1. **Concept Narrative**

**"The peaks of cassava rise above the fields of cassava at the hour of dawn...".**

**According to the analysis of local culture and lifestyle, the project suggests the cultivation of local edible crops in this area, such as cassava, rice, taro, bok choy, sweet corn, pineapples.**

**This space is also a place of attraction for the local community, providing a space for education, games and discussion. The shape of the station is dictated by the movement of the sun and the image of the local landscape, represented by mountains covered with greenery. The station is elongated along the north-south axis to receive more solar energy.**

**Additional energy is constantly being accumulated due to the tides. This system is connected to the system of our stations.**

**The project offers a competent use of the area and location on the territory. The plants that used to grow on the station's territory are multiplied by the built-in vertical farm. Streams of water from the mountains are distributed throughout the territory to reduce soil leaching, provide moisture to the station and make it easier to collect it. The station is also an additional space for education, games and a meeting place for the local community.**

1. **Technical Narrative**

The project provides for 150 m2 of solar panels for each of the stations. In a total of 450 m2, one station generates 84.38 kW of energy and stores it in accumulators located under the amphitheater. The solar panels are mounted on plant boxes and can be rotated by servo or manually.

Solar panels not only generate electricity, but also collect moisture from the air and rain due to their convex back surface. The water collected in this way is collected in special compartments in plant boxes and then used in cultivation.

In the boxes located on the frame, you can grow products that will be in demand by the local population and have long been in its culture. There is a filtration system for incoming and excess water.

Air cushions inside the frame hang over the amphitheater, saving people from the scorching sun. Pillows are also designed to collect moisture from the air and regulate humidity. Moisture is collected and transferred through a system of tubes through a frame to a water storage facility under the station.

"Breathable skin" is a system that collects moisture during dew/fog. Sodium polyacrylate changes from a dry state to a swollen one, absorbing water, and then into an evaporation state that provides cooling. The system is modular. The shape was chosen based on the shape of the cassava leaves, which provides additional identity to the station.

The capillary system connected to the soil and streams is designed to provide additional moisture to plants and reduce the impact of streams on the soil, reducing its waterlogging, saving from floods. Excess water goes into storage underground

**84.38kW×5PSH×365days=154,000 kWh/year**

**This is enough to power ~40–50 households or a small village with basic needs (lighting, refrigeration, water pumps).**

**With an average annual precipitation of 1,665 mm and a collection efficiency of 80%, the system will be able to collect up to 599,000 liters of water per year. On average, this is about 1,640 liters per day, with seasonal fluctuations. To ensure stable water supply during dry periods, it is recommended to install storage tanks with a volume of 20,000-30,000 liters.**

**Annual water collection:**

**150 m2=1.665 m=0.8=199.8 m3=199800 liters/year**

**The structure is designed for a tropical climate, with corrosion-resistant materials and easy maintenance.**

**Sunlight is the main source of energy, being converted into electricity through photovoltaic panels that operate efficiently with five or more hours of direct sunlight per day, which is typical for tropical climates. For maximum performance, the panels must be located in open areas without shading and regularly cleaned of dust and dirt.**

**Rainwater is collected from the surface of solar panels and special catchment areas. The system is designed to efficiently use precipitation typical of the region with an annual level of about 1,665 millimeters.**

**When using 10-20 kinetic turbines in the tidal area, 0.1–2 MW can be obtained, and the potential for the entire region (when scaled) is up to 10-50 MW.**

**Solar Farms (3 × 150 m² PV, 450 m² total)**

**Annual Output: 154,000 kWh/year (~420 kWh/day)**

**Power Equivalent: Supports 40–50 households (basic needs: lighting, pumps, refrigeration)**

**Catchment Area: 450 m² (solar panels + additional surfaces)**

**Annual Rainfall: 1,665 mm = 1.665 m³/m²**

**Collection Efficiency: 80%**

**Total Annual Water:**

**450m²×1.665m×0.8=599m³/year (599,000 liters)**

**Daily Average: 1,640 liters/day (seasonal variations expected)**

**Assuming 80% usability after filtration:**

**~479,000 liters/year (1,312 liters/day)**

**Enough for: 50–100 people (10–20 liters/person/day)**

1. **Prototyping and Pilot Implementation Statement**

**We are going to create a prototype that represents a fragment of our station. It consists of 2 levels of boxes with air cushion, solar panels, water collection and filters. It is connected to a separate tank for collecting drinking water. We will create coconut shell filters with our own hands. We will also turn to the creators of the analogues that we used in the project for additional drawings and assistance in implementation. We will also create a program for wind sensors that will control servos. Having experience implementing a prototype, we will explain how to make our own module to the local community.**

**Using the prototype example, we will identify how the station will work and find out its features.**

1. **Operations and Maintenance Statement**

**The local community will use the station daily as a place for education, growing local crops, and playing sports. Over time, the boxes will need to be replaced and they can be made manually on an island made of wood. It will also be necessary to change the water filters. They can be made from local coconuts. It is possible to make a carbon filter from a shell of coconuts for drinking water and a filter for plants. The amphitheater serves as a storage for batteries for easy replacement. The wooden flooring is unlikely to require repair soon, as it is located at some elevation from the ground and saves equipment and people from the rain. It´s easy to repair.**

**The system is equipped with sensors that monitor key operation parameters. Energy production indicators, water level in storage devices, and equipment status are displayed on a simple interface accessible from a mobile device. This allows you to quickly identify any problems.**

**The role of the local community in the life of the farm is great - sustainable cooperation should be formed between them. Farms will solve the problem of unemployment - new jobs will be created to service the life of farms - people will be needed who will monitor the indicators, respond to possible changes and eliminate them. Regular panel inspections, harvesting, and tank cleaning will also be needed. All this is done intuitively, interchangeably and modularly for the rapid possibility of changing and cleaning parts.**

**This approach will ensure stable operation of the system for many years with minimal operating costs. The experience of similar projects in developing countries shows that local communities successfully manage such systems after initial training.**

1. **Environmental Impact Assessment**

**Streams of water from the mountains are distributed over the territory to reduce soil leaching, provide moisture to the station and make it easier to collect it. According to the analysis of local culture and lifestyle, the project suggests the cultivation of local edible crops in this area, such as cassava, rice, taro, bok choy, sweet corn, pineapples. The plants that used to grow on the station's territory are multiplied by the built-in vertical farm. Our project was created in order to maintain a balance. In rainy weather, it does not allow the ground to waterlog, and in dry weather it maintains the necessary humidity and temperature.**