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Community Participation and Willingness to Pay for Water Conservation and Development in Sipalay City River Watershed, Philippines

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Abstract
Aim: This study assessed the influence of socioeconomic factors on community members' willingness to pay (WTP) and participation in watershed conservation in Sipalay City, Philippines, to inform sustainable local watershed management initiatives.
Methodology: A mixed-method cross-sectional design was employed. Quantitative data were collected from 210 household heads across seven barangays using a structured questionnaire, while qualitative data were obtained from 21 key informants from government agencies and NGOs. Data were analyzed using descriptive statistics, binary logistic regression, and non-parametric tests (Spearman's rank correlation, Mann–Whitney U, Kruskal–Wallis H, and chi-square tests).
Results: Education level and marital status were significant predictors of both WTP and community participation. Despite limited economic capacity, residents exhibited voluntary engagement in conservation efforts. The findings suggest that targeted community education, economic support mechanisms, and multi-sectoral collaboration can enhance participation in watershed protection.
Conclusion: The study underscores the critical role of socioeconomic factors in shaping community-driven watershed conservation. Tailored local governance policies that integrate economic incentives and participatory strategies are recommended to strengthen sustainable watershed management in rural settings.
Keywords: *Watershed Conservation, Community Participation, Willingness to Pay, Socioeconomic Factors, Sipalay City*

INTRODUCTION

The need for effective watershed management in the Philippines has become increasingly urgent due to the combined pressures of climate change, urban expansion, and environmental degradation (Cacal et al., 2024). In response, the government has promoted community-based natural resource management (CBNRM), recognizing the crucial role of local communities in ensuring environmental sustainability and equitable governance (Pulhin et al., 2024; Carvajal et al., 2025). Encouraging active community participation not only strengthens environmental initiatives but also aligns with recent advocacies emphasizing the significance of research-informed, community-driven practices in local policy and management (Dulay et al., 2025).

Sipalay City in Negros Occidental exemplifies this interdependent relationship between watershed ecosystems and the communities they support. The Sipalay River Watershed, the city's primary water source, spans approximately 28,016 hectares and serves around 69,000 residents across fourteen barangays. Of this, about 18,712 hectares are classified as forestland. Co-management arrangements between the local government and the Department of Environment and Natural Resources (DENR) currently cover 169.54 hectares in Mambaroto and Cabadiangan. Such collaborative efforts reflect broader initiatives to balance environmental protection with community livelihood needs (Aranza et al., 2024).

Despite these efforts, the watershed continues to face pressing threats, including deforestation, soil erosion, pollution, and heightened demand due to population growth and industrial activity (Felipe et al., 2023). Climate change

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further exacerbates water scarcity and environmental instability, underscoring the need for adaptive and participatory strategies.

In this context, community participation has emerged as a key strategy for sustainable watershed conservation. Effective engagement enhances local ownership, builds social cohesion, and fosters long-term environmental stewardship (Engalgado, 2024; Calixtro, 2025). However, the level and nature of participation are often shaped by socioeconomic conditions, such as income, education, and livelihood opportunities.

The rationale of this study, therefore, is to explore the socioeconomic factors that influence community members' willingness to pay (WTP) and their involvement in conservation initiatives within the Sipalay River Watershed. By analyzing local awareness, economic constraints, and demographic factors, the study seeks to generate insights that support inclusive, community-centered approaches to watershed management.

Objectives

This study assessed community participation in water conservation and development in the watersheds of Sipalay City. Specifically, this study aimed to:

1. determine the level of awareness of the community's participation in water conservation;
2. measure the willingness to pay (WTP) of community members to contribute financially to conservation efforts; and
3. examine the relationship between socioeconomic factors and community participation in watershed management.

METHODS

Research Design

The study employed a mixed-method, cross-sectional research design to explore how socioeconomic factors influence community members' willingness to pay (WTP) and their participation in watershed conservation. Quantitative data were gathered through a structured household survey, while qualitative data were obtained from key informant interviews. This approach allowed for a comprehensive understanding of behavioral patterns, perceptions, and influencing factors, aligning with prior research emphasizing the value of integrating qualitative insights into quantitative frameworks for community-based environmental studies (Amihan & Sanchez, 2023; Sanchez et al., 2022).

Population and Sampling

This research was conducted in Sipalay City, Negros Occidental, involving 231 participants. Of these, 210 were household heads selected through systematic random sampling across seven barangays to ensure demographic and geographic representation. An additional 21 key informants were purposively selected based on their expertise and affiliations with government agencies and civil society organizations engaged in watershed management. This dual sampling approach is consistent with practices in community-engaged research, which emphasize the inclusion of both local stakeholders and institutional representatives to generate holistic findings (Pangilinan, 2025; Carvajal et al., 2024).

Instrument

The primary instrument for quantitative data collection was a structured questionnaire composed of both closed- and open-ended questions. The questionnaire included sections on demographic characteristics, awareness of water conservation efforts, willingness to pay for watershed protection, and participation in conservation activities. For the qualitative component, a semi-structured interview guide was designed to elicit insights from key informants regarding existing watershed programs, barriers to participation, and recommendations for enhancing community engagement. Both instruments underwent expert validation by environmental management professionals and academic researchers to ensure clarity, relevance, and content validity, reflecting best practices in educational and environmental research (Carvajal et al., 2025; Abenojar et al., 2025).

Data Collection

Data were collected from January to March 2025 across seven barangays in Sipalay City. For the quantitative component, a face-to-face household survey was conducted using a paper-and-pencil format. A total of 210 household heads were systematically selected to ensure representative coverage of the target communities. Surveys were personally administered by the researchers to maintain consistency and ensure immediate clarification of any ambiguous responses.

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For the qualitative component, 21 key informant interviews were conducted with representatives from local government units, the Department of Environment and Natural Resources (DENR), and non-governmental organizations (NGOs) involved in watershed management. Interviews were conducted in barangay halls, government offices, or other accessible venues. Follow-up visits were conducted in cases of unclear or incomplete responses, which enhanced data reliability and integrity (Sanchez, 2025).

Treatment of Data

Quantitative data were analyzed using descriptive statistics, including frequency, percentage, and mean, to describe respondents' demographic profiles and awareness levels. To assess willingness to pay, the mean, median, mode, and standard deviation were computed. Binary logistic regression was applied to identify significant predictors of WTP. Additionally, Spearman's rank-order correlation was utilized to examine the relationship between socioeconomic factors and community participation in watershed conservation.

Qualitative data were analyzed using thematic content analysis. Responses were categorized into key themes such as perceived barriers to participation, program awareness, and institutional support. Manual coding was employed to identify recurring patterns and to triangulate findings with quantitative results, enhancing the credibility of the study's outcomes (Carvajal et al., 2023).

Ethical Considerations

Prior to data collection, the researchers obtained formal approval from DENR-CENRO Kabankalan and the City Government of Sipalay through the City Environment and Natural Resources Office (ENRO). Permission was also secured from barangay chairpersons of the selected communities.

All participants were fully informed about the objectives, procedures, and scope of the study. Informed consent was obtained from all respondents, who were assured of the confidentiality and anonymity of their responses. Participation was voluntary, with no incentives provided, and no personal identifiers recorded. The study strictly adhered to ethical research standards, upholding principles of integrity, respect, and accountability, as highlighted in previous research emphasizing ethical rigor in community and environmental studies (Sanchez et al., 2024; Salendab & Sanchez, 2023).

RESULTS and DISCUSSION

This section presents the findings on the respondents' socio-demographic characteristics, levels of community awareness, willingness to pay for watershed conservation, and the relationship between socio-economic factors and community participation in Sipalay City.

Socio-Demographic Profile of the Respondent

The table below presents the socio-demographic profile of respondents from seven barangays within the Sipalay City River Watershed. Each barangay contributed an equal number of respondents (n = 30) to ensure balanced representation across the study area.

Table 1. Socio-Demographic Profile of the Respondents

Variable	Response	Frequency (n)	Percent (%)
Barangay	Nauhang	30	14.3
	Mambaroto	30	14.3
	Cabadiangan	30	14.3
	San Jose	30	14.3
	Manlucahoc	30	14.3
	Gil Montilla	30	14.3
	Camindangan	30	14.3
Gender	Male	93	44.3
	Female	117	55.7
Age	19 - 39 years old	63	30.0
	40 - 59 years old	99	47.1
	60 - 80 years old	48	22.9
Marital Status	Single	46	21.9

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	Married	152	72.4
	Widowed & separated	12	5.7
Educational Attainment	No formal education	28	13.3
	Elementary Graduate	90	42.9
	High School Graduate	73	34.8
	College & Post-Graduate	19	9.0
Occupation	Farmer	123	58.6
	Fisherman	9	4.3
	Government employee	15	7.1
	Business Owner & Private Sector Employee	11	5.2
	Others	52	24.8
Monthly Income	Php 5,000 and below	161	76.7
	Php 5,001 - Php 10,000	35	16.7
	Php 10,001 and above	14	6.7
Household Size	1 - 5 members	165	78.6
	6 members and above	45	21.4
Water Shortage Experience	Yes	44	21.0
	No	166	79.0

A total of 210 household respondents from seven barangays in Sipalay City were surveyed. Each barangay contributed 30 respondents to ensure equal representation. The majority were female (55.7%) and within the 40–59 age group (47.1%), followed by those aged 19–39 (30.0%). Most respondents were married (72.4%), and educational attainment was generally low, with 42.9% having completed elementary and 34.8% high school. Farming was the dominant occupation (58.6%), and a large majority (76.7%) earned ₱5,000 or less per month, indicating limited financial capacity for conservation contributions. These characteristics provide essential context for interpreting the community's engagement in watershed protection and their willingness to contribute financially.

These demographic patterns reflect a financially constrained community with strong agricultural ties, which may shape their capacity and approach toward watershed conservation. Studies by Carig et al. (2016) and Matso et al. (2024) noted that marital status and education level are positively associated with willingness to pay (WTP) for environmental services.

The awareness of the community's participation in water conservation.

The respondents' level of awareness regarding community participation in water conservation is shown in the tables below.

Table 2. Descriptive Statistics on Community Awareness in Water Conservation

Statement	***Mean***	***Interpretation***
1. Aware of watershed conservation programs in the community.	*3.40*	*Moderately Aware*
2. Understand the importance of protecting watersheds for a sustainable water supply.	*3.98*	*Aware*
3. Know about government programs on watershed protection.	*3.60*	*Aware*
4. Participated in activities like tree planting or river clean-ups	*3.90*	*Aware*
5. Believe that community participation is essential for watershed management.	*4.26*	*Aware*
6. Attended community meetings about watershed conservation.	*3.59*	*Aware*
7. Actively participate in discussions about water conservation in my community.	*3.60*	*Aware*
8. Aware of penalties for activities that harm the watershed.	*3.70*	*Aware*
9. Personally taken steps to conserve water at home.	*4.21*	*Aware*

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10. Encourage family and friends to participate in conservation activities.	*4.08*	*Aware*
Overall Community Awareness Participation in Watershed Conservation	***3.8305***	***Aware***

Legend: (4.50-5.00)-Highly Aware; (3.50-4.49)-Aware;(2.50-3.49)-Moderately Aware; (1.50-2.49)-Slightly Aware;(1.00-1.49)-Not Aware at all

This section presents the respondents' awareness levels regarding their participation in water conservation in Sipalay City. Table 2 summarizes responses to a 10-item awareness scale, capturing the community's knowledge, perceptions, and involvement in watershed conservation.

The overall mean score was 3.83, classified as "Aware," indicating a high level of environmental awareness among community members. The statement with the highest mean score, *"I think watershed management is because of community participation"* (M = 4.26), shows strong recognition of the vital role local communities play in protecting their watershed. Respondents also demonstrated personal commitment, reporting they conserve water at home (M = 4.21) and encourage family and friends to do the same (M = 4.08), suggesting a spillover effect of awareness through social networks.

Furthermore, respondents reported understanding the importance of protecting watersheds for sustainable water supply (M = 3.98) and actively participating in environmental activities like tree planting and clean-up drives (M = 3.90). Awareness of environmental violations and penalties (M = 3.70), attendance in community meetings (M = 3.59), and engagement in water conservation discussions (M = 3.60) also scored within the "Aware" range.

However, the lowest-rated item, *"Aware of watershed conservation programs in the community"* (M = 3.40), suggests gaps in communication and visibility of local initiatives. While general environmental knowledge is evident, specific awareness of formal programs or government-led activities is limited. This reveals the need for targeted community-level information dissemination and formal structures that strengthen visibility and engagement.

These findings echo those of Espectato et al. (2022), who reported that communities with higher trust in collaborative governance are more likely to participate in environmental programs. Komba (2023) emphasized the importance of timely access to conservation-relevant information, while Gagarin et al. (2022) argued that awareness alone is insufficient without active stakeholder engagement and program accessibility.

Qualitative feedback from respondents across all barangays reinforced this. In Barangay Gil Montilla, R155 noted the importance of *"stopping river dumping and practicing waste segregation,"* while R159 emphasized that "awareness about river cleanliness is key to encouraging community involvement." Similarly, in Nauhang, R12 stressed the need to *"always inform the community of programs or gatherings related to environmental concerns."* Similar sentiments were echoed in Manlucahoc and Cabadiangan, where calls for better education and consistent information dissemination were raised.

Key informant interviews supported the survey findings, highlighting that while awareness is present, participation is often limited and situational. Tree planting was the most common activity cited, with participation closely tied to program visibility, community leader mobilization, and scheduling. This aligns with Datuin (2024), who observed high awareness but weak behavioral follow-through in Laguna. Malabarbas and Celeste (2016) similarly emphasized that educational outreach is necessary to convert awareness into sustained conservation action. Internationally, Alam and Zakaria (2025) identified education and income as significant predictors of environmental awareness, implying the importance of considering socioeconomic barriers in designing local programs.

The willingness-to-pay of community members to contribute financially to conservation efforts.

This section presents the community members' willingness to pay (WTP) as a measure of their financial contribution towards conservation efforts in the Sipalay River Watershed.

Table 3. Willingness to Pay: Crosstabulation of the Barangay of the respondents

Barangay of the Respondents	***Php 50 and below***		***Php 51–100***		***Php 101 and above***	
	Number of Respondents (n)	***Average (Php)***	***Number of Respondents (n)***	***Average (Php)***	***Number of Respondents (n)***	***Average (Php)***
Nauhang	*22*	*12.50*	*4*	*100.00*	*4*	*0.00*
Mambaroto	*24*	*22.17*	*5*	*100.00*	*1*	*450.00*

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Cabadiangan	*27*	*18.75*	*3*	*100.00*	*0*	*0.00*
San Jose	*26*	*13.46*	*4*	*100.00*	*0*	*0.00*
Manlucahoc	*20*	*28.00*	*7*	*100.00*	*3*	*0.00*
Gil Montilla	*28*	*13.46*	*2*	*100.00*	*0*	*0.00*
Camindangan	*22*	*12.00*	*8*	*100.00*	*0*	*0.00*
Average Willingness to Pay (N=210)	***Mean= PHP 46.21***					

Table 3 presents This section examined respondents' willingness-to-pay (WTP) as a measure of financial support for watershed conservation in Sipalay City. The results illuminate the economic realities and the strong sense of responsibility of the local communities in contributing financially to sustainable environmental protection.

In the seven barangays, 80.5% of respondents expressed a willingness to pay ₱50 or less, indicating some concern about environmental sustainability, while a small 15.7% indicated a willingness to pay in the range of ₱51–₱100, and only 3.8% committed over ₱100, the highest at ₱1000. These results underscore the financial constraints of the respondents, with a mean WTP of ₱46.21.

Despite this, there were differences at the barangay level in how participants responded. For instance, Camindangan and Manlucahoc had a heavier density of respondents willing to pay more than ₱50, while Gil Montilla, San Jose, and Cabadiangan responded mostly within the ₱50-and-below level. Notably, 30% of respondents (63 individuals) reported that they were not willing to pay at all, and often attributed this to being in poverty, unemployment, and a more general belief that it was the government's responsibility to protect the environment.

These results are in line with earlier studies. Agudilla et al. (2022), Guila et al. (2024), and Carig et al. (2016) explored WTP within watershed services and both reported that many individuals in the Philippines were often willing to pay for these services, but limited the amount they could contribute due to financial capacity.

The qualitative responses supported the quantitative measures. For instance, an elderly participant in Mambaroto indicated they were willing to pay only ₱10 due to their low income. In Nauhang, one person offered ₱1,000 because they were committed to protecting the environment. Another person in Camindangan offered ₱5, but highlighted their role as a volunteer, emphasizing the community's shared sense of identity in non-monetary contributions.

While the WTP overall was modest, the results present a platform of civic duty to be developed with awareness campaigns contextualized to the community, livelihood support, and incentives for action. As Matso et al. (2024) suggest, WTP is often related to perceived benefits, trust in the organization tasked with leadership support, and institutional capacity; these considerations ought to be treated with greater immediate relevance in future watershed financing models of Sipalay, to consider place and people's experiences.

The Relationship of Socio-Economic Factors and Community Participation to Watershed Conservation

This table presents the correlation analysis between socioeconomic factors (such as income, education, and type of work) and the level of community participation in watershed conservation in Sipalay City.

Table 4. The result of the influence respondents' willingness to pay for the water conservation

Relationship Between Variables	***Rho***	***P-Value***	***Decision for Ho***	***Conclusion***
Relationship Socioeconomic Factors and Community Participation in Watershed Conservation	*0.339*	*0.000*	*Reject Ho*	*Significant*

This table the Spearman's rho correlation coefficient was r = 0.339 with a p-value of 0.000, indicating a weak but statistically significant positive relationship. This result suggests that improvements in socioeconomic status — such as higher income, better education, or more stable employment — are associated with a slight increase in participation in watershed conservation. Despite the weak strength of correlation, the significance level ($p < 0.05$) confirms that the relationship is unlikely due to chance. This indicates that while socioeconomic status influences participation, it is not the sole determining factor. Other variables, such as institutional presence, program visibility, and access to infrastructure, are also crucial.

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The findings support those of Tesfaye et al. (2018), who found that community-based watershed programs in Ethiopia led to improved environmental and socioeconomic outcomes, which in turn increased community engagement. Similarly, Naji et al. (2023) emphasized that long-term community involvement in watershed conservation is closely linked to infrastructure and institutional support. This aligns with responses from Sipalay City, particularly in Barangays Mambaroto, San Jose, and Camindangan, where local governance plays a vital role in community mobilization.

Qualitative responses further illustrate the importance of socioeconomic conditions. In Mambaroto, participants emphasized the need for dikes to protect agricultural land from flooding, critical to sustaining livelihoods. In Manlucahoc, R1 identified the necessity for water storage tanks during dry seasons. Respondents from San Jose (R5, R14, R28) noted that poor road and bridge conditions restricted participation in environmental efforts. In Gil Montilla, R153 cited persistent water shortages, while R171 raised concerns about quarrying, linking environmental degradation with economic vulnerability.

In Camindangan, R186 reported the absence of household water connections, despite city-led programs. Other respondents highlighted sanitation problems, such as open defecation near rivers, which threaten both health and watershed sustainability. R123 in Manlucahoc cited low agricultural yields, and R100 in San Jose reported lack of electricity in remote areas, hampering community participation.

Key Informant Interviews (KIIs) validated these insights, revealing that households with direct livelihood dependency on the watershed (e.g., farming, fishing) tended to be more actively engaged in conservation. On the other hand, economically disadvantaged barangays with limited infrastructure and weak institutional access reported lower involvement.

Despite the weak correlation, the statistical significance underscores that socioeconomic status does play a role in shaping participation. However, addressing socioeconomic conditions alone is insufficient. A comprehensive and integrated strategy is needed to foster consistent community engagement. This should include:

- Livelihood support and diversification
- Capacity-building and training programs
- Provision of infrastructure (roads, water, sanitation, electricity)
- Information campaigns and school-based environmental education

Such an approach is supported by Pulhin et al. (2024), who argue that community-based conservation must be grounded in social justice and equity. Likewise, Engalgado (2024) in Panabo City and Mandugay et al. (2022) in Davao City emphasized the role of leadership, education, and institutional support in overcoming barriers to participation.

Conclusions

The research showed that while community knowledge of watershed conservation in Sipalay City is generally high, there is a lack of specific local program knowledge. Most of the respondents were willing to pay for conservation efforts; however, payment capacity is a limitation, since most can afford ₱50 or less. The study also drew a weak but significant correlation between socioeconomic status and the willingness to participate, suggesting income, education, and employment have some influence on willingness to participate. However, other aspects that limit engagement in conservation efforts, such as lack of infrastructure, limited institutional presence, and environmental issues that are local, also have a significant impact on willingness to be involved, especially in barangays such as San Jose, Mambaroto, and Camindangan.

Recommendations

In order to increase engagement, it is suggested that the city provide more locally focused information campaigns and increase program visibility through community assembly, youth, and school participation. These strategies not only inform but also empower the community, making them integral to the conservation efforts. It is equally important to provide stronger institutional support, address and improve needed infrastructure, and offer livelihood incentives focused on conservation—having a WTP scheme that is flexible, based on both monetary and non-monetary notions, will also help. Finally, conservation strategies must be contextualized and inclusive as well in order to deal with common socioeconomic barriers while looking towards environmental solutions.

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