

Green-Blue Dialectics: A Coastal Refluent Village SITE ANALYSIS

LOCATION world map SITE LOCATION The site is located in Barrio Liw-Liwa, Barangay Sto. Niño, Municipality of San Felipe, Zambales, part of Region III of the Philippines. It is bordered by the Western Philippine Sea directly at the west, open roads), and a forest area with fish hatcheries to the east. WEST The site is chosen for its proximity to the sea, fertile land for agricultural PHILIPPINE opportunities, accessibility via the main road and to other amenities and utilities, and other vital establishments as markets, places of worship, and SEA notably, small hostels and hotels that is point of interest for the designer. map of PH map of SAN FELIPE WEST ZAMBALES PHILIPPINE PANGASINAN SEA TARLAC SAN FELIPE PAMPANGA BATAAN AREA 31,250 sqm 31.25 h.a. barrio liw-liwa, barangay santo niño, san felipe, zambales, PH **Design Implications:** Being directly located in a coastal area, the site is considered a coastal zone holding within it a coastal community, thus the measures pertaining to coastal zone developments, environmental impact, and heritage conservation must be affixed to the site's design and planning.



CONNECTION LAYER

untitled roads (5-6 meter widths)

*1.2 km from main road, Olongapo - Bugallon Road (306)

MARINE-HYDRO LAYER





AGRI-PRODUCTIVE LAYER

antipolo sand / hydrosol hydrosol / sandy loam sandy loam / antipolo clay antipolo clay / undifferentiated soil



VEGETATION LAYER

the site is heavily vegetated extending towards the hydrosolic coastline; main species found within the site are agoho trees, benguet pine, acacia, and cogon grass



urban human settlements

barangay sto. niño is a sleepy town with fish hatcheries, an elementary school, and some houses nearest to the site.

barrio liw-liwa has a total of 9 quaint hostels/ resorts / hang out spots for tourists visiting the quiet fishing - surfing village



SOCIOCULTURAL LAYER



building symbiosis

local vs. foreign, young vs. old, rural vs. urban, & coastal vs. human



TOPOGRAPHY, GEOMORPHOLOGY, AND SOIL

The topography and geomorphology of the site is that of a *foreshore flat*, defined as the ground between the water's edge and cultivated land, thus land along the edge of a body of water. It is the part of the shore between the high-water mark and low-water mark. Consulting its topographic elevations from NAMRIA, it is approximately **22 meters** from the mean sea level (MSL). There are 7 types of soil found in the province of Zambales. These are mountain soil, undifferentiated soil, Antipolo Clay, Angeles Sand, Quingua Silt Loam, Cabangan Sandy Loam, and Hydrosol. More than 60 percent of the total land area of the province exhibit mountain soil type since it is traversed by the Zambales Mountain Ranges The biochemical composition of the site's soil is *Angeles Sand*, *Silt loam*, and *Sandy Loam*, as well as some Hydrosol. It is mainly influenced by the 1991 Mt. Pinatubo eruption.

Design Implications & Strategies:

The sloped geomorphology of the site allows for a myriad of possibilities when it comes to the form of the master plan and design, although the soil composition may dictate location feasibility of certain structures and at the same time the height of any structure that may be planned to be built in the site, inspite the area being designated as part of *Alienable and Disposable Land*. The soil composition is quite conducive for building, agricultural, and foresting purposes.

+20.00m +22.00m

CLIMATE MICRO VS. MACRO

The site's longer sides, are oriented towards the north and south, and the shorter sides to the east and west. The site exhibits a micro-climate which is palpably cooler than that without it, as compared to the barangay proper to the east of the site. For its macroclimate, it is subjected to the sun path, which goes from east to west.

RAINFALL

The average rainfall in the Philippines is of 171.8mm (6.8 inches) per month which is caused by high temperature and humidity, and prevailing winds, Northeast (Amihan) and Southwest (Habagat) monsoons, throughout the year. For Zambales, the maximum rainfall was observed at Cabangan (Zambales) station during the month of August at 2712.1 mm. The climate of Central Luzon where Zambales is located is generally influenced by three predominant air streams, namely: the northeast monsoon (Amihan) common from November to February, which is relatively cool and less humid; the tradewinds common during late March and early May, which is very warm and humid; and the southwest monsoon (Habagat) common from June to October. Based on the Corona classification 56 of climate types, most of Central Luzon is described as Type I, Zambales has two pronounced seasons: typically dry from December to May and wet during the rest of the year.

TEMPERATURE

The average normal maximum and minimum temperatures are 32°C and 22°C, respectively. The coldest period is from December to February. The hotter months are from April to June.

Design Strategies:

Notwithstanding the standard factors of high temperature, humidity, and abudant rainfall, the extra wind loads from the seas must be further assessed to completely establish the needs of the site as an intended new village may arise. The micro-climate is beneficial to human settlement, as observed in the Barrio with its burgeoning hostel culture, that it also has the potential influence the existing dry and hotter macroclimate.

ZONING

As of now, there is no existing Comprehensive Land Use and Zoning Map for the municipality of San Felipe, Zambales, although it has been designated by the Department of Agriculture's Land Classification map as **Alienable and Disposable Land**, is mostly covered by Agricultural Lands and Built-Up area in the town proper.

Design Strategies:

With its liberal land classification, the site may be converted into any form of structure or development, yet with the consideration of its context and and the social welfare of its current and future dwellers. The location and weather in the area can serve as riparian reserve to the Barangay of Sto. Niño, being the main breaker from the western body of water, as well as a floodwater regulator.





HYDROLOGY

Heavy precipitation occurs generally from June to October, the period of southwest monsoons. More than 90% of the annual rainfall concentrates in this period with August experiencing the heaviest downpour. The annual amounts range from 1,036 mm in the central portion of Central Luzon to 3,856 mm along the western coasts.

Irrigation water for agricultural land of San Felipe, Zambales was described by its residents as... Currently, one may observe water pipelines above ground, extending to the centers and then to the mountains.

Design Strategies:

With heavy precipitation for a longer period of time than that of dry climate, rainwater harvesting strategies as well as flood-mitigating measures must be applied to the site. As the site is heavily vegetated, and with development comes the relocation and rearrangement of the site's current verdant state, ecologically sustainable interventions must be set to prevent coastal erosion and heat island effect caused by construction and human settlement.

VEGETATION & FLORA AND FAUNA

The common types offorest species that can be observed in Zambales are Agoho (Casuarina equisetifolia), Acacia (Samanea saman), Bagras (Eucalyptus deglupta), Benguet pine (Pinus kesiya), Banuyo (Wallaceodendron celebicum) and Mangium (Acacia mangium). Bagras, Benguet pine and Mangium are exotic to the place and introduced in reforestation areas. However, they are adapted to the place and are thriving well. These forest species are growing throughout the whole area of Zambales. These species have different characteristics. Acacia, Benguet pine and Banuyo, for example, grow up to 30 meters with a diameter of 120 cm or higher often with a straight trunk. Mangium is a popular species for forest plantation and used also for agroforestry projects. It can reach a height of 15 meters and a diameter of 70 cm.

Theothervegetative cover that is widespread in the province is grassland mostly covered with cogon grass. Grassland is very common to grazing. Roughly, 75 % of the total area of the province is grassland including the unproductive agricultural land. Burning of grasses is common in grazing to improve young shoots that are palatable to cattle. **Grass burning is practiced at least twice a year. This explains the high soil erosion of the mountains in the province.**

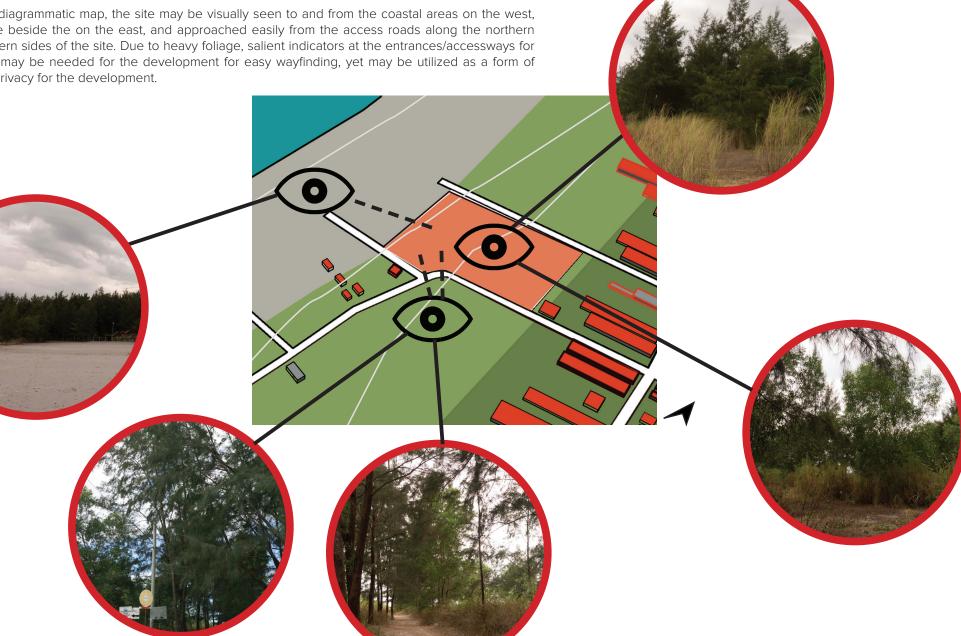
Design Strategies:

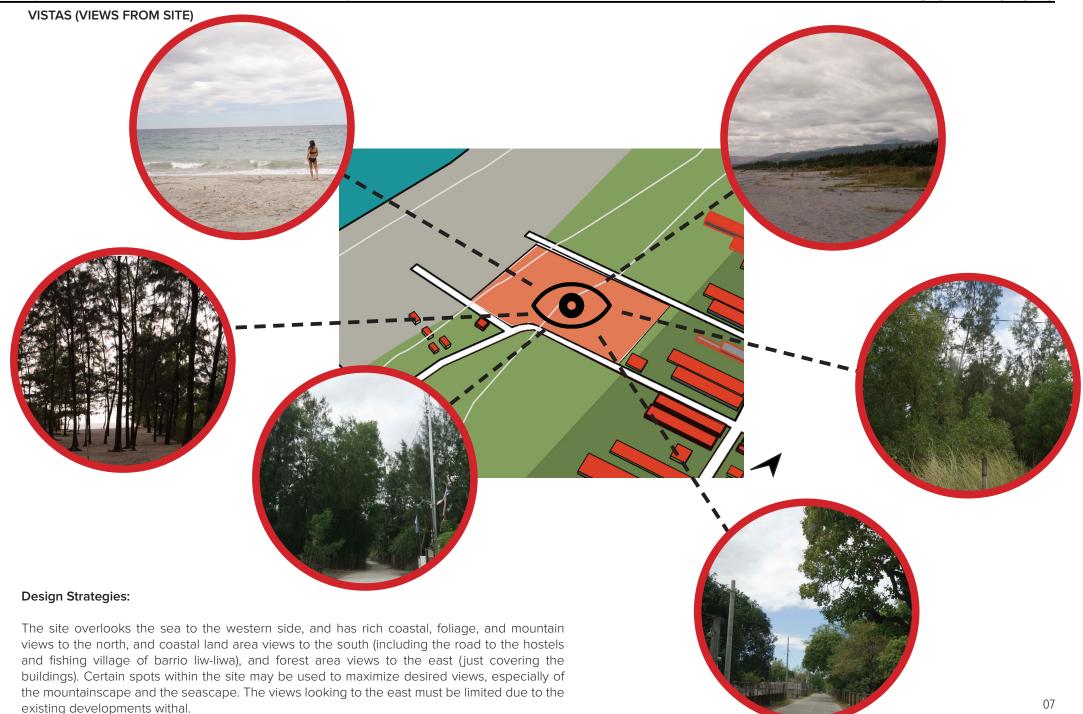
For the same Casuarina / Agoho specimens found in Indonesia and Taiwan, Agoho is found to be a **wood widely used for shingles, fencing, and is said to make excellent hot-burning firewood.** In the islands of Hawaii, **Agoho are also grown for erosion prevention, and in general as wind breaking elements.**

VIEWS TO SITE

Design Strategies:

From the diagrammatic map, the site may be visually seen to and from the coastal areas on the west, by the site beside the on the east, and approached easily from the access roads along the northern and southern sides of the site. Due to heavy foliage, salient indicators at the entrances/accessways for approach may be needed for the development for easy wayfinding, yet may be utilized as a form of security/ privacy for the development.





PROXIMAL DEVELOPMENTS (EXISTING)

There is a diverse set of developments that surround the site. From educational institutions, residential structures, to simple hostels and markets. The site is located in an area with a subtle hustle and a pleasant buzz that makes the town both vibrant and quaint simultaneously.



Design Implications:

A critical point to note though is that the nearest medical and hospital facility is in the neigboring town of San Narciso, which is about 5km away from the site:

La Paz Barangay Health CenterSan Narcisco Health CenterSan Rafael Barangay Health Station

WITHIN 1.0 - KILOMETER RADIUS

Sto. Niño Beach Park
Aglipay Church
Famisan Lodge
Summer Ichiban Resort
Big J Beach Resort
Zambales Central Institute
Bobulon Elementary School
Cockpit Arena (Sabungan)

WITHIN 2.0 - KILOMETER RADIUS

San Felipe Public Market
San Felipe Municipal Hall
Rural Bank of San Felipe
Philippine Red Cross - Olongapo City Chapter
ER Dela Cruz Construction and Supply
San Roque Catholic Church
Iglesia ni Cristo Church
Farmers' Information and Technology Services
San Felipe Elementary School
Fruit and Fish Commercial Stores
AJ CIGNAL and Satellite Services
San Felipe Fire Station
Petron Gas Station
Independent Park Baptist Church

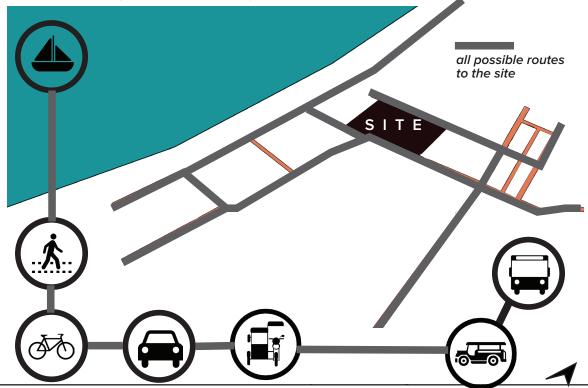
TRANSPORTATION AND ACCESS

The site may be accessed on all sides through various means; pedestrian access on all sides, a 5-meter road that links to inner Barrio Liw-Liwa, the municipality, and then to the main highway; Olangapo-Bugallon Road (306) that is connected to the Subic-Clark Toll Expressway (SCTEX) and then to North Luzon Expressway (NLEX), which leads to the capital of Metro Manila. As the western side is open water, the use of boats or sea vessels may be used to reach the coastal site adjacent to the site.

Vehicles that may be employed to reach and exit from the site are mainly: tricycles, private cars/vans, buses (until main highway only), motorbikes, bicycles, and boats.

Design Strategies:

Issues of security arise from the site's easy accessibility, yet is most beneficial to its future users as there shall be no need to pave new RROWs. Although, within the site, several pathways may need to be carved out for clear and easy wayfinding, as well as making the site more friendly to the intended intergenerational community.



TIES TO NATURE AND THE SEA

Being located at the coastline, the relationship of the site with the sea is of essence to the development of the site. The livelihood of the whole barrio of Liw-liwa is dependent on agro-fishing. The surfing culture in the area has grown through the years, yet is not as progressive and rapid as that of Baler, Aurora, and San Juan, La Union. It is dubbed a "Surf, do nothing, fish" village. The various patches of land that surrounds the site are mostly occupied for locals' homes, hostels, and fishermen's activities. Recently, Arts and Music Festivals have been held in the area as initiated by the small community of hostels which have developed a peaceful and respectful symbiosis with the coastal community.

The beach of Liw-liwa is dominated by a blue seascape with soft gray sands. On peak seasons, the height of surfs reach almost 6 feet high. Such is ideal for both debutant and avid surfers.

However, due to the demand of an ever-growing and highly competitive market, the fishermen are wont to use detrimental fishing methods as muroami or dynamite fishing, a practice well-known to be environementally damaging and toxic to both human and marine life.

Another problem is of wastewater and waste disposal of the community dwellers as well as foreigners/ tourists to the area, as opposed to throwing solid waste into the sea, the citizens fo Liw-liwa burn their trash, whether paper or plastic, causing a rise of toxic chemical air pollution.

Design Implications:

Provisions for a an Integrated Coastal Management Program in the site development program can support and further fortify the site's ties to the sea. Also, adopting a Green-Blue Infrastructure Model and employing Ecosystem Services may resolve waste issues and boost local economy and culture, allowingt the current state of the locality to evolve through the site.

LINKS TO VITAL PORTS

CLARK INTERNATIONAL AIRPORT, PAMPANGA (114 KM)
NINOY AQUINO INTERNATIONAL AIRPORT, PASAY, METRO MANILA (210 KM)

ENVIRONMENTAL HAZARDS

COASTAL PROTECTION & HYDRO-METEOROLOGICAL HAZARDS

Typhoons and Storm Surge

Typhoons frequency in Zambales area coming from the east is low due to its mountain ranges blocking the north-easterly winds. While it is free from the north-easterly winds, it is vulnerable to the southeast monsoon and cyclonic typhoons..

During the past 40 years (1946-1985), the region was visited by typhoons averaging 22 surges annually.97 The typhoons that passed through Zambales from 1947-2002 causing peripheral impacts were Trining which occurred from October 16-31, 1991 (wind speed of 204kph, no rainfall data), Yoling in November 17-20, 1970 (wind speed of 200kph, no rainfall data) and Didang in May 12-17, 1976 (wind speed of 150kph, no rainfall data). These typhoons caused deaths and damages to properties worth billions of pesos. Didang killed 374 persons in Iba, Zambales and Yoling resulted in 611 dead persons. The other typhoons that landed in Zambales are Juan (wind speed of 30-60kph, rainfall of 50-65mm), Basyang (wind speed of 65- 145kph, rainfall of 150mm), and Caloy (wind speed of 130-150kph, rainfall of 80- 90mm). These typhoons damaged mostly the agricultural crops of Zambales through flooding and wind throws.

VOLCANO

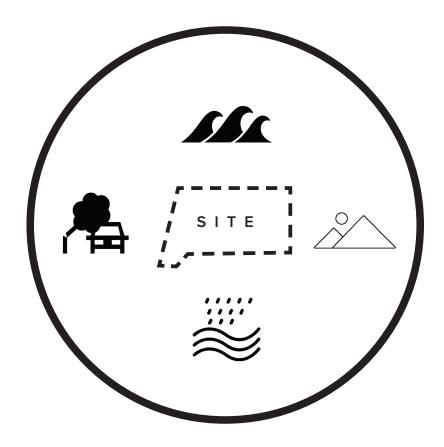
There are two volcanoes found in Zambales. These are Mt. Cuadrado (center at 30.89 km from site), an inactive volcano. The other one is Mt. Pinatubo in Botolan, Zambales (center at 32km from site)

Design Implications:

Critical design and engineering interventions must be integrated and utilized to protect and ensure the safety of the future users of the site with regard to environmental hazards. Being located in a Storm Surge and Flood - prone area, as well as Volcanic eruptions, the site can be made into a buffer zone between town and sea. The community itself can be the breakwater / riparian area / wetlands for hazard regulation by means of ecological symbiosis through the Green-Blue Infrastructure Model.

With a volcano near the site, measures shall be taken equal to that of earthquakes as tremors can occur at the onset of an eruption. Visibility and air quality must be preserved, as well as the roof system (materials and structural) to avoid fire and burning during ashfall.

SYMBIOSIS



The site must maintain balance with the natural environment, not resisting the force of nature, but letting it in, and going with the flow. The site must be versatile by means of creating a symbiotic relationship to its context, especially with regard to its disaster implications.

HISTORY

San Felipe was a little resettlement area during the Pre-Spanish period. It qualified to become a "pueblo" when its population increased caused by the emigration of llocanos from San Vicente, llocandia. These great llocanos' migration, recognized for their visions and courage, their industry and tenacity, were to mold and become burgeoning communities that sowed and cultivated the socio-economic, political and cultural life of the people of the province of Zambales, notwithstanding the whole country.

The Malay Zambas were the first inhabitants of the lowland municipality called Hindol. Hindol was a Zambal Aeta name of a tree abundant in the place. Bobulam was also a kind of tree then abundant at the Public Plaza. San Felipe was named after one of the four 'saintly' brothers that have come from llocandia to settle in the area, thus the other proximal municapalities of San Narciso, San Marcelino, and San Antonio.

The first seat of the "pueblo government" was in Barrio Sindol. The head of the "pueblo" was called "capitan municipal". The seat of the pueblo was later transferred to Bobulon, now the town proper, because it had a wider area for residential purposes. San Felipe was formally founded in 1853. During the whole Spanish period and the early part of the American Regime, San Felipe stood as one town. For purposes of governmental administration, it was incorporated with San Narciso from January 1, 1905 to February 28, 1908, and on March 1, 1908, San Felipe was separated from San Narciso.

Currently it is prided to be the cleanest and greenest town in Central Luzon for 3 consecutive years. A Century Old Tree in Brgy. Maloma adds attraction to this progressive town.

Design Implications:

Ensconcing the roots of the community by way of their culture of building, agriculture, basically their daily life into the site development increases the attraction of the site to both tourists and locals as it aims to respect to the context in which the community shall be living in/with.

Also, being surrounded by hostels and a burgeoning community of both locals and foreigners, interested in the growth and preservation of the coastal area of Barrio Liw-Liwa, the site may profit from becoming the agent of symbiosis due to the presence of dichotonomous demographics that already reside and will reside within the area; **local vs. foreign, young vs. old. and rural vs. urban**

Sto. Niño, San Felipe, Zambales
3641 population

720 787

3641 population **720** male **787** female **767** households Socio-economic Profile

Households sources of income:

Forming/Fishing: 2710 F9 829/

Farming/Fishing: 3,719 • 58.83% Employment: 1,089 • 17.23% Construction works: 316 • 7%

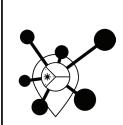
DEMOGRAPHICS

As of 2010, the population of Barangay Sto. Niño is set at 4,246. In 2015, the whole municipality of San Felipe counts **23,183 inhabitants** (a 0.9% increase from 2010) with a density of 540 people per square mile. (Philippine Statistics Authority)

Much of the residents of San Felipe are of Ilocano descent. There are several local Christian churches in the municipality: Methodist, Iglesia Filipina Independiente, and Roman Catholic Church. The local parish is dedicated to San Roque.

There are several private, public and parochial elementary, high schools and a technical college in San Felipe. Within the 111-square kilometer area covered by the municipality, there are over 9 most popular and recognized landmarks and tourist spots namely:

- 1) Century Old Tree
- 2) Coastal Beach Area
- 3) Barrio Liw-liwa
- 4) Nangoloan Falls
- 5) Grotto Falls
- 6) Benedictine Retreat House
- 7) Sabangan of the North
- 8) Brandenburg Resort
- 9) Montecruz Beach Resort



An opportunity for responsible market tourism can also be tapped for this opportunity, and the Zambales LGU prides itself as "A perfect gateway where sun, sea, and sand combine for unforgettable vacations".

ECONOMY AND TOURISM

Tourism plays a large role in the economy of Zambales. Local and foreign tourist flock its many beaches creating many job opportunities and contributing to the economy. Most of the province is still agricultural but there are considerable industrial zones that provide jobs not just for residents of Zambales but also for neighboring provinces. Mining has recently been booming in Zambales where there is an abundant deposit of Nickel and other minerals. Zambales is basically an agricultural province. The chief products are rice, corn, vegetables, and root crops. Major industries include farming, fishing, and mining.

TOURISTIC ACTIVITIES

A myriad of activities have been identified and associated with San Felipe, specifically Liw-liwa in which the site is located. Considered one of th most laidback surfing spots in the region as well as the country, it also accommodates.

TREKKING SURFING CAMPING HIKING SWIMMING BEACH-BUMMING TREE PLANTING w/ TRIBES

MARINE-RELATED ECONOMY

The Ilocanos initiated the settlements that subsequently developed into the agricultural towns of Castillejos, San Marcelino, San Antonio, and the **agro-fishing towns of San Felipe**, Cabangan, and the Southern part of Botolan.

About 52 km south of Iba is Subic Bay, an area that has been spared from the devastating effects of lahar. The coastal zone still supports seagrass, coral reef, and reef fish communities. These areas are potential sources of seeds, larvae, and fry that can repopulate the near-shore area once the sediment becomes stable. The highlights for the seagrass, coral reef and coral reef fish assembly of the 2001 Resource Inventory Report by Woodward-Clyde for the Subic Bay Metropolitan Authrority (SBMA) is presented here.

Sustenance Fishing

In the same Resource Inventory Report, Woodward Clyde reported a total of 49 fish species belonging to 27 Families observed in landing site and market surveys. A total of nine invertebrates (squid, crabs, bivalves, and jelly fish) were recorded from the surveys and experimental fishing conducted. A comparative report for the second quarters of 2001 and 2002 for the both the municipal and commercial fishing identified the same ten fin fish harvested by fishermen. For the municipal fishers, the yellowfin tuna (6.2%) ranked first followed by skipjack tuna (3.9%). An opposite ranking was observed for the commercial fishers, skipjack (40.2%) ranked first, whereas yellowfin tuna (17.7%) ranked second. Crabs and squids were also caught in significant quantities by the municipal fishers.

Interviews conducted in San Narciso (La Paz), Botolan (Porac) and San Felipe (Maloma) showed that most fish caught are small pelagics and reef associated. Flying fish (burador), Indian anchovy (dilis), round scad (galungong), Spanish mackerel (tanigue), threadfin bream (bisugo) are the common fish species that are caught along the coast. Although snappers (maya-maya) and groupers (sigapo) are associated with coral reefs, they have also been reported to be caught from the coastal waters off La Paz to Cabangan. Depending on the season, catch composition varies also. Further, the fishermen also noted that although there were several fish species lost such as fusiliers (dalagang bukid), barracuda and hasa-hasa, there was an increase in the volume of catch of espada.

The volume of catch ranges from 1 to 150 kg, with the highest recorded for La Paz and the lowest from Lapaz and Maloma. A 3 hr operation of seine which involves about ten persons may yield a catch of 50 kgs. When asked whether there was a drastic decrease in catch volume, the fishermen gave opposing views, from no impact to fishery to high impact to fishery.

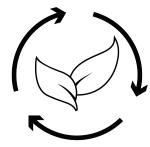
The survey also showed that nets, hook and line or long line, and traps are being used by sustenance fishermen. The nets include gillnets or pante either submerged or floating and seine or pukot. The lines include hook and line or kawil, longline or kitang. Use of these lines are enhanced by beating the water surface to force the fish to move towards the direction of the gears, an activity locally called timbog. Fish pots for crabs and fish corral are the only passive gears being used by the fishermen. There are also some reports that fish poison is being used in San Narciso.

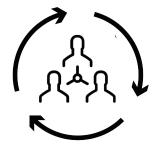
Design Implications:

With an uncertain future for the agricultural and fishing industry of the Philippines, due to lack in both governmental and technological advancement support, interventions in food storage, farming, and issues in sustainabilities must be taken into account in the site as it shall be part in running the locality of Sto. Niño, Zambales, staking in long term effects of the site development to improve the coast and the quality of life of those living in it, and in turn may be replicated in other areas in the province or even the whole Philippines.

sustainabilities







agro-fishing sustainabilities livelihoods,

sustainabilties could be tourism, and

and attained culture

coastal through (ecosystem

al community ugh ecological ystem services)



On a personal account, the proponent of the project aims to establish a community that serves its growing self by serving the environment. The existing coastal community can teach future users of the site the refluent ways of its culture, how the sea and living by it inspires and exhilirates, as well as gives the people a living; that it must be understood, protected and preserved, as well as celebrated.

The site in Barrio Liw-Liwa, Sto. Niño, San Felipe has proven to be a feasible and viable site for this Coastal Refluent Village, wherein the values of ecology can be presented, preserved, for a sustainable future as a system that can be annexed to coastal communities. It celebrates diversity, cross-cultural and intergenerational relationships, and the appreciation of the roots of sustenance itself. Integrating ecological linkages and harmony into the coastal landscape of Zambales has already begun with the existence of youth hostels and movements already working in the area that welcomes young people and the community to be more aware of the marine environment, as well as the local community itself.

As resources dwindle, the sleepy, unassuming town of Sto. Niño can soon be a model for sustainability in an aging and fast-paced world, respecting and enriching the community it shall be lodged in.