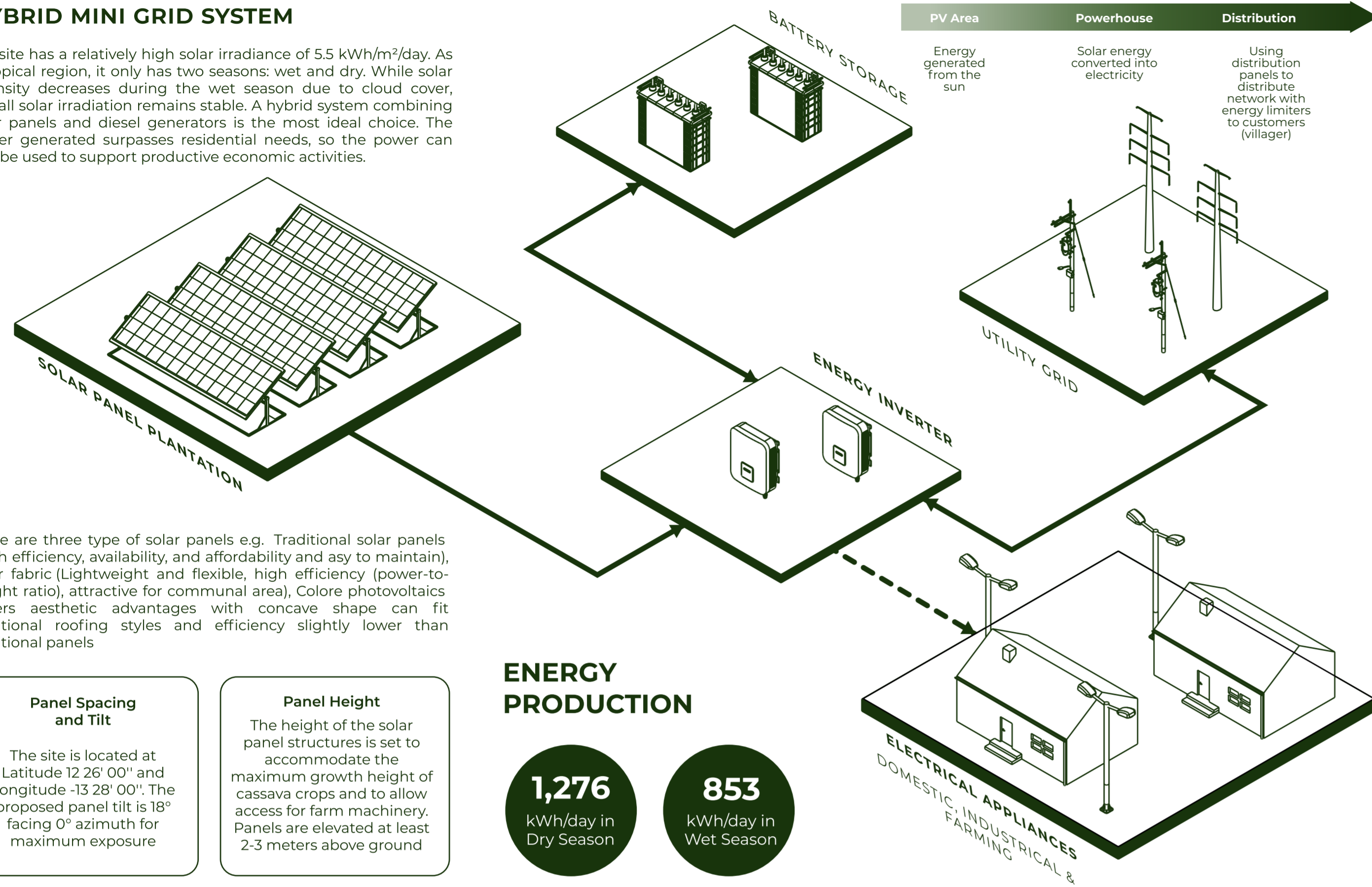


DESIGNING FOR ENERGY

HYBRID MINI GRID SYSTEM

The site has a relatively high solar irradiance of 5.5 kWh/m²/day. As a tropical region, it only has two seasons: wet and dry. While solar intensity decreases during the wet season due to cloud cover, overall solar irradiation remains stable. A hybrid system combining solar panels and diesel generators is the most ideal choice. The power generated surpasses residential needs, so the power can also be used to support productive economic activities.



There are three type of solar panels e.g. Traditional solar panels (High efficiency, availability, and affordability and easy to maintain), Solar fabric (Lightweight and flexible, high efficiency (power-to-weight ratio), attractive for communal area), Colored photovoltaics (Offers aesthetic advantages with concave shape can fit traditional roofing styles and efficiency slightly lower than traditional panels)

Panel Spacing and Tilt

The site is located at Latitude 12 26' 00" and Longitude -13 28' 00". The proposed panel tilt is 18° facing 0° azimuth for maximum exposure

Panel Height

The height of the solar panel structures is set to accommodate the maximum growth height of cassava crops and to allow access for farm machinery. Panels are elevated at least 2-3 meters above ground

ENERGY PRODUCTION

1,276
kWh/day in Dry Season

853
kWh/day in Wet Season

POLYCULTURE AS FOOD SECURITY MANAGEMENT

Maru Village needs to build food resilience to achieve long-term food sustainability, especially because transportation costs are high and the community must rely on their own land with a strong and integrated food security system. One solution is polyculture, which allows limited land to be used more effectively by growing different types of crops, with cassava (a local staple) as the main crop. With the help of greenhouses and organized planting plots, villagers can also grow horticultural crops to meet their daily food needs. The priority is to plant cassava alongside vegetables to provide a balanced diet for the community.



Root crops have similar growth habits and nutrient requirements as cassava

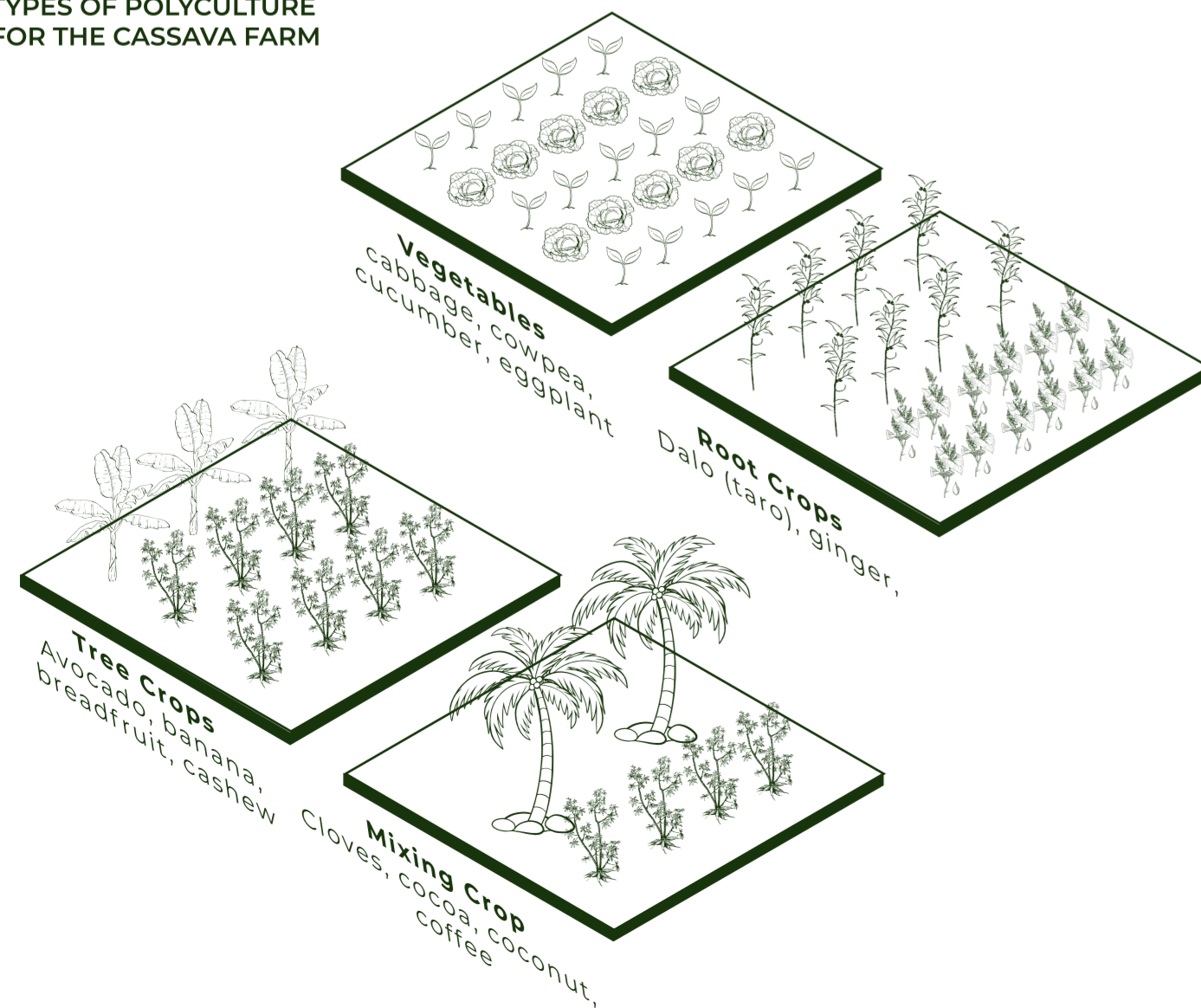


Vegetables can be intercropped with cassava especially during the early stages of cassava growth



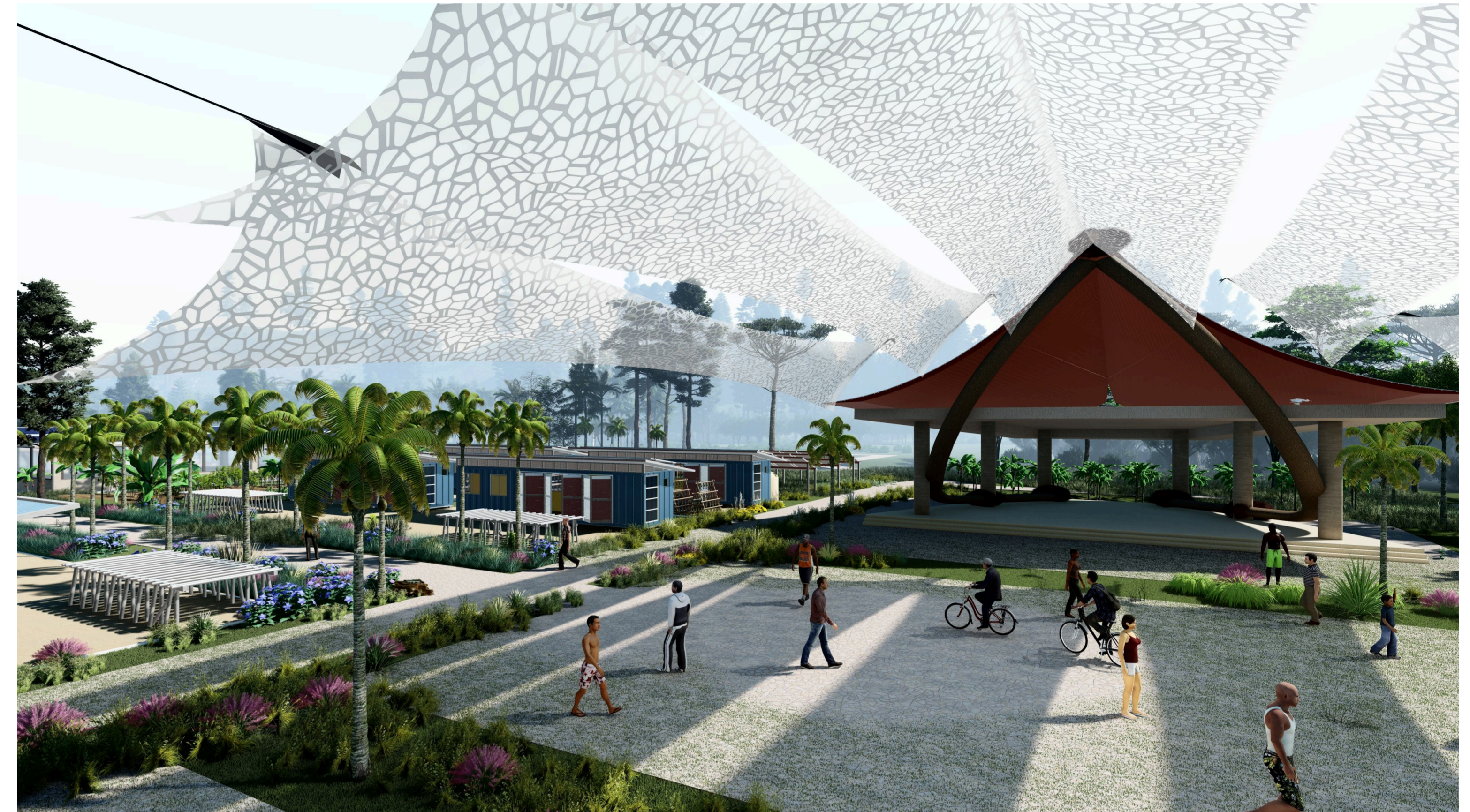
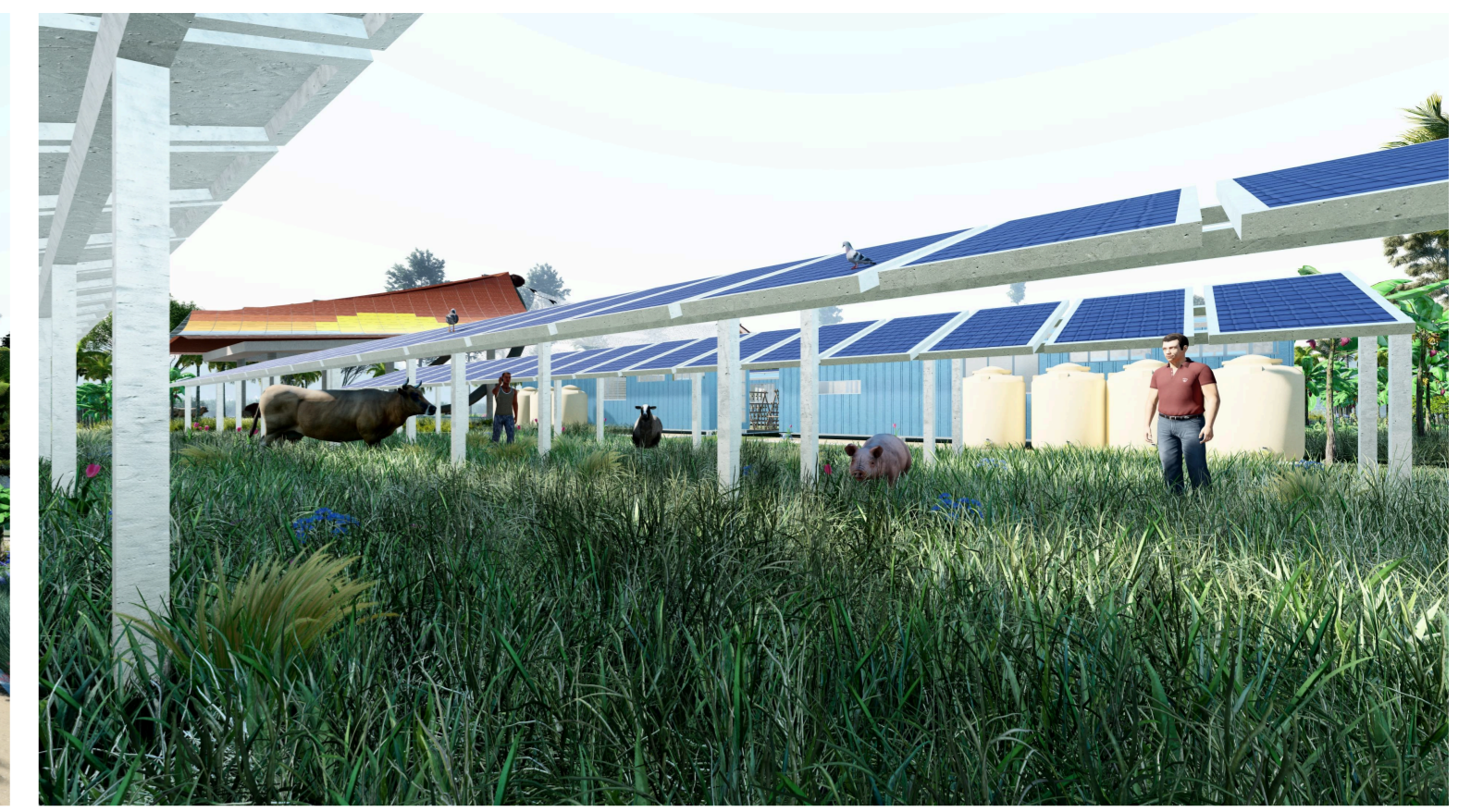
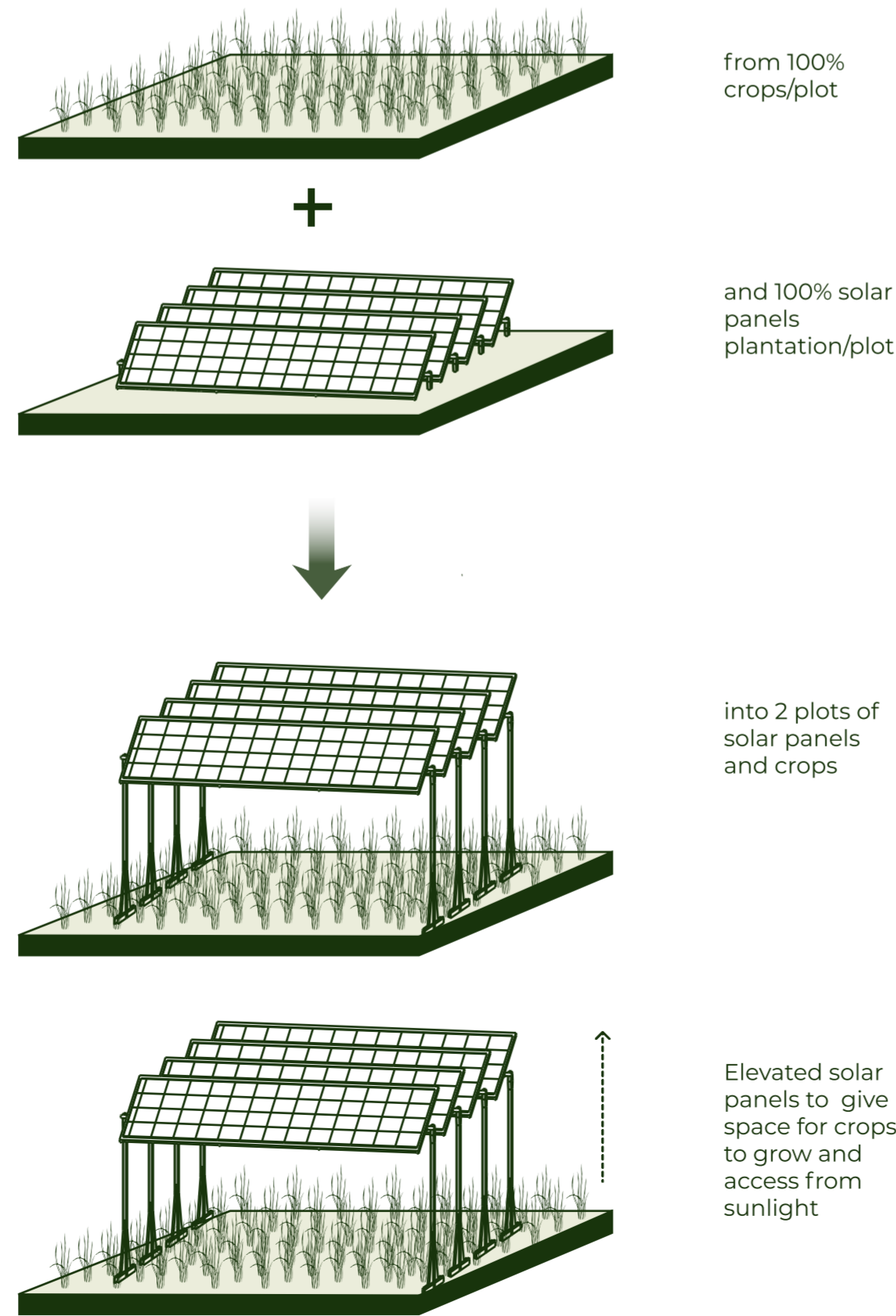
Tree crops can be planted on the borders or at wider spacings within the field

TYPES OF POLYCULTURE FOR THE CASSAVA FARM



AGRIVOLTAICS

To efficiently use land or plots, the energy site uses an agrivoltaics system, or a dual-use solar approach, by co-locating solar panels and agriculture on the same land. With this technique, the land can be used for both energy production and food cultivation on the same plot. Habitats such as crops and livestock can be maintained between the solar panels.

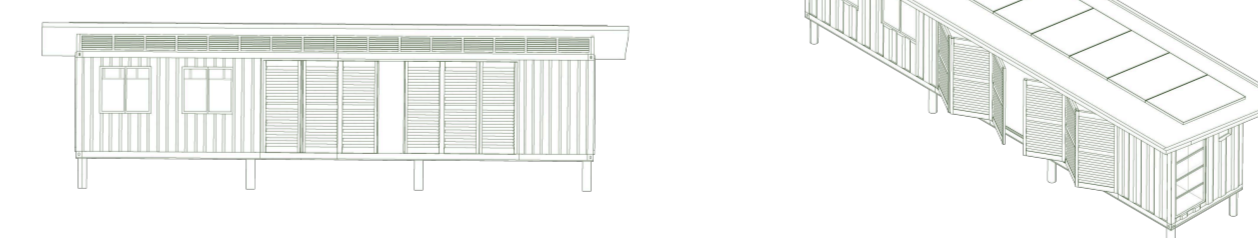


COMMUNITY BUILDING AS IDENTITY



The building design is inspired by local architecture, including traditional Fijian structures with curved roofs and simple coastal buildings. The curved shape at the top is made concave to help the solar panel roof capture sunlight more effectively.

Fish storage building resonates with local home architecture



Colored Solar Panel

This type of solar panel is chosen based on the effectivity and aesthetic considerations. It can produce 55%-95% from standard solar panels using glass color integration with 20-25 years lifespan. It only has around 10% loss of power from the solar module and considered effective.

Photonic pigment on solar PV

