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Building community-driven vertical greening systems for people living on less than £1 a day: A case study in Nigeria

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This paper reports and evaluates the process involved in designing and building affordable community-driven vertical greening systems (VGS) prototypes in a low-income neighbourhood of Lagos, Nigeria. Prototypes are intended to fulfil the dual function of improving indoor thermal comfort conditions and providing substrate to grow edible and medicinal plants. Besides that, the research aims to identify entrepreneurial competences and relationships in the community to transform the prototypes into commercially viable local products. ‘Qualitative fieldwork’ is used as a methodological approach and a product development roadmap is proposed that reports: design and construction development; performance evaluation of thermal impact and plant growth; costing; and community acceptability of the four different prototypes built in two different phases: rainy season 2014 and dry season 2016. The prototypes reduced internal air temperatures by an average of 2.3°C, moving internal comfort conditions to the comfort zone for around 90% to 100% of the time. Besides that, they provided around 16 crops of edible and medicinal plants per year. For two variants of prototypes (bamboo and prefabricated timber), the study reports a range of revenues from the sales of crops, and the estimated payback period (PBP) and internal rate of return (IRR) of the investment.

Keywords: Vertical greening systems prototypes, Community driven design in Nigeria, Thermal comfort in low income houses

1. Introduction

This work reports and evaluates the experience of using community-driven product design and development to ‘reinvent’ vertical greening systems (VGS) in a low income settlement in Lagos

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