



Redesigning Bato, Catanduanes



Background of the Study

Redesigning Bato, Catanduanes



About Bato, Catanduanes

- Bato is situated along the **eastern coast of the Bicol Region** and lies in the **southeastern part** of the storm-tossed island **Province of Catanduanes**.
- It is a **fifth class municipality composed of 27 barangays** with a total land of **4,880 hectares**, which is the smallest among the 11 towns of the province.



About Bato, Catanduanes

- **Agriculture and fishing are the major industries.** The best variety of *abaca fiber* is produced in Bato. It is also the only municipality in the province that produces *millet*, a kind of cereal that is one of the town's delicacies.
- The geographical location of Bato, facing the Pacific Ocean was found to be a **"Tuna Highway"**. Large and marketable sizes of tuna are caught the whole year round as well as other first-class fish species like blue marlin and tanguigue.



About Bato, Catanduanes

- Being in the **middle of the country's typhoon belt**, Virac (and the rest of Catanduanes) has **no pronounced dry season**; rather, it has about 12-15 rainy days a month on average.
- The **decreasing forest cover** has continued despite the logging ban that was imposed by the national government in the province' forest lands in 1973, which was exacerbated by unsustainable upland farming practices and other land uses. Thus, resulting in **low soil productivity, soil erosion, loss of biodiversity, and impaired hydrology**, which when allowed to continue, would **threaten the province' supply of water** and pose serious **repercussions to the lowland ecosystem and to the people's wellbeing**.



Statement of the Problem

Redesigning Bato, Catanduanes



Since Bato, Catanduanes is located within the typhoon belt, it is **highly vulnerable to natural calamities and damages brought about by floods and typhoons**. Due to the recent Typhoon Rolly and Typhoon Ulysses, Bato experienced severe flooding throughout the city as most houses were found near water. With that, most structures, if not all, were left in extremely poor conditions. In addition, Bato is also found to be abundant in natural features that could serve as tourist attractions. The project entails to **redesign the city in terms of resiliency towards natural disasters and economic growth conforming to sustainable development goals (SDG) for zero hunger, clean water, sustainable cities and communities**.



Project Objectives

Redesigning Bato, Catanduanes



Project Objectives

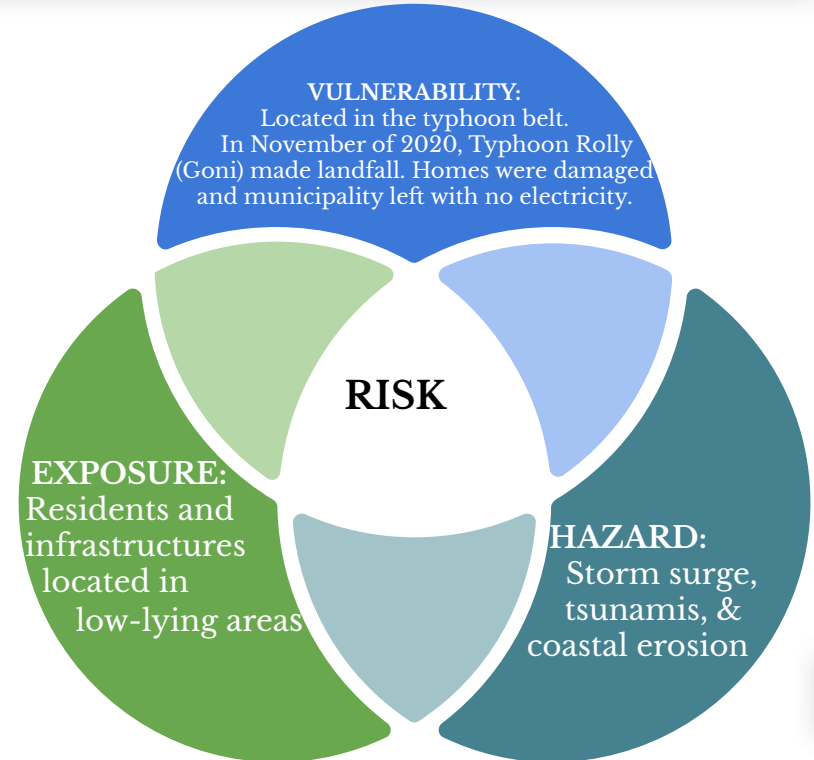
1. To **redesign Bato, Catanduanes** in order for it to become **more resilient to natural disasters** through the use of **proper urban planning**.
2. To be able to **provide enough resources** to sustain the livelihood of the residents and tourists of Bato, Catanduanes by **maintaining the natural resources and making a good economic profit from it**.



Site Analysis

Bato, Catanduanes

RISK ANALYSIS



Site Analysis



According to the City Profile of Bato, Catanduanes the **topography** of the place **ranges from sea level to seven hundred (700) meters above sea level**. As for the existing land use in the municipality, it is evident that the **majority of the land is used for agricultural purposes** (Fig.1). Another is, beside these agricultural spaces are the **residential areas** which shows that agriculture is one major source of livelihood.

Site Analysis

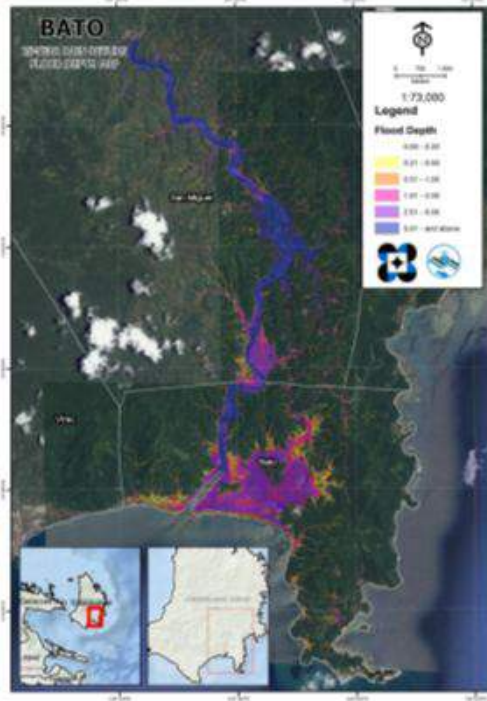


The **Bato Baras Road** is the major road that connects to the **Catanduanes Circumferential Road** which serves as an access to Bato and San Vicente (Fig. 2).

Facility Type	No. of Features
Residential	4863
School	171
Market	0
Agricultural/Agro-Industrial Facilities	1
Medical Institutions	18
Barangay Hall	32
Military Institution	0
Sports Center/Gymnasium/ Covered Court	4
Telecommunication Facilities	0
Transport Terminal	0
Warehouse	0
Power Plant/Substation	13
NGO/CSO Offices	0
Police Station	3
Water Supply/Sewerage	1
Religious Institutions	58
Bank	0
Factory	0
Gas Station	0
Fire Station	1
Other Government Offices	15
Other Commercial Establishments	31
New Building*	3
Total	5214

Site Analysis

- LiDAR Surveys and Flood Mapping of Bato River (2017), estimates over **5,000 structures located in flood prone areas**
- The 25-year rain return flood depth map estimates that **2-5 meters of flood can be expected**





Proposed Solutions

Bato, Catanduanes



PROPOSED SOLUTIONS



PROPOSED SOLUTIONS

MANGROVE BELT



NATURAL BARRIER

The complex root system of mangroves reduce the impact of waves and strong winds



PROTECT SEA BIODIVERSITY

The socio-economic benefit of mangroves is it restores and safeguards the ecosystem. Thus, by propagating sea biodiversity food security and livelihood is ensured.

RECREATION

Mangrove forests and ecological reserves serve as tourist attractions.





PROPOSED MANGROVE BELT ALONG COAST LINES

TOURIST ACTIVITIES FOR ECONOMIC GROWTH

HIKING

Thanks to Bato's healthy vegetation mountainside along the Bato Church serves as the perfect hiking spot for locals and foreigners alike.



BEACH ACTIVITIES

The beach can serve as a scuba diving and surfing spot because of the abundant corals, the beautiful underwater view, and the big waves coming from the Pacific Ocean.



ISLAND HOPPING AND OTHER ACTIVITIES

In the Locot Islands, island hopping will also be available for tourists to enjoy. Biking activities are also available for the elderly and the children who have yet to appreciate beauty in hiking, in fact there are even ziplines direct to the beach or the Bato Church.



TOURIST ACTIVITIES FOR ECONOMIC GROWTH



PROVIDING RENEWABLE ENERGY RESOURCES FOR ELECTRICITY GENERATION

According to the Environmental Impact of Wind Energy (2011), **the demand for energy will only continue to rise in the next couple of years.**

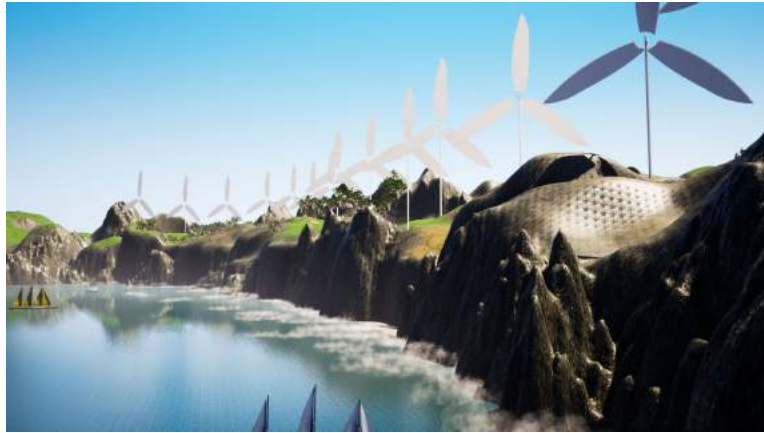
WINDMILLS

Wind turbines can be built on farmlands and especially on **rural areas where winds are the strongest.**

SOLAR PANELS

These are to be integrated into **street lights to reduce the overall consumption, maintenance, pollution, and even accidents** as the use of electrical wires are minimized.



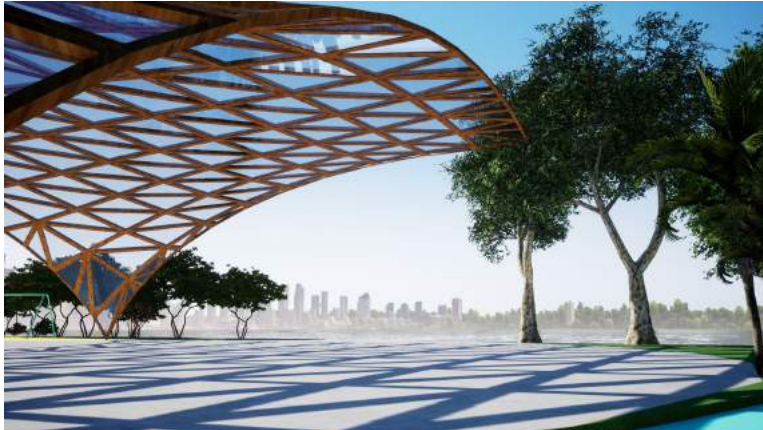


PROPOSED RENEWABLE ENERGY RESOURCES FOR ELECTRICITY GENERATION

ESPLANADE AS A COASTAL BUFFER AND OPEN SPACE



Since the **residential area** in Bato is situated near the coast, it is found to be **extremely vulnerable to its tides**. Providing an **esplanade to serve as a coastal buffer** will help alleviate this recurring issue as it **elevates the city and distances its community structures from the coastal area**.



PROPOSED ESPLANADE

CITY PLANNING



Both major and minor road networks have been affected heavily by the past typhoons, causing difficulty in terms of moving from place to place.

The municipal city hall however, which is currently located beside the Bato Church, is to be relocated to the center of their residential areas.

This increases the accessibility of residents, specifically those with concerns, in contrast to having to travel a long distance.

The marketplace along with various shops and restaurants can also be found near the municipal city hall so that all important offices are in one area.





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Image © 2020 Water
Data SIO, NOAA, U.S.
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Legend

- BOUNDARY
- Major Road
- Minor Road



CREATING A CENTRAL BUSINESS DISTRICT (CBD)



WHAT

A Central Business District is the commercial and business center of an area.



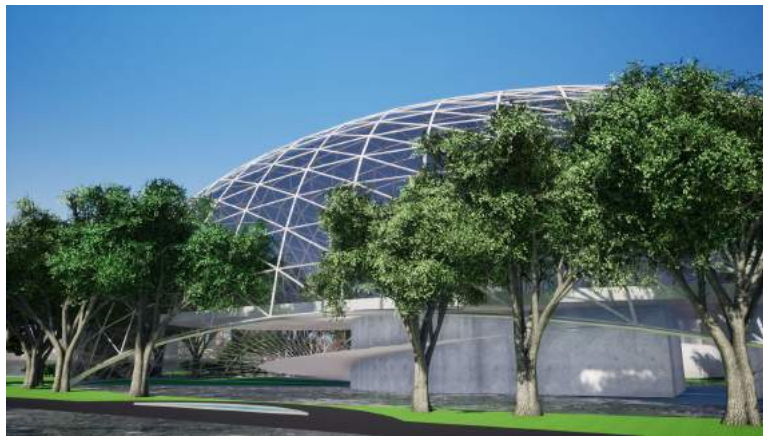
WHY

Having a CBD is efficient for people as this is where they could have an experience of everything and anything all at the same time.

This will also increase its value and may attract tourists. This would also give opportunity for its locals to have more jobs.

When a central market is placed, its locals will be able to sell and share their own produced products and profit from it. Exportation could also be expected when these businesses grow.





PROPOSED CENTRAL BUSINESS DISTRICT (CBD)

BATO CHURCH PLAZA



WHAT

The outdoor plaza can be a venue where mass gatherers can hear mass.

The Bato Church is known as a provincial heritage. With the damage caused by typhoons and COVID-19, religious practitioners are not able to express their beliefs.



WHY

The World Health Organization (WHO), has stated that outdoor venues as opposed to indoor ones are good precautionary measure against the spreading of the virus.

Moreover, a public square or open space contribute toward the social well-being of the community, especially at times like this.



PROPOSED PLAZA



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