Application of choice modelling on mangrove forest valuation in West Lombok, Indonesia

by Endah Saptutyningsih Saptutyningsih

Submission date: 25-May-2020 10:47AM (UTC+0700)
Submission ID: 1331333756
File name: Bidang_C.16-Endag_S.pdf (262.47K)
Word count: 4173
Character count: 22581

Application of choice modelling on mangrove forest valuation in West Lombok, Indonesia

Application of choice modelling on mangrove forest valuation in West Lombok, Indonesia

Endah Saptutyningsih[1] and Diswandi Diswandi[2]

1 Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Indonesia
2 Faculty of Economics and Business, University of Mataram, Indonesia
E-mail: endahsaptuty@umy.ac.id

Abstract. A mangrove forest in West Nusa Tenggara is one of tourist destination that attracts many local and domestic tourists thanks to their natural beauty. In addition to its natural beauty, this place is also used as mangrove conservation and education-based tourism. However, there were various critical statuses in West Nusa Tenggara which damaged. The critical status is also spread in various regions on the island of Lombok, among others in the area of West Lombok Regency. The loss of mangrove forest occurs was because mangrove forests often are converted in order to generate directly marketable products, such as aquaculture that might lead to massive economic losses for the surrounding community. To make efficient resource allocation choices, decision makers need a framework to estimate the non-use values that might be held by the community for mangrove forest conservation. Non-market valuation techniques can be used for this purpose, by applying a choice modelling (CM), appears to hold some promise because it can be used to model complex situations and to frame choices consistent with 'real life' choices. In this paper, a CM method applied for assessing the values that the community and tourists hold for mangrove forest conservation in West Lombok, Indonesia.

1. Introduction

It has been recognized that several socio-economic benefits were provided by mangrove ecosystems, such as timber, tourism, fish, and environmental services (e.g. carbon sequestration, coastal protection, and nursery habitat for extensive species diversity) [1,2]. These support various types of human needs, especially for local communities of surrounding areas [3,4].

Indonesia has more than 20% of the world's mangrove forests--around 3.7 million hectares, with high species diversity [5,6]. Mangrove forests in West Lombok are one of the mangrove area in Eastern Indonesia that has been occupied as mangrove conservation and education-based tourism.

However, studies found that one of the most threatened ecosystems in the world is mangrove ecosystems due to human activity that encouraged continuous encroachment and land degradation. In Indonesia itself, There were around 22% mangrove area decline [6,7]. This is including mangrove forest in West Nusa Tenggara Province that is critical which severely damaged level of 1,756.86 ha, being damaged moderately by 8,128.07 Ha and still well around 8,471, 95 Ha. The critical status was also spread in various regions on the island of Lombok, among others in the area of West Lombok Regency [8]. Presidential Regulation of the Republic of Indonesia No. 73 of 2012 has regulated the Management of sustainable mangrove ecosystems, namely the integration of all efforts to realize a mangrove ecosystem

for sustainable community welfare. The orientation of development in Indonesia that pays attention to social, economic and ecological sustainability requires the sustainable management of mangrove ecosystems [9]. Indicators for sustainable management of mangrove ecosystems are including economic, social, ecology, and institutional [10,11,12]. Economic valuations of mangroves have been conducted in many areas of the world [13,14]. However, a study focusing on the mangrove forest valuation in Indonesia remains an area that requires further exploration. To fill in this knowledge gap, this study aims at estimating the non-market values that the visitors place on the mangrove forest using choice modelling (CM). The CM technique allows us to considers the mangrove forest attributes such as entrance fee, parking cost, rubbish bin, toilet, gazebo, mangrove forest guard. The CM technique also allows flexibility in analysis and offers the potential to reduce framing bias problems because in the design of the questionnaire substitution effects can be included [15].

2. Material and Methods

2.1. Study site

This study was conducted in West Lombok, Indonesia. The area was selected following a mapping using Geographic Information Systems conducted by [16]. Their study clarifies a decreasing of mangrove area in West Lombok as reported by the forestry agency in this province.

2.2. Survey design and administration

We surveyed visitors in the study site to investigate their choice for improving the mangrove forest quality. The questionnaire for this study was set into three sections. Section A collected information on socioeconomic characteristics of respondents including age, marital status, sex, and the length of education. Section B enquired their location attribute (i.e. mangrove forest conditions, facilities in the mangrove forest) and travel cost. Finally, section C consisted of Choice Modelling questions to estimate visitor's choice for improving mangrove forest quality.

2.3. Data analysis

We employed Choice Modelling (CM) which is a stated preference technique in which respondents choose their most preferred resource use option from a number of alternatives (see Figure 1). CM was developed initially in some studies [17,18]. It has been frequently used in the evaluation of choices involving consumer goods [18], transportation [17,19], tourism [20]. There have been a few applications that have valued environmental goods, including water-based recreational value [21] and value of preserving international rainforests [22].

This model is basically almost the same as the contingent valuation method because it is based on the preferences of respondents to estimate the economic value of an ecosystem in the form of goods and services. The difference lies in the respondents who are asked to choose the preferred conditions rather than asked to provide an assessment directly from an ecosystem. CM is also a technique based on statements from individuals to estimate the non-market economic value of a natural resource. In the application, respondents are given a series of choices consisting of two or more alternative choices. One alternative is a combination of several attributes that have value or commonly called levels. CM has an important position because CM directly assesses the characteristics of an attribute and the marginal change in the character rather than just assessing the good or bad of a product as a whole. From this model, it is concluded that the value of willingness to pay is indirectly based on the choices given by the respondents.

In this study, visitors were given several scenarios to determine alternative choices in improving mangrove forests. This scenario is an alternative choice to improve the quality of mangrove forests. Each alternative choice is given, accompanied by several varied attributes such as costs, procurement, and improvement of facilities and infrastructure on the site. The option is presented in Figure 1.

Question: Carefully consider each of the following three options for the Lembar mangrove forest. Suppose Option A, B, and C were the ONLY ones available, which one would you choose?

Attribute	Current condition	Option A	Option B
Entrance fee	 Free entrance fee	 IDR5,000	 IDR10,000
Parking cost	 IDR2,000 (motorbike) IDR5,000 (car)	 IDR1,000 (motorbike) IDR3,000 (car)	 Free parking
rubbish bins	 Lack of rubbish bin lead to littering conducted by visitors	 Addition of 5 rubbish bins to keep mangrove forest clean	 Addition of 5 rubbish bins to keep mangrove forest clean
Toilet	 There is no public toilet available	 Procurement of public toilets	 Procurement of public toilets accompanied by janitors
Gazebo	 There are 3 big and 2 small gazebos	 Addition of 3 small gazebos	 Addition of 1 big gazebo and 3 small gazebos
Mangrove forest guard	 There are no guards or officers to control and watch visitors who come	 There is 1 guard or officer to control and watch visitors who come	 There are 2 guards or officers in the mangrove forest area to control and watch visitors

Which of these options would you choose?
Option A
Option B

Figure 1 Example of a choice set from the Lembar mangrove forest questionnaire

Based on empirical studies, the regression models in this study are as follows:
CHOICE = f (costs, socio-demographic vector, attribute vector)
CHOICE = f ($\beta_0 + \beta_1$COST + β_2SEX + β_3AGE + β_4MARRIAGE + β_5EDUC + β_6ATTRIBUTE
where CHOICE is visitor's choice (1 if respondent choose Option A ; 0 if choosing Option B); COST is travel costs (IDR); SEX is *dummy* sex (1 if male; 0 if female); AGE is age of visitors (years); MARRIAGE is d*ummy* marriage status of visitors (1 if married; 0 if otherwise); EDUC is length of education (years); ATTRIBUTE is location attribute (5 scales)

Probabilities for Visitors' Choice
The probability of visitors in choosing the available alternative is calculated by the following formula [23]:

$$\acute{P} = \frac{e^L}{1 + e^L}$$

where $\acute{P}$ is event probability; $e^L$is exponential of L; L is $ln\left[\frac{p}{1-p}\right]$ atau logit index.

3. Result and Discussion

Of the 140 respondents, 118 visitors (84 percent) chose alternative A and 22 visitors (16 percent) chose alternative B. Most of the visitors preferred alternative A due to the desire to preserve mangrove forests and the costs that were still affordable which is benefited most visitors from middle to lower income. While alternative B is chosen based on additional facilities and infrastructure that are equipped to increase the convenience of the visitors. Thus, this proves that the level of visitor awareness to contribute to improving the quality of the mangrove forest is still very poor.

Table 1. Regression result

Variable	Coefficient	Exp(B)
COST	0,000**	1,000
	(0,000)	
SEX	-1.382***	0.251
	(0.423)	
AGE	-0.028	0.972
	(0.019)	
MARRIAGE	0.671	1.957
	(0.450)	
EDUC	-0.184***	0.832
	(0.065)	
ATTRIBUTE	-1.131***	0.323
	(0.150)	
Constant	2.956	7.574
	(3.704)	

Dependent Variable : Choice (1 if respondent choose Option A ; 0 if choosing Option B)
shows standard error
*significant at α=10% ; **significant at α=5% ; ***significant at α=1%

Probabilities for respondents to choose the provided alternatives were analyzed using binary logistic regression analysis. In CM, each observation is discrete 0–1. This assumption is needed to state the visitor's decision in choosing an alternative, namely 1 if the visitor chooses alternative A and 0 if choosing alternative B. Again, WTP values in Choice Modelling are not obtained directly but are concluded indirectly based on tourist decisions, which are then analyzed using binary logistic regression analysis.

Thus, logit model for the above result is as follow:

$$log\left[\frac{p}{1-p}\right] = 7{,}574 + 0{,}000\ COST - 1.382\ SEX - 0.028\ \text{AGE} + 0.671\ MARRIAGE - 0{,}184\ EDUC - 1{,}131\ ATTRIBUTE$$

Table 1 shows the Exp (B) value of the travel cost variable is equal to 1,000 with a positive regression coefficient. This value can be interpreted as visitors whose travel costs are high will have the probability to choose alternative A rather than B by 1 time greater than visitors who have smaller travel cost. A positive sign on the regression coefficient means that if the visitor's travel costs are greater, there will be an increase in the probability of visitors in choosing alternative A. Likewise, if the visitor's travel costs are smaller, there will be a decrease in the probability of choosing alternative B.

The Exp (B) value for sex is 0.251 with a negative regression coefficient. It can be interpreted as the younger visitors will have the probability to choose alternative A rather than B by 0.251 times greater than older visitors. The value of Exp (B) for education level variable is 0.832 with a negative regression coefficient. It can be interpreted as visitors who have an education level that is higher will have a relative probability to choose alternative A than B by 0.832 times greater than visitor with a low education level. This implies that if the education level of visitors is high, there will be a decrease in the probability of

choosing alternative A. In contrast, if the education level of visitors is low, it will increase the probability of the visitors in choosing alternative B.

The value of Exp (B) for the attribute of mangrove forest is 0.323 with a negative regression coefficient. It can be interpreted as if the location attribute of the mangrove forest is getting better, visitors will have the probability to choose alternative A rather than B by 0.323 times greater than when an attribute of the mangrove forests is not good. So if the attributes of mangrove forests are getting better, there will be a decrease in the probability of visitors choosing alternative A. Conversely, if the attributes of mangrove forest locations are not good, there will be an increase in the probability of visitors choosing alternative B.

The value of Willingness to Pay (WTP) of tourists towards alternative choices is indirectly obtained by using the equation (Putrantomo, 2010):

$$WTP = \left[\frac{\sum_i \exp \beta_1}{\sum_i \exp \beta_1} + \cdots + \frac{\sum_i \exp \beta_n}{\sum_i \exp \beta_1}\right]$$

$$WTP = \frac{ExpCost}{ExpCost} + \frac{ExpSex}{ExpCost} + \frac{ExpEdu}{ExpCost} + \frac{ExpAtribut}{ExpCost}$$

$$WTP = \frac{1.000}{1.000} + \frac{0.251}{1.000} + \frac{0.832}{1.000} + \frac{0.323}{1.000} = 2.406$$

Based on the equation, the value of visitors' WTP to improve the environmental quality of mangrove forests in Lembar is about IDR2,400.00 per person. Thus, with the number of visitors as many as on average 200 people per month, the economic value of the mangrove forest ecotourism will be IDR 480,000.00 per month.

This study found that the cost of travel has a positive and significant influence on the choice of visitors to improve the environmental quality of mangrove forests. If the visitor's travel costs are greater, there will be an increase in the probability of visitors in choosing alternative A. This is in accordance with the initial hypothesis that travel costs have a significant positive effect on the choice of visitors to improve the environmental quality of mangrove forests.

The results of this study are different from the research previous research [24] that cost has a negative and significant effect on alternative choices of tourists to choose tourist sites. It is because visitors want to save on their travel costs so they tend to choose alternative A which has lower costs even though the facilities offered are incomplete. In choosing the alternative that is in the scenario, most visitors to the mangrove forest only see the cost without seeing the other facilities offered. This is proof that there is still a lack of awareness of visitors to help improve the quality of the environment.

The previous study [25] had different result from this research which travel cost did not have a significant effect on alternative choices of tourists to choose a snorkeling location. It could be due to visitors who feel that with A low entry fee, they still able to enjoy a good view, so they will quite satisfied with the available facilities without the need for improvement. Tourists who come to the mangrove forest are usually aimed to see the scenery off to the sea and just to take pictures. Thus they do not really care about the complete facilities offered.

The education level of visitors has a negative and significant influence on the choice of visitors to improve the environmental quality of Lembar mangrove forests. It means that if the visitor's education level is higher then there will be a decrease in the probability of choosing alternative A. This is not in accordance with the initial hypothesis, that assumed that education levels have a positive and significant effect on visitor choices to improve the environment of Lembar mangrove forests in West Lombok. This can be influenced by the visitor's mindset, while those who are highly educated will be more mature and tend to be more aware of the importance of contributing to improving the quality of the mangrove forest environment. In order for mangrove forests to remain sustainable, they feel the need for improvements in the quality and addition of supporting facilities and infrastructure in mangrove forests.

This study found that the location attributes have a negative and significant influence on visitor choices to improve the environmental quality of mangrove forests. It means that if the attributes of mangrove forests

are getting better, then there will be a decrease in the probability of visitors choosing alternative A. This is not in accordance with the initial hypothesis that location attributes have a significant and positive effect on visitor choices to improve the environment of mangrove forests. This can be influenced by the factors of visitors who want the improvement of facilities and infrastructure in the mangrove forest, especially in the access road to the mangrove forest which is unsealed.

The probability of visitor choice indicates the magnitude of the probability that visitors have to choose one of the alternative choices that have been provided. This visitor choice probability is used to find out which alternative choices dominate visitor choices.

Probability for visitors to choose alternative A to improve the quality of the environment of the mangrove forests in Lembar, West Lombok is

$$\acute{P} = \left[\frac{e^{L}}{1+e^{L}}\right] = \left[\frac{0{,}314494}{1+0{,}314494}\right] = \mathbf{0,629}$$

The probability for visitors to choose alternative B to improve the quality of the environment of the mangrove forests in Lembar, West Lombok is Ṕ (0) = 1 – 0,629 = **0,371**

It means that the probability for visitors who choose alternative B to improve the environmental quality of Lembar mangrove forests is 0.371

From the calculation of visitor choice opportunities above, the value of P on alternative A is 0.629 and the value of Ṕ on alternative choice B is 0.371, indicating that visitors to the Lembar mangrove forest prefer the alternative choice A, where the alternative has a lower entry fee. So alternative choices that have low costs are the favorite choice of visitors even though the facilities offered are not so complete. This can be due to the lack of awareness of visitors in participating to improve the environmental quality of mangrove forests, thus lead them to be less concerned in choosing alternative choices.

4. Conclusion

One of the typical environmental issues which using non-use values is the mangrove forest conservation. The main cause of misallocation of resources because non-use value is not recognized. In order to allocate the resources efficiently, it is necessary to assess all components of values. One non-market valuation technique for this purpose is choice modelling. This study is an application of the technique for assessing the values which visitors might hold for a mangrove forest in Lembar, West Lombok. There are three advantages of the technique applied in the mangrove forest valuation. First, the choice model in the CM technique can be precise and detailed. Second, this technique can be used to model complicated choice situations where more than one variable is an important influence on the formation of preferences. Third, the technique can model various simultaneous trade-offs, which include environmental and socio-demographic factors.

The CM application results help decision makers to prioritize mangrove forest conservation options. In addition, the results showed the importance of socio-demographics, namely gender and length of education in the willingness to pay for mangrove conservation. While CM techniques are still in the early stages and a lot of development work still needs to happen, their application looks promising. Its potential to model complex and simultaneous compromises will find many applications within the framework of ecological economics.

5. References

[1] Kunstadter, P., Bird, E.C.F., Sabhasri, S. (Eds. (1986). *Man in the Mangroves*. Tokyo: United Nations University.

[2] Sarhan, M & Tawfik, R. (2018). The Economic Valuation of Mangrove Forest Ecosystem Services: Implications for Protected Area Conservation. *The George Wright Forum* (pp. 341–349).

[3] Kusmana C. (2015). Technique of Guludan as method of planting of mangrove on land flooded with deep water. In: Scientific Oration of Professor of IPB (p. 95).

[4] Kusmana C., Sukristijiono. (2016). Mangrove resources uses by local community in Indonesia. *Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan*, *6*(2), 217–224.

[5] Giri, C. et al. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data (version 1.3, updated by UNEP-WCMC). *Glob. Ecol. Biogeogr.*, *20*, 154–159.

[6] Ilman M., Dargusch P., Dart P. J., O. (2016). A historical analysis of the drivers of loss and degradation of Indonesia's mangroves. *Land Use Policy*, *54*, 448–459.

[7] Ghosh S., Bakshi M., Bhattacharyya S., Nath B., C. P. (2015). A review of threats and vulnerabilities to mangrove habitats : with special emphasis on east coast of India. *Journal of Earth Science and Climate Change*, *6*(4), 1000270.

[8] West Nusa Tenggara Provincial Forestry Office (NTB). (2011). *Mangrove forest in West Nua Tenggara.*

[9] Turner K. G., Anderson S., Gonzales-Chang M., Costanza R., Courville S., Dalgaard T. Dominati E., Kubiszewski I., Ogilvy S., Porfirio L., Ratna N., Sandhu H., Sutton P. C., Svenning J. C., Turner G. M., Varennes Y. D., Voinov A., W. S. (2016). A review of methods, data, and models to assess changes in the value of ecosystem services from land degradation and restoration. *Ecological Modelling*, *319*, 190–207.

[10] Iftekhar M. S., I. M. R. (2004). Managing mangroves in Bangladesh: a strategy analysis. *Journal of Coastal Conservation*, *10*(1–2), 139–146.

[11] KKMTN. (2013). *National strategy of mangrove ecosystem management in Indonesia (book 1.* Jakarta, Indonesia.

[12] Orchard S. E., Stringer L. C., Q. C. H. (2016). Mangrove system dynamics in Southeast Asia: linking livelihoods and ecosystem services in Vietnam. *Regional Environmental Change*, *16*(3), 865–879.

[13] Bann, C. (1999). A contingent valuation of the mangrove of Benol, Johor State, Malaysia, Accessed on [6th Sept. 2018]. Retrieved from www.unepscs.org/Economic_Valuation_Traini ng_Materials/06 Readings on Economic Valuation of Coastal Habitats/14-iii Contingent-Valuation-Mangrove- Johor-Malaysia.pdf

[14] Hema, M., & Devi, P. (2015). Economic Valuation of Mangrove Ecosystems of Kerala, India. *Journal of Environmental Professionals Sri Lanka*, *4*(1), 1–16. https://doi.org/10.4038/jepsl.v4i1.7850.

[15] Rolfe, J., Bennett, J., & Louviere, J. (2000). Choice modelling and its potential application to tropical rainforest preservation. *Ecological Economics*, *35*(2), 289–302. https://doi.org/10.1016/S0921-8009(00)00201-9

[16] Saptutyningsih, E., and D. (2018). Using Contingent Valuation Method for Estimating the Willingness to Pay for Mangrove Forest: a Study in West Lombok, Indonesia. Thailand: Mahidol University.

[17] Louviere, J.J., Hensher, D. A. (1982). On the design and analysis of simulated choice or allocation experiments in travel choice modelling. *Transp. Res. Rec.*, *890*, 11–17.

[18] Louviere, J.J., Woodworth, G. G. (1983). Design and analysis of simulated consumer choice or allocation experiments: an approach based on aggregate data. *J. Market. Res.*, *20*, approach based on aggregate data. J. Market. Res.

[19] Rose, J. M., Bliemer, M. C. J., Hensher, D. A., & Collins, A. T. (2008). Designing efficient stated choice experiments in the presence of reference alternatives. *Transportation Research Part B: Methodological*, *42*(4), 395–406. https://doi.org/10.1016/j.trb.2007.09.002

[20] Morley C.L. (1994). Experimental destination choice analysis. *Annals of Tourism Research*, *21*, 780–791.

[21] Adamowicz, W., Louviere, J. & Williams, M. (1994). Combining revealed and stated preference methods for valuing environmental amenities. *Journal of Environmental Economics and Management*, *26*, 271−292.

[22] Rolfe, J., & Bennett, J. (1996). Valuing international rainforests: A choice modelling approach. *Vanuatu Forest Conservation Research Report* No. 12. University College. Canberra: University of New South Wales.

[23] Widodo. (2013). *Psikologi Belajar [Learning Psychology]*. Jakarta: Rineka Cipta.

[24] Rawi, B. S. (2012). *The Use of Choice Modelling in Assessing Tourists Destinations: A Case Study of Redang Marine Park (RMP) Malaysia*. New Castle University.

[25] Putrantomo, F. (2010). *Aplikasi Contingent Choice Modelling (CCM) dalam Valuasi Ekonomi Terumbu Karang Taman Nasional Karimunjawa*. Institut Pertanian Bogor.

Application of choice modelling on mangrove forest valuation in West Lombok, Indonesia

ORIGINALITY REPORT

19%	%	19%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Yan Liu, Liming Suo. "Exploring spatial and temporal distributions of air quality in China from 2013 to 2017", IOP Conference Series: Earth and Environmental Science, 2019 Publication	3%
2	Chandan Kumar Chakrabarty, Abd Halim Bin Shamsuddin, Ibrahim Bin Ahmad, Mohamed Nor Bin Mohamed Desa et al. "4th International Conference on Energy and Environment 2013 (ICEE 2013)", IOP Conference Series: Earth and Environmental Science, 2013 Publication	2%
3	John Rolfe, Jeff Bennett, Jordan Louviere. "Choice modelling and its potential application to tropical rainforest preservation", Ecological Economics, 2000 Publication	2%
4	Luca Coscieme, Jane C Stout. "Ecosystem Services Evaluation", Elsevier BV, 2019 Publication	2%

5	The Economics of Non-Market Goods and Resources, 2015. Publication	1%
6	Danny Campbell. "Assessing the spatial dependence of welfare estimates obtained from discrete choice experiments", Letters in Spatial and Resource Sciences, 12/2008 Publication	1%
7	Endah Saptutyningsih, Diswandi Diswandi, Wanggi Jaung. "Does social capital matter in climate change adaptation? A lesson from agricultural sector in Yogyakarta, Indonesia", Land Use Policy, 2019 Publication	1%
8	Namoo A. Han, Mark W. Burris. "The Potential Impact of Incentives on Managed Lane Travel", Journal of Transportation Technologies, 2018 Publication	1%
9	Madhurima Bakshi, Somdeep Ghosh, S. S. Ram, M. Sudarshan et al. "Sediment quality, elemental bioaccumulation and antimicrobial properties of mangroves of Indian Sundarban", Environmental Geochemistry and Health, 2018 Publication	1%
10	Amber Himes-Cornell, Linwood Pendleton, Perla Atiyah. "Valuing ecosystem services from blue forests: A systematic review of the valuation of	1%

salt marshes, sea grass beds and mangrove forests", Ecosystem Services, 2018
Publication

---

11 Alyssa S. Thomas, Sangeeta Mangubhai, Chloe Vandervord, Margaret Fox, Yashika Nand. "Impact of Tropical Cyclone Winston on women mud crab fishers in Fiji", Climate and Development, 2018 — 1%
Publication

---

12 M Hema, P Indira Devi. "Economic Valuation of Mangrove Ecosystems of Kerala, India", Journal of Environmental Professionals Sri Lanka, 2015 — 1%
Publication

---

13 R Rahmania, T L Kepel, T Arifin, Yulius. "Evaluating the effectiveness of mangroves rehabilitation efforts by comparing the beta diversity of rehabilitated and natural mangroves", IOP Conference Series: Earth and Environmental Science, 2019 — 1%
Publication

---

14 Sara Kaffashi, Mad Nasir Shamsudin, Alias Radam, Mohd Rusli Yacob, Khalid Abdul Rahim, Muhammad Yazid. "Economic valuation and conservation: Do people vote for better preservation of Shadegan International Wetland?", Biological Conservation, 2012 — 1%
Publication

15	"Cost-Benefit Studies of Natural Resource Management in Southeast Asia", Springer Science and Business Media LLC, 2015 Publication	1%
16	Huynh Viet Khai. "chapter 14 Assessing Urban Residents' Willingness to Pay for Preserving the Biodiversity of Swamp Forest", IGI Global, 2016 Publication	1%

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	Off		