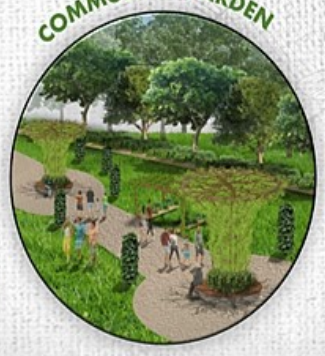
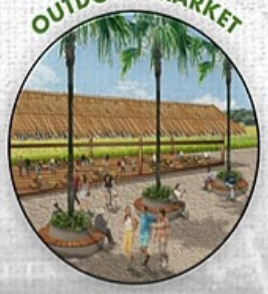
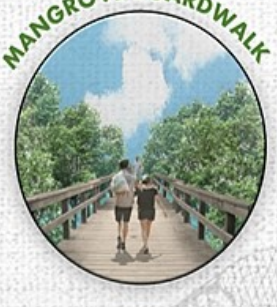
Deforestation to Diversification:

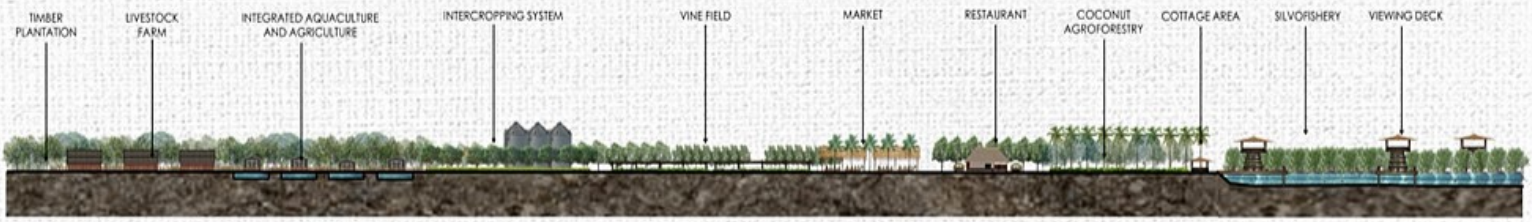
Natural Forest Conservation in Puerto Princesa City, Palawan by Integrating Forestry, Agriculture and Aquaculture through Diversified Sustainable Landscape Design

2019-06074| Aegirine Rei M. Taylan
L ARCH 132| Prof. Madonna P. Danao

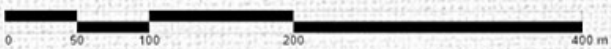


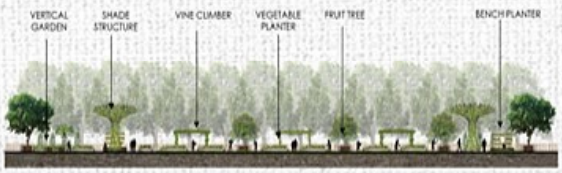






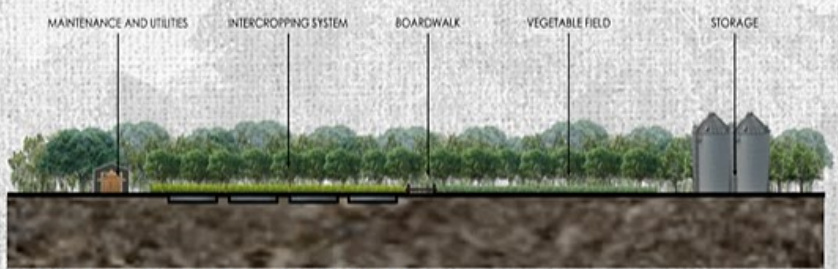
LONGITUDINAL SECTION-ELEVATION



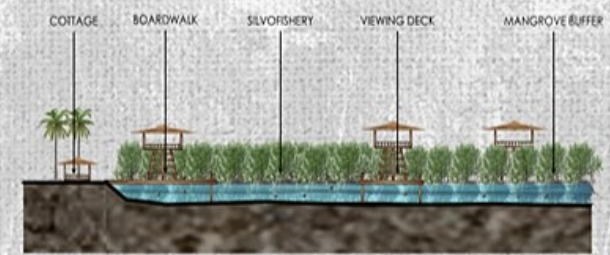


COMMUNITY GARDEN SECTION-ELEVATION

MARKET SECTION-ELEVATION



CROSS SECTION-ELEVATION



MANGROVE BOARDWALK SECTION-ELEVATION

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ABSTRACT

In the Philippines, Puerto Princesa City is known to be the capital city of the Palawan which is known to be the "Last Ecological Frontier" since it contains the largest remaining expanse of unbroken forest cover in the Philippines serves refuge to diverse species of flora and fauna and provides essential goods and services to the environment and to the local community. These services include maintaining balance on the hydrologic cycle, providing important buffer against climate change, and preserving the biodiversity of the island. Despite the services it offers to the environment and the local community, many decades have passed, its forest has been threatened by illegal logging and agricultural colonization as numerous migrants throughout the Philippines settle annually in the island's forested uplands. As the population in the island continuous to grow without sustainable source of livelihood, the island will continue losing forest lands. For that reason, the study aims to introduce a diversified sustainable landscape design approach to natural forest conservation by integrating forestry, agriculture, and aquaculture. Through this, efficient production of goods and optimal use of resources could be achieved and sustainable livelihood for the people could be provided to avoid relying on destructive activities thus, conserving and preserving the existing natural forests in the city. Theories that will be used for the development are Diversity-Stability Hypothesis, Forest Transition Theory and Land Sharing-Sparing Theory. Though applying these theories in the development together with appropriate design strategies and technologies, services offered by development could be maximized thus, promoting multifunctionality of the space, offering better life for people as well as providing positive impacts to the environment.

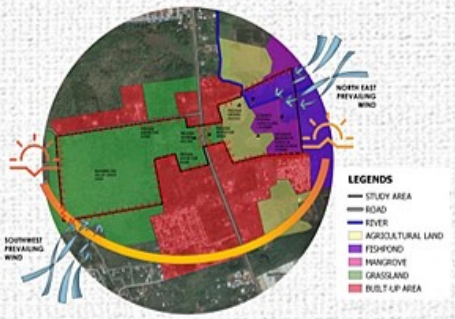
SITE ANALYSIS

STRENGTHS
- She is accessible to the people
- She has an existing mangrove forest
- She is located near water bodies
- She has fertile lands for agriculture
- She has a relatively flat slope

WEAKNESSES
- She is located in place with a uniform high temperature
- The site lacks defined accessways

OPPORTUNITIES
- She has plenty of space to be developed into multi-functional agricultural landscape
- Existing agricultural systems within the site can be connected
- Existing waterbodies around and within the site could be integrated in the design for irrigation
- The shs is easily accessible to the public which could also boost the economy and promote tourism in the city

THREATS
- Some part of the site are prone to noise since it is surrounded built-up areas and the highway
- If not maintained properly, the design may cause disturbance to existing waterbodies and mangrove forest
- She is located along the highway which makes it prone to accidents



DESIGN CONCEPT

Coconut tree is one of the major crops in Puerto Princesa City, Palawan. In the Filipino context, coconut tree is referred as the "Tree of Life" because of its versatility as all parts of the entire tree can be used to sustain human life. Since the goal of the study is to create a landscape design that would provide sustainable livelihood for the people in order to conserve the natural forest, coconut tree would be used as the design concept. The characteristic of coconut tree being versatile would be translated in the design through the integration and diversification of different farming systems in order to maximize the production for each system with efficiency.

FORM COMPOSITION

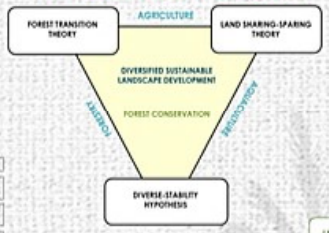
The form composition of the design would be inspired by the linear shape of the coconut leaves so rectilinear form was used in the design and elements will be inspired by different forms that can be observed in a coconut tree.

SITE DESCRIPTION

The site is located in Barangay Tagburos in Puerto Princesa City, which is known as the "City In Forest" and the capital of Palawan, where unique species of flora and fauna can be found in its natural forests. The site has an area of 26.7 hectares surrounded by built-up areas, fishponds, and mangrove forests. Within the study area are existing grassland, agricultural land, fishponds, and mangrove forest. These various types of land use within the study area makes it suitable for diversified sustainable landscape design where forestry, agriculture and aquaculture can be integrated. Furthermore, its proximity to the residential areas will make the design more functional and effective.

RESEARCH DESIGN

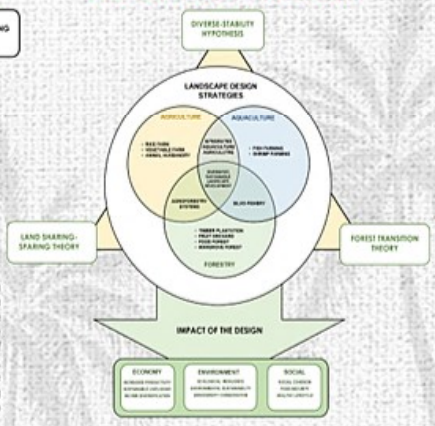
THEORETICAL FRAMEORK



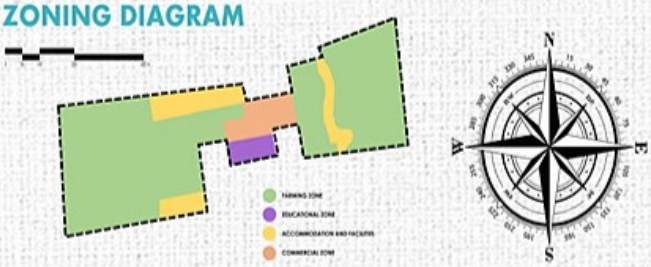
GOAL OF THE STUDY

The study aims to conserve the natural forests in Puerto Princesa, Palawan through providing a multi-functional diversified sustainable landscape development that would maximize the productivity of goods and optimize the use of resources through integrating forestry, agriculture, and aquaculture as well as provide sustainable livelihood opportunities through diversifying income for the community to avoid resorting to activities that leads to destruction of the forest.

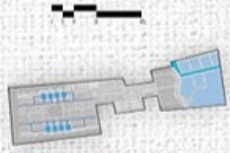
CONCEPTUAL FRAMEWORK



ZONING DIAGRAM



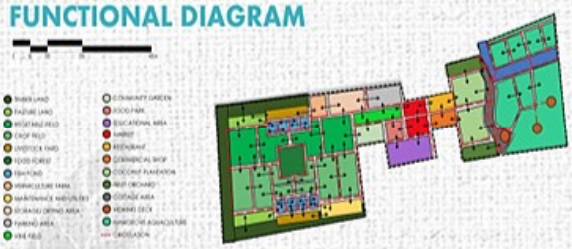
DESIGN LAYERS

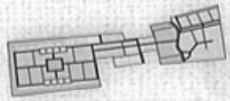


WATER SYSTEM
- MANGROVE AQUACULTURE
- INTEGRATED FISH FARM
- RIVER
- CANAL

GREEN SPACES
- RICE FIELD
- VEGETABLE FIELD
- TIMBER LAND
- FRUIT ORCHARD
- PASTURE LAND
- FOOD FOREST
- MANGROVE AREA
- RECREATIONAL AREA
- COCONUT PLANTATION

FUNCTIONAL DIAGRAM





CIRCULATION SYSTEM
- PRIMARY CIRCULATION
- SECONDARY CIRCULATION

BUILT-UP SPACES
- BUILT-UP SPACES

LEGENDS

1. TIMBER LAND
2. PASTURE LAND
3. VEGETABLE FIELD
4. CROP FIELD
5. LIVESTOCK YARD
6. FOOD FOREST
7. FISH POND
8. VERMICULTURE FARM
9. MAINTENANCE AND UTILITIES
10. STORAGE/ DRYING AREA
11. PARKING AREA
12. VINE FIELD
13. COMMUNITY GARDEN
14. FOOD PARK
15. EDUCATIONAL AREA
16. MARKET
17. RESTAURANT
18. COMMERCIAL SHOP
19. COCONUT PLANTATION
20. FRUIT ORCHARD
21. COTTAGE AREA
22. VIEWING DECK
23. MANGROVE AQUACULTURE
24. BOARDWALK

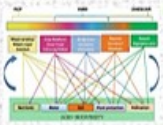
SITE DEVELOPMENT PLAN

DESIGN STRATEGIES

SUSTAINABLE DEVELOPMENT

One of the Sustainable Development Goals, specifically the SDG 15, aims to protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

DIVERSIFIED FARMING SYSTEM



Diversified farming system intentionally includes functional biodiversity at multiple spatial, and/or temporal scales, through practices developed via traditional and agroecological scientific knowledge. Farmers manage this functional biodiversity to generate critical ecosystem services to agriculture.

CONSERVATION AGRICULTURE

Conservation Agriculture (CA) is a farming system that can prevent losses of arable land while regenerating degraded lands. It promotes maintenance of a permanent soil cover, minimum soil disturbance, and diversification of plant species. It enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and to improved and sustained crop production.

INTEGRATED FARMING SYSTEM

Integrated farming system is an agricultural system which combines the activities of crops and horticulture, animal husbandry, fishery, forestry and other sciences related to agriculture within an area simultaneously or a time.

- **INTEGRATED AQUACULTURE AND AGRICULTURE (IAA)**

IAA farming is generally the introduction of aquaculture component into an agriculture system, though it could be the other way around.

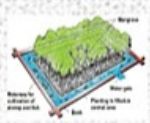
- **AGROFORESTRY**

Agroforestry systems are land management practices in which trees and shrubs are produced on the same land area as agricultural crops or livestock.

- **ALLEY CROPPING**- means planting crops between rows of trees to provide income while the trees mature.

- **FOREST FARMING**- operations grow food, herbal, botanical, or decorative crops under a forest canopy that is managed to provide ideal shade levels as well as other products.

- **SILVOPASTURE**- combines trees with livestock and their forages on one piece of land.



- **SILVO-FISHERY**- is a form of integrated mangrove tree culture with brackish water. It is an agroforestry pattern used in the implementation of social forestry programs in densely populated mangrove forests.