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Socio-economic component, coastal resource use and perception, and participation of the coastal communities/fishing households in San Jose, Gonzaga, Cagayan

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Abstract

The study generally identified and analyzed the socio-economic status, coastal resource use, and perception and community participation of coastal communities of the community of San Jose in Gonzaga, Cagayan. The research conducted interviews based on questionnaires and used a descriptive survey as the research design. Thirty-seven respondents were interviewed and most of them are members of San Jose Fisher folk Association. It revealed that most have low levels of education, with fishing as the main source of income for the residents. This dominance of fishing is a major economic factor contributing to the income of the community. The fishing activities are not only limited to marine waters but also to estuary areas where mangroves thrive. Meanwhile, due to climate change and resource-dependent communities, today, benefits derived from coastal environments are limited since there were some changes observed in fishing ground location, the volume of catch, size of fish, coral reef, mangroves, and beaches. Generally, it implies that a full understanding of socio-economic characteristics, coastal resource use, and perception of the coastal community of Barangay San Jose play important roles in the coastal resource restoration and management plans. Also, these help to understand the underlying causes of degradation and interventions needed in the community.

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Introduction

Mangrove forest is considered a highly productive ecosystem that offers important economic and ecological goods and services (Zakaria and Rajpar, 2015). It is a natural barrier to reduce the devastating impact of natural disasters such as tsunamis, typhoons, and storm surges. Also, it provides breeding and nursing grounds for marine and pelagic species and helps stabilize shorelines. Other ecological benefits are providing medicine, food, building materials for local communities, and fuel. In the country, the current estimates of mangrove forest are less than half of what it once was and this remaining is in a degraded condition. These forests are the least concerned and often over-utilized by human communities (Haritha *et al.*, 2017) and the continued decline of the forest is caused by conversion to aquaculture, agriculture, tourism, urban development, and deforestation. Mangrove forest has been declining at a faster rate as compared to coral reefs and inland tropical forests.

In Cagayan, there are 3,967.9 hectares of mangrove area which are distributed throughout the municipalities of Aparri, Calayan, Abulug, Buguey, Gonzaga, Claveria, Sta. Ana, Pamplona, Santa Teresita, and Sanchez Mira (EQ. Pasion; BT. Tumaliuan, 2015). Mangrove area harbors at least 14 species of true mangrove and this is 35% of the country's mangrove plant species. Particularly, in Gonzaga, the status of the mangrove forest is poor with an average of 25% living mangrove. Most of the areas manifested heavy erosion, severe cutting, and siltation particularly observed in Barangays San Jose and Caroan, where the largest tracts of mangrove forest in the municipality are located (Pasion and Tumaliuan, 2015). The degradation of mangrove forests possesses negative consequences on ecology, disaster preparation and control, livelihood, biodiversity, livelihood, and the living condition of people in coastal areas. With this, restoration and conservation of mangrove forests in these coastal communities are essential. According to Lewis (2009), successful mangrove forest restoration requires careful analyses of a number of factors in advance of attempting actual restoration. A wide variety of restoration techniques have been developed; however, the most critical point is to fit restoration efforts with the local biological and physical settings, selecting the right location and the right species (Lavieren *et al.*, 2012). The ecological aspects of mangrove restoration must also be coupled with considering the local community that has specific socio-economic conditions. A full understanding of the socio-economic status of the community can help the goal of restoration and can guide the management plans of the study. Interviews with local people may help to understand what are the underlying causes of degradation-even to researchers from exact sciences these socio-economic surveys are very important, as they are the only source of retrospective information. The study identified and analyzed the socio-economic status and ecological status of coastal communities of Barangay San Jose in Gonzaga, Cagayan, Philippines, and their dependency on the floral and faunal resources of water. This baseline and ecological information are a basic and prerequisite tool that can be incorporated into a resource management context by recommending interventions that address the underlying factors behind coastal resource degradation.

Materials and methods

Methods

Study Area

The area of the study is Barangay San Jose, Gonzaga, Cagayan, Philippines. Barangay San Jose is one of the barangays in the municipality of Gonzaga, in the province of Cagayan. Geographically, it is situated at approximately 18°21' 20.88" north latitude and 122°7' 24.96" east longitude, on the island of Luzon (San Jose, 2021). The location of Barangay San Jose within the municipality of Gonzaga is shown in Fig. 1. This study area is selected based on the presence of large tracts of mangroves within the area.

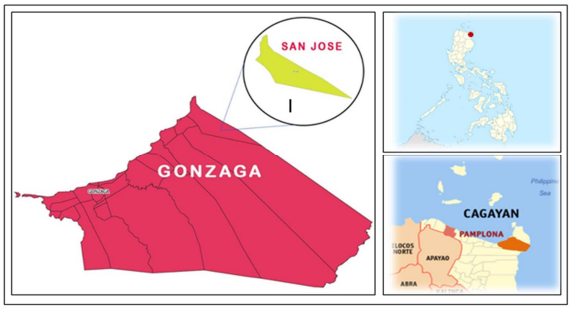

Fig. 1. Location map of Barangay San Jose in Gonzaga, Cagayan, Philippines.

Data collection

Thirty-nine respondents in the community of Barangay San Jose were interviewed to elicit information on coastal resource use and status, socio-economic status, and other issues relating to coastal resource management. The study determined and assessed the socio-economic data such as age, educational and marital status, economic income, source of income, housing, household and productive assets, and fishing gear owned. The study determined also how respondents use their coastal resources and what are their observations on fishery resources and other coastal resources in the area, specifically on the volume of fish caught per trip, the status of fishing ground location, size of fish, the composition of the catch, mangrove area, seaweed area, sea grass bed, beaches, and coral reef area five years ago and today.

Research Design and Analysis

The study conducted interviews as shown in Fig. 2 based using questionnaires to obtain information and data on the coastal resource use, socio-economic component, and participation of coastal communities of Barangay San Jose, Gonzaga, Cagayan. Descriptive statistics and the use of frequency analysis were used as research designs in the analysis of the data. The data were collected and analyzed in terms of frequency and number or percentage and these are used as the basis for ranking the responses. Fifty percent of the fishing households served as sample sizes.

Fig. 2. Conduct interviews with the local community.

Results and discussion

Thirty-seven individuals from the coastal community of Barangay San Jose were interviewed and most of them are members of the San Jose Fisherfolk Association. This association is headed by Mr. Vivencio Agcaoili.

Social Profile of the Community of Barangay San Jose

Age and Marital Status

The respondents are grouped by age and the data showed that the majority belong to age groups of 33 years to 40 years. Most were locals in the area being surveyed. Respondents at these ages and also years of stay in the area have enough knowledge to respond to the questions implying the reliability of the data collected. In marital status, 94.59% of respondents are married and the remaining 5.40% of respondents are single. On the other hand, respondents are not represented in other marital states such as a single parent, widow or widower, common-law marriage (live-in), and separated persons.

Educational Status

In terms of highest educational attainment, 43.24% of respondents have an elementary level of education, followed by 21.62% who graduated from high school level and 21.62% who did not graduate from high school level. Meanwhile, 8.11% of the respondents graduate from the elementary level, 1% did not graduate college level, and 1% graduated vocational. This data imply that respondents generally have a low level of education which is elementary level.

Economic Profile of the Community in Barangay San Jose

Source of Income and Economic Income

The source of income and monthly income are very important aspects of the economic profile of respondents. Based on the Philippine Standard Occupational Classification by PSA (2012), all respondents of the study are classified as skilled agricultural, fishery workers, and forestry. Fig. 3 shows the specific tasks performed by the respondents in Barangay San Jose. According to PSA (2012), skilled agricultural, fishery workers, and forestry grow and harvest field or tree and shrub crops, breed, gather wild fruits and plants, produce a variety of animal husbandry products, tend or hunt animals, cultivate, breed or catch fish, conserve and exploit forests, and cultivate or gather other forms of aquatic life in order to provide shelter, food, and income for themselves and their households. It was observed that fishing is the main source of income for 62.5% of respondents. It can be noted that generally,

respondents are fisher-folks in which fishing is their major occupation. FAO (2016) tells that these respondents are considered full-time fishers since they receive at least 90% of their livelihoods from fishing or devote at least 90% of their working time to that occupation (Tietze, 2004). As to age, fishing is carried out by 23.53% of respondents in the 38-45 age groups. The dominance of fishing implies that the barangay is a coastal community and fishing is a major economic factor that contributed to the income of the community. Aside from fishing as a livelihood of respondents, there are 14.3% of respondents engaged in farming, 10.7% in livestock rising, 8.9% in fish processing, and 3.6% in fish trading.

In terms of economic income, the majorities are engaged in fishing and have a monthly income ranging from ₱500 to ₱3,749. The monthly income of the majority is below the poverty threshold of Php 10, 481.00 for the year 2019 (PSA, 2020). This implies that fishers are making just enough money to meet household and family living expenses.

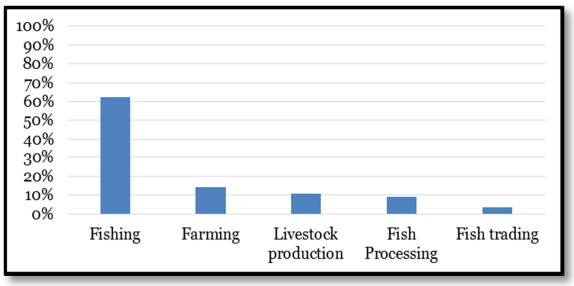

Fig. 3. Occupations of the respondents in Barangay San Jose.

Housing, Household, and Productive Assets

The respondent's profile in terms of housing, productive assets, and household by identifying their type of building/house, tools/equipment owned in farming, construction materials of the outer wall and construction materials of the roof, household items owned, land ownership status, and water source. In terms of house type, all respondents live in a single-typed house, the majorities have mixed but predominantly light materials of construction materials on the house's roof, and the majorities have mixed but predominantly permanent materials on the house's outer wall. Among respondents, the majority owned their residence. Meanwhile, the common household items of the respondents are wood stove, gas stove, radio, TV, gas stove, boat, antenna/satellite disc, refrigerator, engine (for boat), DVD player, and vehicle/motorcycle.

Fishing gear owned

In terms of fishing gear used in fishing activities, Fig. 4 shows that the hook and line (53.3%) and gill net method (46.7%) are the two fishing gears used by the respondents in capturing fish from marine waters. These are devices characterized by the absence of gear movement of the target fish species or known as passive fishing gears (https://www.bfar.da.gov.ph). According to SEAFDEC, gill net and hook and line methods are the most productive fishing gear in municipal water. Meanwhile, the commonly caught fish species is sword fish "blue marlin" using hook and line method and gill net method

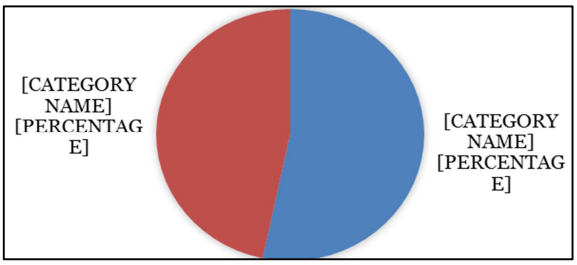

Fig. 4. Fishing gear used by the respondents.

Coastal resource use, perception, and participation of coastal community

Mangrove-based activities

The fishing activities are not only limited to marine waters, but also to the estuary where mangroves thrive. Among the 37 respondents, 13 are engaged in fishing in mangrove waters using the gill net and hook and line methods. This indicates that mangrove resources provide also a source of livelihood and food to the community since these resources are valuable habitats for shellfish, fish, and crustaceans, particularly shrimps and crabs. The same finding was observed in the finding of Eaton *et al.* (2009), in which mangroves are used also as the source of fish, crabs, and shrimps by some community members (E. Eaton *et al.*, 2009).

According to the respondents, mangrove cutting is the main factor that may affect mangrove forest areas. The culture of mud crab and fish in mangrove areas could be also the source of livelihood for the community near the area, considering the biological, physical, and chemical characteristics of mangrove waters in Barangay San Jose observed in the study of Pacris *et al.* (2020).

Problems and conflicts affecting coastal resources

In fisheries management issues, all of them are not aware of generic issues such as intensified resource use competition and conflict, unrealized potential of aquaculture and commercial fisheries, and degraded fishery habitats, and institutional issues such as inadequate/inconsistent fisheries policies, limited institutional capabilities, and weak institutional partnerships. Meanwhile, there are 53.33% of respondents aware of fisheries management issues, particularly on depleted fishery resources.

This implies that they have limited knowledge on fishing management and institutional issues that can be the one reason in having conflicts in fishing livelihood. According to Martinuzzi *et al.* (2009), management plans have been seen to be beneficial to specific areas.

Government regulations require specific management plans but it would be difficult for the local communities of Barangay San Jose to assemble the necessary documentation and set up the appropriate plan because of their limited knowledge of fisheries management. Respondents said that the weather condition is the key factor that affects their fishing.

Livelihood. Meanwhile, 18.92% of respondents have attended training and seminar and all of them are willing to attend training and seminar on aquaculture, organic agriculture, vegetable production, and livestock production.

In the study of Daupan (2016), the training and seminars that barangay Pedada, Iloilo received had a significant impact on how their perception of mangrove forests changed (Daupan, 2003). Thus, conducting training and seminars are very important for local communities to make them realize the importance of mangrove and fishery resources.

Limited knowledge and awareness on fisheries management, illegal human activities, excessive use of coastal resources, and natural disaster are the main factors that could affect the coastal resources and in the long term it affects the fishing livelihood of the community. This supports the statement of Cinner (2000) that the use of coastal resources is dependent upon socio-economic variables (Cinner, 2000).

Observations on the status of fishery resources and other coastal resources

Most of them said that the benefits derived from coastal environments are bathing or swimming, recreation or relaxation, navigation, and transport. Today, benefits derived from coastal areas are noticeably limiting because of human and natural causes. As shown in Table 1, there are changes observed in coastal resources over the last five years and today specifically on the average volume of catch per trip, size of fish, fishing ground location, coral reef areas, beaches, and mangrove area.

Five years ago, the fishing ground location was about 1 km to 8 km, while today the location of the fishing ground is from 1 km to 17 km. When comparing the volume of fish caught per trip between five years ago and today, a noticeable decrease was observed from 10kg-76kg to 5kg to 20kg, respectively.

This indicates that there are lower catches observed today than before. When comparing the size of fish between five years ago and today, a noticeable decrease was observed from 0.05kg.- 9kg. to 0.05kg.-5kg., respectively.

There are changes observed in the coral reef area, beaches, and mangrove area of Barangay San Jose. On the other hand, there were no observed differences in the seagrass bed, the composition of the catch, and seaweed area, over the last five years and today.

Table 1. Observations on the status of fishery resources and other coastal resources.

Coastal Resources	Five years ago	Today
Fishing ground location	From 1km-3km	From 4km-6km
Average volume of catch per trip	From 5kg-45kg	From 2kg-17kg
Composition of catch	Sturgeon, parrotfish, sword fish, dolphin fish, moon fish, twin fish, frigate tuna, yellow fin tuna, rabbitfish, and snapper	Sturgeon, parrot fish, sword fish, dolphin fish, moon fish, twin fish, frigate tuna, yellow fin tuna, and snapper
Size of fish	From 0.05kg-9kg	From 0.05kg-5kg
Mangrove area	Dense	Sparse
Seagrass bed and seaweed area	Dense	Dense
Coral reef area	Live	Live but have some dead rumbles
Beaches	Lot of fish	Sparse of fish

Generally, 83.78% of respondents said that the income and food from fishing activities are not enough for their living. However, even if their income from fishing cannot sustain their daily lives, 75.68% of respondents are not willing to leave their livelihood from fishing if there is an opportunity to get a job or livelihood that is better than fishing. All respondents wanted their children to become professionals and have a better life. To achieve these aspirations, they wanted to seek support from the government such as fishing boats, free fishing gear, and equipment, land, and livelihood program.

Conclusion

The study found that the coastal resources of Barangay San Jose generate environmental and economic benefits. The economic status of the community of the barangay is reflected by the source of income, primarily fishing. This implies that the community needs mangroves and other coastal resources for their living aside from its ecological benefits. However, it was found in the study that these resources have been extensively degraded because of resource-dependent communities and climate change. The study also concludes that there is no sustainable resource management since based on the results, it tells that most of the respondents have a low standard of education and low awareness of institutional and fisheries management issues.

Generally, this implies that a full understanding of coastal resource use, socio-economic characteristics, and perception of the community of Barangay San Jose, Gonzaga, Cagayan play important roles in the management plans and coastal resource restoration. These help also to understand the underlying causes of degradation and interventions needed in the community. Based on the findings of the study, the development of livelihood opportunities and environment-friendly enterprises for local communities are envisioned to address the prevailing poverty of resource-dependent communities and these are ways to motivate communities to protect natural resources specifically fishery resources and mangrove areas. Trainings and seminars are also importantly needed for coastal communities to impart education to make them environmentally responsible and to make them realize the importance of coastal resources. This is seen as a mechanism to protect the forests while ensuring the well-being of the local communities that depend on them for survival and livelihood.

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