



Economic's valuation of marine protected area (MPA) of Karimunjawa, Jepara-Indonesia

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Abstract. The objectives of this study were: 1) to estimate the value of willingness to pay of visitors to participate in consenting the coral reefs and ecosystem of Karimunjawa National Park; 2) to design the contribution fee from visitors to conserve the marine protected area (MPA). The primary data were obtained from the visitors of National Park from 100 respondents using accidental sampling technique. Then, the key persons of Academician, Business, Government, Community (A-B-G-C) were interviewed. The result indicated that respondents' willingness to pay (WTP) to conserve the MPA was Rp 18,000, and the estimated hypothetical market to conserve the coral reef and MPA of Karimunjawa was Rp 2.129 million per year. Furthermore, the amount of the retribution fee which should be paid by visitors was designed with collaboration of A-B-G-C.

Key Words: Karimunjawa, marine protected area, economic valuation, willingness to pay, retribution, sustainability.

Introduction. Indonesia, known for its fascinating natural and cultural diversity, has potential advantages to develop its tourism sector; so that, it might contribute to increase the national income (Dahuri 2003; Alisjahbana 2011; Halim 2011; Suharno et al 2017a, b). World Tourism Organization and United Nations Environment Program (UNEP 1993) states "Ecotourism involves traveling to relatively undisturbed natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals as well as any existing cultural aspect found in those areas". Meanwhile, The Adventure Travel Society (Wood 2002) defines ecotourism as "environmentally responsible travel to experience the natural areas and culture of a region while promoting conservation and economically contribution to local communities". In addition, Hawkins & Roberts (1993) categorize ecotourism into (1) nature-based tourism, (2) conservation areas supported tourism objects, (3) environmental concern based tourism, and (4) sustainable tourism.

The basic concept developed to manage the natural and environmental resources is carrying capacity (Barker & Roberts 2004; Suharno et al 2016). This concept is developed primarily to prevent the destruction or degradation of the natural and environmental resources; so that, the preservation of its existence and function can be maintained, and at the same time, the community taking advantages of such resources remains in a state of prosperity without being suffered (Twining-Ward & Butler 2002; Suharno & Widayati 2015). Previously, Davis & Tisdell (1996) define tourism carrying capacity as the maximum number of tourists tolerated without causing such negative impact of being unable to be recovered by the ecosystems or the environment and, at the same time, without reducing the visitors' satisfaction. If the carrying capacity is exceeded there will be a deterioration of the resources, resulted in the satisfaction of the visitors will not met; thus, giving adverse impact to the economy and culture of the community.

The travel cost method is developed to assess the usefulness of non-market goods. In the market price, nature does not specifically have a value; therefore, its price should be determined and estimated (Pearce et al 2006). In relation to travel cost

method, the methodology of Individual Travel Cost Method (ITCM) is principally similar to that of Zonal Travel Cost Method (ZTCM) (Pak & Turker 2006), but, in statistical analysis, ITCM uses data surveyed to every visitor instead of using zonal data. Therefore, this method requires more data and more complicated analysis; however, it provides more precise results.

Brown et al (2001) and Suharno et al (2017a, b) define participation as taking part or being actively involved in a process. Therefore, a process is said to be participatory, only when there is an active involvement of various actors. Based on the experience of community empowerment in coastal areas, Brown et al (2001) and Suharno et al (2017a, b) provide a participatory typology according to the level of community involvement, ranging from very shallow (passive) to self-participation (self-mobilization).

In relation to coastal resource management Brown et al (2001) group communities based on their influence and interests into three major groups. First, primary communities, i.e. groups that have little influence over a coastal resource management decision, but their lives are strongly and directly influenced by the outcome of the decision. This group is a community living in the coastal area and rely on the coastal resources, such as fishermen. Second, secondary societies, i.e. groups that can influence the decision making of coastal resources management, but their lives are not directly affected by the decision. This group is a community living in the coastal area but does not directly depend on coastal resources. Third, external societies, i.e. individuals or groups that can influence the decision making of coastal resource management through lobbying, but their lives or interests are not related to the decision at all. This group can be a mass, religious, or non-governmental organization (NGO).

According to Yoeti (2008), tourism activities are closely related to the economic condition of a country. The higher the level of the economy achieved by a country, the higher the tourism activity of the country will be, compared to countries that have lower economic levels.

Following is the contribution of tourism sector to Gross Domestic Product (GDP) of Indonesia as shown in Table 1.

Table 1
Gross domestic product of Indonesia at 2000 constant prices by business entity during 2011-2014 (billion rupiah)

<i>Description</i>	<i>Year</i>			
	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>
Tourism sector	83,462.50	88,265.00	93,937.90	99,896.50
Hotel	17,868.60	19,540.00	21,232.40	23,059.00
Restaurant	55,132.20	57,459.10	60,468.00	63,466.10
Entertainment services	10,461.70	11,265.90	12,237.50	13,371.40
Total national GDP	2,464,566.10	2,618,938.40	2,770,345.10	2,909,181.5
Contribution of tourism sector to national GDP (%)	3.38	3.37	3.39	3.43
GDP growth rate of tourism sector (%)	5.8	5.75	6.42	6.34

Source: BPS (2015) (data processed).

In Central Java Province, Karimunjawa National Park is one of the leading tourist destinations that attract both local and foreigner tourists. National Park under article 1 of Law no. 5, 1990 about Conservation of Biological Natural Resources and Ecosystems, in paragraph 14, is defined as a natural conservation area that has a native ecosystem managed by a zoning system and utilized for the purposes of research, science, education, cultivation, tourism, and recreation (Pristiyanto 2005).

Karimunjawa National Park is one of seven national marine parks in Indonesia, covering an area of 111,625 hectares and located 120 km north of Semarang, Central

Java Province. Based on the Decree of the Minister of Forestry Number: 74/Kpts-II/2001, March 15, 2001, Karimunjawa National Park is designated as Marine Conservation Area. Karimunjawa National Park consists of 25 islands, 5 of which are inhabited with approximately 9,106 inhabitants (BPS 2014).

Karimunjawa islands are rich in natural resources diversity, such as mangrove forests, sea grass beds, and coral reefs. The major problem in managing these areas is marine ecosystem protection as Karimunjawa islands are one of the three fishery centers in Central Java. Forty percent of the population is fishermen and rely their life on fishery resources (BPS 2014). Therefore, marine resources have become a foundation for the economic development.

The Decree of the Minister of Forestry and Estate Crop no. 78/Kpts-II/1999, February 22, 1999, stated that the natural reservation of Karimunjawa and its surroundings located in Jepara district of Central Java Province is designated as national park with the name of Karimunjawa National Park covering an area of 111,625 hectares. The zoning of Karimunjawa National Park is stated in the Decree of the Director General of Forest Protection and Nature Conservation No.SK.79/IV/Set-3/2005 which states that there are 6 zones within the Karimunjawa National Park; the zone of protection, the zone of tourism utilization, the cultivation zone, the rehabilitation zones, the residential zones, and the traditional fishery zones. The zones of Karimunjawa National Park is exhibited in Table 2.

Table 2

Wide area of Karimunjawa National Park

<i>Zoning</i>	<i>Coverage (ha)</i>	<i>Location</i>
Main zone	444,629	Part of coastal waters of islands of Kumbang, Taka Menyawakan, Taka Malang, and Tanjung Bomang
Protection zone	2,587,711	Lowland tropical forests of Karimunjawa Island and mangrove forest Geleang island waters, Bird island, Tanjung Gelam, Sintok island, Cemara Kecil island, Katang island, Gosong Selikur, Central Gosong
Tourism utilization zone	1,226,525	Menjangan Besar island waters, Menjangan Kecil island, Menyawakan island, Kembar island, Tengah island, Eastern of Kumbang, Bengkoang island, Indonor and Karang Kapal
Residential zone	2,571,546	Karimunjawa island, Kemujan island, Parang island, and Nyamuk island
Rehabilitation zone	122,514	Eastern waters of Parang island, eastern part of Nyamuk island, western part of Kemujan island and western part of Karimunjawa island
Cultivation zone	788,213	Karimunjawa island waters, Kemujan island, Menjangan Besar island, Parang island, and Nyamuk island
Traditional fisheries utilization zone	103,883,862	All waters outside the designated zones within the Karimunjawa National Park
Total	111,625,000	

Source: Karimunjawa National Park Authority, BTNK Statistics 2010.

Conservation of the marine protection area and the environmental sustainability in Karimunjawa National Park need to be considered as they are the main zones of tourists visiting Karimunjawa National Park; however, their visitation might also lead to environmental threats. For example, dirty coastal as garbage scattered around the waters.

The number of visitors from Karimunjawa National Park from 2008-2016 is shown in Table 3.

Table 3

Visitors of Karimunjawa National Park in 2008-2016

<i>Year</i>	<i>Number of visitors (people)</i>	<i>Visitor growth (%)</i>
2008	9,986	-
2009	28,045	180,84%
2010	16,637	-40,68%
2011	39,224	135,76%
2012	58,638	49,50%
2013	70,940	20,98%
2014	71,081	0,20%
2015	92,115	29,59%
2016	118,301	28,43%

Source: Tourist Information Center (TIC) of Jepara 2017.

The studies of Anggraeni (2008) and Nahib et al (2011) about coral reef in Karimunjawa Island reveal the value of valuation coral reefs of Karimunjawa National Park. Meanwhile, the results of economic valuation of coral reefs in the previous studies in 2011 and 2016 (Nahib et al 2011; Susilowati 2016) that had been adjusted to the average inflation rate in 2011-2016 can be seen in Table 4.

Table 4
Economic valuation of coral reefs of Karimunjawa in 2016 (rp million ha⁻¹)

<i>Type of value</i>	<i>Economic value (2008) (Rp mill ha⁻¹)</i>	<i>1/ Economic value (2011) (Rp mill ha⁻¹)</i>	<i>2/ Economic value (2016) (Rp mill ha⁻¹)</i>	<i>Percentage (%)</i>
Use value	19.60	23.73	31.95	86.74 %
Indirect value	2.53	3.07	4.13	11.21 %
Optional value	0.16	0.19	0.26	0.70 %
The existence	0.30	0.37	0.50	0.37 %
Total benefit	22.60	27.36	36.84	100 %

Source: Anggraeni (2008), Nahib et al (2011); Note: 1/Appendix A; 2/Appendix B.

Table 4 shows that the economic value of coral reefs in 2016 is Rp. 36,840,000 ha⁻¹. This value is very large if it covers the area of Karimunjawa National Park; therefore, the role of visitors in the participation of the use of coral reef value is expected. Based on PP no 12 of 2014 on the conservation of Karimunjawa National Park, Karimunjawa National Park collected retribution to the visitors through wisma, homestay and tour leader as much as Rp. 5,000 for local visitors, and Rp. 150,000 for foreign visitors. However, as conflicts between the administration of the park and the local people of Karimunjawa about the use of the money arose, the retribution was stop after 2014.

Referring to Regulation no. 6 of 2016, 29 April 2016 on Amendment to the Regional Regulation of Jepara district No. 26, 2010 on Retribution of Recreation venue, starting June 1, 2016 the retribution to visit Karimunjawa Recreation Area was set by the Department of Tourism and Culture of Jepara Regency. The retribution is Rp. 5,000 for local visitors and Rp. 25,000 for foreign visitors. According to the Head of Tourism and Culture Office of Jepara Regency, the retribution collected from tourist visiting Karimunjawa is in accordance with law No. 6 of 2016. As Karimunjawa is the national tourism destination, the retribution is used to increase regional real income (PAD) in the sector tourism Jepara regency then returned it back for the development of tourism in Karimunjawa. Meanwhile, according to the Association of Indonesian Hotels and Restaurants (PHRI) of Karimunjawa region, the imposition of the retribution in the area of Karimunjawa is quite surprising, because the actors of tourism activities in Karimunjawa have never received socialization directly and have not yet known the purpose of the retribution.

It should be underlined that the source of the budget for preservation of Karimunjawa National Park came from visitors themselves so as not to burden the

government budget. Moreover, Karimunjawa provides education about the essential of conservation value; therefore, the concern of visitors and their participation to contribute funds as admission/retribution is necessary.

Meanwhile, Jones et al (2011) found that the willingness to give a contribution to the existence of Natura site in Greece in 2000 is still low. Therefore, taxes/levies are considered to be more effective policies compared to entrance tickets. Visitors who tend to trust individuals and other agencies are responsible for environmental management and finance are willing to pay more for entry fees. Moreover, Fadhilah (2015) stated, after interviewing key persons Academician, Business, Government, Community (A-B-G-C), that the community is willing to pay for maintaining mangrove ecosystem in Kendal Regency. The contingent valuation methods (CVM) obtained an average willingness to pay (WTP) of Rp 18,000.00/household/year with a total value of WTP Rp 993,174,000.00/year.

The study of Putera & Alfiani (2015) about economic valuation showed that the total economic value of Teluk Palu resources is Rp. 35,846,290,000.00 per year. Fishery sector contributes Rp. 13,104,000,000.00 per year; tourism sector contributes Rp. 2,422,750,000.00 per year; coral reef function as physical protection global life contributes Rp. 20,319,540,000.00 per year. In short, Teluk Palu resource provides both ecological functions and a very high economic value.

Moreover, Subekti et al (2013) found that the coral reef ecosystem in Kepulauan Seribu National Park is one of the marine ecosystems that having benefits as much as Rp. 20,241,981,976 per year from 98,176 ha; the direct benefit is Rp. 12,718,678,584 (69.24%), the indirect benefit is Rp. 2,319,596,989 (11.46%), and the optional benefit is Rp. 1,451,321,082 (7.17%).

The objectives of this research are: 1) to obtain the updated calculation of the economic valuation of the marine protected area of Karimunjawa in 2016; 2) to obtain the updated calculation of the willingness to pay (WTP) of the respondents observed using Contingent Valuation Method (CVM), which consists of the willingness of visitors to pay the cost of beach cleanliness and conservation of coral reefs in Karimunjawa in 2016; 3) to obtain a model in the process of retribution collection in Karimunjawa by involving four stakeholders; academia, businessman, government, and community.

Meanwhile the specific objectives of this research are: 1) to explore the profile and characteristics of MPA in Karimunjawa; 2) to determine the utilization of resources from MPA Karimunjawa; 3) to estimate the value of MPA Karimunjawa; 4) to find a social engineering model to apply MPA preservation from Karimunjawa.

The number of respondents from about 100 people was selected using multi-stage sampling method. Focus Group Discussion (FGD) with relevant stakeholders (Stakeholder) is required to be undertaken in area studies. So that goal can be realized. According to Susilowati (2016), by basing on the main objective is to estimate the economic and environmental value for Marine Protected Area (MPA) in Karimunjawa National Park.

Material and Method. In this research, the number of respondents was 100 people selected using multi-stage sampling method as suggested by Hair et al (2010) that the number of samples is 100-200 respondents, and Contingent Valuation Method (CVM) analysis was used. According to Fauzi (2004), CVM is a direct calculation method, in this case, the willingness to pay (WTP) was directly asked to the respondents with the emphasis of individual preference in assessing public objects using the standard value of money. According to Fauzi (2004), the stages of CVM are (1) setting up the hypothetical market, (2) obtaining bids, (3) calculating average WTP, (4) aggregating data, (5) evaluating the CVM exercise. The sampling method used in this research was non-probability sampling method that was purposive sampling for key person respondent and accidental sampling for sample of visitor respondents.

There are 4 stakeholder; Academia, Businessman, Government, and Community (A-B-G-C) who understand about marine protection of Karimunjawa National Park. By purposive sampling method, the detail of the number of key person respondents is summarized in Table 5.

Table 5

Details of number of respondents key persons

<i>Element</i>	<i>Name</i>	<i>Position</i>	<i>Amount</i>
Academician (A)	Prof. Dr. Ir. Agus Sabdono, MSc	Dean and Lecturer of Faculty of Fisheries and Marine Sciences	1
	Dr. Ir. Munasik, MSc	Lecturer of Faculty of Fisheries and Marine Sciences	1
Business (B)	Hasyim	Business coordinator of Indonesian Hotels and Restaurants Association (PHRI) of Karimunjawa	1
	Mulyo	Owner of <i>Homestay</i> and <i>tourleader</i> in Karimunjawa	1
Government (G)	Mulyaji	Head of Tourism and Culture of Jepara Regency	1
	Wasro	Representative of the administrators of Karimunjawa Subdistrict	1
Community (C)	Itun Inah	Local people of Karimunjawa Retribution collector	1

Source: Primary Data, processed September 2016.

Variable is the operationalization of a concept to be empirically investigated, while the operational definition is a scientific information used by researchers to measure a variable that is the result of the translation of a concept (Wardiyanta 2010). The research variables used in this study are explained in Table 6.

Table 6

Research variables

<i>Variable</i>	<i>Definition</i>	<i>Description</i>
Economic valuation for conserving marine protection of Karimunjawa National Park	Variables used to determine the level of willingness to pay (WTP) of the visitors in order to clean beach and coral reef conservation. Measurement of economic valuation is done by using Contingent Valuation Method (CVM)	Average willingness to pay Rp 15,000 Rp 17,000 Rp 20,000 Rupiah (metric scale)
Appropriate draft of retribution for conservation of coastal and coral reefs of Karimunjawa National Park	The design is obtained through in- depth interviews with key persons (A-B-G-C); Academics, Businessman, Government, and Community	The design of the withdrawal of the retribution for conserving Karimunjawa National Park

Source: Fadhilah (2015), with modifications (2016).

Results and Discussion. Respondents in this study were the visitors who visited Karimunjawa National Park in the last one year (2015-2016). The sample was taken using accidental sampling method to visitors who had visited, was visiting, and after visiting Karimunjawa National Park in the period of April-September 2016.

Socio-economic characteristics of the visitors are presented in Table 7.

Table 7

Socio-economic character of respondents

Variable	Description	Frequency	Percentage (%)	Note
Gender	Male	65	65	-
	Female	35	35	
Age (years)	15-20	6	6	Min = 16, Max = 46, Mean = 23.12
	21-25	77	77	
	26-30	10	10	
	> 31	7	7	
Revenue/ pocket money (Rupiah)	Rp. 100,000-500,000	15	15	Min = Rp. 0, Max = Rp. 5,000,000, Mean = Rp. 1,278,585
	Rp. 500,001-1,000,000	18	18	
	Rp. 1,000,001-1,500,000	34	34	
	Rp. 1,500,001-2,000,000	13	13	
	Rp. > 2,000,000	20	20	
Length of visit (day)	1-2	3	3	Min = 2, Max = 7, Mean = 3.81
	3	72	72	
	4	5	5	
	> 5	20	20	
Travel expense (Rupiah)	< Rp. 500,000	4	4	Min = Rp. 400,000, Max = Rp. 1,200.000, Mean = Rp. 870,100
	Rp. 500,001-1,000,000	76	76	
	> Rp. 1,000,000	20	20	
Education	SMA/SMK = 5	5	5	-
	D-3 = 4	4	4	
	S-1 = 88	88	88	
	S-2 = 2	2	2	
	Other = 1	1	1	
Job	Housewife = 2	2	2	-
	Private employee = 12	12	12	
	College student = 75	75	75	
	Public servant = 5	5	5	
	Entrepreneur = 5	5	5	
	Student = 1	1	1	
n = 100				

Source: Primary data, processed September 2016.

Economic valuation for conserving marine protection of Karimunjawa National Park (Contingent Valuation Method Analysis / CVM). Economic valuation of coastal hygiene and coral reef conservation was an analysis used to determine the level of willingness to pay of the visitors in order to clean the beach and to conserve the coral reef. The measurement of the economic valuation was done using Contingent Valuation Method (CVM), consisting of the willingness to pay (WTP) of the visitor for beach cleanliness cost and coral reef conservation. By using CVM method, commodities that do not have market prices, such as coastal hygiene and coral reef ecosystems, can be valued (Hanley & Spash 1993). The following is the result of CVM method implementation in this research:

1. *Setting up the hypothetical market* - all respondents were given information and explained about the importance of paying retribution as visitors' contribution to keep Karimunjawa National Park sustainable would help the beach clean and the coral reef conserved. Therefore, the visitors' participation in maintaining the cleaned coastal area and the preserved coral reef would sustain the natural resources to be available not only for the benefits of the next generation but also for the environmental purposes. Otherwise, the environmental damage might cause a great deal of loss.

2. *Obtaining bids* - in this research, the technique used to know the WTP value of respondent was bidding game. The bidding game method was applied by giving a bid

value to the respondent who was willing to pay. The game started from the middle value when the respondent was willing to, then the bid would be raised. However, if the respondent did not want to choose the middle value, it would be lowered to the bottom value until it reached the respondent desired value of the WTP.

The optimum bid design would refer to the offering price and sample size that minimize information about the size of the welfare. The maximum probability of bias estimation can be large if the sample was small, but when the sample size increases it would decrease the bias proportionally.

The estimated cost of coastal cleanliness and coral reef conservation in Karimunjawa National Park was based on the interviews with Karimunjawa National Park Administration and Academics. The bidding value scenario was divided into three as shown in Table 8.

Table 8

Estimated cost of MPA in Karimunjawa National Park based on interviews with Karimunjawa National Park and academics

<i>Scenario</i>	<i>Description</i>	<i>Monthly cost requirement</i>	<i>Yearly cost requirement</i>	<i>Rounding yearly cost requirement (x 12 months)</i>
Scenario 1 (Rp. 15.000)	Coral reef management	Rp 10,800,000	Rp 129,600,000	Rp 130,000,000
	Coastal cleaning management	Rp 4,150,000	Rp 59,800,000	Rp 60,000,000
	Recreation improvement	Rp 3,950,000	Rp 47,400,000	Rp 47,400,000
	Total			Rp 237,400,000
Scenario 2 (Rp. 17.000)	Coral reef management	Rp 10,800,000	Rp 129,600,000	Rp 130,000,000
	Coastal cleaning management	Rp 4,150,000	Rp 59,800,000	Rp 60,000,000
	Recreation improvement	Rp 3,950,000	Rp 47,400,000	Rp 47,400,000
	Coast guard levy	Rp 2,525,000	Rp 30,300,000	Rp 30,320,000
	Total			Rp 267,720,000
Scenario 3 (Rp. 20.000)	Coral reef management	Rp 10,800,000	Rp 129,600,000	Rp 130,000,000
	Coastal cleaning management	Rp 4,150,000	Rp 59,800,000	Rp 60,000,000
	Recreation improvement	Rp 3,950,000	Rp 47,400,000	Rp 47,400,000
	Coast guard levy	Rp 2,525,000	Rp 30,300,000	Rp 30,320,000
	Other sea biota conservation	Rp 3,790,000	Rp 45,480,000	Rp 45,480,000
	Total			Rp 313,200,000

Sources: Primary data and interviews with Karimunjawa National Park Authority managers on the Marine Protected Area (MPA), and interviews with prof. Dr. Ir. Agus Sabdono, MSc, processed 2016.

3. *Calculating average WTP* - interview using questionnaires was conducted to observe the respondents' willingness to pay or not, and to find the value of the WTP to be paid. The result showed that all respondents stated "Need" and "Agreed" about the implementation of the coastal hygiene and the coral reef conservation in Karimunjawa National Park.

When respondents were given the question of whether they were willing to participate by paying the dues according to the set amount, 95 respondents (95 percent) were willing to pay; while, 5 respondents (5 percent) were not willing to pay. The average value the respondents' WTP was calculated based on the ratio of the number of WTPs given by respondents and the total number of respondents who were willing to pay.

The distribution of the respondents' WTP and the total WTP in relation to the effort to keep the coastal hygiene and the coral reef conserved of Karimunjawa National Park in one year can be seen in Table 9.

Table 9

Distribution of respondents' WTP and total WTP about coastal hygiene and coral reef conservation of the Karimunjawa National Park within one year

No	WTP (a)	Respondents (people) (b)	Percentage (%) (c)	WTP x respondents' WTP (a x b)
1	Rp 15,000	30	30 %	Rp 450,000
2	Rp 17,000	26	26%	Rp 442,000
3	Rp 20,000	39	39%	Rp 780,000
4	-	5	5%	Rp 0
Total WTP sample respondent		100	100%	Rp 1,672,000
Average		-	-	Rp 17,600
Total WTP/year	Rp 18,000	118,301		Rp 2,129,418,000

Sources: primary data, processed September 2016.

The value of the WTP presented in Table 9 was calculated using the following formula.

$$EWTP = \frac{\sum_{i=1}^n wi}{n}$$

where: EWTP - average expected WTP;

Wi - value of ith WTP;

n - number of respondents;

i - ith respondents willing to pay (i = 1, 2, 3,n).

So, the calculation is as follows:

$$EWTP = \frac{1,672,000}{95}$$

$$EWTP = \text{Rp. } 17,600$$

The calculation shows that the average value of the respondents' WTP is Rp 17,600 which is rounded up to Rp 18,000.00. The average value of WTP which is Rp 18,000.00/visitor could be used as reference in setting the amount of contribution charged to visitors in the effort of cleaning the beach and conserving the coral reefs in Karimunjawa National Park.

4. *Aggregating data* - the average proposed value in accordance with Table 9 was Rp 18,000.00, and the total population of the visitors observed in this study in 2016 was 118,301. The result of the calculation as shown in Table 9 was that the total WTP of the coastal hygiene and the coral reef conservation of Karimunjawa National Park was Rp 2,129,418,000.00 (total economic value). This value represented the environmental value of the coastal hygiene and the coral reef conservation of Karimunjawa National Park generated through the willingness to pay of the visitors of Karimunjawa National Park.

The design of the retribution for the preservation of Karimunjawa National Park.

The in-depth interview with A-B-G-C (Academician, Businessman, Government, and Community) could summarized as follows.

According to academics, the calculation and setting up of the retribution can be determined not only from economic valuation but also from other aspects involved in such as ecology, economy, and social. The role of visitors is expected because the number of tourists visiting the spot is always increasing. They recommended that the related offices should be smart in collecting the retribution.

According to the government (Head of Tourism and Culture of Jepara Regency), the retribution to be by the visitors is with Perda No. 6 of 2016. Although Karimunjawa does not have any tourist spot, Karimunjawa has been declared as a national tourist destination; therefore, the collected retribution contributes to increase of the regional revenue in the tourism sector which will be returned for tourism development in Karimunjawa.

According to businessman (Coordinator of Hotels and Restaurants Association of Indonesia of Karimunjawa), the implementation of retribution into Karimunjawa area surprised tourism related actors, because its socialization has never been done and they do not know its purposes. However, they do not refuse it, they just curious about the way it is done.

According to local people of Karimunjawa, retribution for improving tourism will be granted as long as they get involved in the stages of planning, implementation, and evaluation of each activity. Budget transparency should also be applied to them to avoid overlapping policy.

The result of the in-depth interview also showed that the process of collecting retribution by government should be conducted in three stages and four stakeholders have an important role in the stage of making the retribution policy that will be done. Based on interviews with key persons of A-B-G-C, the retribution design can be seen in Figure 1.

The local government had to be wise in implementing tax and retribution collection by referring to real economic condition. Moreover, the government should be careful in deciding the type of tax or retribution to be collected from the people or economic sectors. All policy issued should be on the ground of mutual benefits without disturbing economic stability and not be overlapping.

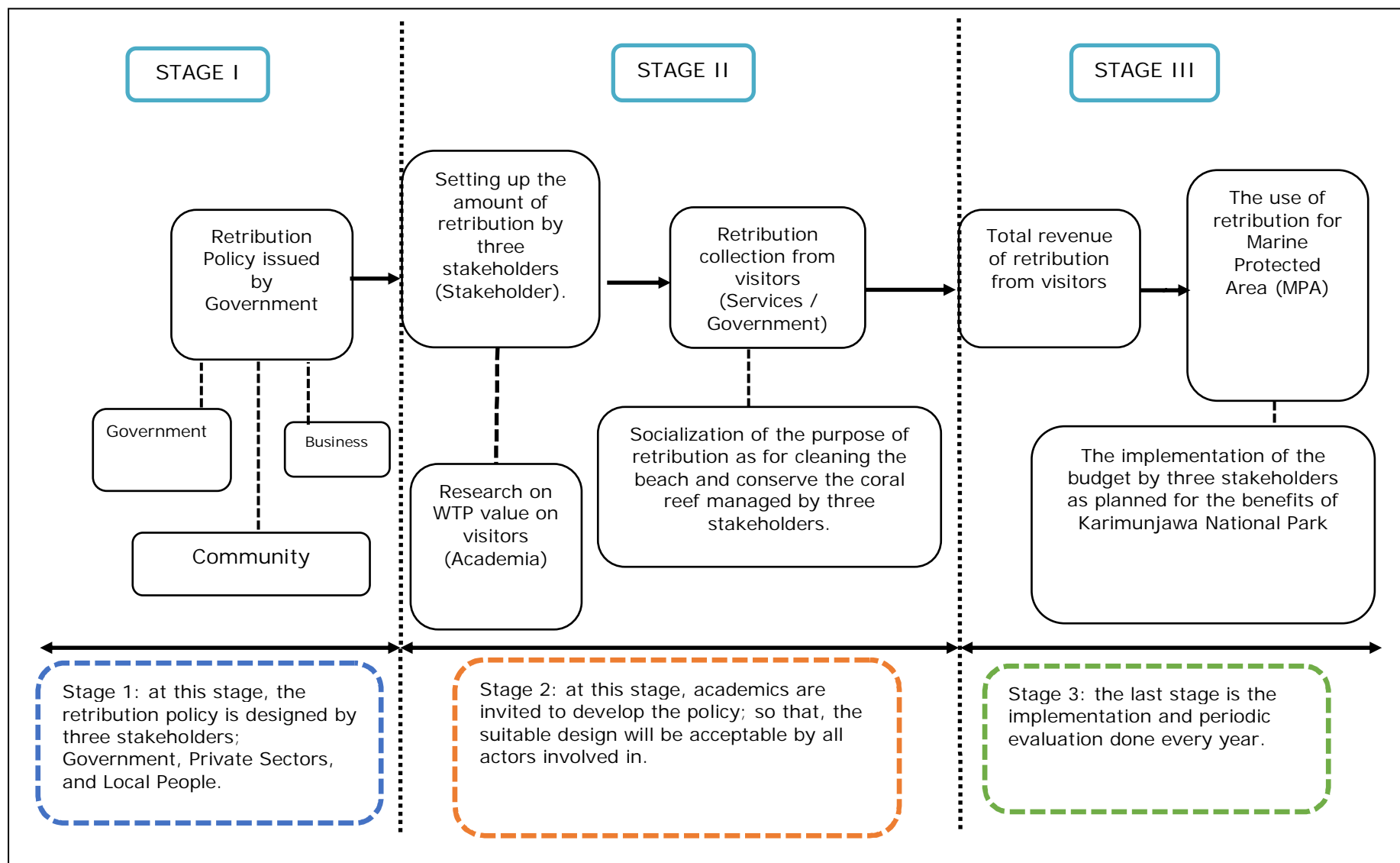


Figure 1. The draft of retribution for Marine Protected Area (MPA) of Karimunjawa National Park of Jepara Regency.

Conclusions. The total respondent willing to pay the WTP is 95; while, five respondents are not willing to pay. The average of the respondents' WTP is Rp 17,600.00 rounding up to Rp 18,000.00, and the total WTP for the effort to clean the beach and to conserve the coral reef in Karimunjawa Nasional Park is Rp 2,129,418,000.00 (total economic value). This value is the environmental value for beach cleanness and coral reef conservation in Karimunjawa National Park.

The retribution design should be planned among stakeholders involved in consisting of academics, businessmen, government officials, and local community of Karimunjawa; so that, the policy issued will not be overlapping.

The purpose of the policy of the retribution management of the Karimunjawa National Park is to improve the management of maintaining the beach cleanness and the beauty of the coral reef to be well preserved.

The awareness of visitors to keep the coastal environment cleaned and coral reef conserved has always to be maintained in order to keep the marine protected area (MPA) sustainable. Therefore, the visitors' WTP for generating budget to clean the beach and to conserve the coral reef is essential.

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References

- Alisjahbana A. S., 2011 [The direction of the national development policy in supporting regional tourism]. Presented at the national tourism conference "Development of regional tourism to support national tourism and enhancement of regional economy", 6 December 2011, Jakarta, pp. 1-31. [in Indonesian]
- Anggraeni R., 2008 [Economic valuation of coral reef ecosystem of Karimunjawa National Park]. BSc Thesis, Bogor Institute of Agriculture, Bogor, Indonesia, 119 pp. [in Indonesian]
- Barker N. H. L, Roberts C. M., 2004 Scuba diver behaviour and the management of diving impacts on coral reefs. *Biological Conservation* 120(4):481-489.
- BPS, 2014 [Central Java GRDP on constant price 2000 year 2010-2013]. BPS, Jakarta, 98 pp. [in Indonesian]
- BPS, 2015 [Karimunjawa in figures 2014]. BPS, Jepara, 28 pp. [in Indonesian]
- Brown K., Tompkins E., Adger W. N., 2001 Trade-off analysis for participatory coastal zone decision making. Overseas Development Group, University of East Anglia, 109 pp.
- Dahuri R., 2003 [Marine biodiversity]. PT. Gramedia Pustaka Utama, Jakarta, 85 pp. [in Indonesian]
- Davis D., Tisdell C., 1996 Economic management of recreational scuba diving and the environment. *Journal of Environmental Management* 48:229-248.
- Decree of the Minister of Forestry and Plantation No. 78/Kpts-II/1999 dated 22 February 1999 [The area of nature reserves Karimunjawa and surrounding areas in Jepara Regency, Central Java Province], pp. 1-3. [in Indonesian]
- Decree of the Minister of Forestry No. 74/Kpts-II/2001 on March 15, 2001 [The status of Karimunjawa National Park was designated as nature conservation area of waters], pp. 1-4. [in Indonesian]
- Decree of Director general of forest protection and nature conservation No.SK.79/IV/Set-3/2005, [Revision of zonation Karimunjawa National Park], pp. 1-4. [in Indonesian]
- Fadhilah S. M., 2015 [Restoration of mangrove ecosystem in Kendal Regency]. BSc Thesis, Diponegoro University, Semarang, Indonesia, 75 pp. [in Indonesian]
- Fauzi A., 2004 [Natural resource economics and environment]. PT. Gramedia Pustaka Utama, Jakarta, 259 pp. [in Indonesian]

- Hair Jr. J. F., Black V. C., Babin B. J., Anderson R. E., 2010 Multivariate data analysis. 7th edition, Prentice Hall, New Jersey Upper Saddle River, United States, 785 pp.
- Halim H. S., 2011 Improving coastal tourism business competitiveness: using ecotourism's concept to explore to potential of coastal tourism business Pandeglang and Serang Districts, Banten, West-Java, Indonesia. *International Journal of Business and Social Science* 2(11):87-90.
- Hanley N., Spash C. L., 1993 Cost-benefit analysis and the environment. Edward Elgar Publishing, England, 288 pp.
- Hawkins J. P., Roberts C. M., 1993 Effects of recreational scuba diving on coral reefs: trampling on reef flat communities. *Journal of Applied Ecology* 30:25-30.
- Jones N., Panagiotidou K., Spilanis I., Evangelinos K. I., Dimitrakopoulus P. G., 2011 Visitors' perceptions on the management of an important nesting site for loggerhead sea turtle (*Caretta caretta* L.): the case of Rethymno coastal area in Greece. *Ocean and Coastal Management* 54:577-584.
- Karimunjawa National Park Authority, 2010 [Statistics of Taman Karimunjawa National Park Area of Karimunjawa National Park]. Semarang, BTNK Semarang, 133 pp. [in Indonesian]
- Law No. 5, article 1/1990 [The conservation of biological natural resources and its ecosystem], 31 pp. [in Indonesian]
- Local regulation: No. 6/2016/29 April 2016 concerning Amendment to the regional regulation of Jepara Regency No. 26 Year 2010 on Retribution Place Recreation Jepara Regency, 12 pp. [in Indonesian]
- Local regulation: No 12/2014 concerning the conservation of Karimunjawa National Park, 77 pp. [in Indonesian]
- Nahib I., Suwarno Y., Soleman M. K., Arief S., 2011 [Development of economic valuation of coral reefs with geographic information system and benefit transfer method (coral reef case study in Karimunjawa Islands, Central Java)]. *Jurnal Big Globe* 13(2):121-131. [in Indonesian]
- Pak M., Turker M. F., 2006 Estimation of recreational use value of forest resources by using individual travel cost and contingent valuation methods (Kayabasi Forest Recreation Site sample). *Journal of Applied Sciences* 6:1-5.
- Pearce D., Atkinson G., Mourato S., 2006 Cost-benefit analysis and the environment: recent development. OECD Publishing, France, 314 pp.
- Pristiyanto D., 2005 [National park according to directorate general of PHKA]. Available at: <http://www.ditjenphka.go.id/kawasan/tn.php>. Accessed: June, 2016. [in Indonesian]
- Putera F. H. A., Alfani E. S., 2015 [Economic valuation of resources in Palu Bay, Palu City, Central Sulawesi Province]. *Ejournal-Balitbang* 5(2):83-87. [in Indonesian]
- Subekti J., Saputra S. W., Triarso I., 2013 [Valuation of resource utilization of coral reef ecosystem fishery at national park of Seribu Islands, Jakarta]. *Journal of Management of Aquatic Resources* 2(3):104-108. [in Indonesian]
- Suharno, Widayati T., 2015 [Management policies for small-scale fishers in the north coast of Central Java]. In: Proceeding SENDI_U. UNISBANK, pp. 1-8. [in Indonesian]
- Suharno, Susilowati I., Anggoro S., Gunanto E. Y. A., 2016 The fisheries management for small-scaler of shrimp fishers in Cilacap using bionomics model. *International Journal of Applied Business and Economic Research* 14(10):6915-6920.
- Suharno, Susilowati I., Firmansyah, 2017a Management of the traditional milkfish culture in Indonesia: an approach using technical efficiency of the stochastic frontier production. *AAFL Bioflux* 10(3):578-586.
- Suharno, Susilowati I., Anggoro S., Gunanto E. Y. A., 2017b Typical analysis for fisheries management: the case for small-scaler of shrimp fishers. *Advanced Science Letters* 23(8):7096-7099.
- Susilowati I., 2016 [Economic valuation of national marine park in Karimunjawa]. *Reserch Publication International (RPI)*, 90 pp. [in Indonesian]

- Tourist Information Center (TIC) Jepara, 2017 [Visitors data Karimunjawa 2008-2016]. Available at: <http://ticjepara.com/index.php/berita/itemlist/tag/statistik>. Accessed: March, 2017. [in Indonesian]
- Twining-Ward L., Butler R., 2002 Implementing sustainable tourism development on a small island: development and use of sustainable tourism development indicators in Samoa. *Journal of Sustainable Tourism* 10(5): 363-387.
- UNEP, 1993 Monitoring coral reefs for global change. Reference Methods for Marine Pollution Studies No. 61, Australian Institute of Marine Science, 72 pp.
- Wardiyanta, 2010 [Research methods of tourism]. Andi Offset, Yogyakarta, 104 pp. [in Indonesian]
- Wood M. E., 2002 Ecotourism: principles, practices and policies for sustainability. UNEP, 59 pp.
- Yoeti O. A., 2008 [Tourism economy: introduction, information and implementation]. Kompas, Jakarta, 320 pp. [in Indonesian]

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Table of economic valuation of coral reef in 2008-2011 (Rp. mill ha⁻¹)

No	Type of utilization	Economic valuation		%
		2008	2011	
1	Direct value	19.6	23.73	86.74
	a. Fishery	17.02	20.61	75.33
	1. Fishing rod	11.71	14.18	51.83
	2. Net	1.72	2.08	7.6
	3. <i>Branjangan</i>	1.65	2	7.3
	4. Fish trap	0.6	0.72	2.64
	5. Arrow	0.59	0.71	2.6
	6. <i>Muroami</i>	0.76	0.91	3.34
	b. Fish culture	2.42	2.93	10.71
	1. Grouper	0.61	0.73	2.68
	2. Sea weed	1.66	2	7.33
	c. Excursion	0.11	0.13	0.48
	d. Research	0.05	0.06	0.22
2	Indirect value	2.53	3.07	11.21
3	Optional value	0.16	0.19	0.77
4	The existence	0.3	0.37	1.35
	Total value	22.6	27.36	100

Based on the previous research about the economic valuation of coral reef conducted in 2008 and 2011, adjustment was made in 2011, and it was converted to the value in 2016 with this formula:

$$V = (1 + i)^t P$$

where: V = value in 2016*;

P = value in 2011;

t = period 2011–2016 = 5;

i = inflation rate in the period of 2011-2016* (November 2016) = 5.13%.

Source: https://www.bps.go.id/website/tabelExcelIndo/indo_03_1.xls. Accessed: January, 2017.