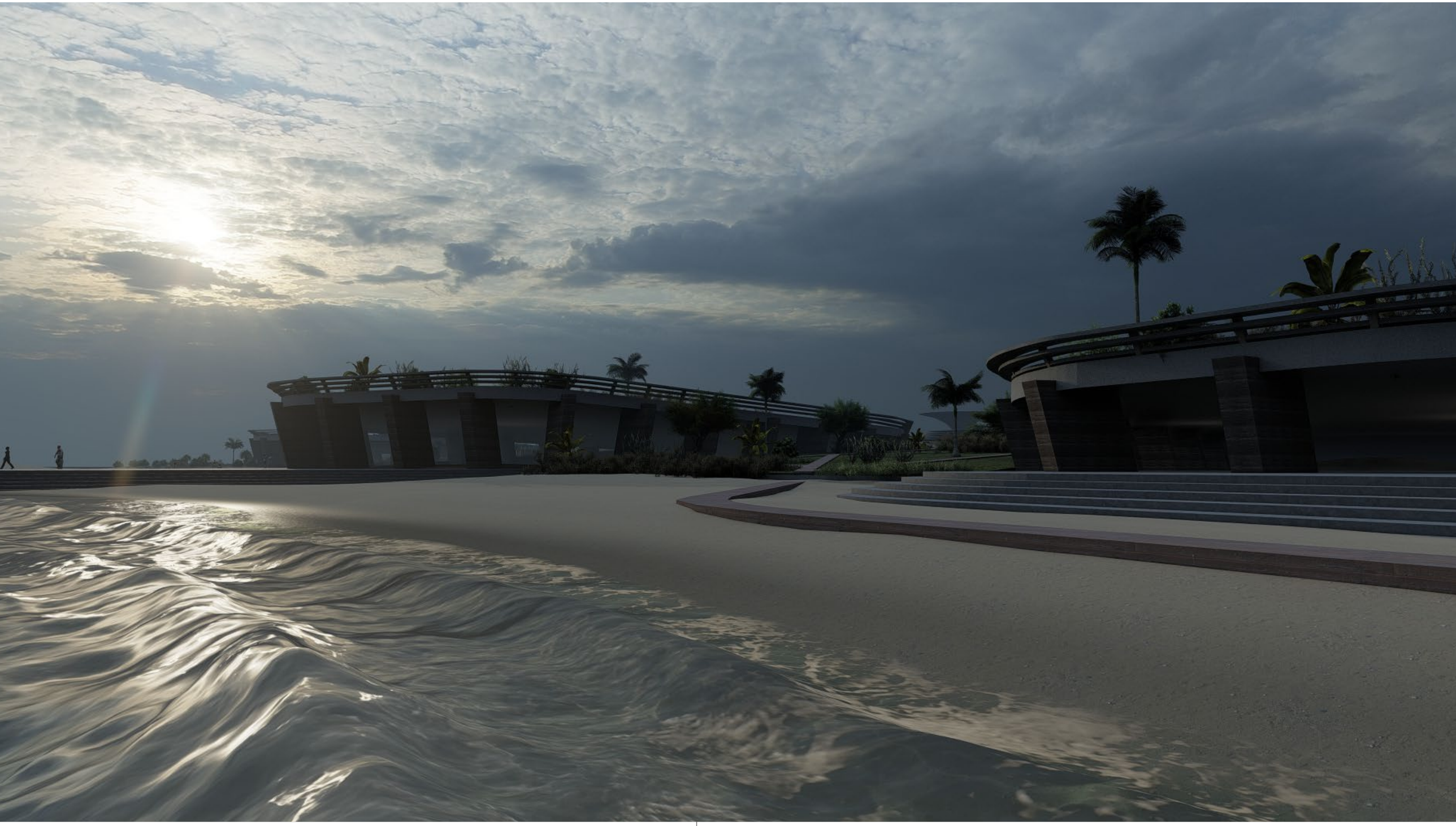
Circulation Base



2023 PRIX DE LA FONDATION JACQUES ROUGERIE

Catégorie de Prix : Architecture & Innovation related to the Climate and Rising Waters

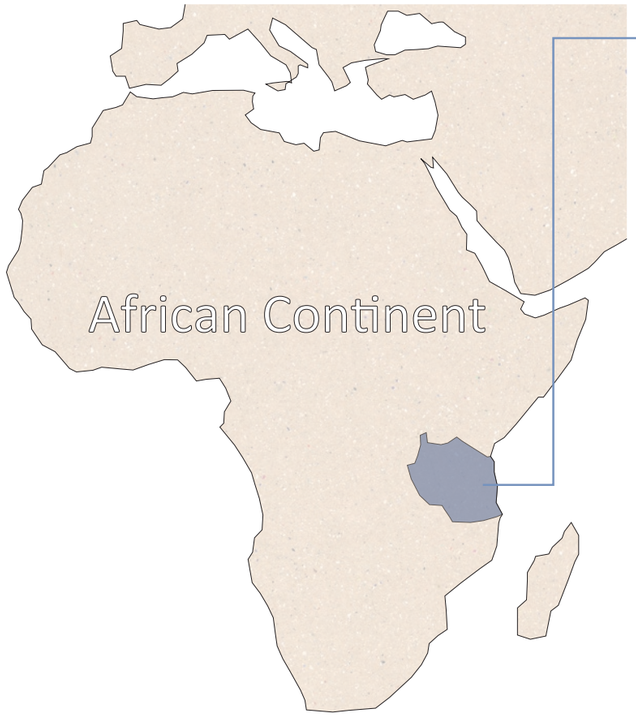
Nom du projet Circulation Base

Description An architecture that can show the world Tanzania's measures to combat sea level rise.

FONDATION JACQUES ROUGERIE GÉNÉRATION ESPACE MER ACADÉMIE DES BEAUX-ARTS

Site

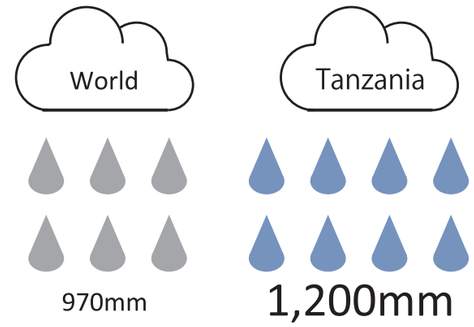
We focused on the coastal areas of Tanzania, which are facing rising sea levels.



TANZANIA

The adverse effects of climate change on Africa's coastal areas include sea level rise and the resulting coastal erosion. In Tanzania, sea level rise and coastal erosion are already underway,
and the damage is expected to increase as climate change progresses. Indeed, rising sea temperatures, extreme weather events, and sea level rise will also lead to the destruction of coral reefs that absorb the force of open ocean swells.
Rising sea levels will also make it more difficult to obtain fresh water as salt water flows into Tanzania's aquifers and deltas.Tanzania receives more rainfall than any other region in the world.

Average annual rainfall



Back ground

Tanzania is affected by global sea level rise.Sea level rise increases the likelihood of shoreline erosion and loss of land in coastal areas. This can affect housing and farmland, forcing residents to evacuate.In addition, salty seawater may enter inland, contaminating freshwater resources and agricultural land. This can adversely affect drinking water and agriculture.

Trees destroyed by sea level erosion

Field dead due to salt damage

Decrease of sea bream in brackish water

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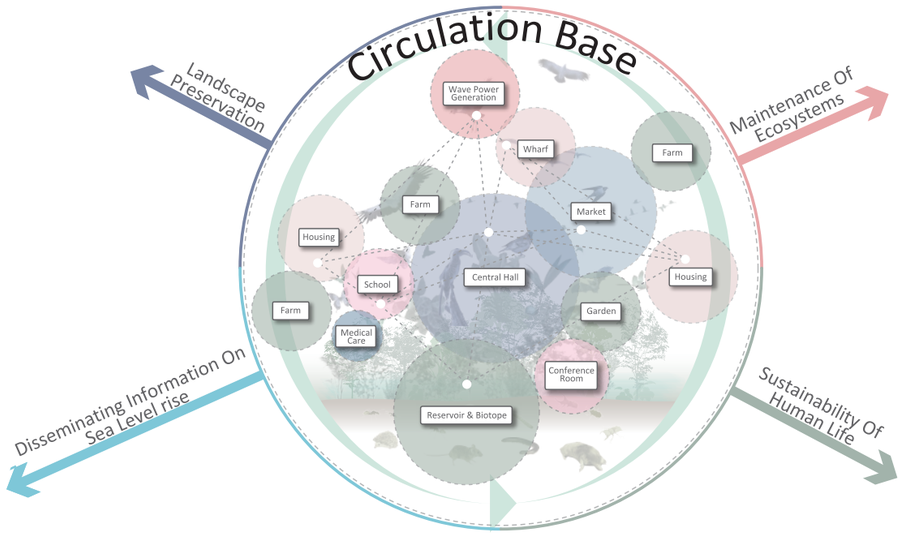
Concept

The architecture is designed to bring together local residents to deepen their understanding of sea level rise and to enable Tanzania to communicate its measures against sea level rise to the world through the active use of natural energy circulation systems, such as rainwater harvesting and wave power generation.



material

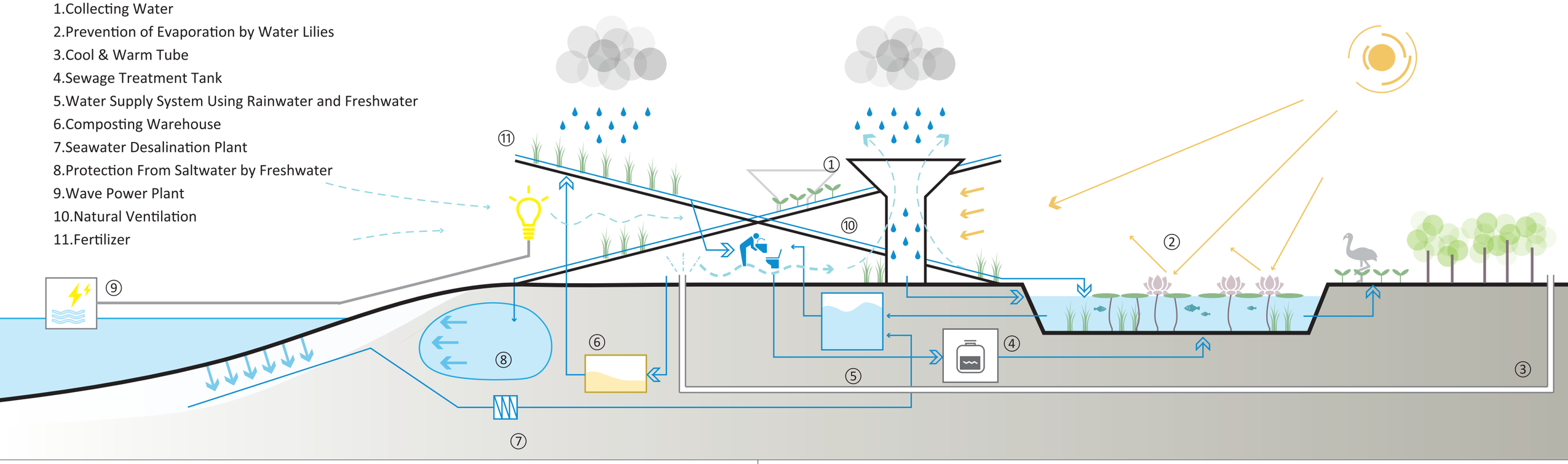
【Bio-waste utilization】
The building structure is made of "sugarcrete," a byproduct of sugarcane. Sugarcane is the world's largest crop in terms of production. In Tanzania, it is one of the top 10 largest producers. About 2 billion tons of sugarcane is produced annually around the world, and 600 million tons of bagasse is disposed of as a byproduct. Compared to concrete production, Sugarcrete reduces curing time from up to 28 days to one week, is four to five times lighter than concrete blocks, and costs significantly less.

【CO2 emissions】
Turning this bagasse into a bio-waste based product like Sugarcrete has the potential to reduce 1.8 trillion tons of CO2, or 3% of the built environment, which generates 40% of the world's annual CO2 emissions. Sugarcrete's CO2 emissions are 15-20% of those of concrete, a significant reduction.

Energy system

The facility will be built using a passive design that takes advantage of the benefits from nature.Electricity will be supplied by renewable energy from large-scale wave power generation.
The symbolic water collector that will collect water vapor from the air and the sloped roof (artificial ground) will efficiently collect rainwater and collect it in a pond for water storage. In this way, it will be effectively utilized to maintain people's lives and the ecosystems of plants and animals.The rooftop, consisting of green space and a vegetable garden, blocks heat from direct sunlight and helps maintain a comfortable indoor environment.

1.Collecting Water
2.Prevention of Evaporation by Water Lilies
3.Cool & Warm Tube
4.Sewage Treatment Tank
5.Water Supply System Using Rainwater and Freshwater
6.Composting Warehouse
7.Seawater Desalination Plant
8.Protection From Saltwater by Freshwater
9.Wave Power Plant
10.Natural Ventilation
11.Fertilizer



Proposition

The erosion of coastlines due to sea level rise will not only destroy forests and ecosystems, but will also have a major impact directly related to human society.We, as architectural engineers, have a mission to pass on to the next generation the culture and lifestyles that have taken root in the local area.Also, it is not enough just to build safe and sturdy buildings.
It is to lean on nature without harming it. We must not only take from nature, but also give back to nature. This is necessary for future generations to inherit it for many years to come.We believe that it is necessary to create buildings with such a mechanism of circulation.

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5m 10m 20m 100m

Rooftop farm

Farms using filtered seawater and rainwater

Wave power plant

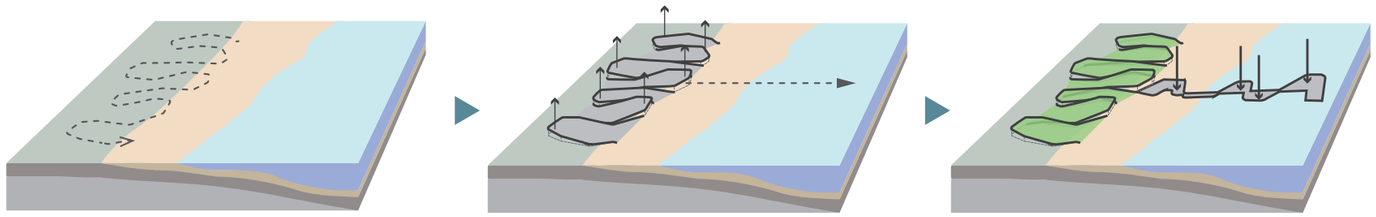
Facilities that generate electricity using the kinetic energy of waves.

Boat landing

Its shape, jutting out into the sea, serves not only as a base for fishing and transportation, but also as a pier.

Collecting water system

Simple structure. This is a water collection device that requires no power.



1,Cutting the Ground

2,Lifting the ground &Cutting the ocean

3,Rooftop greening &Build a levee

Plan & Program

The design was conceived to preserve the beautiful coastal landscape and to become one with nature.The ground was cut by wavy organic lines and alternately raised to form the roof.
By doing this, the natural flora and fauna of that area were lifted into the air and escape from salt damage.In addition, the exterior facing both seaward and inland supports the smooth flow of human traffic.
The contours of the building are curved, and the height of the building is kept low to gently direct the sea breeze inland, The building's curvilinear profile gently directs the sea breezes inland, minimizing the impact of the architecture on the ecosystem.The offshore embankment is composed of similar elements and helps prevent beachsand runoff by dispersing wave energy.

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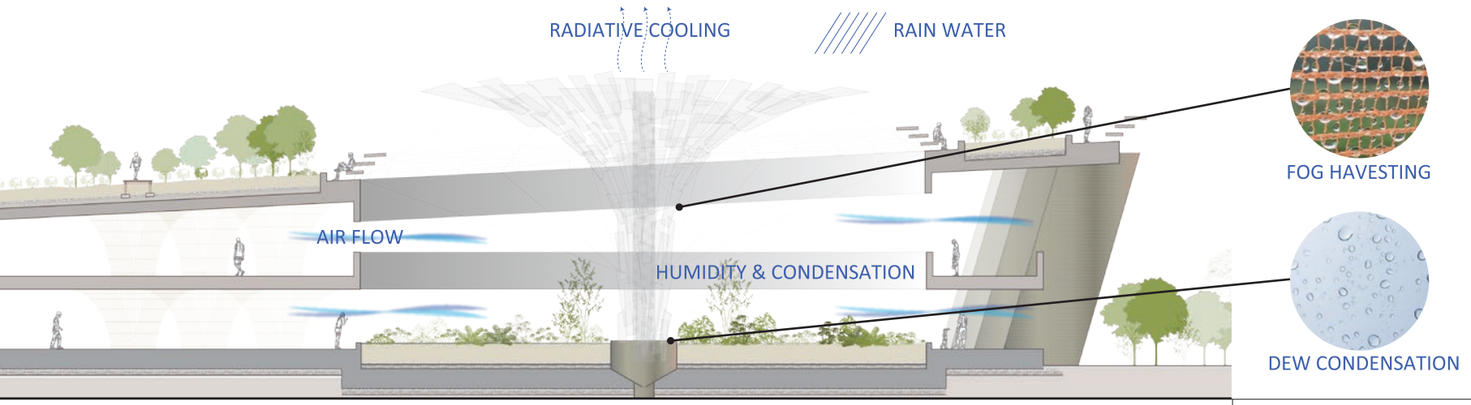
Rooftop farm

On top of the raised ground (rooftop), green areas and fields are spread all over, respectively.Walkways have been laid out to facilitate maintenance and preservation.
Here, a garden that inherits the local plant ecosystem and a field that produces crops that support people's lives are planned,The garden will serve as a community space for the facility's users.
The rooftop will be used as a green space and field to mitigate heat gain from solar radiation on the roof surface and to keep the interior space comfortable.
Louvered benches are installed around the perimeter to prevent people from falling and to effectively block strong sea breezes.

Collecting Water system

Rain and airborne moisture adhere to the mesh-like cloth spread out like lotus leaves and are filtered and collected in a container in the center of the tower.



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Wave Power plant

The coastal areas of Tanzania are considered to have potential for wave power plant due to the relatively high strength and frequency of waves in the region. In particular, the area around the Zanzibar Islands is considered to have conditions suitable for wave power plant. Electricity generated by wave power plant is used not only for lighting and air conditioning, but also for all kinds of equipment, including underground filtration systems and Composting Warehouse.

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Boat landing -50years later ,sea level rising-

【Fishing industry】 Fishing is an important industry in coastal areas of Tanzania. Fishing also contributes to local employment and food supply, and landing sites are the foundation of this industry.

【Breakwater】 The landing site juts out into the sea like a pier. This shape also serves to control waves and currents in the harbor. The jetty prevents sand from running off the beach.

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Circulation Base

The issue of sea level rise is a global problem, and a stand-alone effort will not make sense.
It is hoped that local residents facing the problem will use the information and disseminate it to help solve the problem in any way they can.

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