Abstract

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Ecological Design Principles in Egypt: Case Study Application and Economic Evaluation.

Several international systems exist for measuring sustainability compliance such as BREEAM in the UK, LEED in the US and CASBEE in Japan. A recent Egyptian system is termed the Green Pyramid Rating system (GPRS), and is intended to operate as a rating and certification scheme to define and encourage ecological building design and development in Egypt. Both international and local systems are uncertain in terms of their suitability to local technologies and conditions and in terms of their economics. This paper aims to discuss sustainability system elements of existing buildings in rural areas in Egypt in terms of their suitability to local conditions and economics. Ecological design principles were extracted from international systems and model eco-houses. Challenges facing ecohouses in Egypt were reviewed. The ecological design principles were applied to a case study in Wardan, Egypt, where local available technologies were used to apply the principles of indoor environmental quality, energy efficiency, water management, eomaterials. Ecological systems are proposed for natural ventilation, photovoltaic panels, and thermal insulation and their economic viability is compared to typical air conditioning systems. The conclusion of the comparison is that the proposed ecological renovations of the case study are competitive in terms of construction costs and more economical than typical systems considering life cycle costing. It is thus recommended that government agencies and industry institutions take on awareness campaigns and research institutes direct research towards appropriate ecological technologies for new and existing buildings, whether rural urban.