. As it is considered less favorable, pokcai eventually were sold to buyers from outside Kuala Sempang village so there is no more mangrove tours using pokcai in this village. Community hopes mangrove area in Kuala Sempang village and Busung village can be used as an example of mangrove management for community-based tourism destination. They also hope to be modeled after mangrove tourism management run by Bintan Resorts is located in Sebong Lagoi village.

Based on field observations, the condition of Busung village and Kuala Sempang village are very potential to serve as a tourism destination of mangroves. In Busung village area, there is also the island in the middle of the village which is still a lot of mangrove trees and several rivers which are located around the village Lapan rivers, streams and rivers (Siti river and Teka river). Meanwhile, there has been a simple dock that was once used by Mr. Amran when pokcai still active. On the pier there is also a variety of restaurants provides seafood

(seafood) and food that is made from the fruit of mangrove trees. In the dock was also waisatawan can enjoy the sunset. Busung villave is natural beauty and one of the biggest attractions to be developed further. In addition, there are fireflies that you can enjoy the evening as one of the attractions that can be developed (Figure 22).



Figure 22. The condition of one of the piers that are still simple (left) and restaurants alongside the dock (right) which is located in Busung village.

Infrastructure such as roads and bridges are also available in Busung village and Kuala Sempang village. From the paved highway, the location of the pier is located in Busung village is about 50 meters. This suggests that the accessibility leading to tourist sites (dock) is very close to the highway. The distance between Busung village with the capital sub-district around 65 km and when using a four-wheeled vehicle (car) takes about 25-30 minutes from the capital of Bintan city. Adequate infrastructure can be used as one of the main capital in the development of mangrove tourism in Busung village and Kuala Sempang village. The villagers enthusiasm and seriousness to support the tourism high on both this villages. They are very supportive of the development of tourism as it will improve the economy of the community. With the tourism, community expects a positive benefit, both for the environment and economics.

Meanwhile, other villages also have potential for the development of community-based mangrove tourism. Condition of natural resources in the form of mangrove ecosystems in relatively similar study villages. However, because there is no socialization, intensive

guidance and coaching, community are still not able to develop the potential of the self-contained manner. The main concern for local governments is still more on the development of tourism-oriented big investors. Community feel less attention, especially in terms of local government development and empowerment of communities to manage mangroves for tourist purposes. Community hope that the parties related to tourism can help, guide and empower the community, especially for community based management of mangrove ecosystems for tourism purposes.

According to the community, there are some things that must be considered in the development of mangrove tourism, including the legality or licensing, amenities such as dock, boat or ship or pokcai, food stalls; vigorous campaign, and professional management. For the safety and health of the tourists, river or sea transport that is used must be equipped with personal protective equipment (PPE) such as life jacket and medicines for first aid. It is important to note because the manager has to anticipate the things that are not desirable, such as accidents (Figure 23).



Figure 23. One of the safety equipment (life jacket) is used by tourists to enjoy a mangrove tour the location of Bintan Resorts.

In developing the management of community-based tourism mangrove ecosystem, WWF (2009) has developed principles and criteria for community-based ecotourism. There are 5 basic principles in the development of community-based ecotourism, namely:

1. Ecotourism sustainability from economic, social and environmental (conservation principles and community participation)
2. Institutional development of local communities and partnerships (community participation principles)
3. Community-based economy (principle of community participation)
4. Principles of education.
5. Development and implementation of site plans and site management work kerangka ecotourism (Principles of conservation and tourism)

According to the WWF (2009), the pattern is a community-based ecotourism development patterns that support and enable full participation by local communities in the planning, implementation, and management of ecotourism enterprises and all profits earned. Is a community-based ecotourism ecotourism that emphasizes the active role of the community. It is based on the fact that the public has the knowledge of nature and culture and is a potential sale value as a tourist attraction, so community involvement is absolute. Patterns of community-based ecotourism recognize the right of local communities to manage tourism activities in the areas they have traditionally or as a manager. Community-based ecotourism can create employment opportunities for local communities, and reducing poverty (WWF, 2009).

Furthermore, based on WWF (2009), in developing community -based ecotourism marketing, imaging strategies are needed (branding) and promotion through various activities, such as:

- Following the promotion and international marketing;
- Conduct periodic market surveys to determine market dynamics;
- Identify the target market for ecotourism products are developed;
- Organizing special promotions (farm trip, media trips, etc.)

- Opening and open relationship with the private sector, and encourage a deal between community organizations with the tour operator.

4. Mangrove for Environmental Education

Another benefit of the mangrove ecosystem that can be developed is the mangrove environment for education. Many programs can be done to save the mangrove ecosystem, including the activities of nursery, planting, enrichment, mangrove information center, research and development facilities, as well as environmental education for school children and the general public. This activity aims to provide knowledge to the public there is an understanding of the importance of mangrove ecosystem, good for the environment and for community. Through this kegiatan also expected to promote and increase awareness and sensitivity to the environment around it.

Based on the results of interviews and focus group discussions with community in 7 villages and manager of Bintan Resorts, all mangrove areas are located in the region have the potential to be developed into a site with the goal of environmental education mangrove ecosystem. Bintan Resorts, for example, has developed a nature conservation area which includes mangrove ecosystem. Mangrove area was developed by the manager of Bintan Resorts as one tourist attraction as well as a place of environmental education for school children and the general public.

Pendidikan development environment can also be directed to activities of nursery, planting, and enrichment of mangrove trees. Even in Bintan Resorts, every tourist who comes to offer a package of planting mangrove trees at a cost of US\$1/tree. This tree will be planted by tourists and in accordance with the given name of the plant. According to the manager of Bintan Resorts, quite a lot of tourists, especially foreign tourists who are interested to join the package planting mangrove trees. Activities or enrichment planting mangrove ecosystems are part of the awareness program from the management on the sustainability ekosistem mangroves in the area.

Meanwhile, there are still areas of mangrove ecosystems can also be developed into a mangrove information center. Of all the study villages, the Busung village has greater potential to serve as a community-based mangrove information center. Mangrove in this village location is strategic and has a lot of potential for other woods such as tourism and food from the mangrove. With the mangrove information center is expected of all parties, especially for local community will be able to learn together about the management and development of community-based mangrove ecosystem.

Mangrove ecosystem also has the potential to be developed into a research and development area. Research activities can be conducted by students from universities and research institutes. The concept of research and development is expected to include the community so hopefully community will also benefit from the results of research and development. Community involvement along with researchers will also be a good example because both sides will learn from each other and bertukat mind in the development of the location of the local mangrove ekosistem.

IV.1. 6. Problems and Development Strategy for Community-Based Mangrove Ecosystem Management

IV.1.6.1. Issues and Problems

Based on interviews, focus group discussions, field observations, and analysis of the findings in the field, some of the major issues and problems in the community-based mangrove ecosystems management in Bintan regency, which are:

1. The level of knowledge and awareness about mangrove ecosystem is still low.

One of the basic principles in community-based management is should be actively involved in management activities ranging from planning, implementation, monitoring and evaluation of the results achieved. Participation rates associated with community-based ecosystem management will be strongly influenced by the level of knowledge and awareness of the community itself. Although the level of knowledge and awareness

about mangrove ecosystem is different, but the principle is still relatively low. Lack of knowledge and awareness is due to lack of information and dissemination of the importance of mangrove management, both for the environment and for community itself. Coaching and mentoring to the community by local government agencies still too low, resulting in community not getting enough information about the importance of intact mangrove management for community and the environment. It also encourages community to be less concerned and less participate in the management of mangrove ecosystems Knowledge of community forest and HD as one of alternative patterns of community-based management of mangrove ecosystems is still poorly understood by the public, especially regarding the rules and the way the mangrove forest management with community forestry schemes (HKm) and HD .

2. Threats to mangrove damage.

Based on the data and information obtained during the study, the condition of the mangrove ecosystem in the study villages and in the general area of Bintan island damage is high. Mangrove ecosystem damage is caused by several things, such as a residential conversion, conversion into ponds, conversion to mining (both legal and illegal), illegal felling of mangrove trees and the persistence of the use of mangrove wood as a raw material for making charcoal is not done sustainable. The condition causes the level of damage mangrove increasingly large that the impact of the damage is also significant. In addition, because of the level of knowledge and awareness is still low mangrove ecosystem management also trigger unsustainable.

3. Policy of the local government is not yet available.

At the national level, the central government has issued Presidential Regulation (PP) No. 73/2012. This regulation governs the mangrove ecosystem management strategies must be translated into more technical terms the local level. For Riau Islands province and in Bintan regency, not available government policy or regulation that specifically regulate policy on sustainable mangrove management. This policy is important as a reference for the development and management of mangrove ecosystems at the regional level, particularly with regard to community-based mangrove ecosystems

management. Policy level, this area will also be a legal basis for the implementation of community based mangrove ecosystems management in Bintan regency level. Although in Bintan regency has issued Regulation No. 2/2012 on Spatial Planning of Bintan regency on 2011 to 2031. But, the policy relating to the management of mangrove ecosystems is still general and not specifically indicated management of mangrove ecosystems.

4. Coordination and synergy among local government agencies have not been optimal.

Based on interviews with several government agencies in Bintan regency and the Riau Islands province, revealed that there is no coordination system that integrates well among local government agencies that deal with the management of mangrove ecosystems. This lack of coordination due to the lack of understanding is intact and agreed on the importance of mangrove ecosystem management. In addition, each agency has a different program and has not come along. This causes the mangrove ecosystem management program conducted sectoral still limited and not well integrated. Overlapping area function also makes coordination and supervision system of government to be less than optimal. The uncertainty of tenure that occur in the field between the community and local government to be one example of the lack of coordination among government agencies. It is also related to the unavailability of policies governing the management of mangrove ecosystems in Bintan, as well as at the level of Riau Islands province.

5. Information system is not yet available.

System information about the condition of the mangrove ecosystem in Bintan regency is still very limited. The existence and quality of mangrove ecosystems are likely to continue to decline also can not be known with certainty because it has not provided sufficient data and information. Lack of complete and valid information about the condition of the mangrove ecosystem has also become one of the obstacles for local governments to make policy. It also affects the control and monitoring system for the management and development of mangrove ecosystems.

6. Business development is not optimal.

Mangrove ecosystem management has many benefits. Mangrove management through community could develop into food and beverage, aquaculture, tourism and environmental education. Based on the results of interviews and focus group discussions with community in the villages of the study, the development work done by the public is still not optimal and even some villages have not been touched at all. This is due to the level of knowledge and understanding related to the management of mangrove ecosystems is still limited. Socialization and the development of local government are still limited and there is no synergy between local government agencies relating to the community-based mangrove management. Promotion of the benefits and functions of the mangrove ecosystem is still not optimal. For community who have developed products derived from mangrove fruits are also limited skills and capacity to develop further. The support of all parties felt was lacking in the development of community -based mangrove ecosystem. Partnerships between communities and stakeholders, such as the private sector are also not running optimally.

7. Formation of the farmer groups was not strong commitment.

In some villages of studies have established farmer groups. This group is usually formed when the community will be a program plan or assistance from outside parties, either private or government. The formation of groups that are not based on need and a strong commitment, will likely not run optimally, both managerial and performance aspects. Formation of groups based only on the interests of any assistance or reinforcement project and no group then the group tend to be fragile and not strong bond between the group members. The weaker party will affect the level of community participation in developing the programs and influenced the development of the group itself.

8. Community empowerment programs are still lacking

Coaching and guidance that are part of the community empowerment programs related to the management of mangrove ecosystems is still not optimal. This causes the level of knowledge and awareness of the potential and opportunities of development of

community-based ecosystem is still low. Community development programs and sectoral still do not fully integrated and synergized among government agencies in the area. Lack of coordination and synergy among government agencies has resulted in community empowerment programs for community-based mangrove ecosystems management to be less than optimal.

IV.1. 6.2. Development Strategy

Based on the above issues and problems, it is necessary to develop strategies related to the development of community-based mangrove management, such as:

1. Increase the level of knowledge and awareness about mangrove ecosystem.

Development strategies undertaken to increase knowledge and awareness about mangrove ecosystems can be done through several programs, including:

- a. Increased training program is routinely done, both to the community and local government agency employee associated with the management of mangrove ecosystems, especially mangrove management of sustainable community-based;
- b. Increase the standard of living or income communities through the creation of alternative livelihoods;
- c. Improved coaching/training and mentoring program of the local government to the community associated with community-based ecosystem management;
- d. Increased cooperation with stakeholders (local government, private sector, NGOs, universities and research institutions) to add insight and experiences on community-based ecosystem management;
- e. Improved training programs related to the pattern of forest management through community forestry schemes (HKm) and Village Forest (HD).

2. Improve and restoration of mangrove ecosystems.

Development strategies undertaken to carry out repairs and restoration of mangrove ecosystems can be done through several programs, including:

- a. Development of mangrove ecosystem rehabilitation program;

- b. Development patterns of utilization of community-based mangrove ecosystems that are environmentally friendly;
- c. Preparation guidebook ekosietm mangrove rehabilitation;
- d. Enhancement training program on the management and rehabilitation of mangrove ecosystems;
- e. Development of alternative livelihoods or the lives of people, especially those engaged in activities undermining the ecosystem;
- f. Drafting local regulations or policies on the management of regional and community-based conservation of mangrove ecosystems in a sustainable manner.

3. Formulation and implementation of policies and regulations of the local government.

Although Bintan reGENCY government has issued policies on the management of mangrove areas (Government Regulation No. 02/2012 on spatial planning), but be prepared for the development of strategies to make local government regulations and policies that specifically regulates the community-based management of mangrove ecosystems can be done through several programs, which are:

- a. Formulate policies and regulations on the management of community-based mangrove ecosystem by involving the community;
- b. Implement policies and regulations on community-based mangrove ecosystems management;
- c. Outreach to stakeholders (communities, government agencies, private sector, NGOs, universities, and other institutions relevant) to the application of policies and regulations on community -based management of mangrove ecosystems;
- d. Conduct participatory monitoring and evaluation of the activities of community-based mangrove ecosystems management.

4. Improved coordination and synergy among government agencies in the area.

Strategies related to the development of coordination and synergy among local government agencies on community-based management of mangrove ecosystems can be done through several programs, including:

- a. Conduct regular coordination among local government agencies relating to the management of community-based mangrove ecosystem;
- b. Conduct synergy towards community empowerment program that has been prepared by local government agencies relating to the management of community-based mangrove ecosystem;
- c. Running enforcement for mangrove ecosystem destroyer that violate the rule of law in accordance with applicable regulations;
- d. Creating a network of effective and efficient communication to facilitate coordination among local government agencies.

5. Information systems are complete and valid.

Strategy development related to information system on community-based management of mangrove ecosystems can be done through several programs, including:

- a. Development of information systems is accurate and up to date about the mangrove ecosystem management at the district level;
- b. Making a complete data base, valid, credible and up to date on the condition of the mangrove ecosystem at the district;
- c. Making a website is open and full of community-based management of mangrove ecosystems in the district;
- d. The manufacture and distribution of materials of the socialization of community-based ecosystem management;
- e. Socialization to the parties (communities, government, NGOs, private sector, universities and other parties relevant) on the application of information systems that have been developed and implemented.

6. Increased business development 6. Increased business development.

Strategy development related to business development of community -based management of mangrove ecosystems can be done through several programs, including:

- a. Increased training and mentoring program on the management and development of community-based mangrove ecosystems;

- b. Enhancement training program on entrepreneurship for the public related to the management and development of community-based mangrove ecosystems;
- c. Increased cooperation or partnership program between the public stakeholders (government and private) in the management and development of community-based mangrove ecosystems;
- d. Improved technical training material manufacture food and beverage derived from mangrove;
- e. Improved technical training on aquaculture (silvofishery) around the mangrove ecosystems;
- f. Improved technical training on the preparation and development of community-based tourism mangrove ecosystems;
- g. Improved technical training on mangrove environmental education;
- h. Increased promotion to the parties, both domestically and abroad relating to the management and development of community-based mangrove ecosystems through a variety of media;

7. Strengthening farmer groups

Strategy development related to strengthening communities managed mangrove ecosystems can be done through several programs, including:

- a. Enhancement training program on organizing and managerial;
- b. Enhancement training program on ecosystem-based management and community development;
- c. Increased study program;
- d. Increased co-operation program with stakeholders (government, private sector, universities, and other institutions relevant);
- e. Increased empowerment program of the party groups.

8. Increase community empowerment program

Strategy development related to an increase in community empowerment programs that manage mangrove ecosystems can be done through several programs, including:

- a. Enhancement training program on management and development of community-based mangrove ecosystems;
- b. Improved training and technical assistance programs;
- c. Increased co-operation program with stakeholders (government, private sector, universities, and other institutions relevant);

V. CONCLUSIONS AND RECOMMENDATIONS

V.1. Conclusions

- Sustainable mangrove ecosystems management is the protection, preservation and sustainable use through an integrated process to achieve sustainability of the mangrove ecosystem functions for the welfare of the community. One form of management of the mangrove ecosystem is a community-based mangrove ecosystems management.
- Most of the mangrove ecosystem density (99%) is less dense condition and only 1% a high density conditions. Meanwhile, when the areas of mangrove ecosystems is calculated based administration area in Bintan district, then Teluk Bintan sub-district has the widest ecosystem area is 16.22% or approximately 1326.06 ha compared with 9 other sub-districts. Meanwhile, North Bintan sub-district has only about 0.27% or 21.80 ha or have the smallest area compared to 9 other sub-districts in Bintan district.
- Condition of the mangrove ecosystem is in 8 villages of the study area is relatively diverse. Tembeling village is largest mangrove ecosystem has vast areas of mangrove ecosystems than in other villages. Mangrove ecosystem areas in Tembeling village is around 785.12 ha or 28.5% of the total number of 8 villages. Meanwhile, Pengujan village has smallest area of about 109.76 ha (3.98%) compared with 7 other villages. Mangrove ecosystem conditions in all locations studied are conditions less dense.
- All villages are studies areas still has potential for the management of mangrove ecosystems. In the study villages, especially those that have been and are working on community forestry programs (HKm and HD), directed the management pattern in the form of community-based mangrove ecosystems management or community-based forest management.
- The participation rate associated with community-based ecosystem management will be strongly influenced by the level of knowledge and awareness of the community itself. Although the level of knowledge and awareness about mangrove ecosystem is different, but the principle is still relatively low. Lack of knowledge and awareness is due to lack of information and dissemination of the importance of mangrove management, both for the environment and for the benefit of community itself.

- Condition of the mangrove ecosystem in the study villages and in the general area of Bintan damage is high enough. Mangrove ecosystem damage is caused by several things, such as a residential conversion , conversion to mining (both legal and illegal), illegal felling of mangrove trees and the persistence of the use of mangrove wood as a raw material for making charcoal is unsustainable.
- At the national level, the central government has issued Presidential Regulation (PP) No. 73/2012. But for the province of Riau Islands and in Bintan regency, has not provided local government policies or regulations that specifically regulate policy on sustainable mangrove management. However, Bintan regency government has issued Regulation No. 2/2012 on Spatial Planning of Bintan regency for 2011-2031, which also includes strategic spatial planning policies, one of which is directed to maintain and preserve the mangrove forests.
- There is no coordination system that integrates well among local government agencies that deal with the management of mangrove ecosystems. This lack of coordination due to the lack of understanding is intact and agreed on the importance of mangrove ecosystem management. In addition, each agency has a different program and has not come along.
- System information about the condition of the mangrove ecosystem in Bintan is still very limited. Lack of complete and valid information about the condition of the mangrove ecosystem has also become one of the obstacles for local governments to make policy.
- Management of mangrove ecosystem has many benefits which are into food and beverage, aquaculture, tourism and environmental education. Development work done by the public is still not optimal and even some villages have not been touched at all. This is due to the level of knowledge and understanding related to the management of mangrove ecosystems is still limited.
- Formation of groups that are not based on need and a strong commitment will likely not run optimally, both from a managerial and performance. The weaker party will affect the level of community participation in developing the programs and influenced the development of the group itself.

- Coaching and mentoring are part of the empowerment program to the community associated with mangrove ecosystem management is still not running optimally. This causes the level of knowledge and awareness of the potential and opportunities of development of community-based ecosystem is still low. Lack of coordination and synergy among government agencies has resulted in community empowerment programs for community-based mangrove ecosystems management to be less than optimal.

V.2. Recommendations

- Increase knowledge and awareness of mangrove ecosystems through several training programs that support the development of the mangrove ecosystem and improving the welfare of community.
- Perform repairs and restoration of mangrove ecosystems through several programs such as the mangrove ecosystem rehabilitation, training programs, and drafting local regulations.
- Create local government regulations and policies on community-based mangrove ecosystems management.
- Perform coordination and synergy among local government agencies on community-based management mangrove ecosystems.
- Develop and implement an information system on community-based management mangrove ecosystems.
- Business development of community-based management mangrove ecosystems through several technical training programs on the management of mangrove ecosystems that benefit community and the environment.
- Strengthening farmer groups who managed mangrove ecosystems through several training programs and mentoring.
- Increased empowerment program for community who manage mangrove ecosystems through several training programs, coaching and mentoring.

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