Climate adaptive architecture in desert regions

World Day to Combat Desertification
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BUILDINGS + CLIMATE

40% of the world’s energy consumption is attributed to the construction and use of buildings
WHAT WE ARE AIMING FOR...
human shelter in an economically, ecologically and socially sound way

- High internal comfort
- Spaces based on need and use

but also...
- Adequate use of (local) resources
- Zero CO₂ buildings
- Building which produce rather than consume energy

CLIMATE ZONES

Climate regions based on Ernst Neef (1954); www.klima-der-erde.de/klimazonen.html
Autochthonous architecture ~ from [greek] autos (self) and khthon (soil) ~ indigenous to the land and region

Vernacular architecture ~ architecture based on local resources and needs; designed by local builders rather than formally trained architects

Climate adaptive architecture ~ architecture based according to the local climate; specific to a certain (climatic) region

The local and regional CLIMATE has defined ARCHITECTURE over the centuries

Autochthonous architecture is defined by the necessity to adapt to the most challenging climatic conditions
CLIMATE ADAPTIVE ARCHITECTURE

How it translates into contemporary building design…

• We can learn from the craftsmanship of traditional buildings
• Climate adaptive design necessitates an understanding of the local climate
• Building design and forms vary depending on local resources and climatic conditions
• Decide for heavy weight or light weight construction depending on the climate
• Design with passive measures
• Exploit natural ventilation
• Exploit natural lighting
• Use and activate thermal mass

HOT DESERT CLIMATE

COLD DESERT CLIMATES


STRATEGIES FOR DESERT REGIONS # 1

# 1: reduce cooling loads through adequate fenestration and shading
STRATEGIES FOR DESERT REGIONS # 2

# 2: allow for high thermal mass to reduce peak temperatures

STRATEGIES FOR DESERT REGIONS # 3

# 3: exploit passive cooling strategies such as earth ducts and night cooling
# 4: utilise solar based renewable energy systems


Shibam, Yemen


https://de.wikipedia.org/wiki/Schibam
Sheik Zayed Desert Learning Centre, Abu Dhabi

Eso Residence Paranal Observatory, Chile
Aga Khan Maternity Home, Hyderabad, Pakistan

Pioneertown, California, USA
In order to reduce climate change due to the energy used for buildings, the principles of climate adaptive design can and should be applied to any type of buildings, from residential, to offices, schools and public buildings as well as farm and other utilitarian buildings.