In-Situ Network

Palm tree branches for coastal protection, Tarawa Atoll, Kiribati

Sustainability concept

Progress: The project is focused on innovative material use and design solutions for endangered coastal areas in tropical and subtropical climates. The strategy is resilient, comprehensive and systematic in order to ensure simplicity of deployment and effective function. Due to the overall simplicity and reliance on locally-available materials, the concept is highly transferable, affordable and broadly applicable.

People: Although the project’s primary focus is aimed to provide fundamental living condition and basic needs for people that live in vulnerable coastal areas, the scope that the project effectively covers is much broader. It builds with the values and skills of local communities, creating adaptable and stimulating environments. The collective approach is extremely important in all phases of design, construction and the entire life cycle of the project.

Planet: The project is designed to have an extremely low ecological impact both in terms of material used for construction – the project utilizes the palm leaf stems that are usually waste material and are practically free of charge, we are able to eliminate any direct building material related expenses. The efficient design and implementation process with its broad spectrum of direct and indirect economic benefits for the involved communities provides a resilient long-term investment and at the same time open up possibilities for cultural and know-how exchange.

Place: Simple and resilient. The material system creates coexistence with the landscape, through multi-objective design and passive construction processes.

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Project data

Context: Materials, products and construction technologies
Client: Private Research and development
Planned start: December 2014

Summary and appraisal by the jury

Palm tree branches are used as a simple measure to respond to the increasing threat of coastal erosion – due to rising waters and habitat destruction – on Tarawa Atoll. Inverted into the sand, the spoon-shaped branches constitute an ideal barrier, causing sea currents to slow down and deposit sand material into the concave inner surface of the leaf branch. Sand mounds are thus created which gradually elevate coastline embankments, allowing aquatic plants such as mangroves to grow and secure the beach.

The jury enjoyed the ingenuity and simplicity of the proposal, an ostensibly common solution for the restoration of sandbanks susceptible to the detrimental effects of climate change – a small-scale solution for a large-scale problem. Commended is the intelligent deployment of parametric design to increase the performance of individual branches when combined into groups or swarms of branches, where the whole is greater than the sum of its parts. Furthermore, what was appreciated were the beautiful drawings showing stunning geometric patterns of branch network assemblies, generated from scientific data.

Acknowledgement

In-Situ Network – Armadillo, architect, Amphibious Lab, London UK

Image 1: Target issues for sustainable construction.

Image 2: Main "spoon-shaped" unit in the network.

Image 3: "Target issues" for sustainable construction.

Image 4: Tarawa atoll as an indicator for future events around the globe.

Image 5: Photos from construction site, where building material is usually waste material, which gradually creates a higher coastline. During the process, the palm branch transforms into a "green mound" which is able to host aquatic plants, like mangroves.

Image 6: Material system - structure and performance. Palm branches have an ideal "spoon" shape which enables a sea current to slow down and deposit sand material in the concave area of the leaf. In this way mounds of sand material are created, which gradually elevate coastline embankments, allowing aquatic plants such as mangroves to grow and secure the beach.

Image 7: Structure and performance of the main construction unit.

Image 8: Regular grid for unit organization. The number, density, and orientation depends upon specific location.

Image 9: Site-specific grid which forms a site-specific morphology.

Image 10: Resilient coastline.

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