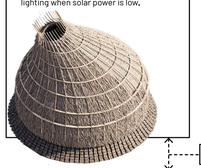
PROGRAM (Components of the Marou Village Ecosystem)

The Marou Village ecosystem is built on interconnected, regenerative systems where energy, water, waste, and food cycles support one another. Key components include solar-powered energy towers, water harvesting and filtration systems, agricultural land, aquaculture ponds, insect and livestock farms, biogas facilities, and community spaces - all working together to create a resilient, self-sufficient environment.

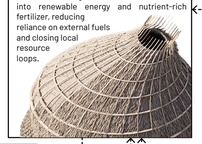
9 BIOGAS STORAGE

Biogas storage holds gas from the digester, offering backup energy for cooking and lighting when solar power is low.



8 BIOGAS DIGESTER

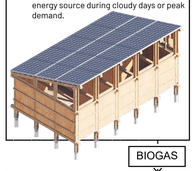
The biogas digester converts organic waste—from animals, agriculture, and households—into renewable energy and nutrient-rich fertilizer, reducing reliance on external fuels and closing local resource loops.



Additional livestock and farmland improve food security, reduce imports, and support local income. They also enable natural waste reuse and sustainable farming cycles.

10 BIOGAS GENERATOR

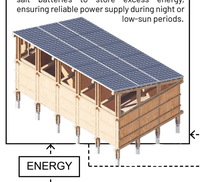
The biogas generator converts stored gas into electricity, providing an alternative energy source during cloudy days or peak demand.



Sanitation in Marou Village is currently basic and decentralized, often consisting of pit latrines or simple outdoor structures without proper sanitation system.

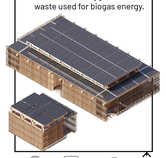
11 ELECTRICITY STORAGE

The electricity storage system uses molten salt batteries to store excess energy, ensuring reliable power supply during night or low-sun periods.



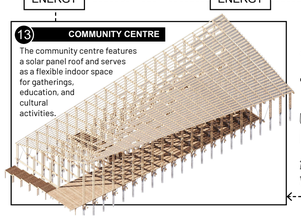
12 PUBLIC TOILET

Public toilets and showers offer basic hygiene, with waste used for biogas energy.



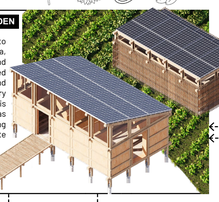
13 COMMUNITY CENTRE

The community centre features a solar panel roof and serves as a flexible indoor space for gatherings, education, and cultural activities.



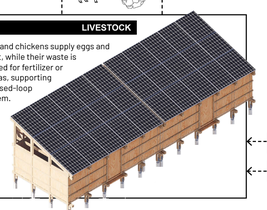
4 SEASONAL GARDEN

Designated plots allow residents to cultivate local crops such as cassava, taro, sweet potatoes, bananas, and leafy greens. These fields are irrigated using stored water from the pond system, ensuring resilience during dry seasons. Organic waste from farming is repurposed for biogas production, or as feed for animals and insects, supporting a circular system that minimizes waste and enhances food security.



7 LIVESTOCK

Pigs and chickens supply eggs and meat, while their waste is reused for fertilizer or biogas, supporting a closed-loop system.



5 BIO WASTE

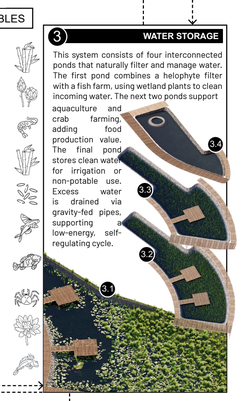
All organic, human, and animal waste is collected and processed on-site. Depending on type and quality, waste is converted into natural fertilizer, used for biogas production, or repurposed as feed for animals and insects—ensuring nothing is wasted and all resources support the village ecosystem.

6 INSECTS FARM

Insect and bee farms support food systems and biodiversity. Bees aid pollination and honey production, while insects process waste and provide animal feed and fishing bait.

3 WATER STORAGE

This system consists of four interconnected ponds that naturally filter and manage water. The first pond combines a helophyte filter with a fish farm, using wetland plants to clean incoming water. The next two ponds support aquaculture and crab farming, adding food production value. The final pond stores clean water for irrigation or non-potable use. Excess water is drained via gravity-fed pipes, supporting a low-energy, self-regulating cycle.



Crabs in rice fields aerate th soil and control pests, while feeding on plant matter. Fish in helophyte filters help purify water by consuming algae and waste.

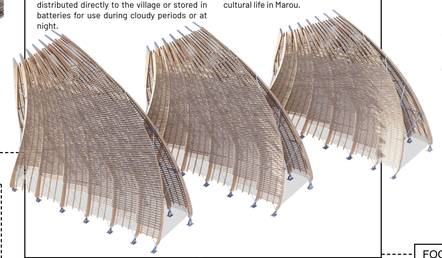
1 ENERGY TOWERS (BURE KALOU - SPIRIT HOUSES)

The Energy Towers are the project's central feature, inspired by traditional Bure Kalou and Fijian boats. They combine solar energy production and water harvesting in a climate-resilient form.

Each tower's north-facing facade is equipped with solar panels, maximizing sun exposure for efficient electricity generation. This energy is distributed directly to the village or stored in batteries for use during cloudy periods or at night.

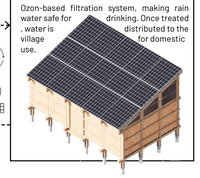
The surface of the towers is wrapped in a special mesh designed to harvest both rain and fog, capturing water that is channeled down into a filtration and storage system.

Each tower also includes indoor spaces for community gatherings, workshops, or shelter, strengthening social and cultural life in Marou.



2 WATER FILTRATION UNIT

Ozon-based filtration system, making rain water safe for drinking. Once treated , water is distributed to the village for domestic use.



RAIN WATER
GRAVITATIONAL WATER
ANIMAL WASTE
FERTILIZER
WATER
BIO WASTE
VEGETABLES
PETFOOD
PETFOOD
BIOGAS
BIOGAS
HUMAN WASTE
SORTED BIO WASTE
INSECTS FOOD
FISH FOOD
HONEY
FISHING BAIT
WATER
ENERGY
ENERGY
ENERGY
ENERGY
RAIN WATER
FOG HARVESTED WATER
FOG HARVESTED WATER
RAIN WATER
FISH
RICE
CRABS
WATER
FILTERED WATER
RESIDENTS

MAROU VILLAGE

COMMUNITY (Sustainability + Traditions + Material Ecology)

MATERIAL ECOLOGY

The design prioritizes the use of local, biodegradable materials sourced directly from Naviti Island. This approach reduces the need for long-distance transportation, significantly lowering construction costs and carbon emissions, while also supporting local businesses and traditional economies. The material palette includes durable native wood for structural framing, thatch from sago palm or coconut leaves for roofing, lashings made from coconut fiber (magimagi) to tie smaller beams, and locally sourced stone and clay for foundations and stormwater protection features. These materials are not only ecologically appropriate but also culturally rooted, drawing from generations of Fijian building knowledge.

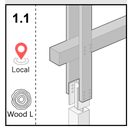
By using familiar materials and techniques, the construction process becomes more accessible to the community. Residents can actively participate in the construction and maintenance of the project, fostering local ownership and long-term sustainability.

MAIN MATERIAL GROUPS:

WOOD L · WOOD S/M · THATCH · LASHING · CLAY · STONE · STEEL · TECHNOLOGIES

MATERIAL EFFICIENCY IN CONSTRUCTION:

STRUCTURAL ELEMENTS



Usage:
- Structural frames
- Structural posts

Material:
- Vesi (Intsia bijuga wood)
- Dakua (Agathis bijuga)

SECONDARY STRUCTURES

Usage:
- Structural elements of walls, roofs and floors

Material:
- Coconut palm
- Rosawa, Kauvula, Yaka

FACADE SYSTEMS

Usage:
- Facades, floors and decorative elements

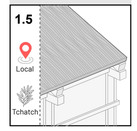
Material:
- Bamboo stem
- Bamboo fiber

LASHING

Usage:
- Nails - Lashings
- Tie beam structures

Material:
- Coconut fiber ropes
- Magimagi

ROOFING SYSTEMS



Usage:
- Roofing material
- Shockproof cover

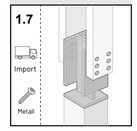
Material:
- Sago palm
- Coconut palm leaves

FOUNDATION

Usage:
- Foundation, reinforsing, stormwater protection

Material:
- Stone or coral stone
- Earth - packed base

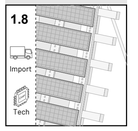
STEEL CONNECTIONS



Usage:
- Foundation
- Wood framing

Material:
- Carbon steel
- Stainless steel

TECHNOLOGIES



Usage:
- Facade and roofing
- Indoor

Material:
- UV Solar pannels
- Filtration systems

TRANSPORTATION:

ISN'T NEEDED

1. LOWER MATERIAL COSTS
Locally sourced materials reduce overall construction expenses by minimizing purchase and transport costs.

2. SUPPORT FOR COMMUNITIES
Utilizing local materials preserves traditional skills, strengthens local economies, and creates job opportunities for local communities.

3. REDUCED CO² EMISSIONS
Avoiding long-distance shipping significantly cuts greenhouse gas emissions associated with transportation.

4. SIMPLIFIED LOGISTICS
On-island resource availability eases delivery challenges and construction planning in a remote location.

NEEDED

5. EXTERNAL SUPPLY
Non-local materials must be shipped from Viti Levu or imported from abroad, increasing vulnerability to delays, higher costs, and logistical complications.

ON-SITE IMPLEMENTATION AND ADAPTATION:

1. MATERIAL RECOVERY
Using modular parts streamlines construction, reduces costs, and minimizes errors.

2. MODULARITY AND COMPONENTS
Focus on material reuse and biodegradable options to reduce waste and enhance sustainability.

3. ADAPTIVE SPACES
Design flexible spaces that serve multiple functions, from energy production to recreation and agriculture.

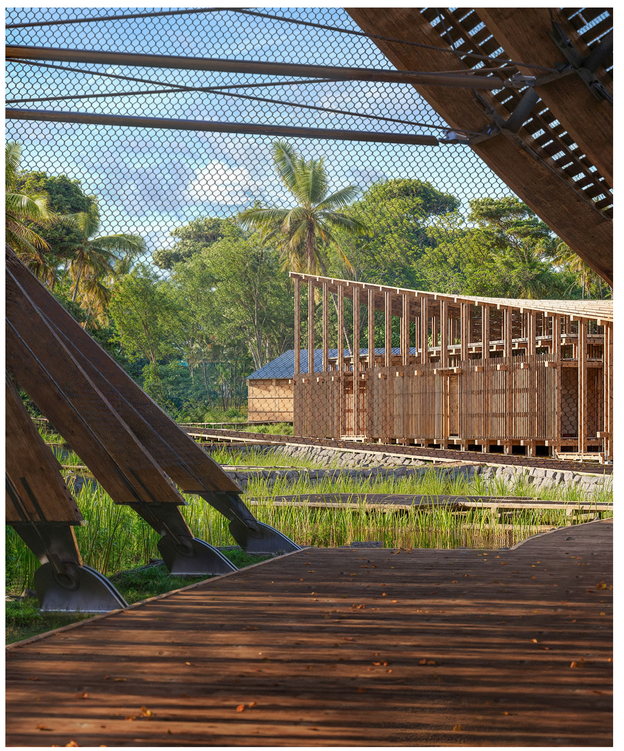
4. LOCAL MATERIALS
Prioritize locally sourced materials to cut costs, reduce carbon emissions, and connect with the environment.

5. TRADITIONAL CONSTRUCTION
Integrate local building traditions to ensure cultural relevance and community familiarity. Preserving the heritage while adapting to modern needs.

6. COMMUNITY ENGAGEMENT
Involving locals in both the construction and ongoing operations fosters a sense of ownership, valuable skills transfer and empowerment.

7. MUTUAL LEARNING
Encourage the exchange of knowledge to improve technical skills, cultural understanding and share traditional practices.

8. PERSONAL INVESTMENT
Foster a sense of pride and responsibility in the community for the long-term success of the project. Personal connection to the project

BUILDING UP COMMUNITY:

1. SHARED SPACE
Supports group meetings, cultural practices, communal meals, and possibly workshops or classes. It strengthens local bonds, fosters knowledge-sharing, and promotes a more sustainable lifestyle centered around the village itself.