

# Development of a Design Catalogue Framework for Flood-resilient Housing

TEODORA CÎTIA

Nepal is subject to multiple floods yearly, affecting millions of people[1]. In the context of Nepal, the construction of houses/shelters is often done by informally trained labourers, largely without the supervision of architects or engineers which results in structures unable to withstand the hazards that Nepal is subjected to.

Although not officially imposed by the government, flood-resilient features have been implemented in the house designs adopted by various humanitarian organisations engaged in helping Nepalese families rebuild their houses post floods. These organisations recognise the need for a **design catalogue** that covers the construction of **flood-resilient housing** while also complying with the measures imposed by the National Building Code of Nepal.

To address the pressing need for effective communication of hazard-resilient house measures, this assignment aims to: Determine the **requirements** for a design catalogue featuring hazard-resilient housing typologies and **devise a structural framework** for its development. The primary focus is on communicating key flood-resilient housing design measures to homeowners in the Terai area. The research is guided by the

question: **How can house design choices be implemented into a design catalogue for hazard-resilient housing in the context of building flood-resilient housing in the Terai area?**

The research methodology involves a 60-day field study conducted in Kathmandu, Nepal. The field study includes collaboration with the Nepalese Flood Technical Working Group and Key Informant Interviews (KII) to gather insights into existing housing projects, architectural typologies, and design considerations for flood resilience. The essential contents of a design catalogue dedicated to hazard-resilient housing have been identified through literature review. These include the explicit hazard-resilient house measures to be implemented and the architectural and structural drawings and instructions needed for the construction. The optimal representation of these contents to suit the target users of the design catalogue has been analysed with the use of Personas [2] and following the principles of design thinking [3] and user-centred design [4]. The Personas have been developed based on the information gathered via the field study.

The outcomes of this assignment include a list of requirements for a design catalogue for hazard-resilient housing, including the contents, the structure and the presentation manner and a structural framework for a design catalogue for flood-resilient housing in Terai.

A framework prototype was created intermediately, which has been improved upon based on expert feedback (Nepalese humanitarian engineers, architects, and supervisors).

No testing of the final framework has been conducted due to time and resource constraints. However, potential testing methods have been briefly analysed.

This assignment focused on identifying flood-resilient measures implemented in house designs in the Terai area, determining what contents should be covered by a design catalogue for hazard-resilient housing, and the means of presenting them in a way that is sensitive to the needs of the target users.

In the case of flood-resilient housing in Nepal, the implementation of flood-resilient house features is more important than the building typology used. A design catalogue for hazard-resilient housing should feature hazard-specific measures and building plans. For homeowners in the Terai region, the catalogue's contents should be presented visually, using icons and drawings with minimal text. Technical drawings should be simplified, featuring strong line art with high-contrast colours. Additionally, these visual elements should reflect local environments and cultural elements to enhance recognition and information retention.

The identified requirements are broadly applicable to design catalogues for various hazards and geographical areas. However, additional

requirements may emerge upon analysing the specific users, areas and hazards targeted. These findings underscore the importance of a user-centred design approach in developing effective and practical resources for hazard-resilient housing. The framework developed within this assignment serves as an initial prototype of how a design catalogue for flood-resilient housing could be structured and how its contents could be presented. Future work should involve iterative testing and refinement to ensure that the catalogue meets the users' needs and aligns with the identified requirements. Although this assignment focuses on flood resilience in the Terai region, further research should explore the applicability of these findings to other regions and types of hazards to ensure broader relevance and utility. This assignment advances the development of user-centred communication tools for hazard-affected communities, highlighting the importance of tailored solutions that address the specific needs of the users. Ongoing research and user feedback will be crucial in refining this tool, ensuring it effectively supports communities in mitigating the impacts of hazards.

## REFERENCES

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