



## RE-EXAMINING THE APPROPRIATENESS OF CURRENT TROPICAL DESIGNS

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The issue is 'we are seemingly unable to design buildings that respond appropriately to our tropical climate and constructed in a way that requires less reliance on energy and artificial cooling systems'. However, the new 'Termites Design Concept—Sustainable, Affordable and Self-Cooling Homes' (SASCH) asserts that we can design buildings that respond to our specific tropical needs, buildings that can 'self-cool', requiring no artificial cooling systems provided we can apply the principles of sustainability backed up by scientific research and underpinned by inspiration from nature. After all, if anthropoids can achieve passive-cooling in Eco-friendly manner as found in 'Termites Mounds' it would be expected that humans can do better.

Sustainability is 'meeting the needs of the present without compromising the ability of future generations to meet theirs'. It has become a relevant way of life because of global warming and associated climate change and cannot be ignored. There is no single silver bullet to solving problems caused by anthropogenic emissions. Sustainability is a multi-faceted approach requiring collective global participation. However, Africa as always is waiting to play catch-up, when in fact, on this round, it is in the direct line of fire itself. Let it be known that the catastrophic effects of climate change will be felt in greater intensities in tropical zones than anywhere else on the planet. Predictably, scorching heat, violent storms droughts etc. will increase in frequency. The mission is to put tropical Africa at the heart of the awareness conversation, to demand buildings that can live up to the challenges of global warming.

'Sustainability' and 'Affordability' are familiar terms that occupy the two extreme ends of the cost spectrum. While sustainability requires initial capital outlay which could be recovered during the operational phase of a building, affordability on the other hand is relative, depending on where you live, here in Ghana, it could mean 'Chamber and Hall' built with mud and costing next to nothing. The proposal attempts to narrow this gap making sustainability affordable. Natural 'Self-cooling' is unfamiliar design concept and first application of its kind in human habitation, but seen to be common and well-practiced in the termite's world.

Termites are shy but intelligent creatures who live in the underworld of a mound. It could be baking hot outside while inside the mound could be up to 12o C cooler. The rationale behind this termite wonder is to protect, on one

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hand their food source which is basically fungi that can only thrive below certain temperatures and on the other hand their queen and nursery at the core of each colony. Termites rely on the buoyancy of hot air to rise and provide natural ventilation through the holes in the mound as well as harnessing cool night air to flush the mound and replace hot stale air when temperatures drop at night. This feat is achieved by plugging and unplugging the holes in the mounds, working round the clock. It was a secret uncovered with the help of modern technology using thermal imagery and air sensors placed strategically inside termite's mounds. Further, the mound is constructed out of a mixture of clay, termite saliva and dung and known to have better thermal resistance properties (U-value) than most building materials.

This study focuses on buildings design practices in the Tropics of Africa and re-examines:

1. The appropriateness of building materials, their usage and availability
2. The indiscriminate use of certain architectural forms in the tropical zone
3. The energy footprint and adoption of an ingenious termite's cooling strategy

With such inspiration from nature, it is hoped that by imitating members of the wild community in our Eco-system, coupled with the application of environmental science principles, the 'SASCH' Project would lead the way forward to building environmentally friendly dwellings in African as well as adoption of sustainable living standards. Instead of dependency on unreliable energy sources for artificial cooling, the air-condition which brought us the 'Sick Building Syndrome', we must focus on reduction of energy consumption to decrease global warming potential of our Built Environment.

