**The great vessel**

***Nature, earth and humanity as a rhizome***

**Introduction**

 *“Land is thus an extension of the self. Likewise the people are an extension of the land. Land becomes lifeless and useless without the people, and likewise the people are helpless and insecure without land to thrive upon”. (Asesela Ravuvu, 1983).* This beautiful citation of Fijian academic and political figure Asesela Ravuvu synthetize our intention to create a deeper intervention available to link nature, earth and the community in an horizontal and holistic structure that could generate energy, social cohesion and beauty simultaneously, always respecting the local culture.

**Concept narrative**

The main idea starts with the reinterpretation of Gilles Deleuze and Félix Guattari’s concept of “*rhizome”* developed in the 80s years of 20th century. This philosophical term defines a complex network where all elements are linked between them in an extensive and nonlinear structure. A rhizome is always a place, and is always in the milieu. In this way, the great vessel consists of a large scale printed module made of low carbon lightweight foamed concrete, reinforced with natural fibers. On the top of this shaped tree element, a funnel-flower composed of flexible natural fiber wires allows to place over them some heliostat mirrors which will reflect the solar energy in a single vertical concentrator.

In the meanwhile, the funnel shape will harvest rainwater that could be further purified to satisfy different community’s necessities. In a final stage, the porosity of the artificial tree will house native vegetation in order to create a symbiotic installation, where the living agents can proliferate and reinforce the structure against cyclones at the same time. In addition, the resulting rhizomatous construction fulfills a sheltering function, offering a public space for diverse community activities from shelter to education and assemblies. Thus, this intervention will generate not only energy, but a rhizome available to integrate energy, nature, earth and people inside a great vessel, as an analogy of the traditional “*kava bowl”*, a symbol of community and shared experiences.

**Technical narrative**

With the intention to supplying electric energy to Marou Village, The great vessel incorporates the use of Concentrated Solar Power as main sustainable technology. This criteria responds to the solar incidence analysis in the region, which disposes of sunlight in almost all the year. Likewise, solar technologies offer the potential to be replicated anywhere in the world. In order to achieve a successful energy production, the team developed a simple strategy where each module is equipped with a flexible flower with a set of heliostats inside, which helps to tracking the sun for reflecting and directing the light in a vertical concentrated element or “pistil”. According to the calculus, each modular structure could generate 1 500 MWh for a **total amount of 20 000 MWh**.

In addition, a secondary strategy is used for harvesting rainwater. Taking the advantage of the funnel shape of the flower, it is possible to capture easily a huge amount of water during an important part of the year. Through a simple process of filtration and chlorination each piece of the installation could supply 25 000 liters of drinking water, it means **a total of 350 000 liters**. The best way to distribute this vital liquid is trough gravity and the natural slope for carry down the water through a conventional network that supplies each household. In brief, this innovating installation uses solar radiation and rainwater as inputs and returns electric energy and drinking water as outputs.

**Operation and maintenance**

In regard to this section, the strategy is divided in two phases. By one hand, the implantation of the structure depends on the development of a large scale 3D printed structure made of low carbon lightweight foamed concrete, reinforced with natural fibers. Although the fabrication of this modules involves transportation to the site, the medium and long-terms benefits could outweigh the logistics. The advances in the field of robotics applied to architecture and the development of biomaterials would allow to implant this prototype with a minimal carbon footprint. Additionally, the nature of this biomaterial offers long durability, the proliferation of native vegetation in a symbiotic relationship and high resistance to cyclones.

By the other hand, the community would be closely involved with the maintenance or more precisely “the care” of the symbiotic structure. The actions from people will focus on controlling the vegetation growing in the modules rather than fix a technical problem with the prototype. This practice has a double intention, it prevents plant growth from covering the solar artifacts and bringing together the community around a self-management project. As well, the maintenance of the elements responsible for harvesting the rain water is really simple and requires exclusively preventive practices regarding to avoid blockages in the distribution system. While the major repairs should be carried out by technicians or trained habitants in collaboration with local government and educational centers.

**Environmental impact**

Finally, the possible environmental consequences generated by the implantation of an intervention of this type implies the common transformations for any other architectural structure such as excavations for punctual foundations, earthworks to produce some leveled platforms and the removal of minor plants like shrubs. Looking for mitigate this effects, it wouldn’t be necessary to produce traditional and *in situ* concrete and its high impact or cutting down local trees for construction purposes. Likewise, all the electricity and drinking water will be generated through passive strategies that warranties clean energy. Additionally, the porous concrete structure allows the proliferation of local plants including lianas and other climbing species available to produce a micro ecosystem, while at the same time offering a higher fixation between the modules to withstand the increasingly cyclones, and assimilating them in to the milieu due to a symbiotic behavior and a rhizomatous macro structure.