



# 7<sup>th</sup> INTERNATIONAL CONFERENCE AND FIELD STUDY IN MALAYSIA 2016

“ADVANCING INCLUSIVE RURAL DEVELOPMENT AND  
TRANSFORMATION IN A CHALLENGING ENVIRONMENT”

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# 7<sup>th</sup> RRPg International Conference and Field Study in Malaysia 2016 (RRPG7)



Centre for Innovative Planning & Development  
Universiti Teknologi Malaysia



Bait Al-Amanah (House of Trust)  
Johor

## *Advancing Inclusive Rural Development and Transformation in a Challenging Environment*

**The** challenges of uncertainties in economic growth, increased globalisation, political conflicts and climate change has made sustainability, and inclusivity of development to become more pressing. The new global development agenda 2030 and Sustainable Development Goals (SDGs) requires more commitment for inclusive development. However, given the need to foster economic growth and competitiveness, concentration of development in core regions seems to be a common strategy adopted by many governments in developing countries. This would further increase the development gap in the rural areas.

In the light of the challenges facing the world today this conference is a perfect opportunity for scholars and practitioners gathered to examine and discuss how inclusivity and sustainability could be the driving force in rural development. This would synergise efforts to develop a more resilient rural community, eradicate rural poverty, and achieve a balanced and equitable development in the rural areas.

RRPG7 with its prime aim of bringing together stakeholders, policy makers, prominent figures, leading academic scientists, researchers and the public to explicitly discuss and expand our understanding of issues related to rural transformation, inclusive rural development and resilient rural environment. This conference will feature leading figures in various fields of sustainable rural development, community empowerment, local economic development and communitybased disaster risk reduction as well as resilient rural community studies.

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# **MODEL-BASED MANAGEMENT ENVIRONMENTAL SERVICES STRENGTHNING COMMUNITIES IN REGION WATERSHED (DAS) BESAI, LAMPUNG PROVINCE, INDONESIA**

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## **ABSTRACT**

Subzone Watershed (DAS) Besai in Lampung Province with an area of 97.672 ha is part of 938.829,45 ha is one of the priority watersheds for recovery in Indonesia. Sub-catchment area Cathment Way Besai has area 44.720 ha and is located in the region upstream of the watershed and the watershed TulangBawang in Lampung Rarem Way North and River Right Way in Way Kanan Regency of Lampung province. The research objective is to identify and develop potential economic value of environmental services based strengthening forest management and watershed-based society, socialized to stakeholders, especially users of hydrological services and ecotourism. Research methods for economists value of hydrological services utilization using Contingent Valuation Method (CVM) is used to see the willingness to pay (WTP) to explore the preferences of consumers. For ecotourism services Travel Cost Method (TCM) is used to assess a conservation area or sites by looking at the willingness to pay the visitors to DAS Besai. The results showed that the economic value of hydrological services in Sub Das Way Besai Rp 745 per m<sup>3</sup>, which means that the value of environmental services utilization hydrological Rp 745 for each use of water for 1 m<sup>3</sup>. If the measurement ecotourism service notice objects that have regular visitors Besai sub watershed area, the economic value of ecotourism services amounting to Rp 270.910.588 per year. Strengthening forest management and community-based Watershed) DAS Besai in Lampung Province has given positive results in terms of program recovery. Output program has been achieved in terms of strengthening the community and also of the efforts to restore the forest and watershed conditions.

Key words: environmental services, watershed, strengthening the community, economic value

## **INTRODUCTION**

Subzone Besai with 97.672 ha area is part of 938.829,45 ha watershed Tulang Bawang and is one of the DAS first priority in Indonesia. Catchment area Way Besai has area 44.720 ha and is located in the region upstream of the watershed and the watershed Tulang Bawang in Lampung Province. In Sub-Basin Besai also a vital infrastructure that is the first government Way Besai hydropower units with installed capacity of 2 x 45 MW. However Way Besai hydropower real operational only less than half of the installed capacity, due to the disruption of water supply in the hydropower dam upstream intake. Way Besai hydropower plant built since the early 1990s and operated in the late 1990s.

DAS Besai area consists of 5 sub-districts Sumber Jaya, Way Tenong, Air Hitam, Gedong Surian, and KebonTebu, West Lampung regency. The population of the five districts at present is 93.302 people. The population density of the area is 458 people / ha for Sumber Jaya sub-district, 268 people/ ha Way Tenong sub-district, and 247 people/ ha Gedung Surian sub-district (BP DAS WSS, 2010). In subzone watershed Besai, there are protected areas covering 13.652 ha, Bukit Barisan Selatan National Park 5.325 ha. The rest are non-forest areas. One of the crucial role of forests and watersheds are the region's role in contributing to environmental services (Abidin, 2014). During this role is not specifically identified either because it is often regarded as a god grace alone or given resources. In fact, humans often ignore the potential benefits as well as environmental services. In

fact, the environmental services of forest resources and watershed management will not be sustainable if it is not managed well by the recipients of environmental services, namely humans.

On this basis, and considering that during this time the issue of environmental services has not been discussed in a participatory manner by communities and stakeholders, the program SCBFWM and BPDAS WSS aims to encourage a discourse of development of the concept of environmental services in the Sub-Basin Way Besai so that the management plan holistically can be developed at this time and which will come. The research objective is to identify and develop potential economic value of environmental services based strengthening forest management and watershed-based society, socialized to stakeholders, especially users of hydrological services and ecotourism.

## **METHODOLOGY**

Contingent Valuation Method (CVM) is used to see the willingness to pay to explore the preferences of consumers (Munasinghe, 1993). This approach is used when there are no relevant markets to environmental goods and services. This technique builds market variables that directly ask to individuals willingness to pay they receive compensation if the goods and services they do not they can use again. Travel Cost Method (TCM) is used to assess a conservation area or sites by looking at the willingness to pay (willingness to pay) the visitors. This approach shows that the value of a conservation area is not only seen on the admission ticket, but also consider the cost of visitors to the location of reserves and their potential loss of revenue since the time he used to visit.

Analysis of the public perception of environmental services in the subzone Besai using proportional sample of respondents. Respondents were farmers or households benefit from environmental services of Besai sub watershed. Similarly, respondents to the analysis of WTP is a general public benefit from the environmental services of Besai sub watershed. Several locations to measure the benefits of hydrological services namely location (1) Common-based organization (CBO) Way Petai, Sumber Jaya Sub-district, (2) CBO Tirta Sari, Gedong Surian Sub-district, (3) CBO Jaga Tirta, and (4) CBO Tirta Kencana, Rigis jaya, Air Hitam Sub-district. The data collection method beauty environmental services and ecotourism aimed at visitors who come to the location of the object and the potential to exploit it. Some of the samples to study ecotourism services namely Rest Area, CBO P.A. Rakit for rafting, and the Way Besai hydropower dam.

## **RESULT AND DISCUSSION**

### **Measurement Hydrological Services**

Hydrological environmental services in DAS Besai comes from water sources from forests and rivers Way Besai (Verbist et al, 2009). Utilization of water resources as hydrological services used by people since 1995, but the use of piped water services since 2006. The distance between houses with bathtub divider between 2-50 meters. While users benefit hydrology distance to water sources ranging from 2-5 km. The approach used in the calculation of environmental services Way Besai economy is to calculate willingness to pay for hydrological services based on the amount of water used by a household water users. The assumptions used are consumers actually use the water volume based on the needs and channel the water available at all times (Bishop, 1999).

To calculate the hydrological services conducted a survey of water user groups and household water users. Four groups of water users (CBO) who sampled the group of water users Jaga Tirta, Sub-district Air Hitam, Way Petai Sub-district of Sumber Jaya, Tirta Kencana, Sub-district Air Hitam, and groups of water users Tirta Sari Sub-district Gedung Surian. Basic sample selection is a representation of water users groups in urban and rural areas. Sample of households that is used by 60 households.

Respondents hydrological service users in subzone Way Besai based on the work of peasants 83%, 12% traders and civil servants by 5%. Almost all respondents cultivate coffee plantations (Hairiah et al, 2003). The average education level of junior high. Based on figures obtained

calculation of Rp 745 per m<sup>3</sup>, which means that the value of environmental services utilization hydrological Rp 745 for each use of water for 1 m<sup>3</sup>. The value of the services of water use when compared with the value of ecosystem services in other regions which Cisadane watershed upstream of Rp 1,563,97 per m<sup>3</sup> indicates that the value is smaller hydrological services. The differences are due to the utilization of the hydrology of the watershed Cisadane watershed upstream for household and commercial (industrial water in containers), whereas in the watershed Besai mostly for domestic industry.

The average household use of water by the water users of hydrological services is 243 liters per day. Use of the hydrological services for everyday purposes consists of the consumption of 11.40 liters of drinking, bathing 92,5 liter, 119,5 liters, and 20 liters more. The average willingness to pay for the water usage per month Rp 5.453- This value is relatively very low compared with the value of the use of water or an average water bill in urban Lampung Province. Capacity hydrological services of water user groups to water supply, charge/ levy charged water and willingness to pay can be seen in Table 1 below.

Table 1. Capacity of Water of CBO Samples in Subzone Watershed Besai

No.	CBO (Water User Group)	Supply Water (hour/day)	Cost of water / (month/ Rp)	Willing to pay for water services (%)	The maximum price of clean water (Rp)
1	JagaTirta	24	5.000	100	12.400
2	Air Way Petai	18	8.000	54,5	13.090
3	TirtaKencana	24	4.166	58,3	5.000
4	Tirta Sari	24	4.166	87,5	5.000
	<b>Average</b>	<b>23</b>	<b>5.453</b>	<b>75</b>	<b>8.490</b>

The water supply for various users from all groups of respondents an average of 23 hours / day. The water supply for day Water User Group acquired Jaga Tirta, Tirta Kencana, and Tirta Sari, whereas the Water User Group Way Petai smaller water supply at 18 hour / day. The amount of the water supply depends on the smooth flow of water from its source. Three groups of the first water well preserved, while the source of water in CBO Way Petai often damaged. The water supply in the group of water users Way Petai formerly PAM installation which was then submitted to the government village.

Levy of clean water in the water group sampled varied from Rp 4,166, - per month or Rp 50.000, - to Rp. 80.000, -. The amount of the fees based on the deliberations of the group of water users to water user groups Jaga Tirta, Tirta Kencana, and Tirta Sari, whereas in Way Petai water levies by the government village. Officers' collector for the levy for water users group JagaTirta, Tirta Kencana, and Tirta Sari comes from the board or the board is assigned, while in Water User Group Way Petai conducted by officers responsible for administering and collecting levies on water.

User's hydrological services in the subzone Way Besai basically willing to pay higher against the use of water. Respondents were willing to pay a higher rate of 75%. But the ability of respondents without notes the need to repair the installation of clean water, clean water is clearer than the present conditions, and flowing all the time. The average payment of water per month from four samples of Rp 5.453, - the potential for improved payment to Rp 8.490, -

A critical factor in relation with the service/ payment of water use is the level of household water consumption. Based on Table 2 it is known that household water consumption per day in the four groups of water users Jaga Tirta, Way Petai, Tirta Kencana, and Tirta Sari used for drinking, bathing, washing and other amount varies. Total water consumption for household water consumption per day lows use by the user group Water Way Petai for 189 liters/ day, while the group of water users Tirta Kencana amounted to 232,917 liters / day and water user groups Jaga Tirta of 285 liters/ day. Total water consumption for household water consumption per day used by the highest water user groups Tirta Sari amounted to 308,125 liters/ day.



Table 2. The level of household water consumption in Subzone Watershed Besai

No	Water User Group (CBO)	domestic water consumption per day (liter)				
		drink	bath	wash	other	Total
1	JagaTirta	15	150	100	20	285
2	Air Way Petai	9	75	85	20	189
3	TirtaKencana	12,1	73,3	127,5	20	232,917
4	Tirta Sari	11,8	110	166,25	20	308,125
	Average	11,40	92,5	119	20	243

The distribution of water use for drinking, bathing, washing and others showed that the average water use in all four groups of water users Jaga Tirta, Air Way Petai, Tirta Kencana, and Tirta Sari for drinking water needs of 11,40 liters/ day, bathing 92,5 liters/ day, washing requirement of 119 liters / day, while the other needs require an average water consumption of 20 liters/ day. Overall, the average household water consumption for the needs of water for drinking, bathing, washing and other water users into four groups of 243 liters/ day.

Table 3. Investment in clean water installations household level in Subzone Watershed Besai

No	CBO	Hose		Pipe (m)		Tap		Total Cost (Rp)
		Amount	Cost (Rp)	Amount	Cost (Rp)	Amount	Cost (Rp)	
1	JagaTirta	6	48.120	12,4	148.800	2,2	34.800	231.720
2	Way Petai	6	77.690	4	100.000	5	75.000	252.690
3	TirtaKencana	3	28.250	1	60.000	2	30.000	118.250
4	Tirta Sari	8	331.250	1	60.000	2	30.000	421.250
	Average		179.257,5		92.200		42.450	

Based on the table, it appears that the total investment costs incurred for installation of water level of the household include pipes, hoses and faucets in all four groups (CBO) Jaga Tirta, Way Petai, Tirta Kencana, and Tirta Sari amount varies. The total investment of installation of water released by the lowest water user groups Tirta Kencana Rp 118.250, -, whereas in the group of water users Way Petai Keep Tirta and each of Rp 231.720, - and Rp 252.690,-. Based on user distribution tool used for installation of water investments in all four groups of water users, the average cost for the purchase of Rp 179,257.5 pipe, - the average cost to purchase hose Rp 92,200, -, while the average cost to purchase faucets Rp 42 450, -. Total spending on clean water installations issued by the highest water user groups Tirta Sari Rp 421 250, - for investment incurred not only for domestic water supply lines, but also to the investment pool. The pools were built by the users of water services in the area of Sub-district Gedung Surian to as water reserves as well as to cultivate fish. The fish are farmed are carp, carp, tilapia fish and others.

#### *Ecotourism services*

In the method of valuation of environmental services ecotourism in DAS Besai to judge the environmental services ecotourism own regulars, namely Rest Area in Sumber Jaya and Way Besai hydropower. Ecotourism services that have regular visitors will be assessed based on the concept of economic benefits to the consumer willingness to pay for services that are enjoyed and the costs incurred to enjoy ecotourism. Rest Area is a recreation area of 800 m<sup>2</sup> in Sub-district Sumber Jaya. Rest Area was built and managed by the Government of West Lampung regency. Rest Area is one source of local revenue (PAD) in West Lampung District. Within a year revenue targets revenue of Rp 7,086 million, - or Rp 590.000, - per month. The benefits derived from the tourism Rest Area is able to enjoy the surrounding scenery and recreation from the altitude. Way Besai hydropower dam area which is the object of ecotourism is the intake dam. Way Besai hydropower plant with an installed capacity of 2 x 45 MW but only the real operational less than half of the installed capacity, as a result of interruptions in the water supply dam upstream of the power plant intake. Hydropower is

built since the early 1990s and operated in the late 1990s. The benefits derived from the tourism Way Besai hydropower is as a vehicle for recreation and fishing. Most of the visitors were students and teenagers who come from Sumber Jaya and surrounding areas, Bukit Kemuning, and Way Kanan district. Average visitors stated that they had never visited before both these attractions.

In the method of valuation of environmental services ecotourism Rest Area Sumberjaya, respondents were asked about the willingness to pay to enjoy the beauty of the region Rest Area. Respondents ecotourism come from different walks of life, but most of the students who want to enjoy the view. The days of the week Rest Areas visited on Saturday week. In addition, visitors come to the Rest Area on holidays and memorial religious holidays. Complete data availability and the total amount of willingness to pay can be seen in Table 4. Based on the table, the respondents were willing to pay the most are at par less than Rp 5.000, -. The reason respondents are willing to pay on the due in accordance with the nominal entry fee is charged and the fees charged.

Table 4. Analysis of the value of the economic benefits of ecotourism Rest Area based willingness to pay in Subzone Watershed Besai

No.	Classification	Number of visits (person/month)	Number of visits (person/year)	Total Willingness (Rp)
1	1.000-5.000	4694	56329	140.823.529
2	5.000-10.000	671	8047	60.352.941
3	10.000-15.000	335	4024	50.294.117
4	15.000-2.5000	0	0	0
5	Above 25.000	0	0	0
	<b>Total</b>	<b>5700</b>	<b>68400</b>	<b>251470588</b>

In the method of valuation of environmental services ecotourism hydroelectric Dam Intake Way Besai Subdistrict Sumberjaya, respondents were asked about the willingness to pay to enjoy the beauty of the region Way Besai hydropower. Complete data availability and the total amount of willingness to pay can be seen in Table 5.

Table 5. Analysis of economic benefits of ecotourism value Hydroelectric Dam Intake WayBesai based on the willingness to pay in Subzone Watershed Besai

No.	Classification	Number of visits (person/month)	Number of visits (person/year)	Total Willingness (Rp)
1	1.000-5.000	576	6912	17.280.000
2	5.000-10.000	24	288	2.160.000
3	10.000-15.000			
4	15.000-25.000			
5	Above 25.000			
	<b>Total</b>	<b>600</b>	<b>7200</b>	<b>19.440.000</b>

Based on Table 5, respondents were willing to pay the most are at par less than Rp 5.000, -. The reason respondents are willing to pay at the nominal paid in accordance with the respondent's willingness to not visit the ecotourism area. If the measurement ecotourism service notice objects that have regular visitors Besai sub watershed area, the economic value of ecotourism services is total travel economy Rest Area and Dam Intake Way Besai hydropower amounting to Rp 270. 910.588 per year. To measure the economic benefits of ecotourism, in addition to using the approach of willingness to pay, also carried out measurements of the travel costs incurred. Travel cost measurement results can be seen in Table 6.

Table 6. Costs Incurred by Ecotourism Visitors in Subzone Watershed Besai

No.	locations Ecotourism	Costs Incurred by Ecotourism Visitors (Rp)			
		Fuel	Entry fee	Other costs	Total
1	Rest Area	9.441	2.000		11.441
2	Intake PLTA Way Besai	8.357		6.250	14.607
3	Rafting (package)			600.000	600.000

Visitors Rest Area in Sub-district Sumberjaya can enjoy the leisure and panoramic scenery. Visitors can see the spread of coffee plantations and river liukan Way Besai long splitting mountains. If the economic benefits are measured on the costs incurred by the visitor's Rest Area average costs Rp. 11.441.- which consist of fuel for vehicles amounting to Rp 9441, - and entry fees for visitors and vehicles. In one month, the number of vehicles, visitors to the motorcycle as much as 200 pieces, while the car about 24 pieces.

Although visitors to the intake ecotourism Hydroelectric Dam Way Besai not charged in, but the costs incurred by visitors is greater than the Rest Area. This caused ecotourism destination in hydropower Way Besai for recreation and fishing around the intake dam so that the average visitor spends Rp 14 607, - consisting of Rp 8357, - for fuel vehicle (mostly motorcycles), and Rp 6,250, - for other costs (such as to purchase fishing bait).

Rafting is a challenging sport torrential streams that hit rock surface rock surface Way Besai forming rapids with rapids about 10 km track. Rafting in Sumber Jaya has rapids class II and class III. The starting point travel adventure rafting located in Sukajaya Village to finish in nurseries fish. Arum Jeram managed by the CBO P.A. Rakit. The fees charged by the service user with a system adventure packages ranging from Rp 400,000, - to Rp 600,000, - who used to rent inflatable boats and equipment, and transportation / vehicles from place finish adventure travel to the same place/ start. If the weather is nice and streamside supports rafting average user service about 4 times a month.

## CONCLUSIONS AND RECOMMENDATIONS

The economic value of hydrological services in DAS Way Besai Rp 745 per m<sup>3</sup>, which means that the value of environmental services utilization hydrological Rp 745 for each use of water for 1 m<sup>3</sup>. If the measurement ecotourism service notice objects that have regular visitors Besai sub watershed area, the economic value of ecotourism services amounting to Rp 270.910.588 per year. The development of ecotourism in the environmental services DAS Besai done by improving the accessibility and infrastructure in order to improve public access to the beauty and other recreational services, and realtion with the program of tourism development areas of local government. Parties can conduct activities Watershed Authority and Program socialize the concept of environmental services to the public, so that people understand the importance of environmental services for the benefit of communities in forest management and watershed. Comprehension the community continued with the development of the potential of environmental services by the community, business, and government in order to create value for its utilization.

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