INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print) 2222-5234 (Online)
http://www.innspub.net
Vol. 22, No. 2, p. 27-32, 2023

RESEARCH PAPER OPEN ACCESS

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

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Key words: Coastal communities, Socio-economic, Perception, Mangroves, Fishery resources

http://dx.doi.org/10.12692/ijb/22.2.27-32 Article published on February 04, 2023

Abstract

Generally, the study identified and analyzed the socio-economic and ecological status of coastal communities of Barangay Caroan, Gonzaga, Cagayan, and their dependency on the faunal and floral resources of water. The study carried out an interview based on questionnaires and used descriptive survey research design. The results of the study discovered that most of the respondents have a low level of education and fishing is the main source of income. Fishing as a source of income states that Barangay Caroan is a coastal community. Fishing activities are also done to the estuary where mangrove trees thrive. Most of the respondents said that the benefits derived from the coastal environments are navigation, bathing/swimming, and transport, and recreation/relaxation. Nevertheless, due to anthropogenic and natural disturbances, today, benefits derived from the coastal area are very limited since there are changes observed in coastal resources specifically on the mangroves, volume of catch, and fishing ground location. Generally, this implies that full understanding of coastal resource use and perception, socio-economic characteristics, and participation of the community plays an important role in the coastal resource restoration and management plans. This database helps 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 (Daupan, 2016). It is a natural barrier to reduce the devastating impact of natural disasters such as tsunamis, typhoons, and storm surge. 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 (Pasion, 2015) 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 (Valiela *et al.*, 2001). 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 (Valiela *et al.*, 2001).

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 Caroan 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

Study Area

The area of the study is Barangay Caroan, Gonzaga, Cagayan, Philippines. Barangay Caroan is one of barangays of the municipality of Gonzaga, in the province of Cagayan. Geographically, the study area is situated at approximately 18° 17' 39.4794" north latitude and 122° 2' 5.6394" east longitude, on the island of Luzon (PhilAtlas. 2021).

The location of the study area is within Gonzaga is shown in Fig. 1. This study area is selected based on the presence of large tracts of mangroves within the area.

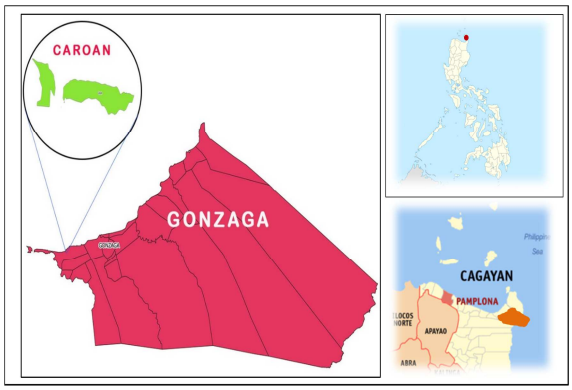

Fig. 1. Location map of Barangay Caroan in Gonzaga, Cagayan, Philippines.

Data collection

Thirty-four respondents in the coastal community of Barangay Caroan 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.

Also, the study determined how respondents use their coastal resources and asked about their observations on fishery resources and other coastal resources in the area, specifically on the volume of fish catch per trip, the status of fishing ground location, size of fish, the composition of the catch, mangrove area, seaweed area, seagrass 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 on questionnaires to obtain information and data on the coastal resource use, socio-economic component, and participation of coastal communities of Barangay Caroan in Gonzaga, Cagayan.

Descriptive statistics and the use of frequency analysis were used as research designs in the analysis of the data gathered. The data collected were analyzed in terms of frequency and number or percentage and used as a basis for ranking the responses. Half of the fishing households served as sample sizes.

Fig. 2. Conduct interviews with the local community.

Results and discussion

Social and Economic Characteristics

Fifty-nine (59) respondents were interviewed in Barangay Caroan and the fishery resources are being managed by the People's Organization, Caroan Fisherfolk Association headed by Mr. Florante Carillo. As to age, fishing is carried out by 22.03% of respondents at age 32-38 years old, 18.64% at age 25-31 years, and 18.64% at age of 39-45 years old.

In terms of the level of highest educational attainment, more than half (50.85%) of respondents had education at the elementary level. This indicates that most have a low level of education.

In terms of occupation, capture fishing is the main source of income for more than half of the respondents (69.40%) as shown in Fig. 3. The dominance of fishing as a source of income proved that Brgy. Caroan is a coastal community. From the fishing occupation, the majority of the respondents (74.58%) have an income of 1,500-3,387 pesos per month. Aside from fishing, 25.9% of the respondents engaged in fish processing, 3.5% in fish trading, and 1.2% in livestock production.

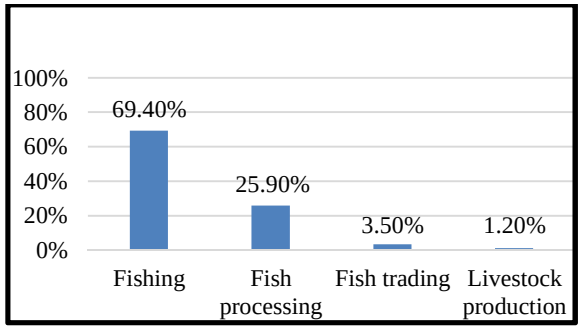

Fig. 3. Main occupation of respondents.

It can be seen in Fig. 4, 46% of the respondents used a gill net or *sigay* as fishing gear or instrument in taking fish and other fishery species. This kind of fishing gear is considered one of the most productive in municipal water (http://map.seafdec.org). Other respondents used hook and line or *bingwit* (22%), baby trawl or *galadgad* (12%), beach seine or *daklis* (12%), filter net or *tangab* (7%), and danish seine or *buli-buli* (1%). It was observed that some respondents used baby trawl, beach seine, danish seine, and filter net. According to Fisheries Administrative Order 201, it prohibits the operation of municipal and commercial fishing boats using active gear in municipal waters, bays, and fishery management areas. The community violated the rules and regulations of FAO 201 since they used active gears such as beach seine, danish seine, baby trawl, and filter net in capturing fish in marine waters. The main potential negative impact of these fishing gears on living resources is when too many small-sized organisms and non-target species are caught and sometimes discarded. This result shows that the use of active fishing gear is prohibited, but the local community of Caroan still used these gears in capturing fish and other fishery resources.

Meanwhile, the major catch in the gill net method and hook and line method is belt fish “espada”; shrimp “hipon” in baby trawl and filter net method; twin fish “mataan” and belt fish in beach seine method and; twin fish, anchovy “monamon” and belt fish in danish seine method.

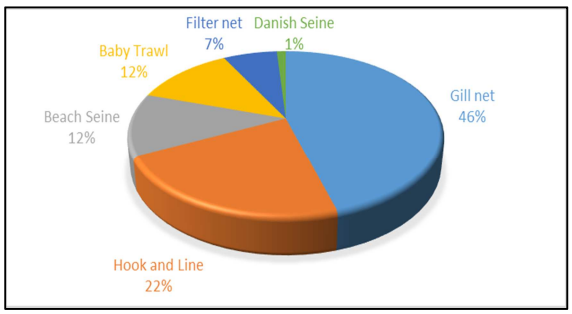

Fig. 4. Fishing gear used by the respondents.

The profile of the respondents in terms of household, housing, and productive assets are determined by identifying their type of building/house, land ownership status, construction materials of roof and construction materials of the outer wall, tools owned in farming, water source, and household items owned. In terms of house type, all respondents live in single-typed house, the majority have mixed but predominantly light materials of construction materials for the house’s roof, and the majority have mixed but predominantly permanent materials for the house’s outer wall. Out of 59 respondents, only half owned their house and other respondents rented and leased the area. Meanwhile, the common household items are wood stove, engine (for boat), radio, DVD player, refrigerator, gas stove, antenna/satellite disc, vehicle/motorcycle, boat, and generator.

Mangrove based activities

There are 33 respondents do mangrove-based activities, 31 of which engaged in fishing while 2 of which engaged in mangrove cutting for fuel. Fishing activities are done using different types of fishing gear such as hook and line, gill net, and filter net. Meanwhile, conversion of mangrove area to fishpond is the main activity that affects mangrove areas followed by mining, mangrove cutting and human waste.

Problems and conflicts affecting livelihood

Weather condition is the main problem that impacts the fishing livelihood of the community which leads to income loss. In fisheries management issues, all of them are not aware of generic issues such as intensified resource use competition and conflict, degraded fishery habitats, unrealized potential of aquaculture and commercial fisheries, uncompetitive products, and post-harvest losses while institutional issues are inadequate/inconsistent fisheries policies, limited institutional capabilities, weak institutional partnerships, and property right and access. This implies that they lack knowledge of fisheries management issues which may be the one factor for having conflicts in fishing livelihood. Meanwhile, half of the respondents would like to attend training or seminar on organic agriculture and the other half would like to attend seminars on aquaculture, food processing, livelihood training, fish processing, livestock production and vegetable production. In the study of Daupan (2016), the seminars and training

that barangay Pedada, Iloilo received had a significant impact on how their perception of mangrove forests change. Since based on the results, most of the respondents have not yet attended any training and seminar, thus conducting training and seminars are very important for local communities to make them realize the importance of mangrove and fishery resources. Most of them said that the beneficial services of coastal environments are bathing and swimming, recreation or relaxation, transport and navigation, and oyster production. However, due to weather conditions and lack of knowledge and awareness on issues that affect the fishing livelihood, at present, benefits derived from the coastal area are limited. It can be seen in Table 1 that there are changes observed in the coastal resources, particularly in mangrove area, fishing ground location, and volume of catch per trip. But, according to the local communities, they perceived an increase in the density of mangrove forests five years from now.

Table 1. Observations of fishery and other coastal resources five years ago vs. today.

Coastal Resources	Before	Now
Fishing ground location	From 0.1km-3.9km	From 0.15km-6.63km
Average volume of catch per trip	From 2kg-131kg	From 1kg-13kg
Composition of catch	Grey mullet, belt fish, snapper, frigate tuna, twin fish, shrimps, shell, moonfish, milkfish, crabs, river mullet, goby	Grey mullet, belt fish, snapper, frigate tuna, twin fish, shrimps, shell, moon fish, milkfish, crabs
Size of fish	From 138-201g	From 72g-102g
Mangrove area	Dense	Sparse
Seagrass bed and seaweed area	Dense	Dense
Coral Reef Area	Live	Live
Beaches	Far	Near

With these changes, about 86.44% of them said that the income and food and income fishing are not enough for their living. There are 32.20% of respondents are willing to leave fishing if there is an opportunity to get a job that is better than fishing. Fishermen want their children to become professionals and have a better life. To achieve these aspirations, free fishing gear, fishing boats, and equipment, scholarship, livelihood program, land, and money are the support they want to receive from the government

Conclusion and recommendation

It is known the economic, social, and environmental benefits derived from the coastal resources of Barangay Caroan, however, it was found that these resources have extensively degraded because of resource-dependent communities, climate change, and human impacts such as illegal use of mangrove forests conversion to fish ponds and deforestation and fishing gears. The degraded state of the environment and natural resources of the country is felt most intensely by the poor, especially the rural communities given that they depend on these resources for their primary source of living. There is a continuous degradation of coastal resources and this cannot be avoided since the community depends on fishing as the main source of their income.

Instead, the development of environment-friendly enterprises and livelihood opportunities for local communities is envisioned to address the prevailing poverty of resource-dependent communities and these ways will motivate communities to protect natural resources specifically coastal resources and mangrove areas. The study concludes that there is no sustainable resources management since based on the results, it tells that most of the respondents lack of awareness of fisheries management and institutional issues, have a low standard of education, and have not yet attended any training or seminar.

Therefore, seminars and capability training are importantly needed for coastal communities to impart education to make them environmentally responsible and to make them realize the importance of coastal resources and mangrove forests. This is seen as a mechanism to protect the forests while ensuring the

well-being of the local communities that depend on them for livelihood and survival.

Generally, this implies that a full understanding of socio-economic characteristics, coastal resource use, and perception of the coastal community of Barangay Caroan play important roles in the coastal resource restoration and management plans. Further, these help to understand the underlying causes of degradation and interventions needed in this community.

References

Daupan SV. 2016. Community Participation in Mangrove Forest Management in the Philippines: Management Strategies, Influences to Participation, and Socio-Economic and Environmental Impacts. Masteral Thesis, University of Michigan, 22. https://deepblue.lib.umich.edu/bitstream/handle/2027.42/118060/Daupan_NREmastersthesis.pdf?sequence=4&isAllowed=y. https://www.philatlas.com/luzon/ r02/cagayan/gonzaga/tapel.html.

Lavieren HV, Spalding M, Alongi D, Kainuma M, Godt MC. 2012. Securing the Future of Mangroves, A Policy Brief. United Nations University. Institute for Water, Environmental and Health, Hamilton, Canada, 1-53. https://unesdoc.unesco.org/ark:/48223/pf0000219248

Lewis RR. 2009. Methods and criteria for successful mangrove forest restoration. Coastal Wetlands: An Integrated Ecosystem Approach. Elsevier,787-800. https://www.researchgate.net/profile/RoyLewis/publication/292718083_Methods_and_criteria_for_successful_mangrove_forest_restoration/links/5a2585bfaca2727dd880dd2c/Methodsand-criteria-for-successful-mangrove-forest-restoration.pdf

Pasion EQ, Tumaliuan BT. 2015. State of the Mangroves in Cagayan. 55-58. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=535ac8188e48c4be96c98afbab1280b891757556

PhilAtlas. 2021. Tapel, Municipality of Gonzaga, Province of Cagayan. [Online].

Valiela I, Bowen JI, York J. 2001. Mangrove Forests: One of the World's Threatened Major Tropical Environments, Bioscience **51,** 807. https://academic.oup.com/bioscience/article/51/10/807/245210