Comment of the Holcim Awards jury Africa Middle East

This outstanding and absolutely novel project proposes an architectural complement to the “Anti-desertification Green-wall Sahara” initiative of the Sahel-states. It envisages facilitating the creation of oases for human habitation through the application of cutting-edge bio-technology: micro-organisms whose metabolic processes bind loose sand into sandstone. Two possibilities: first, a nature-based method which stabilizes the sand dunes directly. Second, separating the system from micro-organisms; the desertification continues. The project aims to find a hybrid method which stabilizes the sand dunes while simultaneously creating an oasis in their midst. The technical details of the project remain speculative, but it takes a visionary, creative and responsible approach to a problem which is likely to become critical in the future. The project is based on an innovative idea that has never been tried before and has great potential for transferability to other areas or situations.

Relevance to target issues by author

Desertification is a threat to the livelihoods of millions of people in the Sahel-region of Africa. The project proposes a novel approach to desertification that combines biological and architectural methods to create a structural barrier of sand that can effectively stop the spread of sand dunes. The project also seeks to create an artificial oasis that provides water and shade, which can be used for agriculture and livestock, and help to stabilize the soil. The project is based on cutting-edge bio-technology, which incorporates micro-organisms that can bind loose sand into sandstone. The project has potential for transferability to other areas or situations.

Project description by author

This project investigates adaptive (as opposed to mitigatory) strategies leading to the creation of a climate-conscious architecture that responds to the extreme environments of tomorrow’s globally-warmed world. Highly speculative yet buildable, the scheme aims to find innovative solutions to combat desertification in the Sahel-region of Africa, where sand dunes are currently moving southwards at a breathtaking pace of around 60 km per year, ruining the land and making it impossible for the inhabitants of this area to make a living or even stay in their homes. The forced migration of desertification refugees is perhaps more threatening in Nigeria than anywhere else. With a population of over 140 million people, Nigeria is the most populous country in Africa, with serious desertification issues throughout its northern states. It was Nigeria’s former president, Olusegun Obasanjo, who initiated the anti-desertification Green Wall Sahara initiative in 2005. This pan-African scheme seeks to plant a shelterbelt across the continent, from Mauritania in the west to Djibouti in the east, in an attempt to stop the dunes from migrating. The trees are being planted right now.

Dune anti-desertification architecture, Sokoto, Nigeria

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Further authors: Not applicable

Type of project

Architecture (research/development)

Estimated start of construction

Not applicable

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An architectural response to this campaign would be to go beyond the mere planting of a mitigatory shelterbelt. Habitable spaces can be created in close proximity to the trees. By cutting through the sand dunes and digging down to find water and shade, an artificial oasis can be formed underground. The sand is solidified using bacillus pasteurii, a micro-organism with which professor Jason DeJong has turned sand into sandstone in a mere 1,400 minutes. This technology of organically cementing networks of sand dunes into habitable barriers that stop the desert from spreading has never been proposed before, but, on hearing about this project, the professor was enthusiastic: “I do think the application you are tackling is possible”. I’m proposing anti-desertification structures made out of the desert itself; sand-stopping devices made of sand: a poetic proposal that simultaneously works in a sustainable way with local materials and assets. Special emphasis has been put on finding a solution that is high-tech in result but low-tech in application and construction, with the economical scenario being hard to pin down as this method is virgin territory. It is recognized that poor people are highly vulnerable to the effects of weather, as drought can cause vulnerable to the effects of weather, as drought can cause

Quantum change and transferability

Traditional anti-desertification methods include the planting of trees and casuaries, the cultivation of grasses and shrubs, and the construction of sand-catching fences and walls. More ambitious projects have ventured into the development of agriculture and livestock, water conservation, soil management, forestry, sustainable energy, improved land use, wildlife protection, poverty alleviation, and so on. This project, apart from utilizing a completely new way of turning sand into sandstone, is the fact that it incorporates all of the above. Inside the dunes, we can take care of our plants and animals, find water and shade, help the soil, care for the trees, and so on. It’s an environmental project that provides an innovation for other architects/builders to copy time and time again.

Ethical standards and social equity

Desertification is a major threat on all continents, affecting all countries and some 70% of the world’s agricultural drylands. Nowhere is the problem more serious than in Africa. Desertification seriously threatens the livelihoods of millions of people in Africa who depend on the land for most of their needs. The ethical implications of this are the very starting point for this project. The question: “Can we challenge desertification in a new way?” This project seeks to do three things: make it possible for desertification refugees to remain in their home area, offer better spaces for social interactions, and, finally, create an inverse separation barrier: a bridge between countries sharing the desert condition.

Economic performance and compatibility

The actual cost of implementing the bacillus pasteurii method of construction has not yet been calculated, as no one has ever tried anything like this. The best way of assessing the structure’s economic performance might be to meditate on the alternative: land owners no longer being able to make a living off their grounds. Here’s architecture with the power to turn an economy.

Contextual and aesthetic impact

The linearity of the dunescape is what truly makes a desert a desert. Raising the aesthetic strategy on tafoni, a kind of cavernous rock formation that exist on the site, the impact is surreal and continuous – the solidified dune mitigates against the migrating dunes, whilst offering living spaces and affectual points of interaction where events can occur outside of the scripted program.

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