

The Habitat of Economical Valuation of NYPA Fruticans Wurmb in the Coast of West Aceh

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Keywords: Nypa fruticans, Total Economic Value, Direct use Value, Indirect use Value, Willingness to Pay

Abstract: Nypa fruticans is one of the species mangrove community to develop in the tidal area dan muddy. Fruticans have ecological, social, economical benefits. the aim of this reseach was to determine the habitat of total economic value of Nypa fruticans from the coast of West Aceh. This research by using quantitative descriptive method with survey technique and interview that conducted in July to August 2018. Sampling was undertaken in mangrove area that dominant by Nypa fruticans habitat that degrade that caused by natural and anthropogenic factors. The total economical value that yield from Nypa fruticans habitat in 2018 as much as Rp1.781.438.375,3 is consist of direct use value as much as 1.159.460.000,-, indirect use value as much as Rp 583.988.000,-, option value as much as Rp 22.848.300, existence value as much as Rp 6.558.962,26 and bequest value as much as Rp 8.583.113. Thus, we concluded direct use value give the bigger contribution than indirect use value.

1 INTRODUCTION

Mangrove ecosystem is the forest that grow in the along estuary that experience tidal and muddy. The mangrove ecosystem were very unique and complex with high productivity that to be the gathering site for flora and fauna habitat that adapt with intertidal environment (Kathiresan dan Bingham, 2001).

The aquatic fauna that exist in the mangrove specifically that adapted by salinity, tidal amplitude, wind, temperature, muddy and anaerob. The high of fauna diversity in mangrove area that appeared from various habitat such as core forest, muddy, coral reef and seaweed ecosystem and water body that approached with river, strait, and backwater (Kathiresan et al., 2015).

The mangrove ecosystem continually experience destructive that occurred the disturbance of ecological function. The destructive occurred continually that impact to other ecosystem. It is influenced the declined of economic use value of environment resources. The management of

mangrove ecosystem sustainable have stipulated in regulation and law with combined between ecological and socio-economical aspect (Bengen 2002).

Nipah (Nypa fruticans Wurmb.) derived from genera palmae that grow in the alongside river and influenced by tidal, Nypa fruticans are part of mangrove forest that grow at certain area with form pure habitat in the alongside river nearby estuary (Kitamura et al., 1997).

Nipah (Nypa fruticans Wurmb.) is the main arrangement of mangrove forest with vegetation composition 30% from the extent of mangrove forest. The estimation of mangrove forest extent in Indonesia is 3.244.018,46 ha that dominant Nypa fruticans habitat (Hartini et al., 2010).

The high of destructive of mangrove Nypa fruticans occurred massively that caused to decline The potency of flora and fauna biodiversity that benefits ecologically, economically and social (Indriana et al., 2009)

The mangrove forest condition in the coast of West Aceh that experience the destructive severely that caused Tsunami in 2004. According to Blue Print Book post Tsunami only 15% of mangrove extent or 49.760 ha that existed in the West coast and Simeulue Island from the estimation of extent total 346.888 ha. Mangrove species that grown in the Coast of West Aceh that dominated by *Nypa fruticans*.

Nypa fruticans have ecological and economical function for community life in the coast fo West Aceh including to be buffer zone (intrusion), retaining abrasion, carbon absorber, and economical benefits that yielded from *Nypa fruticans*. The aim of this research was to determine the total of economical value on *Nypa fruticans*.

2 THEORETICAL FRAMEWORK

Nypa fruticans is palm that grow in the mangrove forest environment near coastal area. The trunks of *Nypa fruticans* spread in soil form rhizome that inundated by muddy. The roots can reached 13 m length.

Generally, palm species have several benefits. *Nypa fruticans* have potency for foodstuff because it contains carbohydrate, fatty acid, protein and vitamin (Sardjono, 1992). In other hand, *Nypa* also have other benefits for daily necessary such as firewood, hand made and other product. But this potency has not yet utilized optimally.

The valuation of natural resources economic by using certain technique or method for estimating the value of money from good and service that taken by natural resources. The economical valuation of mangrove ecosystem were measured

By using measurement model of economical resources value (Pearce dan Moran 1994; Turner et al., 1994).

The total of economical value of natural resource is amount from use value and no-use value. Use value is consist of direct use value and indirect use value, option value, bequest value.

The valuation based on preferences (Contingent Valuation) by using method that measured the valued of good based on person estimation. CVM is approach for measured the Willingness to Pay from responden to the existence of mangrove forest (FAO, 2000).

According to Fauzi (2004), the measurement method by using this method, respondent will be given value (rupiah) with questioner. In operationally, CVM was undertaken several phase. According to Juanda (2009), Linear regression analysis (multiple regression) is regression equation

that depicted relation between one dependent variable with several independent. Multiple regression analysis is to evaluate the usage of ontinent valuation method (CVM). The evaluation of CVM model can see from the level of reability of willingness to pay function.

3 RESEARCH METHOD

This research was conducted from July to August 2018 in the mangrove forest ecosystem Kuala Bubon Subdistrict, Samatiga District West Aceh Regency. This research was quantitative descriptive research by using survey method.

Primary data will obtain from data of *Nypa fruticans* resources that have economical value for community and willingness to pay for existence of mangrove forest. Secondary data is complementary data including populations , working, yield of fishing data.

4 ANALYSIS

The analysis was used to evaluate the usage of CVM in bequest value is multiple regression analysis. The variable that influenced the willingness to pay (WTP) Value of *Nypa fruticans* habitat that was stipulated including sex, age, education, job, income and environment.

5 RESULTS AND DISCUSSION

Valuation of benefit habitat of *Nypa fruticans* was conducted to knowing every utilization of *Nypa fruticans* habitat and counting total economic benefits at research location. Benefits of *Nypa fruticans* is as follows:

1. Direct use value

Based on the research, direct use value of habitat *nypa fruticans* to coastal community i.e. utilization of *nypa fruticans* tree as leaf and *Nypa* fruits. In addition, waters of *Nypa* habitat utilization as crabs, shrimp, fish and shell. Utilization of brackesh water pond is consist of shrimp pond and ecotourism (Table 1).

Table 1: Calculation of the value of Nypa fruticans habitat

No	Direct use value	Area (ha)	Value total (Rp/ha/years)	Percentage
1	Value of nypha tree pohon			
	Leaf	106	69,960,000.00	6,03
2	Fruit	106	127,200,000.00	10,97
	Value of fisheries			
	Crab	106	217,830,000.00	18,79
	Shrimp	106	222,600,000.00	19,20
	Fis	106	201,400,000.00	17,37
3	Shell	106	283,020,000.00	24,41
	Value of fishpond			
4	Shrimp aquaculture	12	34.200.000,00	2,95
	Ecotourism		3.250.000,00	0,28
	Total		1.159.460.000,00	

2. Indirect use value

Indirect use value was calculated in this study i.e. Nypa fruticans habitat as retaining abrasion. Indirect use value is using i.e. groin cost. Groin cost approach is using shadow price i.e. using Ministry of public works standard. Shadow price approach is very needed if data unknown at research area. Groin cost for 50 m x 1.5 m x 2.5 m (Length x wide x high) with durability of groin for 5 years is needed standard cost i.e. 291.994.000,000 or around Rp 5.839.880 per meter (Ministry of public work, s 2014). As for long of groin in research area is 500 meter, where indirect use value shown at Table 2.

Table 2: Calculation of indirect use value

No	Description	Unit	Value
1	Cost standard of groin (Ministry of public works 2014)	Meter	5.839.880,00
2	Groin	Meter	500,00
3	Groin total /5 years		2,919,940,000.00
4	Groin Total/Years		583,988,000.00

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3. Option value

Option value in research area is using benefit transfer method, i.e. with benefit estimate from elsewhere (where resources available) then benefits was transferred to obtain an approximately benefit of environment. Ruintenbeek (1992) approach was used to quantify biodiversity of mangrove forest at Bintuni Gulf, Irian Jaya, suggested biodiversity value of mangrove forest in Indonesia is US \$15/ha/year.

Total of benefits biodiversity is obtainable by means multiplying the benefits i.e. US\$ 15 per ha per year with the rupiah dollar in the day. The result multiplied by total wide of the habitats of mangrove Nypa fruticans research in the area (Table 3).

Table 3: Calculation of indirect use value

No	Description	Unit	Value
1	Biodiversity Value	\$/ha/year	15
2	Exchange rate \$ (1 Agustus 2018)	Rp	14.370,-
3	Area of the research	Ha	106
4	Biodiversity economic value	Rp/year	22.848.300,-

4. Non-use value

Non-use value is one of variable of total economic value. Non-use value in this research is consist of the value of existence and value of the estate with using Contigent Valuation Method (CVM) to knowing willingness to pay (WTP) value.

4.1. Existence Value

Economic valuation of existence value of Nypa fruticans habitat were measured based on willingness to pay as evidence concern someone to watch over the environment quality mangrove ecosystem.

Willingness to pay in this study is categorized into 10 choices i.e. Rp 5.000,00 , Rp. 10.000,00, Rp. 15.000,00, dan Rp. 20.000,00. Rp. 25.000,00. Rp. 30.000,00. Rp. 40.000,00. Rp. 50.000,00. Rp. 75.000,00. Rp. 100.000,00. The willingness to pay aims to the care of ecosystem mangrove/nypha habitats within a month. As for WTP value can be seen Table 4.

Table 4: WTP Value of existence of Nypa fruticans habitat

No	WTPi	Relative Frequency	Quantity	WTP (Rp/month)	WTP Quantity (Rp/month)
1	5000	5.0	2	10000	50000
2	10000	12.5	5	50000	625000
3	15000	12.5	5	75000	937500
4	20000	20.0	8	160000	3200000
5	25000	10.0	4	100000	1000000
6	30000	10.0	4	120000	1200000
7	40000	12.5	5	200000	2500000
8	50000	7.5	3	150000	1125000
9	75000	5.0	2	150000	750000
10	100000	5.0	2	200000	1000000
Total				11487500	
Median value of WTP				22500	
Median value of WTP/year				270000	
Population				2575	
Total value WTP/year				695250000	
Area total				106	
Total value of WTP/year/ha				6.558.962,26	

The Multiple linear regression was used to evaluate CVM using in existence value. Variable affecting WTP value for existence of nypha fruticans habitat is determined i.e sex, age, levels of education., work, income, long of domicile and environmental sustainability (Nypa condition habitat).

Result of regression value of inheritance WTP can be seen in Table 5.

Variable	Coefficient	Std. Error	T-stat	P-value	VIF	Description
(Constant)	-52343.010	21102.304	-2.480	.019		
Age	496.847	475.836	1.044	.304	2.637	Insignificant
Sex	-11691.219	7607.839	-1.537	.134	1.636	Insignificant
Married Status	-5061.683	9187.287	-.551	.585	2.203	Insignificant
Education	2534.734	1115.609	2.272	.030	1.365	Significant
Income	.022	.008	2.974	.006	1.835	Significant

4.2 Bequest value

Bequest value of Nypa fruticans habitat is got with enquire the willingness of pay for the cost of the community to preserve the mangrove ecosystem. The community value of WTP is obtained in combination forming through several phases WTP by the use CVM. The stages in the determination of

WTP is forming hypothetic market, getting a bargain the size of the WTP, estimate the average of WTP, total data and evaluating CVM.

Willingness to pay for value of estate are categorized in 10 choices i.e. Rp.5.000,00, Rp. 10.000,00, Rp. 15.000,00, and Rp. 20.000,00. Rp. 25.000,00. Rp. 30.000,00. Rp. 40.000,00. Rp. 50.000,00. Rp. 75.000,00. Rp. 100.000,00. The Willingness to pay for care mangrove ecosystem/ nypha habitat within one month. As for the value of WTP can be seen Table 6.

Table 6: Results of regression analysis of WTP results of estate value of Nypa fruticans habitat in West Aceh District

Variable	Coefficient	Std. Error	T-stat	P-value	VIF	Description
(Constant)	-33882.227	23795.390	-1.424	.164	2.031	
Age	279.204	549.566	.508	.615	1.432	Insignificant
Sex	3125.829	6945.000	.450	.656	2.120	Insignificant
Married Status	-15631.053	15306.007	-1.021	.315	1.243	Insignificant
Education	5496.010	1156.631	4.752	.000	1.060	Significant
Income	.003	.005	.527	.602	1.146	Insignificant
Long of Domicile	-376.711	258.033	-1.460	.154	1.264	Insignificant
Nypa nypha condition	18361.146	11817.392	1.554	.130	2.031	Insignificant
R-square (R ²)						0,556
R-square (R ²) Adjusted						0,459
F-calculate						5,721
Durbin-Watson						1,543

6 CONCLUSIONS

Total economical value that yielded from mangrove habitat of Nypa frutican in the West Aceh in 2018 as much as Rp1.781.438.375,3 is consisting of direct use value as much as Rp. 1.159.460.000,-, indirect use value as much as Rp 583.988.000,-, option value as much as Rp 22.848.300,-, existence value as much as 6.558.962,26 and bequest value as much as Rp 8.583.113,-. direct use value give the bigger contribution than indirect use value. Direct use value were obtain from fisheries sector.

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