

BIODIVERSITY AND SUSTAINABLE APPROACH IN THE PROTECTION AND MANAGEMENT OF MARINE RESOURCES OF TAGUM CITY, DAVAO DEL NORTE

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ABSTRACT

This study recognized the development, conservation, and management of the fisheries and coastal-marine resources in the City of Tagum, Province of Davao Del Norte in reference to the City Ordinance No. 249, and the series of 2007 “Comprehensive Fisheries Code of Tagum City”. The study’s data gathering and the interview were conducted specifically at the three coastal barangays, Brgy. Madaum, Liboganon and Busaon, in Tagum City. The three coastal barangays have a total population of 20,421 (according to the 2020 census) and a total land area of 4,333 hectares. In order to generate data, an interview with the fishermen was conducted and gathered data on the fish caught by the 82 fishermen at the barangays for the year 2020-2022, data were from the City Agriculture Office (National Fisheries Program). The fishery and aquaculture sectors are a source of income for hundreds of millions of people, especially low-income families, and contribute directly to their food security. Tagum City is no exception to the coastal communities that faced the challenge of advancing the management of its marine resources. The initiative of the city in the implementation of a sustainable approach improved the marine biodiversity condition of coral reefs, and livelihood, and increased mangrove vegetation, however the fish catch analysis from the year 2020 to the present shows a declining result. The challenges of coastal-marine management will always be an issue if not taken into consideration and attention by the local officials. The government plays a vital role in the conservation of our coastal-marine resources. Effective and strategic institutional and domestic management is required for the sustainable development of marine resources, to ensure that the needs of future generations are met while satisfying the requirement of the present.

Keywords: Marine Conservation, Sustainable Approach, Fisherfolk Empowerment, Coastal Resources, Habitat Restoration

1.0 INTRODUCTION

The marine environment is a vital resource for almost all life on earth. The concept of protecting and management of these marine resources is really not new in all countries around the world. Measures to regulate and manage fishing activities have been adopted and implemented as a range of approaches for protection and management in different nations for centuries already. The region of the Island nations in Oceania and its sub-regions Polynesia, Melanesia, and Micronesia for example are closing their fishing and crabbing areas not just for some of their ritual reasons but also considering the protection and conservation of the breeding grounds for their fish that supply the reefs around its area that has been assessed to

be overfished and needs protection (Johannes, 1978). Beverton and Halt (1957) have also provided a description of closing the areas in fisheries for conventional fishery management.

The Philippines is a country that has an essential part in the global center of marine biodiversity reckoning its coastline of approximately 37,000 km and its 7,400 islands and islets. Most of its provinces lie in the coastlines with fundamental functions that highly contribute to the socio-economic development of the people. These people are being referred to as the fisher folks living in the coastal areas who remained and were treated to be one of the poorest groups of the working class in the country. Human-induced threats and activities like overfishing, pollution in the ocean, ocean warming, and ocean acidification can literally cause a sea change that is threatening the fundamental chemical balance of the ocean, the coastal waters, as well as the primary livelihood of the Filipino fishermen, considering fish as the second staple food next to rice in the Philippines(<http://www.philchm.ph/coastal-and-marine/>,<https://psa.gov.ph/content/fishery-resources3>)

Tagum City is a City in the Province of Davao del Norte that is located in the northern part of the Davao Gulf. A gulf is seen and foreseen as one of the major fishing grounds in Davao Province and where commercial fish and other seafood are harvested for marketing and for local consumption in the province and abroad. A relentless effort and holistic approach should be adopted and implemented in the coastal barangays of the city of Tagum. This is to protect the major source of living and to keep the marine biodiversity environment of the city alive for future generations to enjoy.

The Barangay Liboganon, Madaum, and Busan are the three (3) barangays among the five (5) coastal barangays of Tagum City who has successfully implemented the activities and projects that contributed to the conservation and sustainable marine protection approach of the city like the rehabilitation and restoration of the coral reef areas and mangrove habitat, expanding and enhancing the management of Marine Protected Areas, as well as empowering the fisherfolks in mitigations and enforcement of the environmental laws.

During the years of the implementation of such inclusive conservation and marine management and protection approaches, the effort has reflected a notable increase of fish catch in the city which benefited the livelihood of the fisher folks of the coastal barangays and improved their living conditions through abundant fishery. A City Ordinance with C.O. No. 249 was passed last 2007 establishing Tagum City's first fish sanctuary. Since its establishment, the following approach has been successfully adopted and implemented:

1. Enhancement of Artificial Coral Reef (ACR) Project
2. Strong Enforcement of the Law through the Bantay Dagat
3. Mangrove Habitat Restoration

The holistic approach to biodiversity and sustainability in the protection and conservation of the marine resources in the coastal barangays of the City of Tagum has clearly addressed the declining fish catch of the city because of the unsustainable utilization of the coastal and marine resources and climate change fueling environmental degradation. Thus, issues and problems related to people, conservation, and ecotourism, particularly in developing countries, have been raised while conservation is linked to promoting sustainable

development through the conservation area and regional and community development strategies (Dalem, 2002; Nurhayati et al., 2019; Sumarmi et al., 2021).

As the City of Tagum's marine ecosystem is heavily exploited by fishing and negatively affected by other human activities, the need to devise methods to manage and protect these local marine environments and resources is also becoming more apparent to everyone. Marine pollution like siltation and land-based threats like dredging activities and water pollution are noticeably evident yet coastal and marine resource management was not being paid enough attention and obviously not a priority. Moreover, this people-driven project implementation concept by the City Government of Tagum was viewed as the key approach to the coastal environmental problems and issues the locals are facing. Organizing this approach was participated by the coastal communities especially the fisher folks who were organized as the managing bodies in promoting sustainable coastal and marine resources and who are consistently included during the formulation of marine management plans. An important benefit of such intervention would mean sustainability, and the support of long-term meaningful livelihoods for the coastal communities, particularly for coastal indigenous people that rely on fish and seafood for trade, food, and the cultural traditions that build and bind their communities. Merging this protection, management, and conservation initiatives in the program is suggested that the ideal be the simultaneous implementation of coastal networks combining efforts of human activities with the support of its stakeholders for the protection and management of the marine resources of Tagum City.

2.0 OBJECTIVES

This study aims to assess the sustainability of the biodiversity and sustainable management approach in the protection and management of the marine resources, implemented by the City Government of Tagum. Specifically,

- To assess the coastal Biodiversity of the marine resources
- To identify the sustainable coastal-marine management approaches to coastal communities
- To provide substantial baseline data necessary for the identification of key areas for conservation and management
- To identify areas of interest for the expansion of the Marine Protected Areas of the City
- To assess the significant effects and effectiveness of the program and activities implemented by the City Government of Tagum for the management and protection of biodiversity and the city's marine resources

3.0 METHODOLOGY

Research Design. The study utilized a conceptual research method that utilizes existing relevant information on the sustainable approach in the protection and management of marine resources provided by the City Environment and Natural Resource Office (CENRO) of the Local Government of Unit (LGU) of Tagum City. The data gathered will be used to answer the objectives of the research as stated above.

Source Data. The primary data was obtained from the City Environment and Natural Resources Office (CENRO) and City Agriculture Office (CAGRO) of LGU-Tagum City. The data collected will serve as the research instrument used in the study.

Scope and Limitation. This study will cover the biodiversity and sustainable approach in the protection and management of marine resources of Tagum City, Davao del Norte.

Research Instrument. An interview with the fisherfolk was conducted and will serve as an instrument in determining the significant effects of sustainable coastal-marine management to coastal communities of Barangay Madam, Liboganon, and Busaon in Tagum City in terms of fisherfolk income and fish catches.

4.0 RESULTS AND DISCUSSIONS

I. COASTAL MARINE MANAGEMENT

Biodiversity is the diversity of life on Earth. It includes all the animals, plants, and microbes that live in the ocean, from barnacles to whales to coral reefs. The term is also used to describe local biodiversity. Some locations are home to a wide variety of rare species, known as biological 'hotspots'. These are areas of high biodiversity that commonly support important biological processes such as spawning, nurseries, and foraging areas. Since Tagum City passed City Ordinance No. 249 in 2007, the CENRO became the frontline office that took charge of coastal and marine resource management. It has been implementing projects and activities such as the following:

Desolation of Waterways and Rivers

The Liboganon River which is a major waterway that directly connects to the coastal waters of Barangay Liboganon underwent desolation to reduce the silt that commonly ends up in the coastal waters of Tagum City. Silt is considered one of the major causes of a damaged reef.

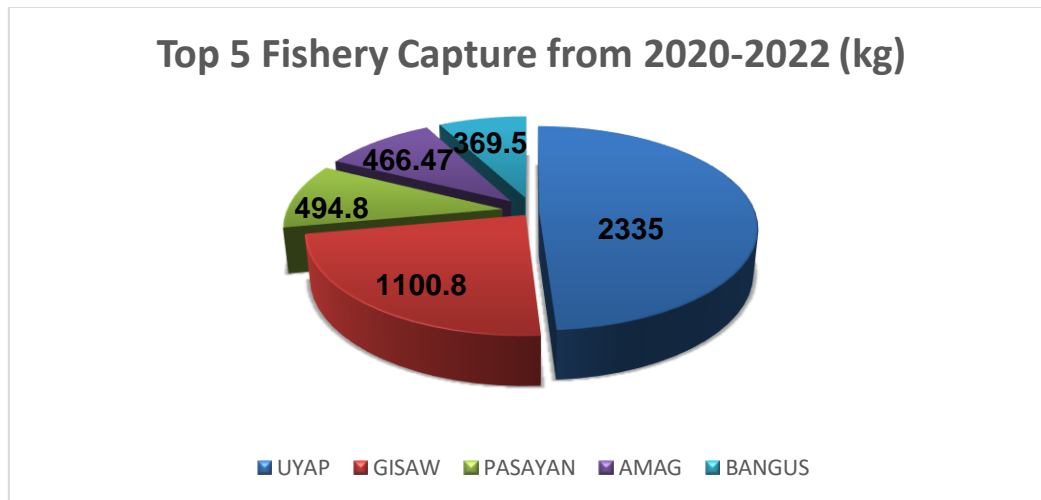
Strong Law Enforcement

Patrol boats, rubber boats, and floating cottages were among the water vehicles used by the task Force Bantay Dagat to strengthen the security and protection of the coastal communities 24/7. Illegal fishing and illegal cutting of mangroves were the main watches of the said task force. Cases were filed against the violators who violated since the start of the implementation of the program

Protection and Rescue of Marine Species

The city has a strict implementation on the protection of sea turtles by providing incentives to the owners of captive sea turtles for their release and providing a nesting facility for sea turtles, Olive Ridley turtles, at Brgy. Madaum, Tagum City. Also, rescue and retrieval of stranded marine species (such as dolphins, whales and etc.).

The graph was the consolidated data of the top identified fish to capture from the year 2020-2022 obtained from the National Fisheries Program Form 1. Shows that Uyap (Paste Shrimps), is the top fish common product from the three (3) barangays.



II SUSTAINABLE COASTAL MARINE MANAGEMENT APPROACH

Enhancement of Artificial Coral Reef (ACR) Project

In the year 2013, the City Environment and Natural Resources Office was the office in-charge in the management of the Artificial Coral Reef (ACR) Project to help improve the conservation of the coral reef area and maintain the current fish biomass of Tagum City.

In a span of five years from the start of the program, more than PhP 2,000,000 was the funds already allocated to develop and install the 3,664 artificial reefs, covering approximately three (3) hectares of the Marine Protected Areas of the coastal portions of Tagum City. Different kinds of genus corals were identified in various types of Artificial Coral Reefs. These coral recruits will then start new coral communities and will take another three months before branching coral recruitment becomes visible.

Also, under this program, Adopt-a-Reef Ball was also initiated by CENRO to encourage civil society organizations and private sectors in Tagum City and from other cities/municipalities to support the coral reef rehabilitation program.

Mangrove Habitat Restoration

Mangroves were planted along Tagum-Liboganon River, Liboganon creek, Tancuan creek, Madam creek, and other wetland areas which aim to conserve water bodies and prevent coastal erosion that can harm the reef. Approximately 217,000 hills of mangroves were planted along the Tagum-Liboganon River, Liboganon creek, Tancuan creek, Madam creek, and other wetland areas which aim to conserve water bodies and prevent coastal erosion that can harm the reef.

Sitio Cabugan in Barangay Busaon was the area recommended for the mangrove habitat restoration project. The mangroves will serve as frontline protection and stabilize the coastal area against storm surges, mangrove forests also reduced erosion caused by currents, waves, and tides. The use of mangroves as seawalls is identified as one of the most effective ecosystem-based approaches in other coastal areas in the country. Furthermore, it also serves

as a nursery habitat for much commercial fish and shellfish, and thus contributes to the local abundance of seafood.

III. KEY AREAS FOR CONSERVATION

One identified area for conservation and management is SitioCabugan in Barangay Busan. Based on the data collected from CENRO-LGU Tagum, Sitio Cabugan was recommended for mangrove habitat restoration. Mangrove Habitat Restoration was chosen for the protection and management of marine resources as a natural protection of the coastal areas of Tagum City against storm surges and coastal erosion.

IV AREAS OF INTEREST

The coastal areas of Brgy. Busan, Liboganon, and Madaum are the only coastal areas in Tagum City. The management of the Marine Protected Areas of the City would greatly improve through the expansion of the area of coverage of the Artificial Coral Reef (ACR)Project. Based on the data collected from CENRO-LGU Tagum, the ACR Projectinstalled 3,664 artificial coral reefs in a span of 5 years. The installation of the ACR covered 3 hectares of the Marine Protected Area.

V. SIGNIFICANT EFFECTS AND EFFECTIVENESS OF THE PROGRAM

The protection and management of marine resources of Tagum City, Davao del Norte were achieved through the installation of the Artificial Coral Reef Project. This project improved the Marine Biodiversity of the Coral Reefs of the 3 host barangays. The data obtained from the National Fisheries Program Form 1 of Region XI on the Fish Capture of Brgy. Busan, Liboganon, and Madaum (see Figure 1) of C.Y. 2020-2022 showed a significant shift in the fish catch obtained by the fisherfolk of the 3 host barangays. The fish catch of the three (3) host barangays for C.Y 2020 was higher compared to the fish catch obtained in 2021 and 2022.

Figure 2 shows the Estimated Fish Catch (PhP) of Barangays Busaon, Liboganon and Madaum. The data was obtained from the product of the fish catch quantity (Kg) multiplied by the market price (PHP/Kg). A significant drop of the estimated fish catch (PHP) was observed for C.Y. 2021-2022. The drop of fish catches for C.Y. 2021-2022 in Brgy. Busan, Liboganon, and Madam affected the Fisherfolk's income as shown in Figure 3.

The decline was due to the ongoing Covid-19 Pandemic which greatly affected the whole economy. The pandemic halted industrial operations through a series of community quarantines as well as imposing restrictions on fisherfolk activities. With this, the coastal-marine management initiated by the local government unit (LGU) of Tagum City experienced a decline both in fish catches and fisherfolk income. It affected the communities by approximately dropping income by 35% from 2020 to the present.

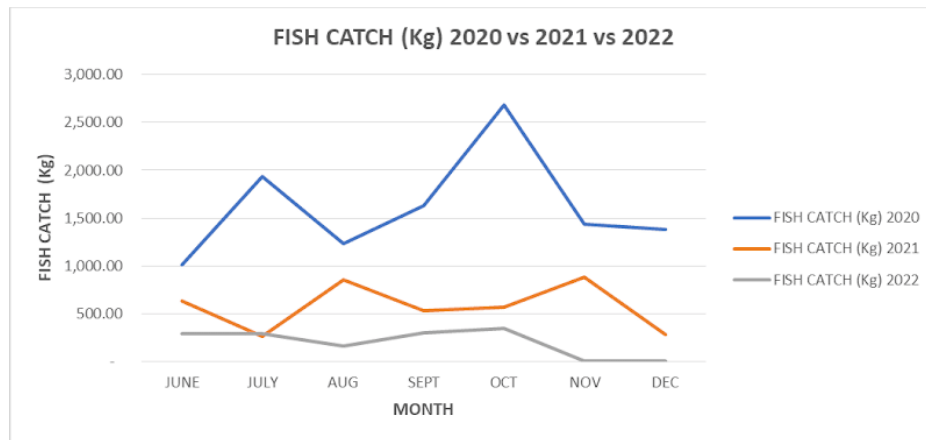


Figure 1: Fish Catch (Kg) for 2020 vs 2021 vs 2022

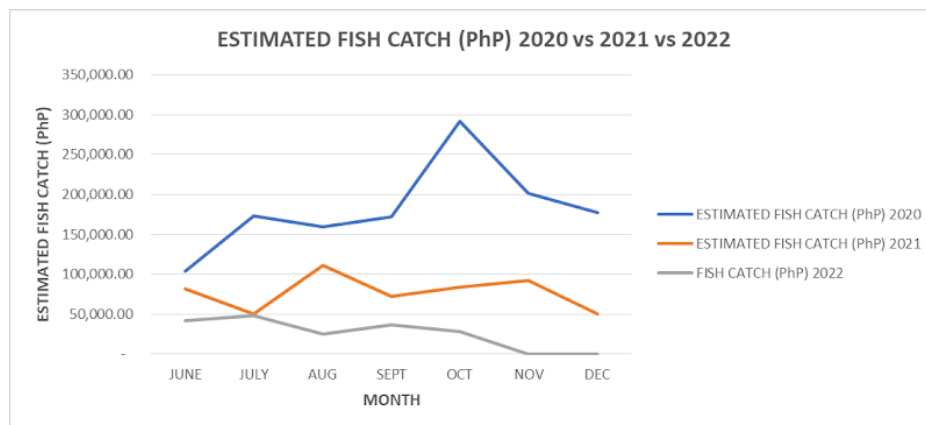


Figure 2: Estimated Fish Catch (PhP) for 2020 vs 2021

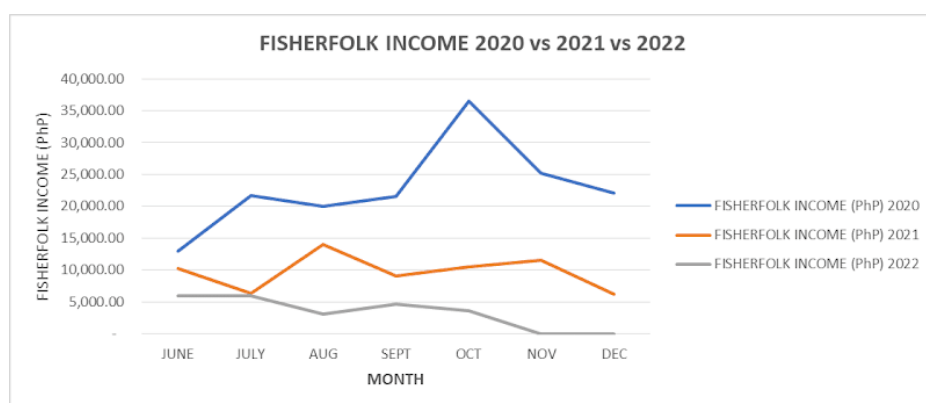


Figure 3: Fisherfolk Income for 2020 vs 2021

5.0 CONCLUSION

Based on the results shown, the year 2020 has the highest fish catch in terms of weight (Kg), value (PHP), and estimated fisher folk income (PHP) compared to the two succeeding years. More specifically, October has the highest fish catch in over six months. In the case of 2021

and 2022, the decline in fish catch was due to the global pandemic, halting industrial activity and imposing restrictions on human activity. This resulted in inadequate oversight of coastal and marine management initiated by local government agencies. Overall, the decline was beyond human control. However, this may increase in the coming years due to the lifting of restrictions. It is recommended that to be able to sustain marine resources, fishermen and locals must plant and maintain additional man-made corals so that marine life can reproduce and proliferate, increasing marine resources and stock. Different areas may be allocated for the construction of man-made corals and the plantation of mangroves depending on fish catch. Stakeholders and other concerned agencies may refer to this study to consult and create a strategic plan to increase fish catch and income. For a better result, the area for one sample point must be lessened so that more samples shall be collected, providing more specific and precise data.

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