Bamboo grove

Our main vision was formed by palm trees offering shade from the sun, and the bamboo groves that are a playful and exciting experience, where you can wander in this natural labyrinth. We aimed to design a space which recreates this atmosphere. Our project offers a shaded communal space for the locals and tourists alike, meanwhile supporting the solar panels and collecting rainwater.

In our project we aim to use bamboo as a locally available building material, which can be familiar to the village’s community. Bamboo usage is also encouraged by the Fiji government ( <https://www.pidf.int/bamboo/> ). This gives the chance to minimize the amount of shipped materials, and to give an opportunity to the locals to shape the final project. The additional materials are mostly for the technological part, like the ground bolts for stability, the water tank, and the filtration system and the solar panels. Optional walls can be added between the bamboo pillars, by using palm tree leaves, the bamboo itself, and other local materials, so they can be built in and removed, as the community needs it.

In the shaded area we plan to add hammocks, hammock chairs, benches and other kind of equipment for creating a lounging area, where locals and tourists can both spend time.

We wanted to incorporate the local culture somehow, and discovered Fiji’s unique weaving patterns, and decided to include textiles with them, as a decorative feature on the underside of the rainwater collecting cones, and possibly as a space divider.

Our project contains a dual aim system, with solar panels placed on top, and a rainwater collecting cone under it (basically a waterproof lining with a bit of bracing for structure inside the bamboo cone), so the water from the panels can be collected. The panels would be placed on a bamboo grid, with some spacing between two panels, to allow the rain to pour down among them. Any necessary cable and wiring can be fastened to the bamboo grid and then the pillars when directed down, to a secluded area among the pillars, where the inverter and the batteries are placed. The water is directed down next to the pillars in several smaller diameter pipes – not to stand out among the bamboo – then drained into tanks, while undergoing necessary filtering, to be able to be used as drinking water. These water tanks are planned to be placed underground, to protect them from the elements, and the wildlife. This is to be only part of the design, which needs excessive earthwork and concrete. If needed, later it could be connected to a larger cistern, located in the village for easier access.

Considering local climate datas, we estimate that one of these cones with the panels above (roughly 2,5 m x 2,5 m) can generate approximately 10 350 kWh energy and collect 37 500 liters of rainwater in a year, with an estimated 28 kWh per day and 3120 liters in a month. These numbers can excessively change considering the time of the year, as it is logical from the weather datas, therefore we used rough average for every data in the calculations.

The installation can be later extended as needed by adding other modules to the already existing ones, expanding the ‘bamboo grove’.

As mentioned above, most of the projects aimed to be possible to build for the community, which involves them in the project from the beginning, and offers them insight into the system, its quirks, while giving the local community the ability to maintain and potentially expand the project, and also to see it more like their creation, their own, opposed to a foreign project.

In the prototyping process we would build one module, to see how much the local community can collaborate in the process, and to get more exact numbers for the energy and water generation for a module, so the final installation can be adjusted in any kind. In the same way it would give us an opportunity to see whether there is any kind of technological problem or mishap, which did not come up during the design process.

The project is planned to operate as little interventions as possible normally. Most of the maintenance is to keep the solar panels clean, check and repair the wiring if needed and to operate the water filtration system, all of them are something the locals already are doing with their own water collecting systems and the existing solar panels. The biggest possible demand for maintenance is after the cyclones, which can potentially damage the installation in the long run, but in this case any structural rebuilding or strengthening needed can be also done by the locals, as they were involved in the original building process.

As mentioned, we plan to have as little ecological impact as possible, by using ground bolts instead of excessive concrete foundations, with mostly natural and biodegrading materials. The most invasive part of the installation is the underground water tank, which we wanted to avoid having to place above ground level, seeing as it would elevate the risks of any natural damage, mostly during the cyclones, and deemed it more protected from wildlife than trying to build a locked building. The waters flow is also easier this way than trying to build a system which prevents water from staying in the pipes or flowing back, due to the pressure of a potentially elevated tank. The underground installation can be built in a way, so that only maintenance access should be seen above, with earth covering the most of it.