Technium Sustainability

Technium Sustainability
Vol. 6, pp 1-13 (2024)
ISSN: 2810-2991
www.techniumscience.com

WILLINGNESS TO PAY (WTP) TO MEASURE THE EXISTING AND THE HERITAGE VALUES OF AGRICULTURE WETLAND (Case Study of Banjar Regency, South Kalimantan)

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Abstract

Agricultural wetlands are rice fields in the tidal swamps area in South Kalimantan. They result from the Banjar Community converting marginal land into productive land over the generations. Now, its existence is threatened due to land conversion. This research aims to find the land existence and heritage value (LEHV) of the agricultural wetlands covering an area of 60,862 hectares in Banjar Regency on the assessment in 2020. The economic valuation method used is the contingent valuation method (CVM), which measures willingness to pay (WTP) landowners of non-agricultural property around agricultural wetlands who enjoy environmental services from agricultural wetlands. WTP is measured by a willingness to pay a significant additional annual land and building tax from the non-agricultural property they own and an incentive to farmers and landowners to continue to maintain the existence of agricultural wetlands so that they can be passed on to future generations. WTP data collection uses a preference survey by distributing questionnaires and interviews. The number of research respondents was seventy-five, spread across the Banjar Regency. The average WTP to maintain the agricultural wetlands in Banjar Regency is IDR 39,500, and the total WTP or LEHV an area of 60,862 hectares on assessment date 31 December 2020, economic valuation results using the CVM amounting to IDR 22,342,582,500.00 or IDR 367,102 per hectare.

Keywords: agricultural wetland, land existing value, land heritage value, willingness to pay

Technium Sustainability
Vol. 6, pp 1-13 (2024)
ISSN: 2810-2991
www.techniumscience.com

INTRODUCTION

The value of heritage and present existence are essential aspects of natural resource conservation, reflecting the significance of cultural and ecological. Heritage value reflects natural resources' cultural, historical, and social importance. In this case, natural resources function as channels of cultural identity, carrying historical meaning and traditional knowledge of society and becoming integral to defining a group's past and maintaining continuity and support for future generations (Himes et al., 2024). The existence value, a type of non-use value that society places on natural resources, is particularly significant. It stems from the intrinsic value placed on knowing that natural resources exist, a value that is deeply emotional and personal. This value is essential in motivating conservation efforts because it includes the benefits of preserving natural environments, such as forests, oceans, and wildlife, which are valuable regardless of physical interaction or individual use (Himes et al., 2024).

Integrating heritage and existing values into conservation strategies is essential; it holds immense potential to revolutionize the effectiveness of environmental protection efforts. By recognizing these values, policymakers and conservation activists can develop management plans that are more comprehensive and respect cultural heritage and biodiversity, understanding these values. This recognition opens exciting possibilities for more effective and inclusive conservation strategies. It will also help gain public support and funding for conservation initiatives, as they align with broader societal beliefs and ethics regarding the role and importance of nature (Noor et al., 2023; Himes et al., 2024). Recognizing heritage values and presence in natural resource management reflects an ethical and cultural imperative and represents a practical approach to achieving long-term sustainability and conservation goals. This dual recognition enhances conservation efforts and ensures natural resources are for current and future generations (Farber et al., 2001; Himes et al., 2024).

The agricultural wetland is a term for agricultural land in the form of rice fields in tidal swamps in South Kalimantan, which was developed by the Banjar's people with local wisdom which has the nature of a multifunctional combination of agricultural land as well as the benefits and functions of wetlands which have direct benefits, ecological functions, production results, and unique characteristics. This condition places agricultural wetlands in Banjar Regency in a critical position. The Banjar community in South Kalimantan has succeeded in combining rice with coconut based on local wisdom to cultivate tidal land, creating a sustainable intercropping farming system (Haitami et al., 2022). Tidal lands in South Kalimantan, which include freshwater swamps, peat swamps, and mangrove lands, have become the focus of productive agricultural development (Ansari et al., 2023). Using superior varieties in tidal swamp ecosystems in South Kalimantan has increased land productivity (Agustiani et al., 2022). Even though tidal land is included in the marginal category with various obstacles such as water fluctuations, salt intrusion, and nutrient deficiencies, the people of South Kalimantan still manage this land for agriculture and daily needs (Balad et al., 2021). Applying water-saturated cultivation technology has helped increase the productivity of soybean plants in tidal fields (Faizaty et al., 2016). The right planting time and good water management are essential factors in the success of agricultural cultivation in tidal swamp land (Wakhid & Syahbuddin, 2019). Studies show that tidal swamp land has a low fertility level, but with proper management, this land can have potential for agricultural development (Nabesar & Annisa, 2020). Using soybean cultivation technology on tidal land has helped increase crop productivity and provided significant economic value for the community (Taufiq et al., 2019; Yaghoubi et al., 2010). With good management, tidal land in South Kalimantan can become a sustainable source of income for society (Suwanda & Noor, 2020). The Banjar

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people have reclaimed and cultivated tidal land in Kalimantan for generations. They have developed a sustainable intercropping farming system on this marginal land (Hatta, 2016).

From an environmental perspective, agricultural wetlands have the characteristics of a combination of wetlands and agricultural land. They are a form of local wisdom for the Banjar people to change marginal land into productive land, which has an essential meaning for the Banjar people. As development grows, it begins to experience damage due to the pressure of land conversion. Into non-agricultural land. Research by Rusadi et al. (2014) shows that the conversion rate of paddy fields in Banjar regency is 64.78 ha or ± 3.47% per year. The leading cause of conversion of paddy fields to residential (non-agricultural) areas is driven by the dynamic growth of Banjarmasin City as the neighbouring place as the supporting areas, increasing population growth, economic conditions, and the absence of regional regulations from the government regarding the use of productive land for infrastructure development (non-agricultural) in each region. Banjar Regency land survey data for 2013-2019 shows a decrease around agricultural wetlands by 2.76% per year during 2013-2019 (Survey Pertanian, 2020), as mentioned in Table 1.

Table 1. Rate of Agricultural Wetland Conversion in Banjar Regency of 2013-2019

Year	Hectare	Transfer Rate (%)	Remarks
2013	70.626	-	-
2014	70.582	- 0.06%	To be a non-agriculture
2015	69.468	- 1.58%	To be a non-agriculture
2016	68.645	- 1.18%	To be a non-agriculture
2017	59.552	- 13.25%	To be a non-agriculture
2018	59.829	+ 0.47%	New agriculture area
2019	60.862	+ 1.73%	New agriculture area
Transfer Rate per Year		- 2.76%	

This research is a conservation effort to ensure that natural resources are preserved not only for the current generation but also for future generations and to include community participation in the protection of agricultural wetlands and measurements of the LEHV of agricultural wetlands in Banjar Regency. The area of agricultural wetlands whose LEHV measured is 60.862 hectares using a natural resource economic valuation approach, namely a process of assessing the economic value of natural resources, which often do not have a clear market price. The main objective of this economic valuation is to provide the information needed for policy and management decision-making by integrating the value of natural resources into economic calculations. The results of the economic valuation enable stakeholders to make more informed choices about the use and conservation of these natural resources (Mazaya et al., 2020; Noor et al., 2024; Saidy et al., 2024). The economic valuation method used is the contingent valuation method (CVM), where the WTP is calculated by the community around agricultural wetlands, which are assumed to enjoy environmental services from these natural resources as a form of concern to participate in maintaining their existence and passing it on to them—generations to come. The form of WTP is the willingness to pay additional land and building tax or annual land tax from owned property for the local government to provide incentives for farmers or owners of agricultural wetlands to protect and maintain the existence of wetlands agriculture. The CVM is commonly used in environmental and natural resource economics to

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ISSN: 2810-2991
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assess the monetary value of environmental benefits or harms for which no established market exists. This method allows for assessing the economic value of environmental attributes such as natural sustainability, air quality, natural resource conservation, and other ecosystem services (Costanza, 1997; Napisah & Annisa, 2020).

METHODOLOGY

The economic valuation method, the contingent valuation method (CVM), is used to determine the LEHV of agricultural wetlands. Data was collected using a preference survey, a household survey, data collection techniques by distributing questionnaires, and limited interviews with respondents who represented the population.

The respondents were seventy-five non-agricultural property owners in the Banjar area. This area was determined as a research location representing the entire research area because of the high rate of change or conversion of agricultural land due to its position as a buffer zone for Banjarmasin City, a neighbour. The selection of respondents used the non-probability sampling technique.

Accidental Sampling is a method of determining the sample by taking present and available respondents in a place according to the research context. Respondents were given information about the environmental attributes of agricultural wetlands and asked to assess what they were willing to pay (WTP) in the form of additional annual land tax payments. In the questionnaire distributed to respondents, they were given an understanding of the importance of agricultural wetlands in terms of providing food and environmental services before filling in the contingency scenario in the form of multilevel questions about the amount of additional annual land tax payments and the forms of incentives given to farmers and owners of agricultural wetlands to continue to maintain the existence of the land. The data collected is then analyzed to determine the average value or distribution of WTP from respondents to determine the LEHV of agricultural wetlands. The analysis involves econometric or statistical techniques to estimate the economic value of the land existence and heritage value of agricultural wetlands in Banjar Regency.

As mentioned in Table 2, the multilevel questions related to adding annual land tax provisions and forms of compensation as incentives for agricultural wetland owners in Table 3, the community advised for compensation, and the equation to calculate the WTP are as follows.

Table 2. In the Questionnaire form, the community agreed to have additional payment

No	Agree for additional pay (IDR/Year)
1	< 25000
2	25001 to 50000
3	50001 to 100000
4	100001 to 150000
5	150001 to 200000
6	200001 to 250000
7	250001 to 500000

Table 3. In the Questionnaire form, the community advise for compensations

Nu.	Compensations
1	Fertilizers and other materials are needed for agriculture.
2	Agricultural infrastructures Improvement
3	Cash reimbursement to landowners
4	Reducing land tax or retribution payment
5	Improvement of the agricultural product trading process

The formula for calculating the average WTP value is as follows,

$$\sum_{i=1}^{n} Wi/\mathrm{n} \quad (1)$$

where: $\sum$ - WTP respondence average, *Wi* - total WTP payment,
i - respondents are willing to pay; *n* – total respondents

The formula for adding data is as follows, namely:

$$TWTP = \sum_{1} W_T p_i \left(\frac{\Pi_i}{\mathbb{N}}\right) \rho \quad (2)$$

where: *TWTP* is the total of WTP, $W_T pi$ - WTP of the individual sample i,
n_i - the number of samples who are willing to pay WTP,
N – total of sample, *P* – last population.

The LEHV of agricultural wetlands is equal to the total Willingness to Pay (TWTP) (3)

The influence of respondent characteristics such as age, gender, marital status, education level, income level, number of dependents, and knowledge about the importance of agricultural wetlands, food security, and environmental function on the amount of WTP was evaluated using multivariate analysis using multiple regression.

RESULT AND DISCUSSION

The research's LEHV of agricultural wetlands or rice fields shows the total WTP value of the additional annual non-agricultural property tax payments or rural and urban land and building Tax. WTP is a fundamental concept that reflects the maximum amount an individual is willing to sacrifice to obtain a good or service from a natural resource or avoid an undesirable result. The WTP concept itself has been used in several studies, such as air pollution reduction services (Zahedi et al., 2019), environmental protection in China (Shao et al., 2018), ecological compensation in China (Kong et al., 2014), donkey conservation in Ethiopia (Melak et al., 2020), and marine conservation in China (Yu et al., 2018). WTP itself includes non-use value, namely intrinsic value or the existence of an ecosystem that exceeds direct or indirect economic

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value. This value includes biodiversity, natural beauty, and cultural heritage associated with a particular ecosystem.
According to a 2019 land data survey from the Banjar Regency, agricultural wetlands or rice fields in Banjar Regency, for which an economic valuation was conducted, have an area of 60,862 hectares, as mentioned in Table 4.

Table 4. Survey on agricultural wetland condition in Banjar Regency in 2019

Land for rice field agriculture	Actual Year of 2019					
	Rice Planting			Not Rice Planting		Total (ha)
	1 x per year	2 x per year	3 x per year	other crops	No planting	
1	2	3	4	5	6	7
a. Irrigation rice field	4,988.00	115.00	-	-	354.00	5,457.00
b. Rain rice field	9,324.50	4,508.00	-	24.00	832.00	14,688.50
c. Tidal rice field	25,646.00	6,595.00	-	-	-	32,241.00
d. Low land rice field	7,572.00	404.00	-	70.00	429.50	8,475.50
Total of rice fields	47,530.50	11,622.00	-	94.00	1,615.50	60,862.00

WTP data itself is collected through a survey, a type of preference survey that involves collecting data by asking respondents how important it is for them to maintain or use specific natural resources in the context of land cultural heritage or natural existence. In this study, the preference survey is referred to as a household survey, which was conducted by distributing WTP questionnaires and short interviews with 75 WTP respondents from July to September 2020. WTP respondents in this study were non-agricultural property owners around the agricultural wetlands area who indirectly obtain environmental services from these natural resources and are aware of the existence of agricultural wetlands in everyday life. The research respondents were spread across three sub-districts in Banjar Regency. The sub-districts were determined as sampling locations, considering that they represent the distribution of wetlands and intensively agricultural wetlands in these areas, experiencing a conversion rate of agricultural wetlands. The total population of Banjar Regency in the year of 2020 was 565,635 people (BPS Banjar, 2021), as mentioned in Table 5.

Table 5. Characteristics of WTP Respondents

Group	Sub Group	Percentage (%)
Gender	Man	58.67%
	Women	41.33%
Education	Elementary School	26.67%
	Junior High School	24.00%
	Senior High School	16.00%
	Diploma	5.33%
	Undergraduate	25.33%

	Graduate	2.67%
Marriage Status	Not Married	17.57%
	Married	82.43%
Job Employment	Government Officer	9.00%
	NGO	0.00%
	Farmer	4.00%
	Employee	4.00%
	Businessmen	28.00%
	Trader	27.00%
	Others	28.00%
Salary/month (IDR)	< IDR.2 Million	48.00%
	IDR. 2 - 5 M	40.00%
	IDR. 5 - 10 M	10.67%
	IDR.10 - 20 M	1.33%
	IDR.20 - 50 M	0.00%
	> IDR 50 M	0.00%
Agricultural wetlands are essential for the environment	know	87.00%
	do not know	13.00%
	Others	0.00%
Agricultural wetlands are Not essential for the environment	know	72.00%
	do not know	28.00%
	Others	0.00%

The influence of demographic characteristics of respondents such as age, gender, marital status, education level, income level, number of dependents, and knowledge about the importance of agricultural wetlands related to food security and environmental functions on the amount of WTP was measured using multivariate analysis as mentioned in Table 6. The results obtained were R^2 of 0.212. This coefficient of determination shows that the factors above explain 21.2% of the WTP in the form of additional annual land tax payments related to efforts to maintain agricultural wetlands.

Table 6. Multiple Regression Test Results of Demographic Characteristics of WTP Respondents Against WTP

Description	Coefficients	Standard Error	t Stat	P-value
Intercept	71,649.322	109,354.76	0.655	0.515
Age	352.464	962.909	0.366	0.716
Gender	26,345.267	21,908.43	1,203	0.234
Education Level	4,081.249	8,231.07	0.496	0.622

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Marital Status	-75,399.752	33,122.60	-2.276	0.026
the number of dependents	11,089.602	8,921.60	1.243	0.218
Job level	- 2,761.562	5,744.03	-0.481	0.632
Income level	33,719.074	16,961.09	1.988	0.051
Knowledge for food	-5,500.995	34,459.40	-0.160	0.874
Knowledge for environment	-3,032.176	27,184.77	-0.112	0.912

Based on the results of multiple regression tests, namely analysis to measure the magnitude of the influence between two or more independent variables (factors) on a dependent variable, in this case, the influence of each demographic characteristic on the amount of WTP, the following results were obtained, namely for the factors of respondent's age, gender, level of education, number of dependents, income level have a positive influence on the amount of WTP that is willing to be paid because the coefficient value obtained is positive, for example every year the respondent's age increases will affect the amount of WTP paid, namely an increase of IDR 352.46.

There are also characteristics of respondents that have a negative influence, such as marital status, type of work, knowledge of the importance of agricultural wetlands as a food provider, and importance for the environment. The test results from the p-value column, namely the significance column, contained two variables with a significance <0.05, so they were rejected. Thus, marital status and income level had a significant effect on WTP.

Other factors such as age, gender, education level, number of dependents, occupation, and knowledge of the importance of wetlands do not significantly influence the amount of WTP paid. This explains that individuals who are unmarried or in another marital status may be more willing to pay more WTP. Likewise, the income level factor almost reaches the level of significance, which could indicate that the higher the income, the greater the WTP, detail as mentioned in Table 7.

The above conditions suggest that personal and economic living conditions may play a key role in individuals' economic decisions regarding the WTP value they place on agricultural wetlands. At the same time, other factors such as gender, age, and education do not show a strong and consistent influence. The results of these statistical tests are researched by Rizali et al. (2017) in determining the amount of WTP for clean air found that the characteristics of respondents significantly influenced the amount of WTP, thus indicating a relationship that requires further exploration in the context of wetland agriculture (Anshari et al., 2023; Rizali et al., 2017) as well as Tantri et al. (2022) in a study to investigate the influence of gender, age, and anthropometric data on popliteal block landmarks, presenting a research approach that considers various characteristics of respondents, which can be applied to study the determinants of WTP (Tantri et al., 2022).

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Table 7. WTP calculation for agricultural wetland at Banjar Regency

WTP offers (IDR)	Respondent	Total respondent	WTP Unit (IDR)	Total Banjar Population	Total WTP (IDR)
1	2	3	4 ((2 : 3) x 1)	5	6 (4 x 5)
25000	17	75	5,667	565,635	3,205,265,000
37,500	11	75	5,500	565,635	3,110,992,500
75,000	5	75	5,000	565,635	2828175000
125,000	2	75	3,333	565,635	1,885,450,000
375,000	4	75	20,000	565,635	11,312,700,000
39					22,342,582,500

The calculation of total WTP, which becomes LEHV, is as in Table 7 above, where the number of respondents who did not answer or refused to pay WTP or answered according to the increase in income was thirty-six respondents, or 48%. In comparison, those who chose a large WTP bid were thirty-nine respondents or 52%. Respondents who chose the WTP bid offered (bid) were given a weight of one, while those who did not or did not give an answer or answered according to the increase in income were given a weight of zero. The most significant frequency was for respondents who chose the IDR WTP bid. 25,000 at 17 and the smallest who chose the bid of IDR. ,125,000 is two. The largest WTP per bid is at the bid of IDR. 375,000, which is IDR. 20,000, and the smallest is at the bid of IDR. 125,000 with a WTP of IDR. 3,333. The average WTP bid calculated is IDR 39,500. With a total population of Banjar Regency of 565,635 people in 2020, the total WTP generated, or the LEHV of agricultural wetlands in Banjar Regency, South Kalimantan, is 60,862 hectares. On the assessment date 31 December 2020, they amounted to IDR 22,342,582,500.00 or IDR 367,102 per hectare.

The economic valuation method used to calculate the LEHV has the advantage of flexibility in that it can be applied to assess various environmental attributes, can be adapted to specific conditions related to the environmental problem being studied, and allows for measuring the economic value of environmental benefits or harms that cannot be measured directly through markets. The shortcomings of this method are related to validity, where it is difficult to ensure that respondents provide accurate and valid answers to questions about environmental values, as well as respondent answer bias due to the context of the survey and the way the questions are raised. The results of the CVM method are susceptible to differences in survey design and analysis methods used.

The LEHV has described the community's desire throughout Banjar Regency to maintain the existence of agricultural wetlands as the work or form of local wisdom of previous generations to survive in terms of food by changing the marginal land of tidal swamps in the river flood plains. Barito and the Martapura River have become productive rice fields, or agricultural wetlands, including local irrigation systems, called the Handil system, and local rice produced, leaving the agricultural wetlands to future generations (Wulandari et al., 2023).

A form of incentive for farmers or agricultural wetland owners from additional annual land tax payments or Rural and Urban Land and Building Tax from non-agricultural property owners in Banjar Regency based on input from the Household Survey result provided in Table 8. The

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most recommended incentives for farmers and agricultural wetland owners are in the form of (1). cash compensation to landowners, namely 46.7%, then in the form of (2). cash reimbursement and provision of fertilizer, medicine, and agricultural equipment amounted to 17.3%, (3). a combination of cash replacements, fertilizers, and medicines as well as agricultural equipment, reduced tax payments, improved trade systems, and improvements to the agricultural infrastructure of 17.3%, (4). %, a combination of providing fertilizer, medicine, and agricultural equipment and reducing land tax payments by 13.3% (5). A combination of cash replacement and improvements in the trading system for agricultural products of 4% and (5). incentives in the form of reduced land tax payments by 1.3%.

Cash reimbursement incentives for agricultural wetland owners and farmers reached 85.3% of all respondents' answers regarding incentives given as a single answer or combined with other incentives. This condition shows that rice farming, seen from the perspective of 96% of respondents, most of whom are not farmers, is not economically promising in the current agricultural system. The government and all related parties must immediately address this phenomenon by making improvements and providing incentives for farmers and agricultural wetland owners because a strong country is a food-independent country (Rusady et al., 2014; Turner et al., 2009).

Table 8. Incentive program recommended by WTP correspondence

No.	Incentive Program	Total	Percentage (%)
1	Cash reimbursement to landowners	35	46.7%
2	Fertilizer donations and other agricultural needs	13	17.3%
3	Improving the trading system for agricultural products	3	4.0%
4	Fertilizer donation and reduction in the amount of tax payments	10	13.3%
5	Reduction in the amount of land tax/retribution payments	1	1.3%
6	The combination of answers includes improving the infrastructure	13	17.3%
	Jumlah Responden	75	

CONCLUSION

The average WTP to maintain the agricultural wetlands in Banjar Regency is IDR 39,500, and the total WTP or LEHV an area of 60,862 hectares on assessment date 31 December 2020, economic valuation results using the CVM amounting to IDR 22,342,582,500.00 or IDR 367,102 per hectare. The LEHV above is the total WTP of the entire population in Banjar Regency in the form of additional annual land tax or land and building tax payment as a form of incentive for agricultural wetland owners or farmers to continue to maintain the existence of wetlands agriculture and pass on these natural resources to future generations.

The population characteristics that have the most considerable influence on the amount of WTP are marital status and income level. The most recommended incentive for agricultural landowners and farmers is cash compensation, which shows that rice farming, in its current

condition, cannot promise economic independence for farmers. What is interesting is that the burden of annual land and building tax on agricultural wetlands is one of the factors that becomes an obstacle in efforts to maintain agricultural wetlands. The Banjar Regency Government, as the annual land tax collecting authority, can conduct fiscal policy engineering to encourage farmers and agricultural wetland owners to maintain the existence of agricultural wetlands.

Acknowledgments.
Thanks to the Doctoral Program of Lambung Mangkurat University, Banjarbaru, for all the support and facilities. Also, thank the Maleimakuni family (Yuyun Purwaningsih, Kayla, Kanaya, and Kaiza) for their support during the research and reporting preparation.

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