

Revival and Improvements

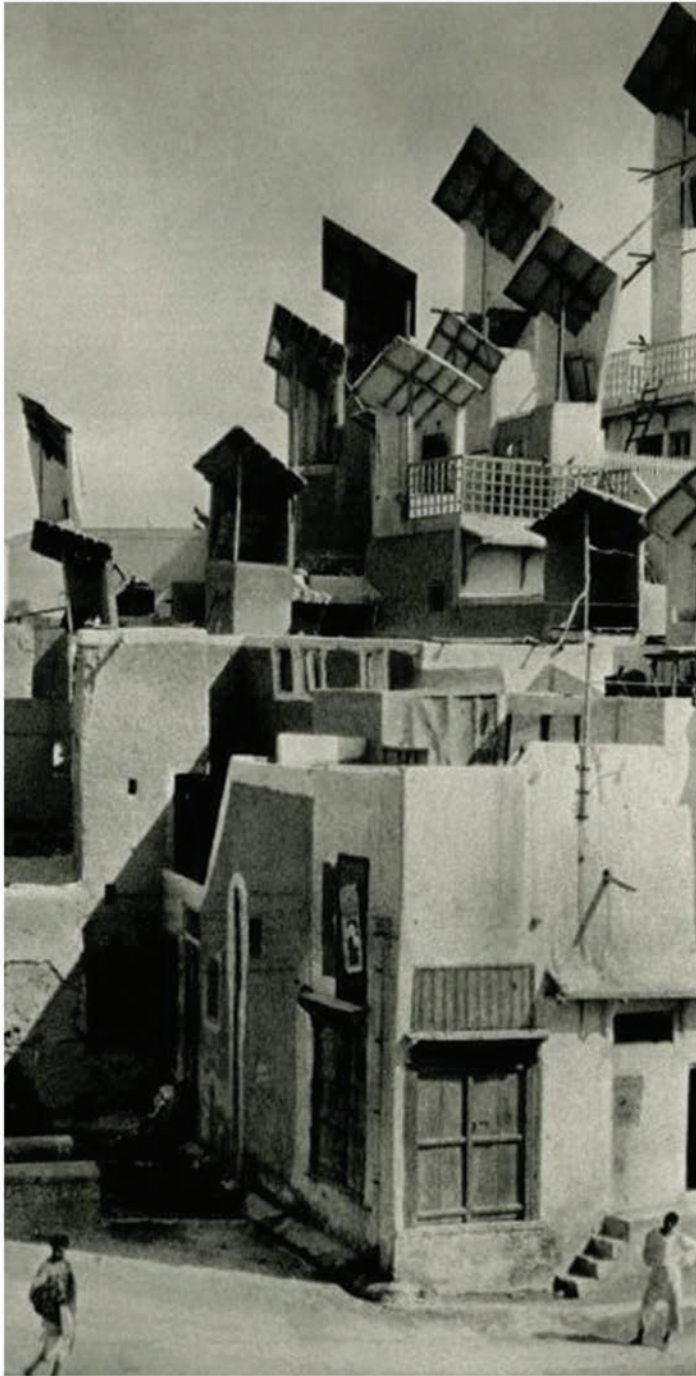
Indigenous Energy Efficient Housing



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Resilient nations.



SGP The GEF
Small Grants
Programme



■ Wind catchers dominating the horizon of Hyderabad Sindh, Pakistan in 1928

Features of Indigenous Housing

The indigenous housing structures in Pakistan were environment friendly. The structures were spacious and ventilated which brought a lot of outdoor wind and light into the rooms. The house walls were high and had different forms of ventilation to keep the house cool through the natural wind. The indigenous houses in Pakistan especially in Hyderabad Sindh had wind catchers - very simple form of ventilation with triangular structure - on top of the roofs and were used to funnel cool breezes in. Wind catchers in Pakistan were in a shape of squire that was surrounded by two vertical sheets.

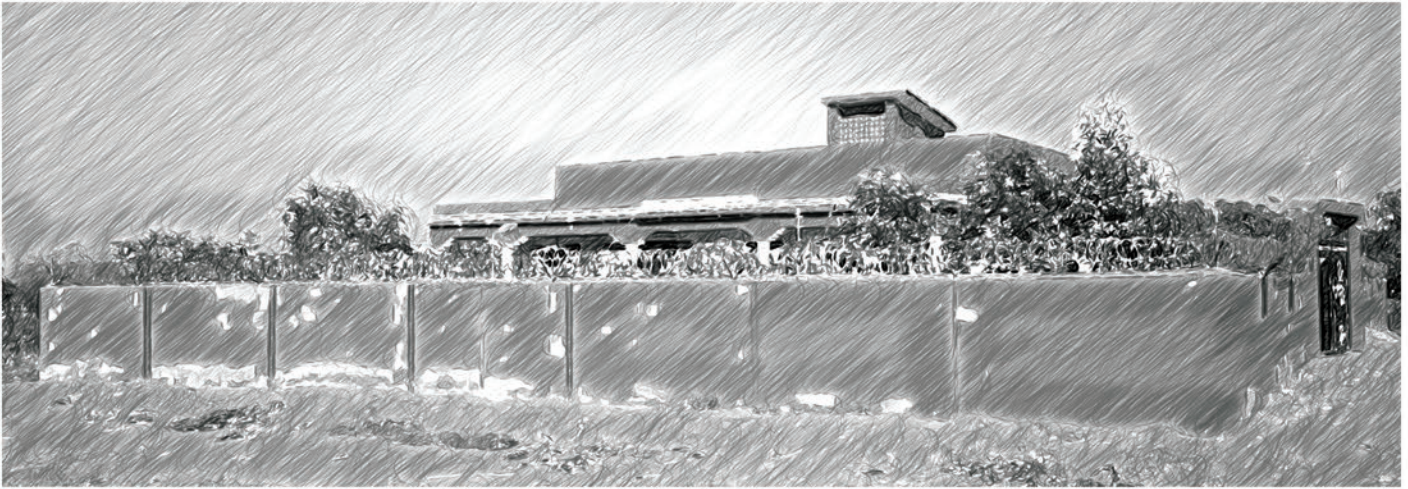
Westernization of Housing in Pakistan

The western style brick-cement-steel construction with the passage of time replaced the indigenous environment friendly housing structures. The current housing structures in Pakistan are completely power-dependent for cooling and lighting. This shift in housing paradigm is very important to address now for several reasons, ranging from power deficiency to checking carbon footprint. The energy-inefficient westren style of housing forces the use of airconditioning as a necessity rather than luxury. Hence heavy electricity bills and severe power shortage are common in the country.

Revival of Indigenous Housing

by UNDP-GEF Small Grants Programme

UNDP-GEF Small Grants Programme Pakistan has been endeavoring for developing energy efficient housing models for the poor communities of Pakistan since 2006. The objective was to improve the quality of life by providing an environmentally compatible, economically affordable and socially acceptable housing by using passive energy. UNDP-GEF Small Grants Programme has successfully designed and constructed energy efficient house with wind catcher and duct systems. It infact is the revival of the indigenous housing structures with further improvements.



■ A view of SGP's EE House Model in Jamshoro

Key Features of the Energy Efficient House

Foundation: Trapezoidal plinth beam for foundation to control the capillary action of ground water.

Double Hollow Brick Wall: The walls of the indigenous houses were kept thick to prevent the heat penetration inside the house. UNDP-GEF SGP has adopted the 'hollow mechanism' with double hollow brick wall and 4 inches gap has been filled with stone dust. It acts as an insulator and controls the dampness from the external surface of the wall and the ground. Stone dust is widely available in graded form. It is a mixture of 70% sand, 15-20% sand silt and minimum 12% clay in natural form of stone dust. CEB has strength of 700-800% psi.

Roof Insulation: Lime, sand with jute reinforced non-conventional topping for insulation. These materials have been used after RCC to prevent penetration of heat inside the house and keep the inside of the house cool.

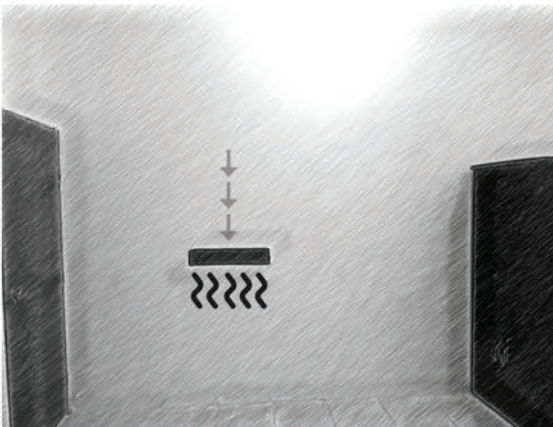
Wind Catcher with Humidifier: Keeping in view the design of the indigenous wind catcher a wind catcher with a modified design has been constructed. Besides, humidifier has also been established inside the wind catcher to further reduce the air temperatures once it enters into the rooms.

Glazed Windows: Glazed windows with GI frame with air ducting system have been constructed for the supply of fresh and humid air.

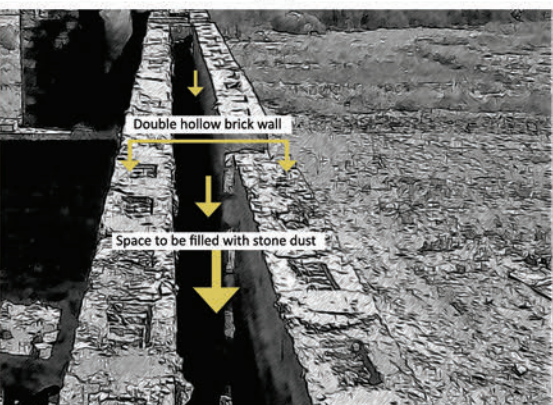
Waste Water Reuse: Waste water from kitchen and bath enters into the front yard chamber where oil and grease is separated by baffle, then the waste water is used in the kitchen garden through sub surface irrigation or furrow irrigation. The plantation will be natural, excess water either will be absorbed into the ground or overflow into the soak pit. Vegetables and fruits can be grown in the kitchen garden.



■ Remodeled wind catcher



■ Duct system for fresh air supply. The arrows indicate the flow



■ Double hollow brick wall



■ Federal Secretary Ministry of Climate Change Ms. Rukhsana Saleem visiting the under-construction UNDP-GEF SGP EE House Model



■ Outside view of UNDP-GEF SGP's EE House Model



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