

## LOCAL COMMUNITY PERCEPTIONS TOWARDS THE BENEFITS FROM MANGROVE CONSERVATION IN DELTA KELANTAN (DKMF)

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### ABSTRACT

Mangrove is one of the forest ecosystem that is important for providing the goods and services to the environment and their surrounding societies. The extent of mangrove in Malaysia is about 630 thousand hectares and distributed at the coastal of Peninsular Malaysia, Sabah and Sarawak. Mangrove in Delta Kelantan is one of the largest mangrove areas at the northern east coast of Peninsular Malaysia. Delta Kelantan covered about 13,000 ha in area, comprise 17 islands. Before 2000, Delta Kelantan was an open land and no mangroves colony were existed. In 2000, Kelantan Forestry Department had made an initiative of planting mangroves for biodiversity conservation. More than 87 ha of mangrove forest have been planted since 2000. The plantation and conservation of mangrove forest directly benefited local communities surrounding DKMF. Hence, the objective of this paper is to assess the perception of local community towards the plantation and conservation of mangrove forest in this area. Methodology of the study comprise the discussion and Rapid Rural Appraisal (RRA) with the local communities and respective agencies. Questionnaire were developed based on the information gathered and survey on face-to-face basis were done for 12 localities. A total of 501 respondents were interviewed. Results found that majority of the respondents agreed and have a positive perception towards the conservation mangrove forest.

Keywords: Mangrove forest, perception study, local communities, mangrove conservation

### INTRODUCTION

The forest stands that exist along the coastline play a very important role to the well-being of the coastal population living close to the coast in term of socioeconomics, environment and security. This area is also an important for various flora and fauna as well as marine life. In addition, it is a layer of natural zones that protects the coast from the physical forces of nature such as waves, currents and hurricanes as well as prevent and reduce the rate of coastal erosion.

Considering the benefits, Kelantan Forestry Department with collaboration with Forestry Department of Peninsular Malaysia has implemented the mangrove plantation programs at one of the potential coastal areas of Delta Kelantan. The areas were in 250 ha in size and was an open area. In 2000, the initiative by the forestry department planting of several mangrove species such as *Rhizophora muncronata* and *Rhizophora apiculata*. Until now, there were more than 87 ha of the areas have been planted with these mangrove species. The aim of the mangrove plantation was for biodiversity conservation.

Study by Parid M. et al (2015) stated that 50% of the local communities were visited the area before it been planted with mangrove species. After plantation in 2011, it provides increased in income opportunities for the local community in which 10% were receiving from the mangrove area. Hence, the benefits from the plantation of mangrove forest also not only for natural and environment conservation, but also in socioeconomics.

Mangrove itself provide many direct and indirect benefits to human. Other than providing the ecosystem services, villagers living within and around the mangrove area use goods and services from the forest as their source of livelihood. Mangrove product is obtained from the mangrove forests that cover all biological life, including all types of animals or plants found in mangrove areas. According to Ismail Yaakob (1994), there are a lot of habitats in the mangrove forests like shrimps, crabs and may other species as these areas are suitable for the species breeding. Hence, provide sources of income on socio-economics development of local people.

### OBJECTIVE

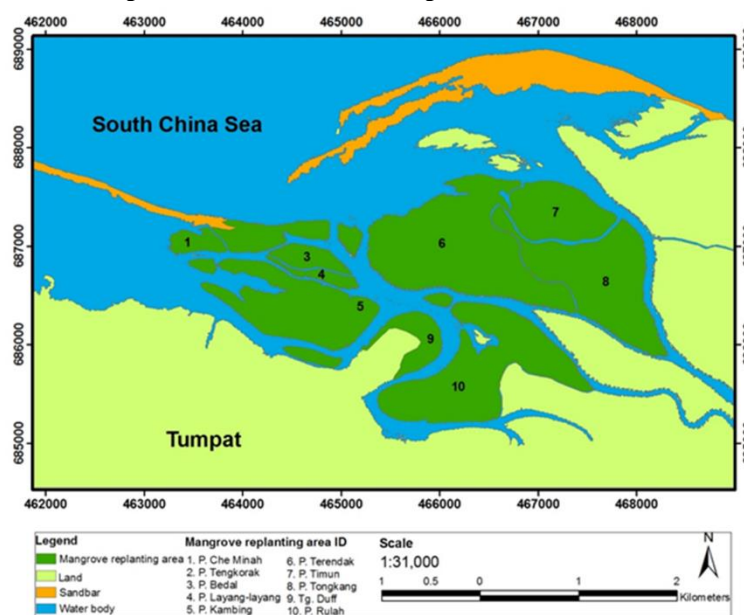
The objective of this paper is to assess the perceptions towards the benefits of local communities on the conservation of mangrove forest in DKMF. The assessment of perceptions focusses on benefits of mangrove forest in DKMF in aspects of providing goods and ecosystem services, the impacts of the mangrove plantation towards the livelihood of the local people compared to before they were planted and their prioritization expectations towards DKMF area.

## METHODOLOGY

### Study Area

Delta Kelantan is situated at the northern part of Kelantan. The area covers around 13,000 hectares consist of 17 islands. The uniqueness of the area is formed from the deposition of lanar, impacted from “Red Flood” event in 1971. Delta Kelantan were high in biodiversity and become their main habitat. Figure 1 show the map of planting area at Delta Kelantan Mangrove Forest. The main interest of Delta Kelantan is the area originally was a bare land area. In year 2000, the Forestry Department of Kelantan and Forestry Department of Peninsular Malaysia have made an initiative in planting the mangrove forest in several islands in Delta Kelantan. The aim of the initiatives was for biodiversity conservation of flora and fauna.

Figure 1: Plantation areas of mangrove in Delta Kelantan.



### Approach

Methodology uses the medium of a face-to-face survey for the household community near DKMF. Several methods prior to household survey were rapid rural appraisal (RRA), preparation of questionnaire and survey planning. RRA was conducted prior to the survey and aims to gather some basic community information. Information collected includes population size, population, number of households, economic activity, household dependence on resources in mangrove forest in Delta Kelantan. The information of RRA were important as basis input for questionnaire designation. Focus group analysis was used to identify the issues to be addressed in the questionnaire.

Questionnaire development was the most important component of the study. The formation of the questions in the questionnaire was based on the initial survey and the objectives of the study needs. This questionnaire has two forms of questions, namely closed question the type of question accompanied by a list of answers with Likert scale and open-ended. The use of closed -ended questions aims to make it easier for respondents to answer this question, besides it can save time for respondents and researchers (Bailey, 1984), while open -ended questions allow respondents to give any of their views on the matter studied. The survey questions were constructed based on previous studies by Er Ah Choy (2009, 2010, 2011), Scheyvens (1999), Tosun (1999), Mowforth and Munt (1998). In addition, Likert scale response measurement was used. According to Resis Likert (Chua 2006), data collected through Likert scale has higher reliability compared to other scales. This study uses five answer choices to measure the items that have been constructed. Several important sections in the questionnaire are;

- i) Household demographic background
- ii) Information on the level of awareness and knowledge of household members on mangrove planting projects in DKMF
- iii) Perception information on DKMF and the sources of income
- iv) Information on the uses of resources

The appropriate sample size is important in determining the accuracy of the estimated value of the results. The total population of household were determined through rapid rural appraisal and discussion were used as a basis calculation for sample size.

The study was conducted in a way of face-to face interview with the households in twelve (12) villages located near the DKMF. For survey work, enumerators were first being trained about the questionnaire and how to interview the respondents. Survey was done in April 2021 and a total of 501 respondents were interviewed. The survey has to comply with the restriction and SOP during the pandemic Covid-19.

## RESULTS AND DISCUSSION

## Household's profile

A total of 501 households or of all households in the area. There were two types of villages included in the study in which repeats the study done by M. Parid et al (2015), coastal and island villages. Table 1 show the number of households participated in this study. Five villages were from coastal areas of Tumpat namely Kg. Baru Nelayan, Kg. Tanjung Kuala, Kg. Besut, Kg. Pak Jah and Kg Kelong. Seven villages from island sites of Tumpat were Kg. Pulau Cendol, Kg. Pulau Suri, Kg. Pulau Besar, Kg. pulau Che Soh, Kg. Pulau Seratus, Kg. Pulau Beluru and Kg. Pulau Tongkang. From total of 2,379 households, 21.1% equal to 501 households were interviewed. Total members of households interviewed were 2,327 from 501 head of households.

Table 1: Number of Household by villages interviewed

Villages	Name	Total household in village	Head of households interviewed	Household members
Coastal Village	Kg. Baru Nelayan	600	70	322
	Kg. Tanjung Kuala	500	81	362
	Kg. Besut	500	60	301
	Kg. Pak Jah	120	30	150
	Kg. Kelong	220	42	174
Island Village	Kg. Pulau Cendol	30	16	63
	Kg. Pulau Suri	166	58	299
	Kg. Pulau Besar	68	55	278
	Kg. Pulau Che Soh	10	8	45
	Kg. Pulau Seratus	53	23	95
	Kg. Pulau Beluru	36	22	89
	Kg. Pulau Tongkang	76	36	149
<b>Total</b>		<b>2,379</b>	<b>501 (21.1%)</b>	<b>2,327</b>

Table 2 presented the demographic profiles for 2,327 households members. The numbers of male and female gender were equally quantified with male is 50.7%, while female is 49.3%. In term of age, the most households were ranged in the age of 11 to 20 years old (20.7%), followed by 21 to 30 years old (16.9%), more than 60 years old (13.5%), 31 to 40 years old (11.2%) and 51 to 60 years old (10.3%). Three least age group were 41- 50 years old (9.3%), 6 to 10 years (9%) and below 5 years old (8.9%). The level of education was recorded secondary school as the major education engaged (47.3%) and primary school (26.2%). There were 18% have no education in which probably the most comes from 8.9% of the household below 5 years old. Higher education in which upper secondary school (form 6) and tertiary education were only 2.4% and 6.0% respectively. In term of marital status, half of the household were single (53.8%), followed by married (42.1%) and other (4%).

Table 2: Socio-demographic profiles

		Frequency	%
<b>Gender</b>	Men	1179	50.7
	Women	1148	49.3
<b>Age</b>	<5	208	8.9
	6 to 10	210	9.0
	11 to 20	481	20.7
	21 to 30	394	16.9
	31 to 40	260	11.2
	41 to 50	219	9.4
	51 to 60	240	10.3
	>60	315	13.5
<b>Education</b>	No education	419	18.0
	Primary school	610	26.2
	Secondary school	1101	47.3

	Upper secondary school	56	2.4
	Tertiary education	140	6.0
<b>Marital Status</b>	Single	1253	53.8
	Married	980	42.1
	Other (widow)	93	4.0
<b>Total</b>		2327	100.0

### Visitation and activities in DKMF

Results show that, most of the local community, about 88% were aware on the mangrove plantation program by Forestry Department at the DKMF. It indicates that the plantation program is known by the local communities. In term of the visitation to DKMF area, about 47.7% were entered the mangrove area for several activities. Among activities by local communities, 68.9% were fishing, or getting mangrove product such as fish, crabs and 'lokan'. About 12.2% entered DKMF for recreational activities, 10.8% were among the boat drivers as their boat route. There were also 5.4% of the local communities involved in tree planting of DKMF areas and about 1.4% entered for working and get mangrove product, nipah. Table 3 shows the results on the use of DKMF.

Table 3: Visitation and activities in DKMF

<b><i>Are you aware that the Kelantan State Forestry Department has planted mangroves in the area near DKMF</i></b>		
No	58	11.6 %
Yes	443	88.4 %
<b><i>Have you ever entered or carried out any activities in the DKMF area near your settlement?</i></b>		
No	262	52.3 %
Yes	239	47.7 %
<b><i>Types of activities in DKMF</i></b>		
Get Nipah trees	1.4 %	
Work	1.4 %	
Boat route	10.8 %	
Fishing for fish, crabs etc	68.9 %	
Recreational	12.2 %	
Tree planting	5.4 %	

### Perception towards the conservation mangrove in DKMF

Local communities were asked about their perception towards their perception on the mangrove conservation and planting. Most of the respondents agreed with the role of mangrove as fish breeding area and habitat (mean value: 4.7), income generation especially in sea products (mean value: 4.7) and acts as waves and strong winds protection (mean value: 4.7). They also agreed on the important of DKMF as flora and fauna conservation area (mean value: 4.6), tourism and recreational activities (mean value: 4.2) and as source firewood and construction materials, respondents (mean value: 4.0). However, respondents or local communities were partially agreed on the importance of DKMF area as a source of daily food (mean value: 3.2) and slightly not agreed on the value of DKMF as traditional medicine. This might be due to nonexistence of local communities whom a traditional practitioner and there were no suitable mangrove forest species for medicine remedy. Table 4 shows the results on local community's perception towards DKMF.

Table 4: Local community's perception towards DKMF

<b><i>Perception towards the value of mangrove area in DKMF</i></b>	<b><i>Mean scale</i></b>
The area is important for fish breeding area and habitat	4.7
The area is important for income generation from river and sea products	4.7

The area is important protection from waves and strong winds	4.7
The area is important for conservation for flora and fauna	4.6
The area is important for daily food resources	3.2
The area is important for traditional medicine resources	2.8
The area is important for tourism and recreational activities	4.2
The area is important for sources of firewood and construction materials	4.0

In term of positive and negative impacts on conservation efforts in DKMF to local communities, respondents mostly agreed that the DKMF benefited them in such increased income (86.4%), created more job opportunities (70.5%). However, most of the respondents slightly agreed on the impacts towards local development (45.5%) and support tourism (45.5%). However, they were mostly not agreed on the impacts through increased communication skills (21.2%), business skill (16.0%) among local communities, women empowerment through small industries (10.0%) and support culture exposition (10.2 %). Table 4 listed the impacts of DKMF.

Most of the respondents were not agreed on the negative impacts from the development of DKMF, such as interference by outsiders (85.4%), lack of income sources (90.6%) and lack of agricultural lands (96.6%). These indicates that, the DKMF have no significant negative impacts to local communities.

Table 5: The impacts of DKMF.

<i>Perception towards the impacts conservation of mangrove planting in DKMF to local communities</i>					
		No	%	Yes	%
Positive	Increased income	68	13.6	433	86.4
	Job opportunities	148	29.5	353	70.5
	Local development	273	54.5	228	45.5
	Tourism	273	54.5	228	45.5
	Communication skills	395	78.8	106	21.2
	Business skills	421	84.0	80	16.0
	Women empowerment - small industries	451	90.0	50	10.0
	Culture	450	89.8	51	10.2
Negative	Interference by outsiders	428	85.4	73	14.6
	Lack of income sources	454	90.6	47	9.4
	Lack of agricultural lands	484	96.6	17	3.4

Based on respondent's opinions on the priority of DKMF areas to be, most of the respondents prioritized the DKMF to be conserved naturally (43.3%), followed by idea of development for tourism (41.5%), open the areas for aquaculture (45.9%) and lastly open to be agriculture sites (60.5%). Table 6 show the priority local communities towards DKMF.

Table 6: The priority local communities towards DKMF.

<b>Local communities views on the use of DKMF according to priority:</b>									
	1	%	2	%	3	%	4	%	Priority
Conservation (leave it naturally)	217	43.3	78	15.6	66	13.2	140	27.9	<b>1</b>
Development for tourism industry	208	41.5	209	41.7	56	11.2	28	5.6	<b>2</b>
Open for aquaculture	57	11.4	187	37.3	230	45.9	27	5.4	<b>3</b>
Open for agricultural lands	19	3.8	28	5.6	149	29.7	305	60.9	<b>4</b>

## CONCLUSION

In summary, effort by local Forestry Department have gave tremendous benefit not only for conservation of natural resources, but also provided other values especially to local communities near DKMF. Most of the local communities agreed on the beneficial impacts towards their socio-economic and livelihoods. About 68% of the households use the DKMF to get the source of food such as fish and crabs. The area also become household's choice for recreational activities (12%). In term of the positive impacts, households agreed that DKMF area contribute to increased income (86%) and job opportunities (70%). They also preferred the DKMF to be conserved naturally aside being develop for other purposes.

In conclusion, local community's perception on the conservation of DKMF proof the effectiveness of the programs initiated by the Forestry Department after 20 years of the mangrove planting. From the bare land, the area now provides variety of goods and services as well as local socio-economic development.

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