

Self-built housing as an alternative for post-disaster recovery

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ABSTRACT

Purpose: This study evaluates cases where self-built housing is applied by NGO's as a strategy for post-disaster recovery of low-income groups and indicates opportunities for further research.

Methodology: Three post-disaster recovery case studies; (1) Sri Lanka tsunami 2004, (2) Pakistan floods 2010, (3) Philippines typhoon 2013, are examined from three points of view, namely cost and time reduction, maintenance of local tradition and increased hazard resistance, and concentrate on expected long-term effects the approach can have on community resilience.

Findings: The research reveals that self-built as a strategy for post-disaster recovery, could enable cost and time reduction and maintenance of local traditions. Community resilience is achieved by creating a greater understanding of hazard resistant construction principles which decreases the vulnerability of those hit by a disaster. However, tools are lacking to exchange building related knowledge so that it lasts.

Research limitations: Due to a lack of examples, the case-studies available are not so suitable for a detailed comparison, but can nevertheless be used to give an initial evaluation to the application of self-built housing.

Originality value: Better insight is provided into community resilience, with a focus on self-built housing as an approach for post-disaster recovery, giving direction for future research into knowledge exchange tools which could support NGO's in applying them.

KEYWORDS

community resilience, post-disaster recovery, disaster risk reduction, self-built housing

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Eefje Hendriks is a doctoral researcher and lecturer at the University of Technology in Eindhoven and the Avans University of Applied Science, focussing on post-disaster sheltering and community resilience. She investigates tools to exchange knowledge about hazard resistant construction with self-builders. The tools are to be applied by NGO's to guide basically educated low-income groups of disaster survivors in their recovery process. For this paper she collaborates with a group of four master students.

1 Introduction

Worldwide, almost 60 million people are currently displaced by conflict, climate change, disasters and development, having lost their shelter and settlements (Stephanie Nebehay 2015; Gaynor 2015; Section 2015). From these displaced people 30% are sheltered by humanitarian aid organisations, in planned and managed areas, leaving the remaining to improvise their own shelters (Saunders 2016). From last year's estimated shelter demand of 1.8 billion dollars, only a quarter was covered (Initiatives 2015).

Currently, most NGO's provide temporary readymade shelters which do not catalyse the self-recovery process, creating instead an undesirable dependence on external aid (Shelter Centre 2010; SPHERE Project 2011; Baquero 2013). Over time, camps transform into permanent settlements on illegal land, when affordable alternatives are lacking and NGO's, governments and landowners miss a long-term vision involving low-income survivors' active participation (Setchell 2006). In order to innovate the aid process, decision makers need to see practical examples of the positive impact of alternative approaches, such as self-built housing (Hayles 2010; Thrippugazh 2014; Saunders 2016).

While there is substantial literature on post-disaster reconstruction, there is, by comparison, insufficient on self-built reconstruction. The cases of the tsunami in Sri Lanka(2004), the floods in Pakistan(2010) and the typhoon in the Philippines(2013), found in literature, exemplify different disaster situations where self-built housing is applied as approach for post-disaster recovery of low-income groups. The goal is to evaluate the potential of these approaches and stimulate a wider application, basing conclusions on successes and shortcomings and giving recommendations for further research.

<i>Disaster</i>	<i>Area</i>	<i>Realization</i>	<i>Project name</i>
2004 Tsunami, Sri Lanka	Jaffna district	Government, UN-Habitat	India Housing project
2010 Flood, Pakistan	Swat region	Heritage Foundation, Glasgow University	Green KaravanGhar
2013 Typhoon, Philippines	East-Samar province	Cordaid, Build Change, CAFOD	Resilient communities

Figure 1. Key aspects of the case studies

2 Self-built housing strategy

This paper evaluates qualities of the approaches that positively influence long-term community resilience. This can be defined as *“the capacity of a community... potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure”* (UN-ISDR 2004). Community resilience is important to enable independence from external aid. Only qualities related to the approach of self-built housing which support community resilience are evaluated here (IFRC 2014).

First of all, self-built housing has the potential for cost and time reduction. Users provide the needed labour and through participation, future adaptation costs are prevented since the houses directly comply with the user’s needs and principles of hazard resistance. Saving costs and time accelerates the community to create economy opportunities and take care of their own needs (IFRC 2014).

In case of recurring disasters, basic understanding of hazard resistant construction principles can empower a local community reduce their vulnerability, meet their own needs and thus contribute to long-term improved resilience (Berke, Kartez, and Wenger 1993; de Haas, Cox, and Gijsbers 2013; Shaw 2014; Renaud, Sudmeier-Rieux, and Estrella 2013; IFRC 2014).

Besides that, the autonomy of the end-user in the design and building process leads to liberty of expression of local identity and an important preservation of local traditions (Alexander 1989; Harris 2003). In general, an owner-driven design and construction process, enables the maintenance of the local architecture and cultural identity (Alexander 1989). The commonly used imported emergency shelters lack uniqueness, which enables owners to recognize their home. Feeling at home and having a future perspective are crucial for mental recovery after a disaster (Leon et al. 2009; Kennedy et al. 2008). Therefore, an acceptable maintenance of local structures is important for the community resilience (IFRC 2014). In addition, community-based construction activities contribute to the psychological recovery of disaster survivors and, if organised well, the sense of community (Leon et al. 2009; Kennedy et al. 2008).

These qualities present the importance of involving the affected population in reconstruction. In this article for all cases three qualities are evaluated: (1) cost and time reduction, (2) increased hazard resistance, (3) maintenance of local identity.

3 Case study evaluation

3.1 Cost and time reduction

In Sri Lanka, due to the uniqueness of the phenomenon and overwhelming media attention, the funding received was exceptional, even more than the loss to be covered. Therefore, disaster survivors with completely destroyed houses were granted relatively large funds, Rs. 550.000, at that time equal to 4300 USD, for each house (UN-Habitat 2012). However, the initial lack of coordination between stakeholders and the misevaluation of risks led to an extended recovery period (Ingram et al. 2006). However, as can be seen in Figure 2, time and money were saved because locals were trained to build their own houses.



Figure 2. Practical female mason training in Sri Lanka (Jayasinghe 2013)

The situation in Pakistan, started with poor policymaking, leaving a lot of freedom to the various organisations involved (Ward 2012). The close collaboration with the community is characterized by free labour and the extensive use of low carbon footprint local materials, such as bamboo, mud and lime, and vernacular building techniques (Heritage Foundation of Pakistan 2011b). This resulted in 266 decent and extremely affordable houses in Islamabad for approximately Rs. 50.000 per dwelling, around 500 USD (Heritage Foundation of Pakistan 2011b).

In the Philippines, the government and NGO's had a relatively good collaboration due to recurring disasters in the area, which enable the implementation of participatory approaches and speeded up the recovery. Remarkable is the complete authority given to the community to define and prioritize their objectives and manage a large part of the available budget (Cordaid 2015). In total 537.127 Euro, 668.562 USD at the time, was available for the recovery of the community with around 200 families (Cordaid 2014). Participants could purchase building materials and hire local construction workers, providing a local cash flow and enabling local businesses to recover faster. The NGO only guided and trained the community, enabling for example a sensitive cost reduction by supporting community labour, which increased the project's impact (Cordaid 2014).

3.2 Increased hazard resistance

In their first response, the unprepared government of Sri Lanka overestimated the likelihood of a repetition of such an event when defining a no-construction buffer zone. This resulted in relocation of communities to the inland, destroying their livelihood and part of the social structure. However, hazard resistant buildings were assured and knowledge and skills were shared. The high multi-hazard risk associated with major floods in the monsoon season required safe construction sites with adequate drainage and safety for floods (Zubair et al. 2006; Disaster Management Centre 2005; UN-Habitat 2012).

In Pakistan, all community actors were trained in disaster preparedness, which included construction skills and knowledge about flood resistant typologies (Lari 2011; Malik and Rasul 2011). Especially women were empowered (Malik and Rasul 2011). The introduction of early warning systems enabled faster responses in the future (Heritage Foundation of Pakistan 2013). Besides that, all designs were tested for durability and hazard resistance before being introduced to the communities (Heritage Foundation of Pakistan 2011b).

In the Philippines, the repetitive nature of typhoons, had enabled the Government to consolidate relationships with NGO's. Through collaboration between the government, the NGO's and the communities future risks were diagnosed, gaps in resilience were identified and disaster preparedness and risk reduction plans were successfully implemented (Janse and Van Der Flier 2014). The NGO aimed to reduce structural risks by stressing principles and details to cope with high wind loads, presented in Figure 3 (Shelter Cluster Philippines 2014b). During typhoons inhabitants had cleverly sought shelter in their rigid outside toilet. This principle was reused in the program for immediate sheltering, since reinforcing houses to withstand strong typhoons is extremely costly compared to the risk and rebuilding costs (Cordaid 2015). Through participation it is expected that future hazards will have less impact on the community and that they will be able to take measurements more independently.

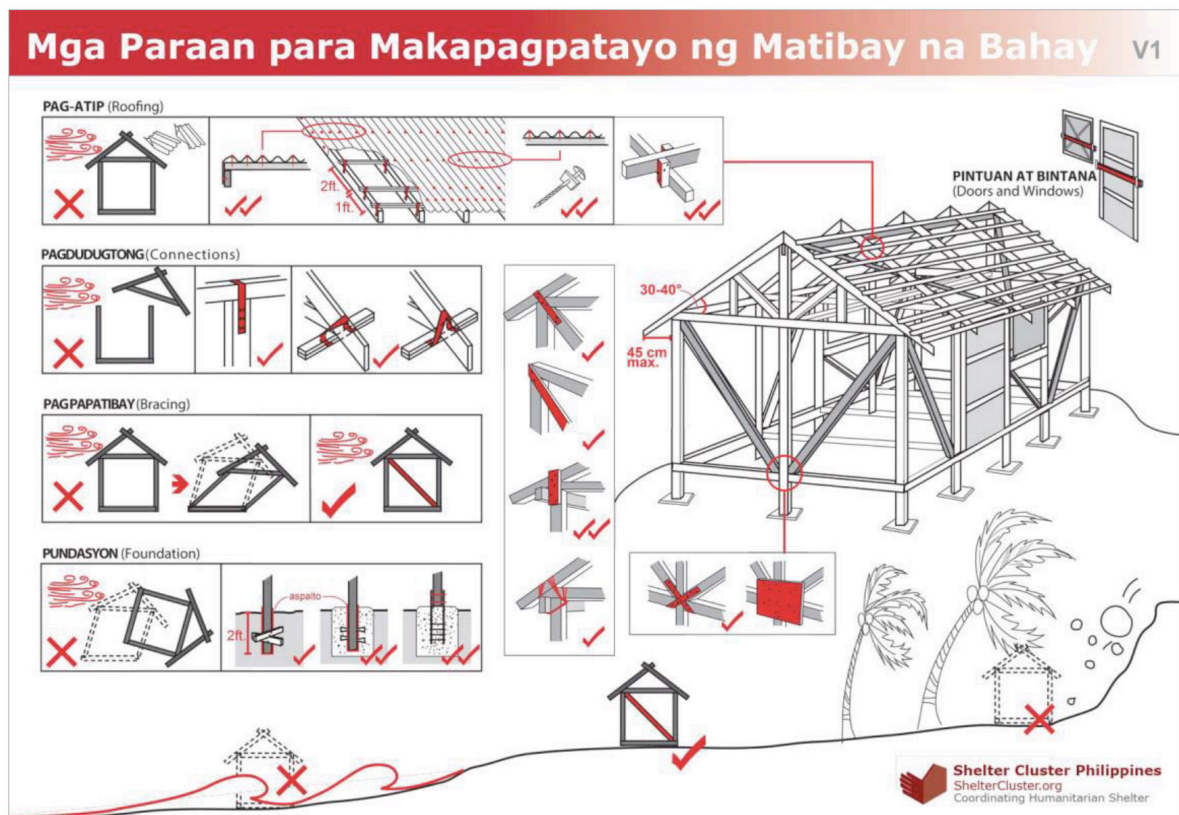


Figure 3. Joints for self-built houses in the Philippines (Shelter Cluster Philippines 2014a).

3.3 Maintenance of local traditions

In Sri Lanka, through collaboration with inhabitants, five building typologies were developed (UN-Habitat 2010). Although traditional in form, they were strongly influenced by international housing typologies with little variations and lacking reference to cultural heritage (UN-Habitat 2012). They only differed in the chimney position and the presence or absence of a veranda and only gable vents were recognized from traditional constructions. However, the use of cost effective green building materials and methods was encouraged: enabling the communities to execute the work themselves and manage their own natural assets (UN-Habitat 2009). Local clay, earth and sand were mixed with cement to consolidate the structure.

In Pakistan, the use of local building traditions and indigenous materials simplified the participation of the community and made new housing blend with older ones, presented in Figure 4 (Heritage Foundation of Pakistan 2011b). Bamboo structures accelerated the construction and the walls of mats resulted in a comfortable indoor climate (Lari 2011; Heritage Foundation of Pakistan 2011b). This prevented environmental degradation and supported the regional economy. With improved construction techniques, confidence was restored in local methods which corresponded to lifestyle, income and personal needs (Heritage Foundation of Pakistan 2011b). Although the designs of the houses were adjusted to personal needs of dwellers, maximizing participation and reinforcing the sense of ownership, only 8 designs were developed with only small variations in roof types and base plinths (Heritage Foundation of Pakistan 2011b).



Figure 4. Maintenance of local traditions in Pakistan (Lari and Heritage Foundation of Pakistan 2011).

In the Philippines, the community participation led to maintenance of local building traditions since houses designed by the owners themselves corresponded to the surroundings. The use of locally available materials such as timber, coconut lumber, bamboo and organic mats was stimulated (Howe, Chris; Himberg 2014;

Shelter Cluster Philippines 2014b). Especially remarkable is the reuse of waste materials in the environment such as the large amount of young coconut trees that were destroyed by the typhoon.

4 Conclusions

Self-built housing has been applied by NGO's in several post-disaster situations as an alternative to readymade or predesigned solutions. From this case study can be concluded that, if applied well, self-build housing can have a positive impact on community resilience, which could support NGO's and governments to consider an alternative approach. This paper highlights cost and time reduction, hazard resistance and the maintenance of local traditions. For a better understanding, more cases, more qualities and shortcomings are relevant to regard and relate them to factors that influence community resilience. Long-term measurements are needed to investigate the long-term effect on the communities.

The case in Pakistan reveals the most remarkable cost-reduction, where the permanent houses had a price competitive with ready-made temporary family tents. If self-built housing would be more accepted as a recovery approach, it would provide an affordable and therefore more realistic answer to the shortage shelter relief. This case is also remarkable for the low-carbon footprint when compared to other post-disaster recovery programs (Glasgow n.d.). Key to the low-costs in Pakistan was the strong community involvement and the collaboration with local NGO's, enabled by lacking influence of the government. The strong government involvement in Sri Lanka slowed down recovery by initiating an unnecessary buffer zone. In the Philippines, the government was experienced in disaster recovery and this supported a successful implementation of fast participatory processes. In all three cases the role of the government has influence on the speed of recovery. In further research the exact influence of decision makers and local NGO's can be measured.

All three cases reveal that empowerment was targeted to reduce disaster risks with trainings and guidance. It would be interesting to measure long-term effects when a disaster recurs and compare the recovery of these communities with communities that had a less participatory recovery program. Besides that, it would be relevant to compare the way knowledge is exchanged in these cases and measure their long-term effect. NGO's need better applied tools to support self-built initiatives.

All discussed approaches intend to respect local traditions. A remarkable maintenance of local traditions is found in the most recent case in the Philippines. No readymade or predesigned solutions were given. The participatory approach in the Philippines can be seen as a best-practice to exchange labour, materials, knowledge and funding. In Sri Lanka, large funding organisations were involved in the recovery, and their influence on the construction process and housing typologies was larger, which might indirectly have caused a greater loss of local traditions. Further research is needed to define how funds influence the loss of local traditions.

Although, few NGO's use self-built housing as a strategy for resilient recovery, in the future hopefully more will recognize its benefits. More detailed case studies, which evaluate self-built housing are needed to support acceptance by governments and NGO's.

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