**LAGI 2025 Fiji Narrative Template**

1. **Concept Narrative**

**Remote and hard-to-reach places like Marou in Fiji face challenges, yet the people's sense of place and love for where they live is palpable. To sustain such small societies and their cultures, it is sensitive to offer outside help, seemingly at odds with the large-scale project required to create the right energy source. However, making this accessible and understandable makes it more accommodating for them.**

**In our concept, we have tried to create a modular system that allows for the involvement of such communities, not only in terms of the construction system, but also in terms of use. By varying the units as detailed later, the community can feel ownership of the resulting project through participation.**

**For Marou, the project must be as efficient and practical as possible, while ensuring that the money is used responsibly. We have therefore chosen a cost-effective photovoltaic crystalline solution to harness solar energy to achieve the highest possible output. The units will be mounted on low pitched roofs with a 16-degree angle to the sunlight and the area underneath will be used for agricultural purposes. This will take advantage of the shaded area created by the solar panels and create a source of income and employment for the villagers. The area of the solar park needed in Marou is just the right size to create a commercial vanilla farm under it. We will also collect rainwater from solar panels.**

**The supporting structure for the roofs supporting the solar panels is made of mahogany. A piece of the roof and the supporting structure form a single unit, which are assembled side by side to form the vanilla farm. These units also create additional necessary spaces for the workers, such as a dining area, rest area, tool storage, water purification and water intake area. There is also the possibility of creating a unit that will give tourists and school groups visiting as part of an educational program an insight into the life of the vanilla farm and the operation of the solar park. To serve the solar panel system, the storage units can also house the necessary inverter and battery, as well as a tank for the collected rainwater.**

**Our aim is to build the solar farm to generate energy and rainwater harvesting for Marou, to make the technology acceptable to the community, to create a quality job and income stream by building the solar farm, and to engage the community during the project with a variable module system.**

1. **Technical Narrative**

**The solar farm is a 75 kWp mini-grid, island-powered system. Its units are 178 times 1.95 m × 2.05 m photovoltaic silicon-crystalline cells of 421 W each, mounted side by side on a support structure, facing north at an angle of 16 degrees. This technology is cost-effective and results in one of the best performing systems available. It is complemented by an inverter and a battery, which are in a highly protected, watertight location. The water draining from the solar panels is channeled into a water tank on a gravity basis. To create potable water for the workers on the vanilla farm, SODIS purification is possible, and to create additional potable water, water purification methods currently used in households and public buildings can be applied.**

**Navity Island's estimated solar photovoltaic power generation potential is 4.4 kWp, i.e. a 75 kWp system can produce max 330 kwh per day and max 7070 kWh per year. The gravity water harvesting system can achieve a water yield of 2.5-3.1 m³/day (based on an annual average). In line with the module system, this can be collected in 15 m3 tanks (2 m × 3 m × 2.5 m), of which we propose to install at least 3, which can store 45 m3 of water at a time.**

**The support structure is made of mahogany, specifically Swietenia macrophylla (Meliaceae). Fiji has been growing mahogany since 1910, so we use it to support local farms. Mahogany is easy to work with and has excellent finishing qualities and dimensional stability. Sands to a very fine finish and will take a good polish. Mahogany is also one of the most resistant woods to cyclones in its lifetime, making it suitable for structural use. The cross-section of the beams of the support structure is 100 mm × 150 mm, available. To build the structure, reinforced concrete is needed to create the foundation and the watertight space needed for the battery and inverter. To prevent damage caused by coconut balls during cyclones, metal grids will be fixed to the side walls of the structure.**

**Vanilla is grown on a soil-based vertical farm. It is ideal for cultivation under a solar park because it prefers a tropical climate (25-35 °C), high humidity (80-90 %) and shady bends. Out of 500 vanilla vines (here 144 vertical supports), the project area can produce roughly 1000 kg of green vanilla beans in 8-9 months, which is already optimal for commercial purposes. For the placement of the plants, circular posts with a diameter of 100-150 mm, saturated with soil and placed in a 1 m × 2.5 m grid, are ideal. At the foot of 2 m high poles, beds of about 800 mm diameter and 300-400 mm high are often created, which are also useful here to protect against occasional ground water. Each column contains 3-4 vanilla tubes which, creeping plants, run on a wire mesh between the vertical containers and the columns of the supporting structure. Growing vanilla requires a lot of manual labour, so local labour is useful.**

1. **Prototyping and Pilot Implementation Statement**

**The prototype we have created is a single module. The roof is 3 m × 4 m with a 16-degree pitch, on which 6 solar panels can be mounted. The roof is supported by two posts. Separate provision is made for bracing and a grid on one side for demonstration purposes and a channel running along the edge of the roof.**

**To help the community, a workshop will be held on the general installation and maintenance of mahogany timber and the techniques for creating the module. In addition, we will hold a creative brainstorming workshop on the creative design of dining, resting and community space that can be created in the modules. We will create a prototype of the basic unit for vanilla cultivation, i.e. vertical support on a plinth, and introduce them to the technique and benefits of SODIS cleaning.**

1. **Operations and Maintenance Statement**

**To maintain the structure, the structural timber should be UV protected when it is made and during use, it should be checked annually for any cracks and surface treated once a year. This requires an extra labourer once a year, but it is possible that farm workers can do the job with the help of a specialist.**

**The surfaces of the solar panels should be cleaned 2-3 times a year, in the morning or evening, to remove dust, pollen, leaves, bird droppings and other contaminants that are not helped by a dusty environment but are helped by frequent rainfall. You will need water and possibly a mild detergent, as well as soft-bristled brushes and brooms. The cleaning of the solar panels can be done by community members. Once a year, a professional should check the condition of the battery and inverter to ensure reliable operation.**

1. **Environmental Impact Assessment**

**This agro-voltaic system, which is a combination of a solar farm and a vanilla farm, could even have a positive impact on the ecology of the area, but it needs to be carefully thought through.**

**The ecosystem could be affected by several things related to the project. Changed light conditions could affect the local flora outside the intervention area, especially for the species present. Cooler air below the panels and heat above the panels may even affect the microclimate. Rainwater harvesting is positive, but overflow of uncollected rainwater risks creating stagnant water in the area, leading to an overgrowth of insects and mosquitoes. In addition, construction and human presence may alter biodiversity in the area, e.g. disturbing ground-dwelling insects and nesting birds. In addition, during the maintenance of the structure and the solar panels, pollutants may be released into the environment.**

**To mitigate the negative impacts mentioned above, it may be worthwhile to carry out an ecological impact assessment and to educate residents about the correct approach. Water treatment needs to be made sustainable; shade planting needs to be optimized so that it is good for vanilla crops, but also light corridors for wildlife on the water, and native plants can be reintroduced for biodiversity. Maintenance should be carried out with care to ensure that cleaning products are used sparingly or avoided altogether.**

**The aim is to live in harmony with the ecosystem.**