Land Art Generator

The proposed system integrates low-impact technologies tailored to the climatic, ecological, and cultural context of Marou. It is based on rainwater harvesting, solar energy generation, natural filtration, efficient storage, and modular construction using local materials. These technologies were selected for their low cost, local availability, ease of maintenance, and resilience to extreme conditions.

Each module features a concave spiral roof that channels rainwater into a soakaway infiltration system. This underground solution takes advantage of the natural slope and protects the resource from contaminants and evaporation, while also serving as structural counterweight. The catchment surface per module is 69.44 m^2, allowing for an estimated annual collection of 137.22 m^3 of water. With 12 modules, the system collects approximately 1,646.63 m^3 per year. The total storage capacity is 300 m^3, ensuring water supply during the dry season and providing a safety margin against extreme rainfall events.

In parallel, the power generation system uses crystalline silicon solar panels mounted on handwoven palm latticework. Each module has 55.55 m^2 of solar surface, with a tilt angle of 18° and an azimuth of 0°. According to the Fiji Power Potential Map by the World Bank Group, the complete installation (12 modules) delivers an estimated 192,720 kWh per year, with a total installed capacity of 120 kWp. To ensure uninterrupted off-grid operation during periods of low solar irradiance, the energy storage system has been sized at approximately 611.25 kWh—enough to provide two full days of autonomy without solar input, based on a daily demand of 244 kWh for community operations.

Solar surface

55.55 m^2 / Module

According to the Fiji Power Potential Map by the World Bank

1607 kWh/kWp / year

Energy production

192,720 kWh / year

Energy Storage

611.25 kWh

Daily Demand

244 kWh

The catchment surface per module:

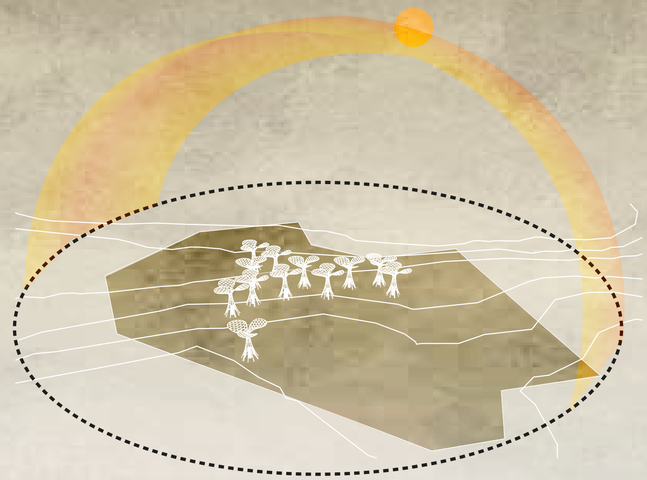
69.44 m^2

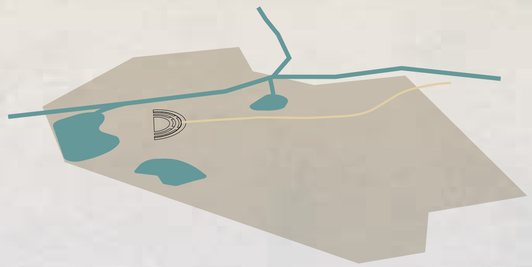
Annual water collection:

137.22 m^3

With 12 modules, the system collects approximately

1,646.63 m^3 / year





Storage capacity

300 m^3

Water Filtration

Collected water is filtered using activated carbon made from coconut shells, a local agricultural residue with high adsorption capacity.

This system removes contaminants such as chlorine, pesticides, heavy metals, and organic compounds, ensuring safe water for domestic use. Filter replacement is estimated every 6 to 12 months depending on water quality, with basic monitoring in place to optimize replacement intervals.

The modular design of the installation prioritizes simplicity, durability, and community ownership to ensure long-term operability and resilience.

Each module integrates low-maintenance technologies such as crystalline silicon solar panels and rainwater harvesting systems with passive filtration (e.g., activated carbon), designed to function autonomously with minimal intervention. Structural components made from bamboo, palm, and weather-resistant steel were selected for their robustness, local availability, and ease of replacement or repair using community resources.

Rain Gardens

Based on an analysis of natural watercourses during the rainy season, two perpendicular swales were designed and implemented to efficiently redirect and distribute stormwater flow toward rain gardens with high infiltration capacity. These green infrastructure elements help mitigate flood risk and promote aquifer recharge, integrating the collection system into the local hydrological cycle.

The placement of the rain gardens was determined through a hydrological vulnerability assessment, identifying critical zones with a high likelihood of flooding to maximize their functional effectiveness