

Mud House ('Katchi Kothi') at Anangpur Village

1.0 Synopsis of the project:

A mud house in a dis-used quarry, embodying the ecological principles of interdependence, recycling, democracy, partnership, flexibility, diversity and as a consequence of all those- sustainability.

2.0 Type of Project:

Residential

3.0 About the Project:

Location: Anangpur Village, Faridabad.

Plot Area: 1.25 Acres

Built up Area: 5000 sqft

FAR Achieved:

Architects: Kamath Design Studio.

Design Team: Revathi Kamath, Vasant Kamath

Consultants:

Structural: N/A

Electrical: N/A

Plumbing: N/A

Others: N/A

Contractors: N/A

Year of Completion: 1996

Owner: Self

Awards received: N/A

Cost of Construction: Rs. 350/- per sq. ft.

Design Concept and Project Description

The Mud House at Anangpur Village, Surajkund, Haryana, is located on land that was once a quarry, mining quartzite and Badarpur stone dust. The ecology of the area had been devastated by the mining and the original scrub forest had been chopped and ravaged for fire wood.

The Mud House is an attempt to heal the wounds inflicted on the earth and establish a niche in the ecosystem that is expressive of emerging ecological values.

The architecture of the house is based on the premise that the purpose of human culture is to accord dignity to all forms of life, to recognize the holistic nature of the environment and to value its regenerating and self-healing capabilities.

The design process has actively been guided towards the evolution of an ecological architectural vocabulary informed by indigenous building practices.

The creating of space, form and visual characteristics is based on the rearrangement of natural materials found on the site and its surroundings, with a minimum, judicious use of non-renewable, non-bio-degradable and fossil resources such as metals, stone, stone slabs, plastics, cement, lime etc.

The site, at the beginning of the project, was undulating, with the quarrying having formed deep pits and caves. Loose excavated rock was strewn all over the land. Stumps of trees, hacked repeatedly for firewood by villagers, season after season, was the vegetation we inherited.

The land was gently shaped to slope to the lowest points of the existing pits, which were natural rainwater collection areas, to create three ponds on the site. A network of swayles was also made to channelize the rainwater into the ponds, while irrigating the land along their routes. The ponds were the major source of the clay and silt used to make the mud bricks for the construction.

The house is located at the highest elevations and responds to the undulating land by incorporating a number of levels within itself, enclosing both internal and external courtyards within its form. The sinuous outlines of the building follow the existing rock formations while utilizing them as foundations. The bed rooms are placed in an arc, overlooking one of the ponds in the north east. They receive the early morning sun all year round, but the lower winter sun penetrates deeper into the rooms creating warmth. The main corridor connecting the bedroom block to the living room is placed on the Western face. The western face is thick, with small jaalis puncturing the wall for breeze. The living room is an extension of the courtyard and overlooks the east. On the southern side are an array of built in solar cookers that are operated from within the living space. The public areas of the house are placed over the bedrooms, commanding a view of the north and northeast. A large opening is placed on the extreme west to catch a view of the setting sun. The utility room and kitchen are placed at a level lower than the living room. These noisy spaces are sunk partially into the ground, because of which they are cool in summers and warm in winters. These rooms face the southern and eastern directions. The house for the support staff is on the southern end of the site, adjacent to the vehicular entrance.

The courtyards are the cool air sinks which bring in cool air into the living spaces of the house. During the hot, dry summer months the cool courtyard air is further cooled by atomisers and the

cool air is actively drawn in to the living spaces by low speed blowers, through the traditional wet 'khas tati'. During the humid months, however, when the atomisers are not used, air is drawn in through wind catchers and ducted in to the living spaces through in built mud masonry ducts. Additionally, at night, the pond on the North-East creates a micro pool of cool air which natural breezes blow into the three bedrooms through open windows.

For heating in winter there is a fireplace in the living room, which uses the dry and waste wood from the land and from which glowing embers from the evening's fire are taken into the bedrooms in mobile iron containers for the night. Day time heating relies on the warmth of the sun, coming into different spaces at different times of the day.

The structure itself has a high thermal capacity with its thick earth walls and 'green' roof, which moderate the effect of both the cold and the heat within the house. No air conditioners are used.

Recycling of material resources in a longer time frame than the lifespan of a building has also dictated the choice of materials and details for the construction of the house.

The foundations are in random stone masonry with stone from the site, set in lime mortar, between stretches of existing rock formations on the site, where no foundations were required.

The stone masonry ends at the plinth level with a damp proof course consisting of two layers of rough sandstone laid in cement mortar, with staggered joints.

The two storey superstructure has load bearing walls made of sun dried, hand moulded, mud bricks. The earth for the bricks was sourced from different parts of the site to ensure the right mix of clay, silt and coarse sand, all of which were present on the land. A 'chutney' of neem leaves was kneaded in to every batch of mud, which was puddled wet and left for about ten days, before being moulded into bricks, which were then sun dried for about 20 days before being used for the masonry.

The intermediate floor is made of sandstone slabs supported on the mud walls and on intermediate steel girders, as the spans were larger than the length of the stone slabs easily sourced (2 to 3 metres).

A 'green' roof with live grass and vegetation tops the two storey structure. The roofing system consists of bamboo-crete on eucalyptus 'balli' trusses, waterproofed with rubber sheets and finished with about a 10cm. layer of earth on which the local site grass was propagated.

The construction team consisted of a group of stone masons and bricklayers from Bihar who had worked on some of our earlier projects in and around Delhi; electricians, plumbers and carpenters from nearby Sangam Vihar; mud brick makers including village women who prepared the soil and older men who moulded the mud into bricks; and a group of mud plaster renderers who had worked on some of our earlier projects.

The carpenters worked on re-cycling and re-shaping old doors and windows into the new doors, windows, brackets, cupboards, switch boards and shelves; they also worked on the eucalyptus trusses and the bamboo mat for the bamboo-crete roof.

The stone masons, besides working on the stone masonry, also made the stone brackets, lintels, sills, shelves, built-in furniture, cement flooring and the waste marble mosaic in the kitchen and toilets.

The brick masons made the arches in mud brick, the 'jalisi' in the mud brick walls and the built-in mud seats and beds.

This informal team of craftsmen and women who have been nurtured and sensitised by us over the years, continue to work on many of the projects of the studio. Through the development of their skills we have contributed to the cultural continuum of the architecture of the ecologically conscious community in the region.

A network of paths, steps and ramps connect the various levels and spaces of the site, interweaving with the swales in a variety of configurations. The ponds and vegetation attract a number of species of birds, insects, reptiles and mammals. It is with their presence that the new plant species are propagated.

The condition of the soil was poor, as it was newly excavated, and the main task at hand was the enriching of the top soil. This is happening with leaf litter and a host of earthworms inhabiting the banks of the swales.

The old tree stumps have over fifteen years grown into tall trees that shade almost half the site. The remaining open spaces have been allowed to regenerate. Each space has developed its distinct characteristics. Some are grasslands, others are filled with shrubs and seasonal plants, others are developing into valley forests and yet others into the original scrub habitat.

Some of the invasive species, like 'subabool' and lantana are constantly being weeded out and contribute bulk to the compost heaps occupying the caves and their vicinity. The 'vilayati keekar' trees are gradually giving way to the original species of the habitat. Agriculture and horticulture are not actively pursued. However, edible species do occur through natural propagation.

Twigs and dried out branches are collected weekly and supplement the fuel requirements of the three families that occupy the land.

Three anaerobic digesters (Shankar-Balram system) acting in consonance with root zone digesters are located proximate to the house, at the higher levels. They treat the entire waste water produced by the occupants and discharge the clean treated water into the swales to irrigate the land.

The significance of the house lies not just in its ecological materials and innovative techniques, nor just in its hands-on, labour intensive construction methodology, nor just in its direct and informal involvement of a team of crafts people and workers from the community without the institution of the middleman contractor, nor just in its regeneration of a degraded, ecological wasteland, but in the totality of the unique ecological initiative it has promoted; and the enriching habitat and ecological lifestyle it has created. Many, many more such 'non-Leeds' initiatives are the need of the times.