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Research paper

Wetland Biodiversity of Telaga Air, Sarawak: Perception and Conservation of Local

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Abstract

Wetland are among the most productive of the world's ecosystem and the most threatened tropical ecosystem. Mangrove forest is very useful and gives various benefits and it is extremely productive ecosystem that provide numerous good and services both to the marine environment and people. This research was conducted to identify the factors that influence the perception of local communities towards wetland biodiversity conservation which brings more beneficial towards our daily life. The interest group for this study is focuses on communities who live near the mangroves forest area and the location of study is in Telaga Air, Sarawak. The method that been used in this study was Factor Analysis and multiple regression. There are 15 factors that have been extracted by using Factor Analysis. Out of the factors, only 7 factors that are chosen as independent variables to run the regression analysis with the dependent variable of respondent's Perception. Lastly, the study found that the factors of community awareness, garbage disposal and level of pollution have a strong relationship with the perception of residents towards wetland biodiversity conservation in Telaga Air. Overall, this study shows that majority of local communities that live nearby mangroves shows a positive attitude towards the conservation of wetland in Kuching. All the activities that being carried out in mangrove area should be monitor by authorities in order to ensure the sustainable of the mangrove forest are protected and guaranteed.

Keywords: *Ecotourism; Perception; Government Effectiveness; Socio Economics.*

1. Introduction

Wetlands are among the most productive of the world's ecosystem. They equip essential services for people, as well as a place for tourism and recreation and provide a unique habitat for many different species (World Wide Fund (WWF) (1). According to Beavit and Tuen (2), Kuching Wetland National Park (KWNP) is an important spawning and nursery ground for fish and prawn species and also provide a wide array of raw resources. KWNP had contained a wide number diversity of wildlife such as Proboscis Monkeys, silvery langur, long tailed macaque monkeys, estuarine crocodile, monitor lizards, a range of birdlife and bearded pig (Beavit & Tuen, 2010). Besides that, they support a huge number of wildlife that would otherwise become extinct, and they protect millions of people from a tragic flooding(3).

According to WWF (.), mangrove forest is very useful and has various benefits. It supplies a lot of goods and services that include fisheries, timber and plant products, coastal protection and tourism (1). Most of the residents that live near with mangrove plant area are relying on the resources from the mangrove forest and the sea for their daily needs. Moreover, Beavit and Tuen (2) reported that KWNP has good tourism potential, but requires a development of the right promotional strategies.

However, since the tourism activities start to flourishing, the residents had a lot of opportunities to generate income. One of it is supplying the boat services to bring visitors to look around KWNP from Kampung Telaga Air Jetty. KWNP has a long attract nature where people not only attracted with the beauty of the mangrove but also other protected wildlife found across the 6,610 hectares of land ("Wildlife species an asset to Kuching wetlands", 2015). In addition, according to WWF(1), mangrove forests are one of the most endangered tropical ecosystem in the world. A danger may affect their habitats include clearing, overharvesting, river changes, overfishing, destruction of coral reefs, pollution, and climate changes (WWF, .). In order to conserve mangrove forest, the attitude of people that live near mangrove area is very important in order to minimize the threat.

2. Problem Statement

The practical problem of conservation of wetland in Telaga Air is the mangrove forest has been reduced even though the conservation is measured by Forest Reserve. A huge area of mangrove plant in Kuching has gone through exploitation because of aquaculture and quarrying activities. Meanwhile, there is a certain locations of mangrove area have been turned into a dumpsite. Many other places experience degradation which has affected all the natural resources of wetlands because of the irresponsible activities such as agricultural, urbanization and development activities (4).

The reduction of the mangrove forest is related to the attitude of the communities. Most of the local communities harvest the mangrove forest resources for their daily life and economic activities. They tend to restore the resources and show the positive attitude or just simply harvest the mangrove forest, breaking the rule and shows the negative attitude. This negative attitude will lead to destruction and reduce the area or wetland and bring worrisomely.

The attitude towards conservation of wetland is really significant in order to maintain and restore the wetland.

According to previous studies, there are many factors that would affect the attitudes of local communities towards the wetland conservation. The factors inspiring positive attitude are likely to enhance the conservation objectives while those inducing negative attitudes are likely to oppose the conservation objective. According to the study of Badola et al.(5), local communities in Bhitarkanika Conservation Area (BCA), India shows a positive attitude towards conservation and the factors that influenced people attitude are more to their demographic and socio-economic conditions. Most people in BCA are tended to have a positive attitude towards conservation that influenced by education and gender. Most of the respondents are more aware with the conservation of BCA mangrove forest are came from the higher education level and had a positive attitude towards conservation issues.

In the study of Shuib et al. (6), the factor that determines the attitude towards conservation are socio-demographic which are age, gender, occupation, and mangrove restoration programs where it has a substantial causal relationship with an attitude in the district towards the preservation of mangrove forest resources. This study shows that the effect of a socio-demographics variable specifies that there is a contrast in attitudes between the older generation and younger generations. Older respondents have less favorable attitudes because they feel that conservation efforts have not been successful in preventing the destruction of the mangrove. While the younger generation who have better education and more knowledgeable would have more favorable towards the conservation because they know about the benefit of conservation.

Moreover, the study shows that there are a positive significant attitude towards the mangrove restoration program undertaken by the Sarawak Forestry Department. This shows that there are more local communities are involving themselves in the conservation efforts. The positive attitudes are more towards male members compared to the female members of the communities. Overall, the studies of Shuib et al. show that people who live near the mangrove forest, male local communities and educated youngsters have a higher positive conservation attitude toward mangrove forest resources. However, although most of the communities show the positive attitude, improvement of the attitude towards the conservation is significant in order to succeed in conservation activities.

3. Theoretical Framework

Perception is a measure of an attitude of people where in other words, attitude is a dependent of perception. There are several factors that affect the attitude and which are socio-demographic of the local communities, specific location, ecological, political, historical and economic condition. The socio-demographic for an individual are include the income level, age, gender, level of education (knowledge) and others. All this factor also affects behavior. When all of the factors affect an attitude and behavior, it will develop a perception of the individual. According to Serrat (7), acquiring, interpreting, selecting, and organizing sensory information to attain awareness is the process of perception. From perception, it will develop an awareness and it will influence people to participate in the preservation of wetland biodiversity and related activities.

4. Methodology

4.1. Study Area

Kuching Wetlands National Park gazette as a national park, a totally protected area in July 2002 and nominated as a Ramsar site on November 2005. KWNP is the first Ramsar in Sarawak, covering an area of 6,610 hectares. It is situated between Sibu and Batang Salak's rivers, about 15km northwest of Kuching and approximately 5km from Damai Beach, formerly known as Sarawak Mangrove Forest Reserve (SMFR) (Sarawak Forestry Corporation, 2013). KWNP is owned by the government of Sarawak and currently managed by the Sarawak Forestry Corporation. The park is surrounded by an islands and saline waterways lined with salt-resistant trees that offer food and shelter for the wildlife habitat. The major occupation of individuals in KWNP area are actively in mangrove swamps activity such as fisherman, tourism and business.

4.2. Sampling Method

Interview was the main method of data collection that was being done to the Telaga Air villagers. The interviews were done in face-to-face approach to the respondents. The questionnaire was written in *Bahasa Melayu* because all the respondents are mostly not using English as their mother tongue language. There are 7 numerators were completing the interview session in Telaga Air. All the numerators are local from Sarawak that make an interview session seem easier because all the questions that have been delivered are in Sarawak language. The roles of the numerator were to explain the question in a most leisurely way that would make respondents easy to understand the meaning of the questions and to avoid misinterpreting during the interview process. 103 questionnaires were retrieved from the respondents. The questionnaire was divided into the following section.

a. Section 1: Respondents profile (open-ended question which consists of 5 questions that asked about the personal detail of the respondent)
b. Section 2: Socioeconomic background (open-ended questions where the respondents been asked what is their income that related to Mangrove resources)
c. Section 3: Mangrove forest resources (the knowledge about Mangrove forest resources)
d. Section 4: Wetland management. (To identify whether local communities are aware with the effectiveness of wetland management in Telaga Air)

5. Result

5.1. Demographic Characteristic of Respondents

As shown in Table 1, shows that there were more males (56%) than females (47%). The largest proportion was between ages 41-60. Most of them are involved directly in KWNP especially for those who having a family as this activity are part of their household income. For level of education, most of them are up to secondary school. Only a minority of the respondents decided to pursue their study.

Table 1: Demographic characteristics

Demography		Frequency	Percentage (%)
Gender	Male	58	56
	Female	45	47
	Total	**103**	**100**
Age	Youth (11-20)	4	4
	Young Adult (21-40)	41	40
	Adult (41-60)	46	45
	Elderly (61-100)	12	11
	Total	**103**	**100**
Level of education	No formal education	8	8
	Primary	31	30
	Secondary	52	50
	High education	12	12
	Total	**103**	**100**
Occupation	Mangrove swamp activity related	24	23
	Tourism related	3	3
	Business related	20	19

	Others	56	55
	Total	**103**	**100**

5.2. Factor Analysis

An Explanatory Factor Analysis (EFA) was conducted in this chapter in order to answer the objective. EFA is often used to identify underlying relationship between measured variables. The Kaiser-Meyer Olkin (KMO) was used to examine how suited the data is for Factor Analysis and the value was at 0.821 which higher than the recommended of 0.6. The Bartlett's test of sphericity was at 9366.96 which is significant at 5% level of significance. Therefore, it signifies that factor analysis is suitable for principal component analysis.

From the collected data, fifteen factors have been extracted on the basis of Varimax Rotation with Kaiser Normalisation. Each factor can be formed by looking on the factors loading that greater than 0.5. These fifteen extracted factors explained 68.61% of the variance. It is based on the eigenvalues that is greater than 1 and cumulative variance. The explanation of the fifteen factors shows that there is a fifteen dimensional of factors influencing attitudes of people towards wetland biodiversity conservation.

Examine the reliability of questionnaire are the crucial parts in order to indicates whether the questionnaire performs consistently. The value of Cronbach's Alpha shows an excellent score where the value is at 0.838. It shows that the reliability to the scale used in this research is acceptable. Hence, the respondent is easily understood with the distributed questionnaire. For the factors that been extracted, out of 15 factors, only 7 factors are pass to the next step which shows the score between 0.6 to 0.8. The remaining 8 factors have been rejected through the reliability test. Table 2 shows the result of acceptable reliability.

Table 2: Acceptable Reliability

Factors	Cronbach's Alpha
Community Awareness	0.803
Relationship with Authorities	0.808
Regulation	0.848
Management	0.668
Garbage Disposal	0.840
Level of Pollution	0.728
Common knowledge	0.786

5.1. Regression Model

This research test for all type of regression model to find out the best suitable model based on the smallest coefficient of variation. Linear-Log model had been chosen as the best regression model because it has the smallest coefficient of variation among the other model. Table 3 shows the estimated model equation and coefficient of variation.

Table 3: Estimated model equation and coefficient of variation.

Models	Coefficient of variation
Linear Models	0.1170
Linear – Log Models	0.1094
Log - Linear Models	0.1171
Double Log	0.1099

From the regression model which constructed by SPSS, the value of F-statistic is 19.410 and the p-value is 0.0000 less than 0.05. It shows that the result is statistically significant. This mean that at least one of the parameter is not equal to zero and conclude that the overall regression is significant.

Below is the regression model which constructed by SPSS.

$ATT = 1.095 + 0.610LIndex_1 + 0.132LIndex_2 + 0.069LIndex_3 + 0.173LIndex_4$ + (3.129) (1.877) (0.738) (0.392) (0.964)
(0.002) (0.064)** (0.463) (0.969) (0.337)

$1.123LIndex_5 + 1.127LIndex_6 + 0.569LIndex_7$
(8.267) (6.570) (1.083)
(0.000)* (0.000)* (0.282)

R-squared = 0.602
F-test = 19.410(0.0000) Durbin-Watson = 1.952

ATT=	1.095+	0.610LIndex$_1$+	0.132LIndex$_2$+	0.069LIndex$_3^+$	0.173LIndex$_4$
	(3.129)	(1.877)	(0.738)	(0.392)	(0.964)
	(0.002)	(0.064)**	(0.463)	(0.969)	(0.337)
	1.123LIndex$_5$	1.127LIndex$_6$	0.569LIndex$_7$		
	(8.267)	(6.570)	(1.083)		
	(0.000)*	(0.000)*	(0.282)		

Note: (*) significant at 0.01 significant level.
(**) significant at 0.10 significant level.

Where,

ATT	=	Attitude
LIndex $_1$	=	Community Awareness
LIndex $_2$	=	Relationship with Authorities
LIndex $_3$	=	Regulation
LIndex $_4$	=	Government Involvement
LIndex $_5$	=	Garbage Disposal
LIndex $_6$	=	Level of Pollution
LIndex $_7$	=	Common knowledge

The value of adjusted R-squared is 0.602. It shows that 60.2 percent of the Perception can be explained by the Indexes while the remaining 39.8 percent is explained by the error term. Also, the value of Durbin-Watson is 1.952 where it is larger than 1.5 which indicates that there is no autocorrelation problem arise.

As shown from the computed regression model, all of the index shows positive impacts on attitude. To summarize, only Index 1 (Community Awareness), Index 5 (Garbage Disposal), and Index 6 (Level of Pollution) are significant at 10 percent significance level, influencing the Attitude of residents towards wetland biodiversity conservation in Telaga Air and the remaining indexes are not significant.

6. Conclusion

In this research, most of the local communities that live nearby mangroves area in Telaga Air shows a positive attitude towards conservation of wetland resources. The Department of Forestry Sarawak had to control and monitor all the activities that are carried out in HPB's areas to ensure that the sustainability of the mangrove forest is protected and guaranteed. This action also can simplify the local communities, if there is any doubt regarding mangrove forest, especially for those who involve directly in wetland activities, they can refer it directly to the committee.

Mass media play an important role to give an awareness towards society, especially for youth. It is because nowadays social media are a strong medium that could affect youth, how important were the values of mangrove, also to expose them what is the direct and indirect benefits of the mangrove ecosystem towards their next generation. This can be done by doing the advertisement on the importance of mangrove forest, and include some creativities inside so that it could attract more youth since people nowadays are easily being attracted with creativities.

Government intervention is the crucial part to sustain the mangrove forest. Revising back all the laws and regulation that had been implemented, could sustain the mangrove forest. Mangrove forest nowadays is towards the extinction, so the government should strengthen and restrict all the regulations to protect the mangrove resources from degradation.

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