HOUSING VULNERABILITY IN THE CARIBBEAN REGION: A SOCIO-CULTURAL AND TECHNOLOGICAL APPROACH

Claudio Varini, Doctor Architect
Universidad Piloto de Colombia
claudio-varini@unipiloto.edu.co

ABSTRACT

San Andres is a Caribbean island, with an extreme aggressive atmosphere, an annual average air temperature of 27.6°C. High Resolution Meteorological models forecast the following for 2100: Changes in rainfall (+2.5 ÷-10.3%), sea level rise (+23÷32cm), temperature (T_{av}=+1.4°C) and possibility of storm force winds.

Polychrome wood houses typology is losing ground in favor of concrete/brick buildings, indifferent to the Caribbean culture. Psychologically, it represents modernization; technically speaking, it poses a setback in terms of natural resources use and comfort; aesthetically, an antinomy related to local identity and to the richness of the natural environment.

The San Andres Climate-house project proposes three climate-sensitive housing typologies, adapted to the climate change and respecting the material culture, the aesthetics and the island's life model.

Principles implemented:

- Appropriate configuration and low-impact materiality, compatible with the local labels;
- Constant use of the stack effect, cross ventilation and floor inertia;
- Structural reinforcements, shutters and concrete stilts to reduce vulnerability to strong winds and floods;
- Design and orientation to reduce the thermal gains;
- Reuse of rainwater.

Regarding energy and materials, the island is absolutely dependent, but due to its cost ($16.105€), social housing cannot implement solutions such as ventilated enclosures or the building integrated photovoltaic (TeCd) on roofs. The additional costs to adapt housing to climate change are justified with a reduction in vulnerability, environmental impact and costs in the life cycle.

The thermal simulations with ventilated envelopes carry a better comfort with regards to brick/concrete of 7.3÷10.5°C without air-conditioning. CFD simulations lead to compact forms that reduce the resistance to strong winds yet maintaining generous eaves to reduce the thermal gains by direct radiation. The materials are free from chemical pollutants and largely recyclable or reusable.

A social housing prototype will be carried out in 2012.