



Vunilagi

Culturally Connected

Vunilagi draws on Fijian cultural history, in particular, the method by which the sails on Fijian Drua boats were raised and lowered, using ropes and of sails, made from woven mat. These methods have been resurrected for Vunilagi and given new meaning.

Locally & Historically Inspired

Vunilagi is designed to fit into the existing landscape visually and culturally. Its height is human scale but it reaches up at its entrance to an apex as a reference to the volcanos which have formed this incredible part of the world and inspired this triangular form. This triangular entrance is orientated on the site so as to create a visual centrepoint between Vatu Rua which dominate village views. Reaching up to nature, inspired by ancient forces yet sitting comfortably within it.

Shaped By Nature

The curved shape of Vunilagi fans out and twists as it travels along its length as a direct reference to the way a coconut palm tree leaf also fans out and curves gently from one end to the other. The coconut palm tree is a source of food, water and covering. It is critical to survival in Fiji and has formed the basic structural approach to Vunilagi.

Only Ten Items Needed for Construction

1. Shovels 2. Clear tube with water for creating level surfaces 3. Cement dust 4. Palm leaves 5. Saws 6. Bamboo 7. Drills 8. Picks 9. Rope 10. Custom Jig

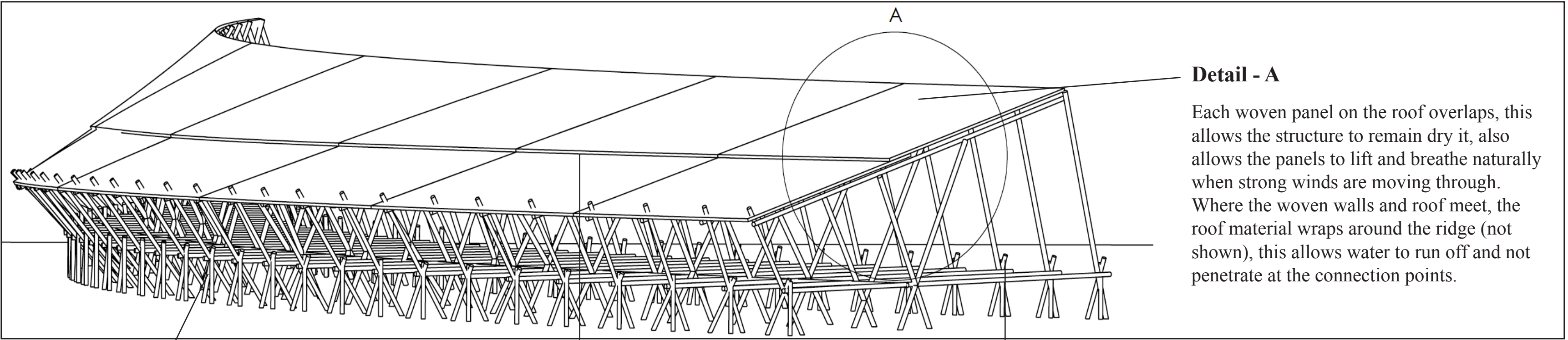
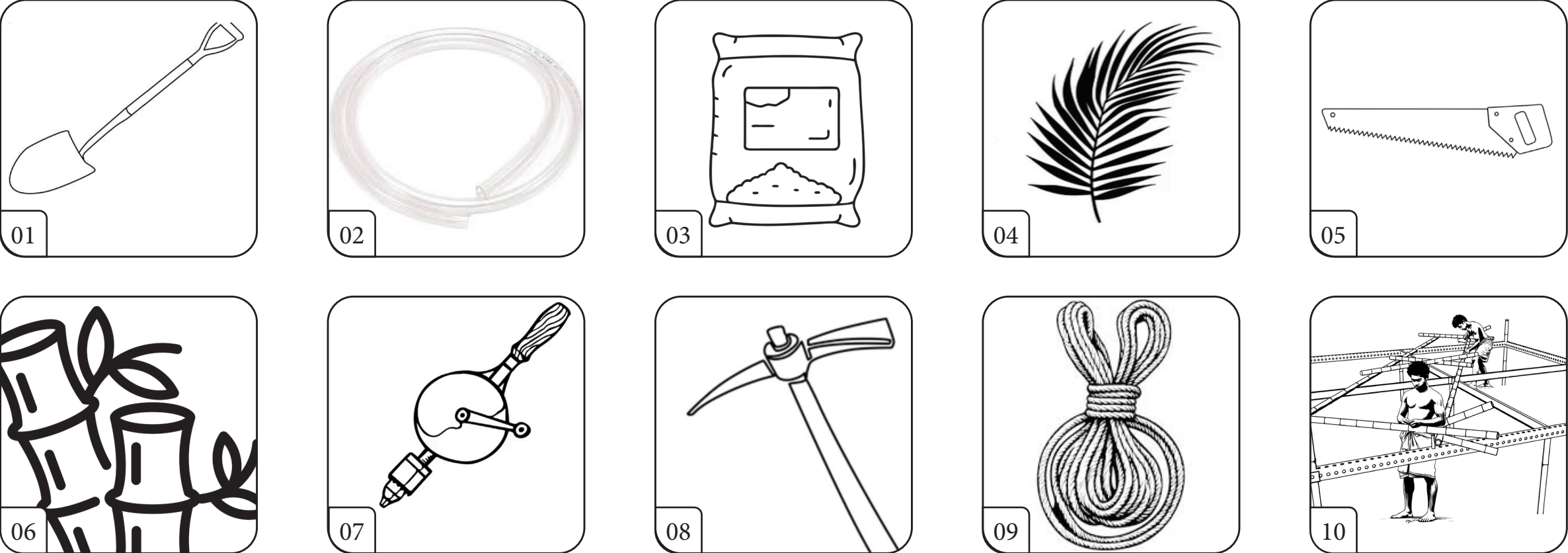
Locally sourced and easily manageable materials are critical for success. All materials for the construction of Vunilagi are:

- either already available locally in the village, or
- can be sourced in any major Fijian centre, like Nadi
- will be modular and lightweight and therefore easily transportable by local boats
- can be lifted into the village from local boats at low or high tide
- moved to the site by hand without any transport equipment

Materials that need to be purchased will include

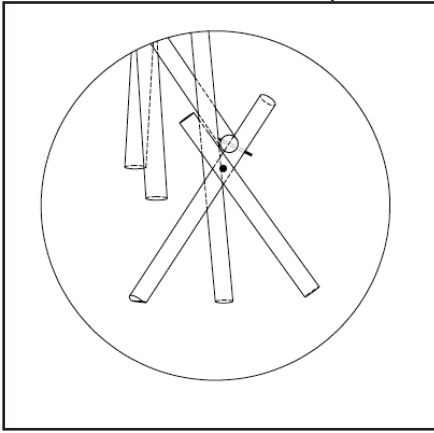
- three pressure pumps, four collapsible rainwater tanks (one small tank at Vunilagi, three large storage tanks in the village), three sand filters, poly pipe for water distribution
- a jig - custom made - this is the only prefabricated component needed. Supplied flat & set up in minutes it guides the making of every frame with accuracy
- and of course, batteries, solar panels, electrical wiring and associated solar infrastructure as required

Cement dust is different to bags of pre-mix cement (which are typical and weigh 20kg each) it is the *dust only*. By using dust and mixing it with local crushed dead coral, sand and rock found around the village we eliminate the need for dozens of heavy bags of cement. A great deal of research (Wang, F., Sun, Y., Xue, X., Wang, N., Zhou, J., & Hua, J. (2023)) has been done on the use of coral as aggregate for this purpose and proper structural calculations can be conducted for exact quantities at pilot stage. Due to the short spacing between legs and the curving form Vinulagi is designed to be extremely strong and it is not expected that all legs will require cement - only some.



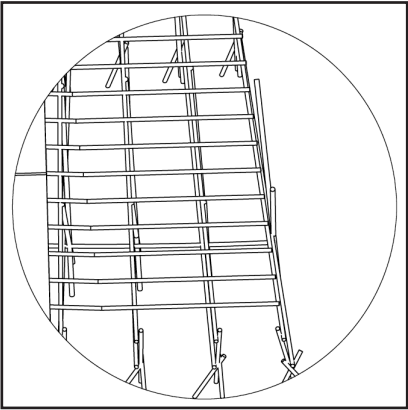
Detail - A

Each woven panel on the roof overlaps, this allows the structure to remain dry it, also allows the panels to lift and breathe naturally when strong winds are moving through. Where the woven walls and roof meet, the roof material wraps around the ridge (not shown), this allows water to run off and not penetrate at the connection points.



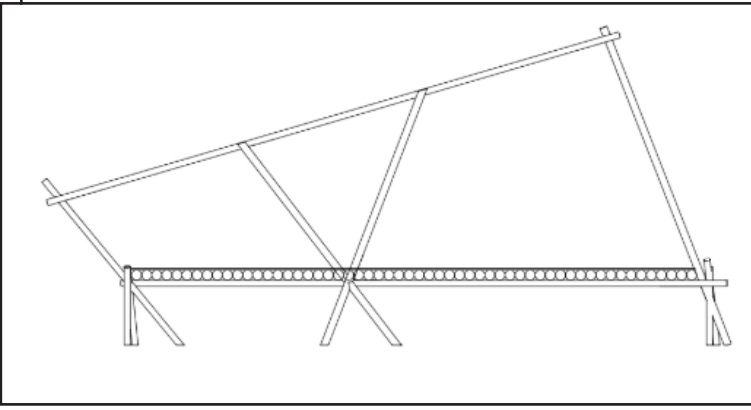
Detail - B

Each leg where it touches the ground is a three part supporting structure. It is lashed together with ropes and supported mechanically by pins made from thinner solid bamboo which are slotted into drilled holes.



Detail - C

A supporting grid network of joists sit along each frame, connecting them into a series, lashed with rope. The diameter of bamboo used and the spacing can be adjusted for structural engineering requirements.



Detail - D

The floor joists are made from bamboo approx 100mm in diameter which run in the opposite direction (lengthwise) to the main frame bearers. Small bamboo (not shown) sits in the gaps on the top to flatten the floor surface for walking. The palm leaf mats act as the floor covering.

Why Bamboo?



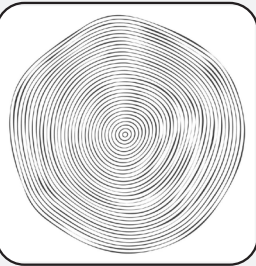
Environmental benefits:

- Rapidly renewable
- Minimal maintenance
- Drought and flood tolerant.
- Carbon sequestration
- Soil erosion prevention
- Locally grown in Fiji



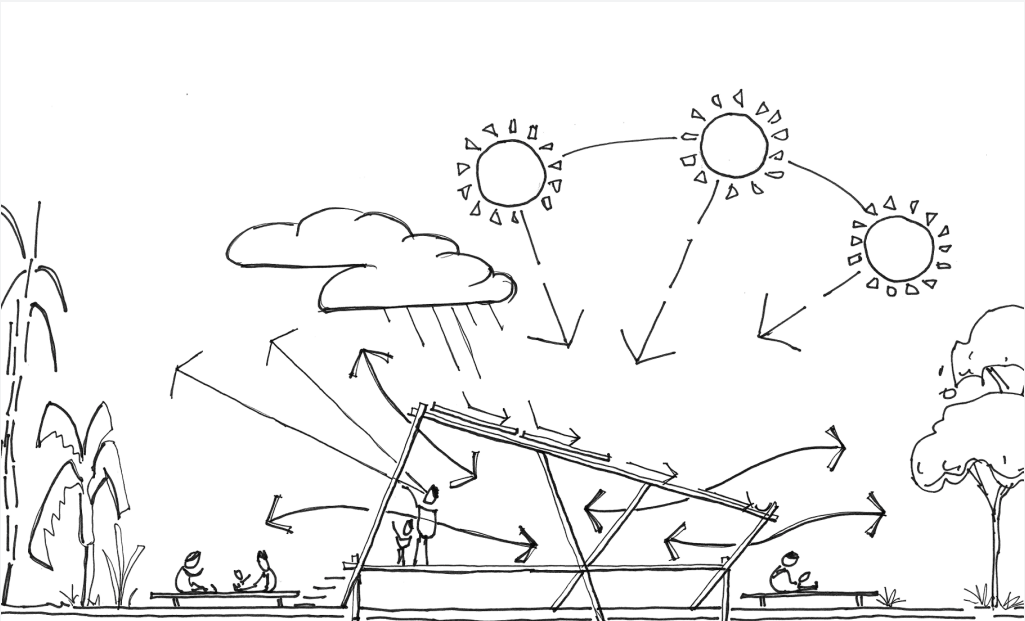
Community Benefits

- Economic & skills
- Agriculture - Marou Village can become regional leaders
- Food source
- Already government backed and incentivised



Material Properties

- Cheap
- Flexibility and durable
- Strong
- Versatile – can be used for clothing, furniture, food and medicine.



All walls of Vunilagi are retractable and roll up and down with ropes like Drua Boat sails. By controlling the amount of side panels which are open and closed, Vinulagi allows cooling breezes to move through from both sides. In times of strong winds, opening the sides fully helps to reduce risk of damage from competing air pressures. The roof provides shelter from storms and projectiles.