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Assessing residents willingness to pay and participate in tree planting at Brgy. Diegas, Basilisa, Province of Dinagat Island

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Abstract

The study aims to assess the residents' willingness to pay and participate in tree planting activities in Brgy. Diegas, Basilisa, PDI. There are 295 random participants or respondents who had been interviewed in Brgy, Diegas with a total of 174 males and 121 females respectively. With the frequency and percent distribution across their demographic profile ages 21-30 had 43%, 31-40 had 39%, and 40 above which is 18% with this there are many of the ages 21-30 years old had been interviewed in the said Barangay. In the willingness to donate for tree planting the respondents wish to donate Php 21.00 – Php 40.00 which there are a total of 227, while there are also willing to donate Php 1.00 – Php 20.00 around 11 respondents, and Php 41.00 – Php 60.00 with the total of 14 respondents and also a total of 43 respondents who are not willing to donate for tree planting activity. For the willingness to participate for tree planting there are 89 or 30% respondents who are not willing to participate for tree planting on the other note out of 295 respondents there are 206 or 70% who are willing to participate in tree planting with a duration of 1-2 hours. In more particular observation not all respondents are willing to participate and to donate at the same time because there are 175 respondents or 59% that are willing to participate in tree planting but not willing to pay or donate.

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Introduction

The rapid urbanization has put the urban and rural ecosystem under the pressure of biodiversity loss, environmental pollution as well as habitat destruction (Tian *et al.*, 2020). There is plenty of evidence indicating that many important ecosystems are facing threats of degradation mainly attributed to human activities (Deng *et al.*, 2017). A forest is considered as one of the most productive ecosystems in the world because of its well-established ecological, economic, and cultural importance. Deforestation in tropical developing countries accounts for around 6% 17% of global anthropogenic CO_2 emissions (Bakaki and Bernauer, 2016). Tree planting provides several goods and services (Liu *et al.*, 2018), and has been perceived as a cure for biodiversity loss, and climate change including ecosystem loss (Folkard-Tapp *et al.*, 2021). Planting trees vastly improves the quality of our natural surroundings and increase the resilience of ecosystems, help minimize climate change effects, and buy people and governments time to adapt to changing conditions. According to Rafiq *et al.* (2016) that urbanization is set to take place mainly in developing countries, but has several benefits including productivity growth and industrialization (Wu, 2015), and higher returns on investment from education (Xing, 2016).

Urbanization has many positive effects on the economy and society, but in the years to come, maintaining liability and sustainability in cities will require putting residents' needs first and putting a strong emphasis on protecting and preserving the environment (Wheeler and Beatley, 2014). People's perception is known to influence WTP for a variety of goods and services (Barnes-Mauthe *et al.*, 2015; Kenter *et al.*, 2016).

Dinagat Island is an extension of Mindanao's northeastern mountains which during the Pliocene epoch, formed an island apart from the rest of Mindanao (1986), and the third largest Island in Mindanao biogeographic sub-region (Lillo and Fernando, 2017). According to reports, Super Typhoon Odette was one of the worst natural catastrophes to ever strike the world in 2021. Dinagat Islands was one of the islands in the Philippines that experienced vast destruction in our natural resources. This study can give the importance to the community, because they could contribute substantially to the quality of rural life and social welfare through the provision of an array of biological, aesthetical, environmental, and cultural benefits. This survey result may find utility in crafting more effective support maintenance for tree planting activity to preserve the community in the future generation.

Materials and methods

Description of the study area

It is located at approximately 10° 5' North, 125° 36' East (Fig. 1). Its population as determined by the 2020 Census was 1,252. This represented 3.39% of the total population of Basilisa, Province of Dinagat Island. The said location of Brgy, Diegas Basilisa Dinagat Islands is known to be hot, oppresive and overcast. Over the course of the year, the temperature typically varies from 76°F to 90°F and is rarely below 74°F or above 90°F. The soil of Dinagat Island has a pH range of 4.8 to 6.9, with an average organic matter of 2.25% and phosphorus levels of 1 to 37 pppm. The majority of the soil is classed as Dinagat clay loam (70%), with the remaining 20% being classified as Cabatohan loam and the remaining 10% as Bolinao clay (Haribon, 2004).

Sampling technique and sample size

Probability sampling is appropriate for quantitative research as compared to non-probability sampling. In determining the sample size, the Cochran formula was used in the study. Based on the information gathered with the assistance of the barangay captain and secretary, Barangay Diegas had a total of 1,252 population, the data is based on the population record of the barangay in the year 2020. With that, there were about 295 respondents in the study and they were randomly selected. Pretesting and a pilot study were conducted to enhance the quality of the constructed questionnaire.

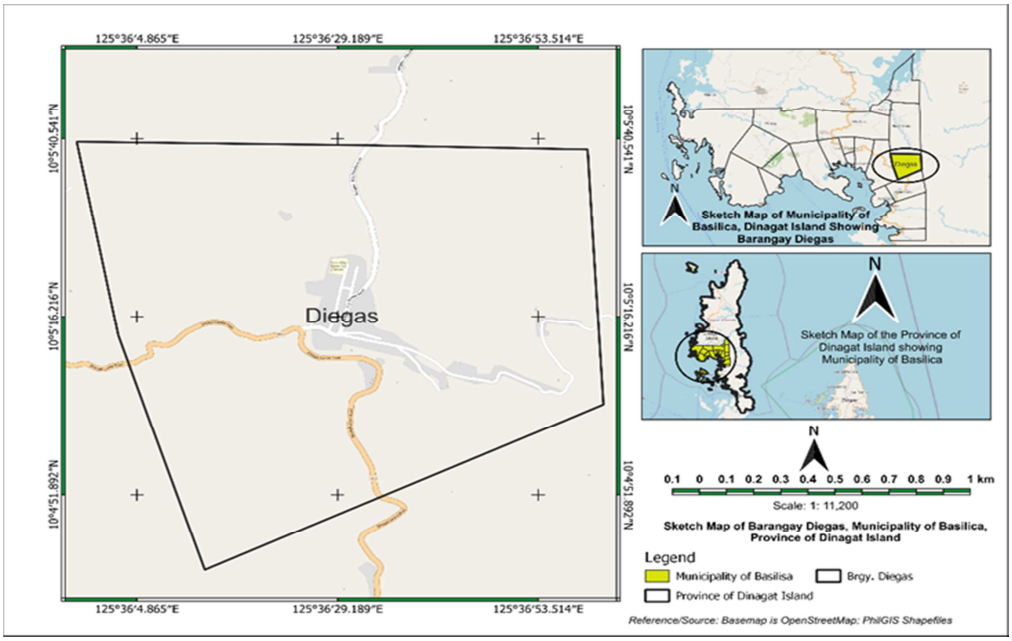

Fig. 1. Location of the study area in Brgy, Diegas, Basilisa Dinagat Islands

Data collection

The primary data were gathered via face-to-face interviews. Moreover, secondary data were collected from the Barangay hall office in the study area. The questionnaire was administered in two sections. The first section incorporates information about the demographic profile of the respondents, and their willingness to pay and participate. The second section contains the respondents on their not willing to pay but are willing to participate in tree-planting activities. The enumerators of the study were well trained and they were employed to gather the data required for this study.

Statistical analysis

The data collected was analyzed using the frequency and percentage, and chi square test. This kind of method used graphs to summarize the data; the results were tabulated and subsequently analyzed by using the Jamovi Statistical Tool. The result was compiled by summarizing the total number of responses for each answer and expressing this value as a percent of the total number of responses for the question. After summarizing, each data was placed together in a single graph emphasizing the results through percentages.

Results and discussion

Respondents' demographic profile

Table 1 shows the demographic profile of the respondents in Brgy, Diegas Basilisa Dinagat Islands using the frequency and percent distribution with a total of 295 respondents who had been randomly interviewed. Based on the data provided there are 8 major categories that can be seen in the table namely, age, gender, ethnicity, food expenses, marital status, occupation, religion, and residency. It can be observed that 43% (127) of the surveyed respondents are aging 21-30 years old are being interviewed by the researcher. The remaining percentage shares of 39% (115) and 18% (53) correspond to the respondents with ages falling within 31-40 and above 40, respectively.

The Table 1 revealed that in terms of age, 21-30 years old possesses a larger group of participants and 40 above possesses smallest group of participants respectively. In terms of sex, 59% (174) are male and 41% (121) female are being interviewed randomly but this will not possess significant difference or relationship in selecting the respondents. The participants are dominated by Cebuano as evidenced by the largest percentage chunk of 97% (286) in which it is the main verbal language they were using.

Table 1. Frequency and percent distribution of respondents across demographic profile

Profile variables	Frequency	Percentage
Age		
21-30	127	43%
31-40	115	39%
40 and above	53	18%
Total	295	100%
Gender		
Male	174	59%
Female	121	41%
Total	295	100%
Ethnicity		
Cebuano	286	97%
Tagalog	8	3%
Others	1	0%
Total	295	100%
Food Expenses		
5000-10000 a month	295	100%
Total	295	100%
Occupation		
Farmer	80	27%
Government Employee	128	43%
Driver	30	10%
Housewife	57	19%
Total	295	100%
Marital Status		
Single	65	22%
Married	104	35%
Widow	23	8%
Separated	10	3%
Live-in	93	32%
Total	295	100%
Religion		
Catholic	224	76%
Iglesia ni Christo	58	20%
Others	13	4%
Total	295	100%
Continuation		
Residency		
1-10 years	95	32%
11-20 years	94	32%
21-30 years	44	15%
31-40 years	47	16%
41 and above years	15	5%
Total	295	100%

Noticeably, all respondents (100%) that they spent Php 5,000.00 to Php 10,000.00 as their monthly food and expenses in which it provides the insights into their financial capacity to donate. As to employment, 43% (128) are Government employees, 27% (80) are farmers, 19% (57) are housewives, and 10% (30) are drivers, these respondents' occupation represents their employment status and the nature of their work. It provides insight into their professional backgrounds and potential links between occupation and willingness to pay or donate.

Further, Table 1 percentage shares 35% (104) for married, 32% (93) for live-in, 22% (65) for single, 8% (23) for widow, and 3% (10) for separated, with these data marital status can possibly affect lifestyle choices, financial considerations, and social support systems, which may influence willingness to pay and participate for tree planting (Rendall *et al.*, 2011). In religion, majority or 76% (224) are catholic and 20% (58) INC or Iglesia ni Cristo members, it varies the participants religious affiliation or belief system and can shape environmental attitudes and behaviors including views and stewardship, responsibility towards nature, and the importance of environmental conservation. In addition, a cumulative of 64% (189) respondents have been living or residing in the area within 1-20 years already and 36% (106) respondents residing at 21-40 years above which we call (LUMADS) lumad is a Bisayan term meaning native or indigenous people who are living or born in the area without transferring to another place (Indigenous Cultural – Konrad – Adenauer- Stiftung).

Statistically the data on the profile of the study reflect the demographic and economic characteristics of the participants that might influence in their understanding about the importance of tree planting and other environmental conservation activities. Understanding the demographic profile of the participants allows for a comprehensive analysis of how these may influence willingness to pay or donate and participate in tree planting. It helps to identify any pattern or differences in attitude and behavior across different demographic groups, contributing to a better understanding of the research findings.

Respondents' willingness to pay and to participate for tree planting

Public participation and economic valuation of environmental services (ES) has emerged as a new and more direct approach to enhance the conservation of tree resource in urban areas (Garekae *et al.*, 2016; Ives *et al.*, 2017). Fig. 2 displays the graphical distribution of the respondents when grouped according to their willingness to pay through donation for tree planting activity.

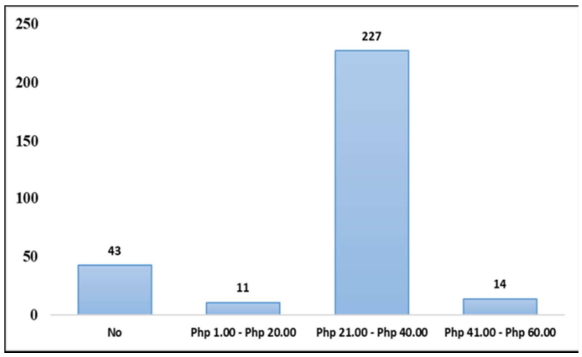

Fig. 2. Willingness to donate for tree planting activity

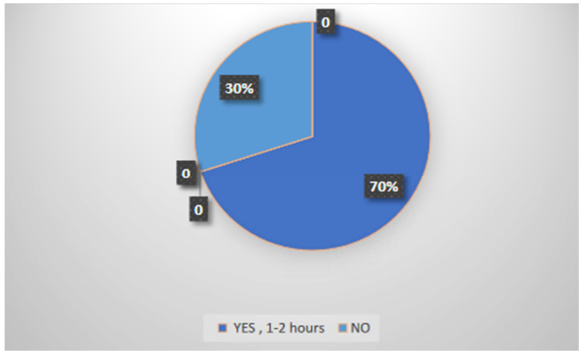

Fig. 3. Willingness to participate in tree planting activity

It can be gleaned from the table that 43 out of 295 respondents are not willing to pay or to donate for tree planting activity. On the other note, 227 or 77% of the participants are willing to donate by around Php 21.00-Php 40.00. A similar study of Arabomen *et al.* (2019) Most of their respondents (70%, n = 227), irrespective of their socioeconomic profiles, were willing to make financial contribution to conserve trees as opposed to the 30% (n = 98) who were unwilling. Willingness to pay (WTP) is a measure of preference that provide information to guide policy development (Ansong and Roskaft, 2014). It can also be noticed that 14 and 11 respondents expressed their willingness to donate an amount of Php 1.00 – Php 20.00 and Php 41.00 – Php 60.00, respectively. This shows that there is a generally positive willingness to pay or donate in the people of Brgy, Diegas. People recognize the importance of trees in mitigating climate change, improving air quality, conserving biodiversity and providing various ecosystem services. As a result, they are willing to support tree planting initiatives through financial contributions. These findings only imply that the study participants gave importance to tree planting activity. Other studies have documented that positive perception about trees is widespread among the general public (Barro *et al.*, 2007; Lohr *et al.*, 2004; Wendel *et al.*, 2012). This might be explained by the fact that most respondents have experienced the changes in the environment through time where trees are diminished and being destroyed. The exposed willingness of the participants are opportunities for the local officials to take advantage of this while saving the environment against the threat of climate change.

Fig. 3 shows a pie chart representation of the respondents when categorized according to their willingness to participate in tree planting activity. As shown in the same figure, 89 or 30% of the participants said that they are not willing to participate in tree planting activity. On the other note, 70% or 206 out of 295 expressed their willingness to participate in the same activity at a range of 1-2 hours. These statistical findings indicate that majority of the residents in the area of Brgy, Diegas willingly to participate for tree planting with the duration of 1-2 hours it implies that in participating for tree planting it can offer them various benefits, including a sense of connection with nature, personal satisfaction in contributing environmental conservation. Additionally, participating for tree planting also can foster a sense of ownership and stewardship among individuals, leading to long-term commitment to environmental sustainability. In a more particular observation, not all respondents who are willing to participate are willing to donate at the same time. Table 2 clearly shows that there are 175 or 59% of the respondents who are willing to participate in tree planting but not willing to pay or donate in the same activity. This situation might be linked to economic reasons, across the demographic profile of the respondents considering that the population of the area is dominated by the low-income households. It was supported by the study of Sharif *et al.* (2021) that there is positive coefficient value of income suggested that households with higher incomes had a greater willingness to donate for forest conservation and management.

Table 2. Frequency and percent distribution of respondents who are willing to participate in tree planting but not willing to pay

Time to spend	Frequency	Percentage
1-2 hours	175	59%

Relationship between the demographic profile and the willingness to pay and willingness to participate

Table 3 shows the correlation results between the demographic profile against the willingness to pay and willingness participate in tree planting activities. It can be observed from the table that among the profile variables, only age has significant result to the willingness to pay and willingness to participate in the tree planting activity. It was supported by the study of Sharif *et al.* (2021) indicating that the idea of enhancing conservation efforts, age, and income had a significant relationship with the willingness to donate. This is supported by the p-values of 0.013 and 0.004 (lesser than 0.05) as showcased in table 3. Further, Pearson R values are positive. This means that those who belong to higher age categories displayed higher willingness to pay and participate for tree planting activity. On the other note, other variables such as ethnicity, gender, marital status, religion and occupation do not show any significant relationship against willingness to pay and participate as evidenced by the p-values that are larger than 0.05.

Table 3. Correlations between the demographic profile and the willingness to pay and willingness to participate

Dependent variables	Statistics	Age	Gender	Ethnicity	Occupation	Marital status	Religion	Length of residency
Willingness to pay	Pearson's R	0.144	0.001	-0.071	-0.004	0.101	-0.118	-0.046
	p-value	0.013	0.995	0.225	0.943	0.083	0.084	0.432
	Remarks	S	NS	NS	NS	NS	NS	NS
Willingness to participate	Pearson's R	0.166	0.023	-0.037	0.044	-0.03	-0.009	-0.083
	p-value	0.004	0.699	0.532	0.447	0.606	0.878	0.156
	Remarks	S	NS	NS	NS	NS	NS	NS

According to Sabyrbekov *et al.* (2020) the assessment of the value of green spaces would benefit from combining monetary and non-monetary approaches under various institutional contexts; and that this would be particularly important for cities in developing countries. However, the study of Bani and Damnyag (2017) stresses out that the respondents are also willing to pay for the provision of supporting ecosystem services for non-profit motive.

Conclusion

The study was to determine the residents in Brgy. Diegas, Basilisa, Province of Dinagat Islands willing to pay and participate in tree planting activities. 295 respondents were randomly identified. The results show that age has been found to influence the willingness to pay and participatein tree planting. The majority of the respondents (43%) are aged 21-30 years old and the remaining corresponded to the respondents ages between 31-40 years old and above respectively. The results revealed that in terms of age, 21-30-year-oldspossess a larger group of participants and 40 and above possess smallest group of participants respectively. The older respondents tend to show a higher inclination to engage in environmental initiatives like tree planting. Other variables such as ethnicity, gender, marital status, religion, and occupation do not show any significant relationship against willingness to pay and participate.

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