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Post-disaster housing: Translating socio-cultural findings into usable design technical inputs

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1. Introduction

On December 26, 2004 a 9.1 Richter scale earthquake followed by a high tsunami struck Indonesia's Aceh province. It was one of the largest natural disasters in Aceh's history and had a tremendous effect on the housing and settlement sector. Banda Aceh, the capital of Aceh province, was one of the hardest hit spots along with Aceh Jaya and Aceh Barat. Some 500,000 survivors lost their homes, rendering 20% of the Acehnese population homeless [2]. Up to 140,000 homes were destroyed or severely damaged. The tsunami disaster triggered international attention. Billions of foreign aid dollars for reconstruction were offered. Many international agencies and NGOs pitch in to help Aceh with Indonesian governmental agencies. In addition to the rehabilitation of the economy, livelihood, environment, infrastructure, health services and schools, the reconstruction of houses is the major activity of post-disaster response. The combined national and international aid resulted in large scale post-disaster housing reconstruction projects. The rehabilitation and reconstruction phase was completed in 2009. After reconstruction, 147,000 houses were built for survivors [7], a significant achievement.

Several studies on how to empower and involve local community in the design process of post-disaster housing carried out but few explore how to engage social scientists in the process. Their position is often being overlooked due to the dominant role played by technical experts such as architects, planners, designers and other construction professionals. In fact, the role of social scientist group is important as they can add value to the design. Using Aceh post-tsunami permanent housing as case study, this paper argues that it is necessary to build a synergy between local community, the 'hardware' actors (planners, NGOs, designers, architects and builders) and the 'software' actors (social scientists including anthropologists, sociologists and psychologists) to assist the translation process of cultural findings into usable technical inputs to design better post-disaster housing. Accommodating socio-cultural needs of survivors gives them a roof over their head and at the same time helps the rebuild their lives. Therefore it is of great importance for all of the relevant post-disaster housing reconstruction actors to be aware of social and cultural factors and to integrate these into their design and planning.

2. Literature review

Several factors have to be considered in housing design and planning. Among these, the interpretation of culture is the most important one [14]. Other important factors that need to be considered are daily practices and social interactions of the inhabitants either internally among family members or externally with neighbors or visitors [26,27]. These social and cultural factors are the main characteristics of many household patterns which influence the layout, function and facilities of the rooms in houses. These aspects need to be considered not only in designing housing in normal situation but also in unusual sudden events like natural disasters. Designing post-disaster housing for survivors is not just a matter of giving them a shelter but also restoring their socio-cultural life. As stated by Davis [11] 'The task for designers (whether professional or indigenous) is to seek to create 'places' with meaning, not merely spaces. Places that provide 'identity' and deep sense of 'belonging' and 'security' are essential, and not merely for protection from the elements, or as occupation and accommodation'. However, major Post-disaster housing design and planning actors, particularly the planners, architects, builders and construction professionals, often neglect the importance of socio-cultural factors or they translate them incorrectly into their

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designs. Principles of local culture are commonly disregarded by reconstruction agencies as they are no longer believed appropriate in post-disaster situations [10]. Most post-disaster housing projects only focus on immediate actions and the policies, strategies, approaches, processes, technologies and costs involved [21] while less attention is given to the social cultural factors of housing. Essential social and cultural housing meanings following from home layouts, exterior space design and what kind of feel they give, are often neglected in post-disaster processes [26,27]. Limited local experience and knowledge of many reconstruction experts and agencies make housing reconstruction more complicated [22]. The lack of understanding in interpreting these socio-cultural aspects might cause problematic issues which will especially impact affected communities. It is therefore essential to understand how individual communities build their houses and arrange the spaces within them. Allison [1] argues that the social aspect of communities and the interrelationships of the members of the households can be studied through the ways communities build their houses and arrange their space. This understanding can help explain the social relationships in households, and how those relationships can be irretrievably transformed in the context of post-disaster reconstruction, particularly if changes were imposed or carried out by outsiders.

Permanent housing is the last stage of the housing reconstruction response [16]. It is the core issue of post-disaster reconstruction study. Thanks to the variety of real life post-disaster planning of house building, scholars have fortunately begun to focus on permanent housing issues and how individual household revival makes social processes more important in later stage housing projects [12]. There are several common approaches used in the post-disaster housing reconstruction: top-down, bottom-up or a combination of the two. When disaster strike, top-down approaches are commonly used but they do not seem to be interested in the lifestyles, wants and wishes of individual survivors. For example, a top-down post-tsunami 2004 housing project in Tamil Nadu, India which was handled by contractors has threatened both the natural habitat and the socio-cultural life of the people. The contractor-driven project demolished vegetation and vernacular buildings and built a new style of 'modern' settlements that changed culture and people's way of life. The natural habitat was degraded and from a socio-cultural point of view the houses built by contractors were sub-standard [5]. New space arrangements and a lack of verandas did not cater to family gathering habits causing significant, disruption to the local culture [4]. In addition, future developments will suffer since there is 'no active role for beneficiaries to play in the development of their own future' [17].

Conversely, the bottom up approach where survivors engage in the planning, design and building process is believed to be the most culturally sensitive approach and results in the highest levels of satisfaction. Mantel [18] argues that handing over control to homeowners in design, planning and building their house will also provide many benefits. In this approach communities build their new houses themselves with some external helps from financial and technical actors [5]. Barenstein [3] also finds that bottom-up approaches help and re-establish confidence and pride of traumatic survivors, by encouraging them to be actively involved and able to participate in the building of their own new homes. Barenstein also observes that it makes people stronger as they see their needs and wants materialized. Some NGOs, policy makers and scholars have been encouraged to use this approach [9]. The importance and benefits of beneficiary engagement in post-disaster housing reconstruction housing process through a bottom-up approach has been widely studied in the literature. It is also highlighted by shelter experts [11]. However, this approach also has disadvantages. It may take more time and mostly cannot do without extensive facilitation [23]. This is not an easy task as it needs capable actors who will play a role in facilitation process among the community members, while the one of the common problems faced in the disaster situation is the lack of the resources and facilities. And it may not be at all easy to let qualified actors play roles of facilitation. Moreover the communities were also separated in different locations such as barracks and tented camps which destroyed the community structure [23]. This situation creates difficulty in the facilitation process among the community members.

In the case of Aceh's recovery, professionalism has been a frequent problem [23]. Sometimes it may be risky because technical quality is not always secured. In a number of cases traditionally built buildings have collapsed [3]. These weaknesses complicate the integration of socio-cultural factors into the design of post-disaster housing. Additional role from another group of experts besides the local community and technical actors becomes necessary in this situation. Social scientist experts including anthropologists, sociologists and psychologists are the group that can give significant contribution to ensure the integration of socio-cultural findings into usable design technical inputs. Unfortunately, the role of this 'software' group is not fully recognized in post-disaster housing studies. The majority of the literature overlooks this group and they are not considered part of post-disaster housing actors. Guidelines for Assistance for Shelter after Disaster published by the UNDRO (1982) [25] for example, only stated the roles of local professionals, private sectors, relief agencies, donor governments, international agencies (UN) and the role of local experts on shelter and housing (architects, engineers, builders and carpenters). Davis (1981) also identifies similar groups consisting of National government (affected country), Local government, Local private sector, Local expertise, Expatriate expertise, Local co-ops/relief agencies, Surviving population, Expatriate agencies (voluntary agencies), Expatriate agencies (governments), and Expatriate agencies (international agencies). Due to their important role, social scientist experts needs to be highlighted and specifically mentioned in the post-disaster housing studies.

3. Methodology

To understand how to build synergy between the 'hardware' and 'software' actors and local community in order to ensure the local socio-cultural factors are adequately translated into technical design of post-disaster housing, this study used three approaches for the analysis. First**,** the local vernacular house (Acehnese house) was studied, including the form, type, space arrangement/layout as well as the embedded concept and philosophy. The second approach analyzed how the vernacular form and the concept/philosophy were transformed into contemporary forms right up to the point before the Tsunami. The third approach analyzed the type of designs of post-tsunami housing in Aceh and assessed how those new designs changed the social-practices of the occupants and the further implications of these changes for the community.

The first and second approaches were carried out primarily based upon the Author's own research experience in Aceh traditional houses between 1997 and 2008, supported with existing literature. The third approach was carried out through fieldwork in July-August 2010 and October 2011-January 2012 in Banda Aceh city and part of Aceh Besar district. During these periods, 50 houses in four neighborhoods notably *Meuraxa*, *Kutaraja*, *Jaya Baru* and *Peukan Bada* have been observed. These neighborhoods were amongst the most devastated areas affected by the disaster and also the concentration zones of post-tsunami housing reconstruction project carried out by big donor agencies. Among the

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