

Methodology for the Design & Development of a Sustainable House Concept for Quetta, Pakistan

Abstract

Quetta, the capital of Balochistan province, Pakistan, is facing problems due to increasing population and shortage of energy and water. The aim of this PhD is to develop a methodology for the design of sustainable houses in Quetta, taking into account the best possible solutions for the energy and water shortage and maximizing the use of local materials.

In the first phase of the PhD, an inventory of the existing housing stock is made. Due to the unsatisfactory law and order situation, a safety questionnaire was distributed online to identify the safe areas for the housing survey. The areas identified as safe were complemented with areas in which university students and staff, who helped with the housing stock survey, live, to get more representative data. Then 215 houses were surveyed in 32 residential areas of Quetta by filling in the questionnaire, taking pictures and drawing sketches.

In the survey, demographic information, data on the energy consumption and systems, construction types and material use is gathered. Three common structural systems are identified, i.e. R.CC frame, brick masonry and sundried bricks. For each structural system, the main materials for the construction and finishing of walls, roof and floor are inventoried.

The most common housing type is R.C.C frame structure for all income groups, with a plot size depending on household size and income. In phase-II, this type of houses will be further analyzed in detail for their energy performance, environmental impact, construction patterns, water and energy consumption and the household characteristics. In phase-III, a sustainable house concept has to be developed taking into account all the information collected in phase-I & II. It will be further validated by simulations of energy, comfort and water performance and discussion with experts and future occupants.