POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE
Degree in Architecture
Honors theses

Natural Cooling: traditional and contemporary tecnologies of Developing Countries in warm-humid climates. South-East Asia and India

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This research deals with natural cooling systems in the warm-humid regions, in particular it refers to South-East Asia and Indian subcontinent . In the first part we did some considerations on natural cooling. It valued the connections between building and urban web with the climate, taking buildings'integration into account with the complex environmental system, in which they place temselves. The second part has been devoted to the analysis of warm-humid climate's features, which concerns the latitude's belt included between 15° N and S of the Equator. It consequently valued the adaptation's strategies of building in these particular environmental conditions. These last regard:

- the protection against the strong solar radiation
- the protection from rains
- the evaporation's promotion through ventilation

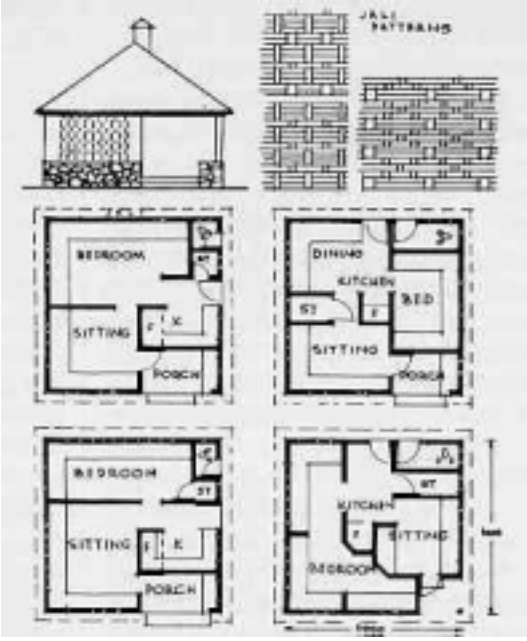
In these chapters we followed as criterion that to give an essential view of the argument, trying not to get too much into the specific, but to offer the essential point, just to be able to read reality in her complexity. The third part, to which we dedicated more time and space, refers to South-East Asia and India.After having analysed the climatic features of the area, we valued how these affected the building environment, through the study of some example of natural cooling systems, either traditional or contemporary. As regards the traditional architecture, we have verified as the climate plays a fundamental role to the development of the different forms and living typologies.Although the numerous South-East Asian regions belong to several social and cultural realities, often they offer the same architectural solution due to their being situated in the same environmental area: to the same climatic conditions correspond the same architectural solutions.

Palawa Village in the South of Sulawesi's Isle, Indonesia

We concentrated our attention, at the end, on the architectural contemporary thought and its bioclimatic aspects, which came out with Modern Mouvement's crisis and with the revaluation of local traditions at the beginning of the Seventies.
In this case we tried to succeed in reaching two aims:

- on the one hand the analysis of the relationship between passive system and low cost
- on the other hand local architects' activity, more sensible to the bioclimatic approach and their more or less expansive projects, like bioclimatic skyscrapers' creation, as we will see.

The necessity of analysing the connection between architecture and low cost comes out of our awareness that the energetic demand's increase, in these years, has been stronger in the Developing Countries than everywhere, causing the dangerous emissions of carbon dioxide. In the building field one of the strategies consists in formulating some national programs, which should adress designers towards the bioclimatic approach.In this way is possible to warrant people the best living conditions and, at the same time, to obtain energetic saving.



Low cost house's project for rural family in Kerala, India

About local architects' activity, the numerous cases inspected testify the presence of several local architects, who have been able to build in harmony with the environment, the climate and the cultural framework.Among these we put in evidence Ken Yeang's activity, who has worked in Malaysia from the end of the Seventies, and his study of bioclimatic skyscrapers.


Menara mesinisga, office building, Malaysia, 1992

The recent urban development suffered by the South-East Asian cities in the last twenty years, has increased the demand of appropiate design models of skyscrapers: they should take the climatic requirements into account and they shouldn't be a simple imitation of the western ones.
The main points of Ken Yeang's study regard:

- service-core positions
- orientation
- skyscourts
- hall
- openings
- vegetation
- materials

The whole realization of the bioclimatic skyscrapers depends on the users themselves, who accept lower level of comfort due to the necessity of occasional manipulations of the devices, when the climatic conditions change.

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