A CONCEPT OF RESILIENT HOUSING
GORAKHPUR, INDIA

CHARACTERISTICS OF RESILIENT SYSTEMS

1 SAFE FAILURE:

Safe failure refers to the ability of a system to absorb sudden shocks or the cumulative effects of slow-onset stress in a way that avoids catastrophic failure. Safe failure can also be shown through the interdependence of various systems, which support each other—failures in one structure are then unlikely to result in cascading impacts across other systems (Little, 2002).

1a The plinth of the main living room is at a height of 1.8 m. Even if there is a flood that enters the house, the sleeping room on the second level will keep the occupants safe in the event of rising flood levels.

2 REDUNDANCY AND MODULARITY:

Interacting components composed of similar parts that can replace each other if one, or even many, fail. Redundancy is supported by the presence of buffer stocks within systems that can compensate if functions in one area of the system is disrupted.

2a This is a single house design but can be integrated with other similar structures to develop into a neatly stitched design of multiple houses or a neighborhood

2b The raised space underneath the house for water to flow can be used for parking motorbikes/ bicycles during the non-flood season.

RESILIENT HOUSING
DESIGN COMPETITION
2013

The housing design shown here is the winning entry of the Resilient Housing Design Competition 2013—Aqueous Communes, by Mad(e) in Mumbai.

The characteristics of resilience are drawn from the Climate Resilience Framework. A robust collection of materials, including training materials, further elaborate on this conceptual framework and are available at **www.i-s-e-t.org/crf**

3 FLEXIBILITY AND DIVERSITY:

A resilient system has key assets and functions physically distributed so that they are not all affected by a given event at one time (spatial diversity) and has multiple ways of meeting a given need (functional diversity).

3a The house can be expanded to have more rooms if the need arises.

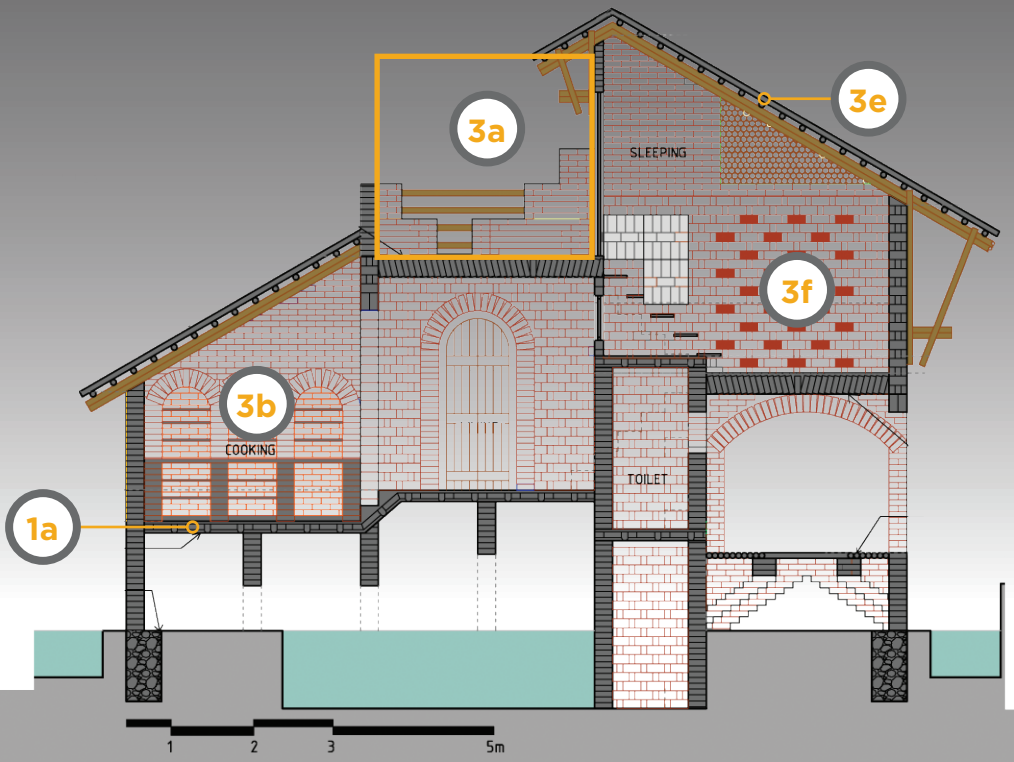
3b Built-in shelves save costs for the household and act as a storage space during flood events.

3c The vegetable garden is raised above the flood level.

3d A hanging wall garden has been integrated into the design of the house to act as an additional space for vegetable production.

3e The house has built-in design features like rat-trap bonds and terra-cotta tiles that help keep the temperatures down.

3f For better ventilation and light during the daytime, walls have been designed with slits (jali wall system).



SHELTERING FROM A GATHERING STORM & THE RESILIENT HOUSING DESIGN COMPETITION 2013

GORAKHPUR, INDIA

Sheltering From a Gathering Storm aims to improve the understanding of the costs and benefits of climate-resilient shelter design, and contribute towards the transformative change necessary to make communities more resilient to future disasters.

Shelter design is one of the largest factors influencing the loss of lives and assets during extreme climate events, and is therefore one of the biggest costs for governments, the private sector, and NGOs working on disaster risk reduction or post-disaster reconstruction. Using cost-benefit analysis, this applied research project has produced a number of outputs to provide insights into economic and other non-financial returns of adaptive, resilient shelter design that takes into consideration hazards such as typhoons, flooding, and temperature increases. The research spans South and Southeast Asia; with a focus on Central Vietnam, Northern India, and Central to Northern Pakistan.

As part of this project, ISET-International, Gorakhpur Environmental Action Group, and Seeds India hosted the Resilient Housing Design Competition 2013 in Gorakhpur, India with funding from the Climate Development Knowledge Network. This competition was open to engineers, architects, students, teams, and individuals to show off their design talent and skills for low-cost housing that is resilient to climate change.

Here we share with you the winning design 'Aqueous Communes', conceived and designed by the architecture firm 'Mad(e) in Mumbai', and describe how it encompasses characteristics of resilience in their thoughtful and beautiful design.

The competition required each design to include one or two rooms, a kitchen, and a toilet; develop construction costs under Rs 500,000 (the estimated cost of Mad(e)'s design is 75 sq/m house is Rs 400,000; consider climate resilience, environmental sustainability, and the sourcing of local materials and labor; integrate innovative construction technology that meets building codes and bylaws; and make all design considerations for low income households as the target population.

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