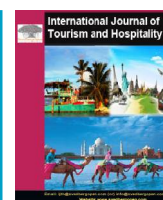




International Journal of Tourism and Hospitality

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Research Paper

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Balancing-up ecotourism in labangan channel philippines: a mangrove rehabilitation program

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Article Info

Volume 1, Issue 2, April 2021

Received : 04 January 2021

Accepted : 25 March 2021

Published : 05 April 2021

doi: [10.51483/IJTH.1.2.2021.34-41](https://doi.org/10.51483/IJTH.1.2.2021.34-41)

Abstract

The mangrove species present in Labangan Channel, based on FRI – Forest Resource Index, were categorized low, medium and high. The species includes; Api-api/Avicenia which has a high index with more than 6 species, Sonneratia-Alba/Pagatpat, also high index, Rhizophora Mucronata (Bakawan) and Rhizophora Apiculata (Bakawan) has a medium index with 2-5 species, a low index of Rhizophora Stylosa (Bakawan) which has less than 2 species and Sasa/Nypa Fruiticano having a high index with more than 6 species. These are the mangrove species feasible for planting and rehabilitation along the Labangan Channel. It is found out that the primary reason for mangrove degeneration along the Labangan Channel going to the island of Tibaguin, Hagonoy, Bulacan is oil pollution. Other reasons for mangrove degeneration includes; conversion to ponds, climate change and other pollutions carried by the river. It is believed that mangrove affects the livelihood of the residents/fisher folk of Tibaguin, Hagonoy, Bulacan. 66% of the respondents said that it is where fish lay eggs which is their main source of income and 78% of the respondents are aware of the significance of mangrove in their community. Aside from being sanctuary to fishes and defensive zones against storm and high tides, it is one of their scenic attraction. It has also been found out that not so long ago, the island of Tibaguin, Hagonoy, Bulacan has a beach named “Aroma Beach” which vanished due to negligence and carelessness of the residents. Also, the island possesses a “Parola” or lighthouse but had not been paid much attention and is now non-functional. The present study was an attempt to conduct a mangrove rehabilitation program, propose possible mangrove based income generating project and eventually create an ecotourism destination.

Keywords: Mangrove, Rehabilitation, Ecotourism, Livelihood

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1. Introduction

Viewed as one of a kind components of the aquatic environment, mangroves are among the most beneficial biological systems, which directly give financial and natural advantages to man. They fill in as supports or between tidal defensive zones against tropical storms, storm floods and tsunamis, anticipating soil disintegration and limiting water contamination; are instrumental in building extensive regions of tidal land; and give interesting natural surroundings, sanctuary and reproducing ground for endemic, unusual and endangered types of amphibian and varied vegetation.

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Any disruption in the structure of any natural system causes unfavorable consequences on the forces of the entire system. In certain cases, the disturbance surpasses the endurance of the ecosystem, resulting in environmental degradation bringing about permanent damages. Continuous exploitation of mangroves has serious implications to the coastal communities.

Demolition of mangroves will definitely affect the lives of the individuals, especially on their pay, nourishment security and other related fundamental needs.

Bulacan has a total land area of 262,500 hectares or roughly 14% of the total land area of Central Luzon, the biggest Philippine island, and 0.9% of the country's total land area. The province has 21 municipalities, 3 component cities and 569 barangays.

The coastal perimeter of Bulacan is 25 kilometer or 15 miles. The first coastal barangay is Salambao, Obando and the last coastal barangay is Pugad, Hagonoy. Hagonoy has 12 coastal barangays.

The mangrove areas in Bulacan has a total of 293.7 hectares broken down as follows; Hagonoy which consists of Pugad, Tibaguin, San Pascual, Mercado, Sna Roque I and San Roque II has 120 hectares, Paombong which consists of Sta. Cruz, Masukol and Binacod has 50 hectares, Malolos which consists of Pamarawan, Babatnin, Masile and Caliligawan has 32 hectares, Bulakan which consists of Habulan, San Nicolas and Bambang has 21.79 hectares and Obando which consists of Tawiran and Salambao has 70 hectares.

Several exercises have been embraced in coastal communities. Mangrove rehabilitation programs have been widespread, from community undertakings to government-sponsored projects to large-scale international development assistance programs. However, regardless of the allocation of enormous funds to plant mangrove forests in recent decades in the Philippines, the survival rate of mangroves is 10-20%. According to Kodikara *et al.* (2017), mangrove restoration is notoriously unsuccessful. Primavera and Esteban (2018) revealed that poor survival rates of mangroves is often because inappropriate species are planted in inappropriate locations.

2. Literature Review

Mangrove ecosystems are among the most productive ecosystems that directly or indirectly provide ecological and economic benefits to humans. It provides a unique habitat for animals, breeding ground for unique species of flora and fauna. Acanto, R. (2016), in his study found out that among the economic importance of the eco-tourism park, 4.4% of respondents identified both brings financial incentives to the community and served as a sightseeing route for eco-tours.

The use of mangroves as a travel and tourism destination has not received much attention, but provides high-value, low impact use of these important ecosystems. If the island Tibaguin will be realized as an ecotourism destination, awareness on the types and kinds of mangroves present on Labangan Channel is very important. In a study conducted by Yao C (1999), he mentioned that most of the mangrove tourist destinations are not sustainable due to serious lack of mangrove interpretive components. Visitors were just ushered along a lengthy boardwalk with limited information on the importance of mangroves or the socio-cultural uniqueness of the community.

The possibility of creating a plan for mangrove rehabilitation which will produce livelihood programs and with the participation of local government and other organizations is assured. Galia *et al.* (2009), revealed that the Nueva Valencia municipal government approved the Coastal Fishery Resources Recovery Program developed by KAMAMADO (Katilingaban sang Magagmay nga Manginisda sa Dolores) in 2004, which analyzed the problem issues in fisheries; developed a work plan and budget and work out a partnership arrangement of all activities in Basyaw Cove, which formed part of the Municipal Five-Year Coastal Resource Management Plan. This included the establishment of milkfish cage culture as a livelihood project.

3. Methods

The process in the conduct of this study are; appointing key researchers, planning, preparing, surveying and visiting. The investigation was fundamentally led through supplementary information gathering, individual meeting of key sources, community immersion and personal observation.

The research method is a combination of qualitative and quantitative research. The researchers distributed two kinds of questionnaires for two groups of respondents namely; resident and fisher folks of Tibaguin Hagonoy Bulacan, Philippines and government employees such as the administrators and staffs of DENR, DAR, DOT and Local Government of Hagonoy, Bulacan.

4. Results

The mangrove species feasible for planting along the Labangan Channel includes; Api- api/Avicenia which has a high index with more than six species, Sonneratia-Alba/Pagatpat, also high index, Rhizophora Mucronata (Bakawan) and Rhizophora Apiculata (Bakawan) has a medium index with 2-5 species, a low index of Rhizophora Stylosa(Bakawan) which has less than two species and Sasa/Nypa Fruiticano having a high index with more than six species.

It is found out that the primary reason for mangrove degeneration along the Labangan Channel going to the island of Tibaguin, Hagonoy, Bulacan is oil pollution. Other reasons for mangrove degeneration includes; conversion to ponds, climate change and other pollutants carried by the river.

The community profile of Bulacan with regards to the number of fisherfolks had revealed that Hagonoy has the highest number of fisherfolks with 49% followed by 26% which is shared by other municipalities, 11% Malolos, 8% Bulakan and 6% Paombong.

Majority of the respondents are ages 36-40. The oldest respondents are 61 above while the youngest respondents are 21-25 years of age. 70% of the respondents are male and 15 or 30% of the respondents are female. There are more male respondents because most of the respondents are fishermen. 76% of the respondents are married, 9 or 18% are single and 3 or 6% are widows. Only 3 or 6% of the respondents have graduated from college while 20 or 40% had finished their elementary education and 17 or 34% were able to study at the elementary level but had not graduated.

The data revealed that most of the respondents did not have enough education to get better jobs so stayed on the island and concentrated on fishing. The primary source of income with 76% is fishing and related to fishing, while the secondary source with 24% are others.

5. Discussion and Conclusion

In view of the preceding findings the following conclusions were drawn: (1) The primary reason for mangrove degeneration along Labangan Channel going to the island of Tibaguin, Hagonoy, Bulacan is due to oil pollution. It is assumed that since motorized pump boats are the only means of public transportation going to the island. Oil spills from these boats smother mangrove roots and suffocate the trees; (2) Although there have been numerous undertakings for mangrove rehabilitation along Labangan Channel going to the island of Tibaguin, Hagonoy, Bulacan, monitoring had also been a problem; (3) Mangrove species like Rhizophora Mucronata and Rhizophora Apiculata are particularly ideal for mangrove planting as they are both fast growing and lucrative; (4) Most of the residents who have not finished a higher education remains in the island and their primary source of income is fishing, and others related to fishing such as drying fish and making boats. Those who have had finished their college degree leaves the island and look for better opportunities in Manila and other areas and some abroad; and (5) Tibaguin Island is a good ecotourism destination for having the widely accepted element of ecotourism such as undisturbed and under-visited areas, natural beauty, cultural and historical importance of the place.

To address the mangrove rehabilitation program, we involved the participation of the local government and a non-profit organization. This study is limited to the Labangan Channel going to Tibaguin Island in Hagonoy, Bulacan.

6. Recommendations

In light of the foregoing findings, the following recommendations are presented:

1. The municipal employees, as one of the program implementers, should give full support in terms of formulation and ordinance that can help protect and conserve the “protected areas” against man-made distractions and calamities. Allocation of funds will be recommended for protection and maintenance of the project.
2. The program beneficiaries as direct stakeholders would be aware of the role expected from them by the provincial and local government units to help sustain the project. Establishment of mangrove nursery and buffer zone on protected areas are recommended.
3. The educational institutions are primary agencies of the government that FF formal orientation and information dissemination to their clients. These institutions should make innovations in their curriculum that would encourage students to be vigilant, dedicated, committed and responsible users in order to protect the coastal resources and other marine products.
4. It is recommended that seminars and training for livelihood projects be done in order to create more livelihood for the residents, specifically for the housewives of the fishermen.

- The researchers would also like to recommend to the local government to look for partners from private or non-governmental organizations for funding of the proposed mangrove conservation and possible eco-tourism project. Suggested attractions would include the rehabilitation of the Aroma Beach and the Lighthouse which would serve as the main attraction of the island aside from the possible activities like fishing and trailing in a mangrove eco-park.

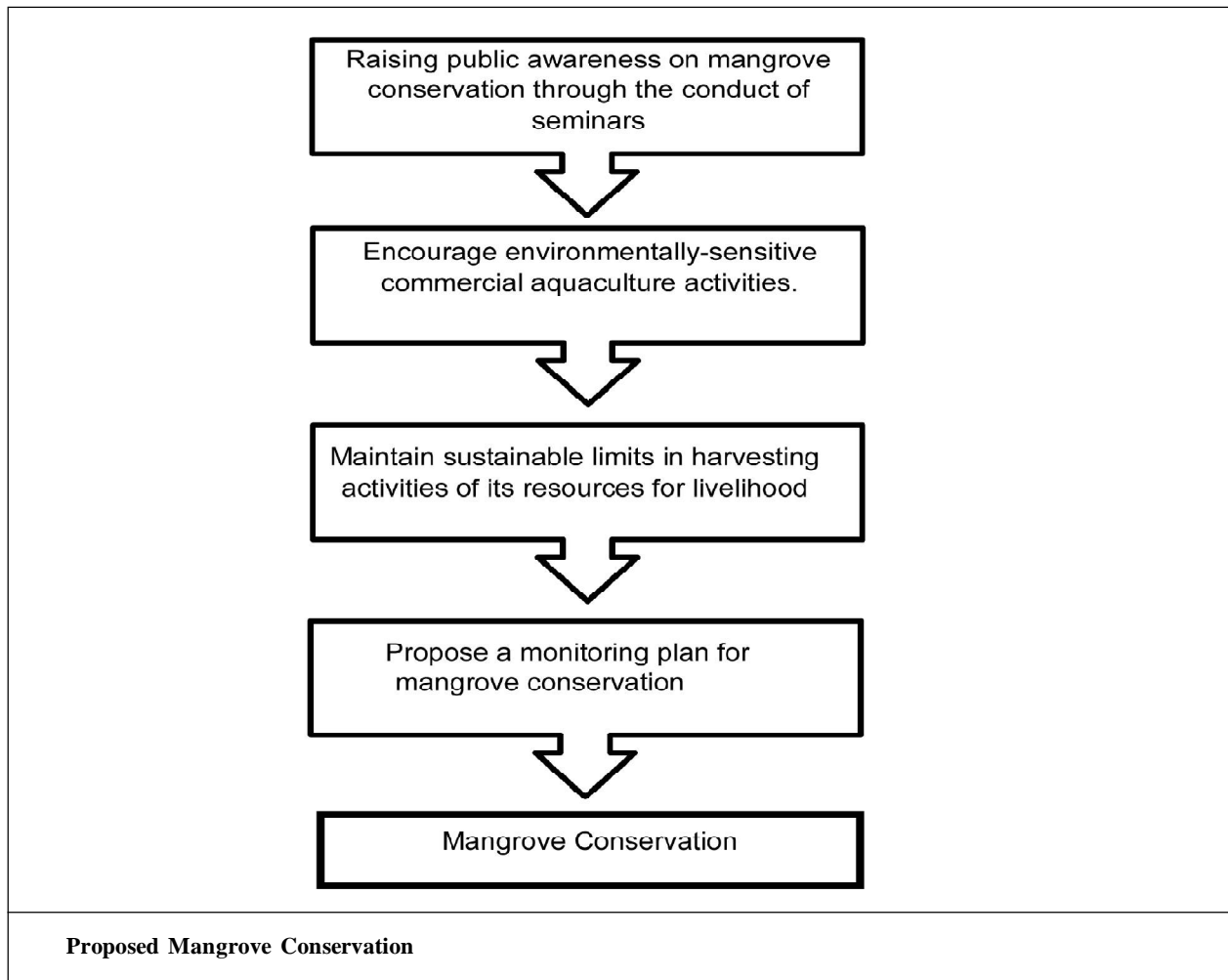
The matrix below outlines the mangrove rehabilitation plan:

It is shown above how the mangrove rehabilitation will be done and coordinated. The rehabilitation is limited only to the areas of Labangan Channel going to the island of Tibaguin, Hagonoy, Bulacan.

The above flowchart is a step by step process in the conservation of the mangroves along Labangan Channel going to the island of Tibaguin, Hagonoy, Bulacan.

Proposed Mangrove Conservation

Factor (what)	Method (how)	Schedule (when)	In-charge (who)	Location (where)
1. Length of coastline to be planted	-Site visit -Ground level photography	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
2. Occurrence and extent of anthropogenic activities on site	Visual encounter survey	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
3. Soil type	Soil test	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
4. Mud bank topography	Topographic survey / point sampling	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
5. Wave energy	Point sampling or surface buoys	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
6. Salinity	Salinity test	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
7. pH	pH test	January 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
9. Mangrove species for planting	Identifying of mangrove species suitable for planting	February 2021	Researchers in coordination with municipal officials and Barangay Tibaguin officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
8. Sourcing of seedlings	-request for mangrove seedlings	February 2021	Researchers, Good Neighbor Foundation, CESO, Municipal and Barangay officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan
9. Planting of mangroves	Assigning areas for mangrove planting	March 2021	Researchers, Good Neighbor Foundation, CESO, Municipal and Barangay officials	Hagonoy, Bulacan
			Researchers, Good Neighbor Foundation, CESO, Municipal and Barangay officials	Labangan Channel going to Tibaguin, Hagonoy, Bulacan



Proposed Livelihood Project	
Livelihood	Description
1. Backyard Mangrove Nurseries	· The objective is to include wives of fishermen in mangrove protection by preparing them in mangrove raising methods and develop enormous number of mangroves in backyards of every household in the island. This method will not just increase the production of mangroves but also will increase community responsibility. Each housewife will grow mangrove in her backyard and will get paid for every mangrove seedling. This continuous participation of fishermen’s wives will share commitment, responsibility and will provide financial benefits to the community.
2. Souvenir Shops	· If the island would an ecotourism destination, the residents can put up a souvenir shops and sell items like keychains, mugs, shirts, etc. with the name of the island imprinted. This will not only give livelihood but it could also be the best way to promote the island.
3. Eateries	· The influx of tourist in the future would generate more income to the island and one source of it will definitely come from foods. Eateries which will be managed by the residents and catering their heirloom recipes is also recommended.
4. Tour-guiding	· Another good source of income is through tour-guiding. Residents will be trained on how to provide assistance and give information on the cultural and historical significance of the island and will be tasked to guide the tourist during their stay in the islan

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Cite this article as: Lena N. Cañet, Maria Cecilia E. De luna and Catehrine B. Pulumbarit (2021). **Balancing-up ecotourism in labangan channel philippines: a mangrove rehabilitation program.** *International Journal of Tourism and Hospitality.* 1(2), 34-41. doi: 10.51483/IJTH.1.2.2021.34-41.