Affordable building materials from recycled agricultural waste, Zaria, Nigeria

Project data

<table>
<thead>
<tr>
<th>Project group</th>
<th>Materials, products and construction technologies</th>
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<tr>
<td>Client</td>
<td>University of Zaria / University of Enugu</td>
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<td>Project background</td>
<td>Research and development</td>
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<tr>
<td>Estimated start of construction</td>
<td>December 2012</td>
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Main author

<table>
<thead>
<tr>
<th>Name</th>
<th>Charles Oluwole Job</th>
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<tbody>
<tr>
<td>Profession</td>
<td>Architect</td>
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<tr>
<td>Organization</td>
<td>Bern University of Applied Sciences, Architecture, Wood &amp; C. Eng, Biel, Switzerland</td>
</tr>
<tr>
<td>City, country</td>
<td>Burgdorf, Switzerland</td>
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Further author(s)

1. Dr. Frédéric Pichelin, Engineer, Bern University of Applied Sciences, Architecture, Wood & C. Eng, Biel, Switzerland
2. Andreas Burgdorf, Engineer, Bern University of Applied Sciences, Architecture, Wood & C. Eng, Biel, Switzerland
3. Dr. Henry Tata Kimeng, Architect, Ahmadu Bello University, Dept. of Architecture, Zaria, Nigeria
4. Sani Mustapha, Architect, Ahmadu Bello University, Dept. of Architecture, Zaria, Nigeria
5. Dr. Chigbo Aghaejui Njohmenye, Architect, University of Nigeria Unsukka, Unsukka, Nigeria
6. Obey Nkula, Architect, University of Nigeria, Enugu Campus, Enugu, Nigeria

Comment of the Holcim Awards jury Africa Middle East

The jury considers this project a remarkable approach to ameliorate through one innovation a number of current challenges experienced in developing regions in the world. The new building material creates additional uses for local resources, turns the former burden of waste disposal into a supplementary income stream for local farmers, and reduces dependence on expensive imported alternatives. In addition, the material has the potential to create a new industry, strengthening economic independence and a potential export. Beyond this, the product’s characteristics will provoke unique design responses.

Project description by author

Accessibility to affordable social housing
With a population of 140 million, Nigeria has an estimated housing deficit of 17 million units. This deficit mostly affects low income earners. In view of this, there is an urgent need to research and propose innovative strategies for effective delivery of affordable housing to this group.

Natural materials:
This need for affordable housing stimulated our research, and in partnership with two Nigerian universities, we researched and produced alternative affordable and more readily available building materials, delivering an educational vehicle with which to address a range of academic, environmental and socio-cultural issues pertinent to many developing economies that include:

- Environmental pollution
- Agricultural waste recycling
- Sustainable resource management
- Provision of affordable housing

Relevance to target issues by author

Innovation and transferability – Progress
By researching and producing composite building materials from vegetable waste using low technology, we address a range of economic, environmental and socio-cultural issues, bring together material and agricultural engineers and architects, and propagate an integrated system of crop cultivation and crop waste management. We promote a multi-disciplinary approach to problem-solving that ensures a transfer of knowledge across various disciplines in an investigative framework.

Ethical standards and social equity – People
The composite boards produced from discarded vegetable waste will be deployed in the production of prototypical low cost units. The design and construction of these units will be by local builders and informed by local building practices. The local population benefit from the new affordable building materials, the local farmers gain an extra income from their residual waste materials, which would otherwise have been burnt and thereby degrading the environment.

Environmental quality and resource efficiency – Planet
Recycling and appreciation of agricultural waste: Burning waste crops is one of the main causes of environmental pollution. We help alleviate this by raising economic interest in the recycling of these “waste” materials to generate extra income for the farmers. Furthermore, the boards produced are bonded with natural farm-based adhesive. This is environment friendly, and the technology can be easily transferred to the local industry.

Economic performance and compatibility – Prosperity
By demonstrating the added economic benefits of utilizing “waste materials” we promote economic modernization and diversification and help reduce poverty by offering an added income-earning opportunity to local farmers. This alternative method of recycling allows the sequestration of CO2 emissions. More importantly, the utilization of these local materials should reduce the need to import more expensive building materials.

Contextual and aesthetic impact – Proficiency
Our research goal of establishing production workshops within our partner institutions in Nigeria, who would then be in a position to educate and encourage local production of affordable building materials, will not only help reduce the present dependence on imported, non-sustainable building materials, it will also help develop the building material to be more responsive to the prevailing local needs and context.