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TOWARDS LONG-TERM SUSTAINABLE PERFORMANCE OF POST-DISASTER HOUSING RECONSTRUCTION: SECOND LIFE FOR TEMPORARY HOUSING

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ABSTRACT

The pressing human needs caused due to post-disaster effects may force donors to provide a roof above the heads of the displaced communities than focusing on fulfilling the references of a 'home,' which is a step toward restoring a certain sense of stability embedded with social, cultural, economic, and other interactions. And several displaced communities around the world continue to live in their temporary housing on a long-term basis. Therefore, this study aimed at investigating methods to consider a second life for the post-disaster temporary housing which may ensure long-term sustainable performance. A comprehensive literature survey has been carried out in attaining the aim. Many studies have found that the rapid post-disaster housing re-construction strategies through universal working standards have become unsustainable and culturally unacceptable in the long term. Furthermore, in various instances, the real-life post-disaster temporary housing has been simply dismantled or abandoned due to the end of usage and cultural incompatibility, without giving any concern for future disasters. This could be minimised by transforming the donor initiated temporary housing into a permanent basis. To achieve this, scholars have identified the need of considering the socio-cultural and related physical needs through active involvement of affected communities. Therefore, to achieve prolonged use of temporary housing, the findings suggest that the social and cultural needs of communities and associated physical transformations need to be considered by the donors. The findings serve as a way forward to explore a transformational space that can accommodate social and physical transformations in post-disaster housing reconstruction.

Keywords: *Post-disaster housing; Sheltering; Sustainability; Temporary housing; Transformation.*

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1. INTRODUCTION

A disaster is often described as a potential disruption to an individual's or society's quality of life that results in prevalent human, material, environmental and economic disruptions, and effects (United Nations Office for Disaster Risk Reduction [UNISDR], 2010). There will be substantial casualties in the event of a disaster, such as partial loss of physical infrastructure, interruption of essential facilities, and harm to means of livelihoods in the affected areas. Of the many called tragic results, household damage is one of the most noticeable outcomes of a disaster, resulting in many homeless individuals (Biswas, 2019).

As a result, reconstruction is a highly valued task following any catastrophe, and it occurs in unstable environments, often in remote areas, and under severe time constraints (Wu and Lindell, 2004). The reconstruction mechanism is mostly concerned with two aspects: the construction of housing units and the restoration or construction of facilities. In most post-disaster reconstructions, housing schemes take precedence over other projects (Karunasena and Rameezdeen, 2010). As it is agreed that to restore the livelihoods of the displaced peoples, the reconstruction of the fundamental unit of the community (i.e., family) should begin as soon as possible by providing a home (United Nations Disaster Relief Organization [UNDRO], 1982). A house is a communal space that provides necessities for domestic life, convenience, security, and safety. During a tragedy, the need for housing must be addressed quickly because homelessness is anything more than a structural hardship; it is also a loss of reputation, personality, and safety (Barakat, 2003). Therefore, temporary housing is essential in recovering stage after a disaster, allowing the survivors to take back to their regular activities such as employing, schooling, housekeeping, socialising, and many more with a common standard of living (Arslan and Cosgun, 2008; Johnson, 2007). Temporary housing refers to physical structures that the people inhabit after a disaster or as a part of the post-disaster reconstruction programme, which provides shelter for the people, who affected by a disaster until they are relocated to a permanent house (Johnson, 2007). However, previous studies have scrutinised the long-term feasibility of temporary housing scenarios considering their sustainability and the cultural insensitivity of the occupants (Yau *et al*., 2014; Felix *et al*., 2013). Hence, Biswas (2019), Arslan (2007) and Johnson (2007) have presented the second life scenario under five possibilities (refer section 4.2) for temporary housing structures to gain better value for the money invested by the donors. Felix *et al*. (2013) identified two main categories in temporary housing namely, ready-made units and kit suppliers. The ready-made units are constructed in factories and carried to the site or parts of the units are transported and assembled at the site. Due to the transportation difficulties, small elements are produced and assembled at the site following the 'kit concept'.

In most cases, the temporary housing is provided through a top-down approach by the government and other donor agencies, where the housing units are mostly being mass-produced upon a common standard without being tailored to any specific needs of a family upon their socio-cultural, economic, and psychological upbringing before any such disaster. Consequently, Shelter Center (2012) described the essential quality of temporary housing structures to withstand physical and social transformations, which influenced by the operational and physical aspects as well as social and psychological aspects of the people implemented by occupants for a smooth landing to their normal daily routine. Therefore, this paper aims to identify the strategies to be followed by the donors (i.e., government or disaster-related organisations) with regards to the long-term

use of post-disaster temporary housing through a physical and social transformation in achieving the sincere desire for post-disaster reconstruction.

This paper is structured in six sections, the introduction followed by the methodology adopted in this study are presented first. Then, an overview of post-disaster housing reconstruction and the problems of sheltering are discussed. Thereafter, attention is drawn to temporary housing second life and strategies for transition of temporary housing in terms of social and physical transformations. Finally, the conclusions have been drawn with the way forward in this study.

2. METHODOLOGY

This paper expects to answer the research problem of "why the donors must consider the long-term use of temporary housing structures to withstand against the long-lasted claims on unsustainability and cultural inadequacy of traditional post-disaster housing reconstruction" through a qualitative research approach. The qualitative research approach has been appraised for its ability to achieve an in-depth analysis of new concepts. Hence, the literature review for this study was developed on the themes of post-disaster housing, sheltering, temporary housing, problems of temporary housing and sheltering, and transformation. Accordingly, this research critically analyses the secondary data obtained through existing case studies and literature sources on post-disaster temporary housing construction. The focus of the study was further narrowed down to investigate the affected communities from natural hazards in a global context to identify any barriers in existing post-disaster housing reconstruction and explore mechanisms suggested by scholars to withstand those in future disaster incidents. Thereby, this study would bring up the mechanisms to be followed by the donors to achieve a second-life instance for temporary housing structures in terms of social and physical transformations.

3. POST-DISASTER HOUSING RECONSTRUCTION

Natural hazards have frequently caused extreme impacts on the built environment, which can change the morphology of the surrounding and individual spaces of people that are hit by such disasters (Wijegunarathna *et al*., 2018). The short-term effects of disaster rehabilitation and reconstruction are getting more attention, which includes providing temporary housing, assisting in rebuilding the original house and permanent relocation to special schemes designed for reconstruction (Rahmayati, 2016). Previous studies signify the failures of many reconstruction projects done by the government and other donor funding agencies without the consideration of the requirements of the relocatees (Danquah *et al.*, 2015; Rahmayati, 2016). Post-disaster relocation may have negative impacts on the livelihood of the survivors including, disruptions to daily habits, interruptions to socio-cultural networks, and conflicts with host communities in the relocated area (Wijegunarathna *et al*., 2018). Hence, the relocation schemes ought to ensure that the survivors are satisfied with the long-term performance of post-disaster housing. Thus, the recovery actors along with the government and non-government organisations, policymakers, built environment professionals, builders and financial and technical donors shall recognise and understand the long-time outcomes of post-disaster reconstruction.

Post-disaster housing reconstruction programmes have focused on addressing urgent needs by adopting immediate actions, thereby, delay in aiding for housing puts the survivors under mental stress and leads to community displacement (Varas and Boano, 2013). In this manner, permanent housing is considered the final stage and is typically performed by organisations, which includes planners and builders. However, the post-disaster housing reconstruction has a critical influence on the affected community in terms of social and cultural aspects, thereby, the socio-cultural processes of recovery at large cannot be ignored from the provisions of sheltering and housing in the post-disaster stage (Rahmayati, 2016).

3.1 SHELTERING VS HOUSING

For the people, who suffered from natural hazards, and must mobilise from their homes, remobilise in a long-term shelter is an essential part of the recovery process (Bolin and Stanford, 1991). Further, Quarantelli (1995) made a distinction between sheltering and housing. Sheltering refers to the asylum for people immediately afterwards any disaster suspending their normal living process while housing denotes the return to household responsibilities and daily routine. Based on this distinction, four stages of different forms of disaster-related sheltering and housing are briefly described below.

- **Emergency shelter:** Emergency sheltering is a place, where the survivors will stay for a brief period before a hazard, during the height of the emergency, or immediately after the impact. This can be in the house of a friend or relative, or a public shelter (Peacock *et al.*, 2017). The period is expected to be short, depending on the severity of the hazard and the community affected by the disaster. However, it is around two weeks or subjected for extensions up to eight weeks depending on the case. This emergency sheltering has s spontaneous nature and focused on locational or regional convenience and promptness of the need (Alexander, 2002).
- **Temporary shelter:** Temporary sheltering is also thought to be short-term, nonetheless, there is no pre-defined period for what short-term entails as express by Peacock *et al*. (2017). Further to the authors, the survivors can stay in temporary shelters while waiting for a safe return to their permanent residences. Thus, the government and other donors shall provide them with daily necessities including food, water, sanitation, security, and other requirements, thereby, requires more preparedness than emergency shelters.
- **Temporary housing:** Temporary housing is a place, where the survivors can be settled temporarily for a planned period range from six months to three years. The survivors can return to their normal routine while occupying temporary housing, or they can wait until they relocate for permanent housing, either to their homes, which they lived in pre-disaster or an alternative permanent house (Tierney *et al*., 2001).
- **Permanent housing:** In this stage, the affected people will return to their rebuilt house, or they will resettle in a new build house permanently when they are unable to return or refused to return to their pre-disaster home (Bolin, 1994). According to Peacock *et al.* (2017), certain other problems such as crime, violence and other social influences coming from the clusters or congested quarters they are living in may impact moving to permanent housing.

3.2 PROBLEMS WITH SHELTERING

Provisions of sheltering and housing for the community affected by a disaster is a complex process subject to many challenges (Quarantelli, 1995). Bolin and Stanford (1991) present cultural, environmental, political, and economic constraints relating to the behaviour of survivors on the choice of temporary provisions. These include the availability of non-hazardous locations to build temporary shelters, modifications for the uses in post-disaster lands, disaster risk reduction programmes, housing and other related aid programmes, socio-cultural patterns on housing, and political conflicts on fostering specific class interests in the reconstruction process.

After a disaster or soon after the immediate disaster threat has gone, the affected community will leave the emergency shelters to resume their daily routine, unless the disaster caused severe damage to their houses. When their houses are inhabitable and impossible to return, the emergency sheltering may need a transition to temporary sheltering. Yet, the intention of temporary sheltering is not to replace their original pre-disaster houses (Bolin, 1994). Providing emergency shelters or temporary shelters is not a consistent social approach, which can be subjected to the varying needs of survivors over time. For instance, those with higher incomes will stay at hotels or motels, while the others will stay in tents or other temporary shelters with their families (Morrow, 1997). Hence, the financial capacity, ability of travelling and the absence of relatives outside the hazardous area will critically affect the choice of temporary shelters. In most cases, the survivors are reluctant to stay in temporary shelters such as tents, however, ended up there, since no other options available (Peacock *et al*., 2017). The reason for this reluctance is the temporary shelters are not planned well in advance to fulfil the needs of the community who were displaced. Those were adaptive responses with little or no planning with the focus on having many people, who need temporary sheltering after a disaster. Hence, the process of transition from sheltering to housing will vary depending on the time and resources available irrespective of the needs of the people.

4. TEMPORARY HOUSING

Following the definition of Quarantelli (1995), it is inevitable to ignore the importance of temporary housing to recuperate from disasters and let the people resume their routine (Arslan and Cosgun, 2008; Johnson, 2007). The people are indeed fortified in shelters from the consequences of disasters, but it is almost impossible to continue their daily life within a shelter, and so they are unlikely to stay longer in shelters. Considering the external factors that may deteriorate the temporary shelters, it is particularly important to think about more durable and resistant solutions to minimise the jeopardy of people, while it brings much value to the concept of providing temporary housing (Steinberg, 2007). Further, reconstruction of houses takes ample time and to bridge this gap, temporary housing can be an essential alternative option (Johnson *et al*., 2010). Moreover, Felix et *al.* (2013) identified the criticality of temporary housing to provide a comfort level for the survivors comprising the common standard of living soon after a disaster. Temporary house's need is expected to end when permanent housing is provided. In contrast, Bris and Bendito (2019) elaborated on many instances in the global context where temporary houses have been used as permanent solutions by communities by improving the high-quality standard of living. Nevertheless, Hooper (2020) found out that the desire of affected communities to continue their life in temporary houses (in this study, communities in Montserrat island of UK have spent two decades in temporary housing

following hurricanes) was majorly affected by the low cost to upgrade the existing structure, compatibility of the location with their daily needs and the community spirit as faced to the same disaster.

4.1 PROBLEMS WITH TEMPORARY HOUSING

Notwithstanding the success of temporary housing in letting the survivors resume their normal life aftermath disasters, criticism based on sustainability and cultural adequacies hits the temporary housing immensely and pervert the dignity of its success in a controversial manner (Barakat, 2003; Hadafi and Fallahi, 2010; Johnson, 2007, 2008; UNDRO, 1982).

4.1.1 Sustainability Problems

Post-disaster temporary housing solutions have sustainability problems in two ways: i.e.

- Unsustainable in terms of costs and;
- Unsustainable in terms of environmental issues.

Based on the findings of UNDRO (1982), the permanent housing unit is comparably cheaper than a temporary housing unit, Hadafi and Fallahi (2010) significantly portrayed that temporary housing units are as three times expensive than a permeant housing unit. In addition to the unit cost of temporary housing, infrastructural components such as roads, water, sewerage, electricity, etc. also need to be accounted for in the expenses to function a temporary housing. Thus, the temporary housing seems to be expensive substantiate the above fact, and it is not a potential solution because of its life span considering the amount of investment for each unit (Johnson, 2008). Even though most of the times considering the durability, comfortability and ephemeral conditions, units are made up for resisting longer-time rather than the amount they required. Therefore, even after the intended period of usage, units are still usable, but the immense sizes of structures hinder the usage. Often the units are simply dismantled due to the lack of a plan for their usage in future (Felix *et al.*, 2013).

In addition to these facts, the places occupied by the units become more contaminated with dirt and wastages. It is especially important to remove all the infrastructure, foundations, debris, garbage, etc., due to occupancy of such temporary units and ensure the place be as it was earlier (Biswas, 2019; Yau *et al*., 2014). Yet sometimes it is not what happens, causing great environmental consequences. Consequently, temporary housing becomes environmentally unsustainable because of its requirements of resources and scarcity of plans after its intended usage which creates huge problems in terms of economy and environment.

4.1.2 Cultural Inadequacy Problems

The temporary housing units are intended to be utilised all over the world (Barakat, 2003). Although, this concept is not feasible as it often ignores the diversities and requirements of various users from different areas consisting of different variations in climate, house forms and family size, etc. (Gulahane and Gokhale, 2012), including environments that may be culturally alien (Gulahane and Gokhale, 2012). Studies by Caia *et al*. (2010) portray the importance of shape and material to match the prototype of a home. Further, Caia *et al*. (2010) revealed the psychological stress that may create in temporary housing unit users due to the incompatibility of a unit with their pre-disaster status. Thus, the type of housing unit determines the psychological well-being of the users.

Many studies have suggested alternative strategies and recommendations to overcome the issues in temporary housings (Biswas, 2019; Yau *et al*., 2014; Felix *et al*., 2013; Arslan, 2007; Johnson, 2007). Among those Arslan (2007), Johnson (2007) and Biswas (2019) have insisted that principles such as community participation, usage of local resources and the development of solutions to reuse units, to find more sustainable and culturally adequate solutions concerning temporary housing.

Though Quarantelli's (1995) distinction brought four stages in post-disaster housing reconstruction, this study has continued its focus only on the temporary or permanent housing due to the identified problems (refer section 4.1) associated with the first two stages; emergency and temporary sheltering. Accordingly, it has been established that the longer period of occupancy in the first two stages takes, it would be impossible to achieve the desired outcome of successful rehabilitation where the focus of the donors would be vested upon the final two stages. On the other hand, either governments or donors worldwide cannot provide permanent housing for affected communities within a shorter period where the top authorities should think of an alternative solution for the provided temporary housing to be evolved itself to permanent housing (Johnson, 2007). Further, to achieve a better value of money from temporary housing, researchers like Biswas (2019), Yau *et al*. (2014) and Felix *et al*. (2013) have identified recycling and reusing instances for temporary housing to overcome identified problems in section 4.1.

4.2 TEMPORARY HOUSING 'SECOND LIFE'

Due to the concerns raised, it is vital to explore the most sustainable solutions for temporary housing units. Accordingly, this study reflects a 'second life' phase for temporary housing units which can be interpreted as becoming beneficial even after completing their expected lifetime or fulfilling intended purpose. Even though temporary housing is an important stage in achieving the true aspects of post-disaster reconstruction, the overall impact of these structures is proven to be more negative on their occupants and surrounding ecosystem. Accordingly, based on the studies of Biswas (2019), Yau *et al*. (2014) and Johnson (2007), five possibilities for temporary housing can be identified as such 'second life' contexts.

- The occupants can use the same temporary housing units in the long term. As the temporary housing schemes are not mostly provided up to the quality standard of living, occupants may face social and financial stigma in the long-term to fulfil their day-to-day activities as before facing the disaster. This might result in social dysfunctions, illegal occupancy, and high crime rates (theft, burglary, etc.) in the housing scheme and neighbourhood.
- The donors can dismantle the housing units after permanent housings are being provided and keep the units securely stored in use of future disasters. However, as such, the government need to bear the costs of dismantling, transporting, storing and reassembling.
- The donors can sell the used units, or in parts to recover the initial investment on temporary houses. However, considering the depreciation rate of the used housing elements, it is difficult to recover the initial investment.
- The used structures can be demolished and donate their parts for occupants in building their own permanent houses through active community involvement (bottom-up approach in post-disaster housing reconstruction). However, due to the

final conditions of housing units after long-term use, the building components often have little value in return.

- The existing structures can be reused by the occupants for the same purpose or a different purpose after a certain modification. Arslan (2007) states that units should be able to be re-used after the end of usage while gaining the recognition of a permanent structure.

However, the heart of above identified possibilities is the need to address transitional strategies that take into the account the cultural and social needs of the affected communities.

5. TRANSITION OF TEMPORARY HOUSES: STRATEGIES

For families socially and mentally wounded by disasters, finding a long-term solution or a permanent home might take years owing to a variety of factors such as the financial burden, complexity of wreckage clearance, land distribution, and a shortage of available land or resources, amongst many others. As a result, modest temporary housing would be the only accessible location to dwell for some vulnerable groups during the rehabilitation process (IFRC, 2011, p.4). As a result, they change their temporary housing. These changes might enhance the performance of the transitional home, but they can also re-create concerns caused by a lack of oversight and technical understanding (Wagemann, 2015).

However, to facilitate this process, the top-level of the decision-makers (donor organisations or disaster-related government organisations) are required to foresee such occasions during the feasibility stage of temporary housing designs. Therefore, studies have identified two main strategies such as "planning ahead" and "design beyond the unit" for the designers or decision-makers to consider in developing the designs or the establishment of temporary housing sites (Biswas, 2019). In the process of designing temporary housing units, designers are required to anticipate any prospects of the structure to be used for various purposes, which is called '**planning ahead**'. This mechanism would inevitably provide many opportunities for the temporary housing unit structure in future after fulfilling their intended usage. It can be designed with great flexibility as much as possible for reuse after the intended purposes. In addition to that, it must give space for users to customise and personalise the units following their whims and fancies (Biswas, 2019). During the disaster periods, these temporary housings are often used for working purposes (Kellett and Tipple, 2000; Lizarralde and Davidson, 2006) thus, the flexibility of such housing is particularly important to acquire different functional requirements at once. As substantiated by the number of authors (UNDRO, 1982; Kellett and Tipple, 2000; Barakat, 2003; Bedoya, 2004; Lizarralde and Davidson, 2006; Arslan and Cosgun, 2008; Sener and Altum, 2009).

'Design beyond the unit' simply refers that the success of a unit is not only determined by its user's needs, cultural issues, and integration of economic and environmental values (Felix *et al.*, 2013). In addition to all these, it is important to establish the location of the unit that can be situated close to people's workplaces, services, and amenities. Further than location, it should provide the opportunity for socialising and the design of public spaces can create community spirit, maintain social ties and it can be an opportunity to develop new relationships. In the meantime, considering the services, it is important to

be close to schools, medical centres, community centres, shops, and worshipping places to grant all the conditions for normal life in the temporary settlement (Felix *et al.,* 2013).

However, the government and other donor funders usually failed to fulfil the real housing needs of stricken communities through temporary housing. Hence, the socio-cultural aspects such as cultural living needs, lifestyles, and habits of the people as well as the physical aspects of location, typology, size, and layout design of housing must be considered to re-establish their normal lifestyle in a post-disaster situation (Rahmayati, 2016). The deficiency of accommodating the socio-cultural needs of the affected communities may lead to transformations in the socio-cultural life of the people as well as transformations in physical aspects of temporary housing structures which are identified in subsequent sections.

5.1 SOCIAL TRANSFORMATION

Periods after disasters present the affected communities with considerable short and long-term challenges. In addition to meeting the needs of emergency measures, reconstruction measures have direct and indirect effects on the long-term development path of an affected society (Monteil *et al.,* 2019). Meantime, since disasters are closely related to daily life and development processes, social transformation plays a vital role in sustainable recovery from disasters (Mayer, 2018; Aldrich and Meyer, 2014; Hsueh, 2019). The term social transformation incorporates "the change of existing parameters of a societal system, including technological, economic, political and cultural restructuring." (Bruggen *et al.,* 2020, p.6). However, after a natural hazard, in the process of rehabilitation and reconstruction interventions, it is extremely hard to integrate some of these parameters, significantly due to its ill-suited nature to the norms, values and exact requirements of the victims (Makachia, 2010). Therefore, post-disaster reconstruction actions need to consider the long-term impact of temporary housing, especially their impact on the establishment of social cohesion, which is a key factor for a sustainable recovery in a dynamically changing society. The above-mentioned gap could be bridged with the integration of socio-spatial studies in the housing process (Makachia, 2010). Consequent to these statements, the need to integrate social parameters within the design has evolved. Therefore, the people who are going to be accommodated should be assessed in their own needs and ensure the temporary solutions will be suitable for them without any drawbacks (Gulahane and Gokhale, 2012). It can be said, the design process of such buildings needs to consider the point-of-view of the users rather than from functional and technical approaches along with routine activities and additional symbols (Bedoya, 2004). Therefore, designing post-disaster housing is all about designing the physical structure for social cohesion. In the long term, the second life of temporary housings need to aim at the social transformation which will promote social cohesion and hence encouraging sustainable recovery.

5.2 PHYSICAL TRANSFORMATION

The physical transformation refers to a change in the physical appearance of a house from its original appearance after occupation. This phenomenon is a typical manifestation of the privatisation of public housing (Danquah *et al*., 2015). The human agent is at the heart of the system, with varying functional demands that are the subject of various design strategies. Nevertheless, the formal provider of temporary housing is just as alien to the

inhabitants and did not realise their desires, where the inhabitants would not be a part of the system, giving rise to transformations to fulfil their needs (Makachia, 2010).

The study of Wijegunarathna *et al.* (2018) on assessing the physical performance of post-disaster housing projects revealed that the affected communities got minimal satisfaction with the long-term physical performance of their relocation. Out of the physical parameters of housing that was considered in the study, minor satisfactions were received for many aspects including plot area, size of the house and number of rooms available, and provision for alterations. Among these, the provision for alterations found to be the most significant parameter to expand the houses according to various requirements of the occupants. This would make it possible for the survivors to improve their houses that initially offered as per their changing needs. The empirical evidence of previous research (Wijegunarathna *et al.*, 2018; Rahmayati, 2016; Boano and Garcia, 2011) signified that many of the post-disaster housing reconstruction projects have not got the affected communities involved during the planning and design stages, hence, the actual requirements of the people were not appropriately captured. Thereby, those have failed to achieve the long-term sustainable performance of post-disaster housing reconstruction projects. Therefore, the decision-makers at the top level must 'plan ahead' by considering the real needs of the affected communities during the design phase itself through a systematic approach to provide successful temporary housing solutions considering its second life. Hence, the active community involvement in the process of providing long-term sustainable post-disaster housing is found to be a key requirement for future post-disaster housing projects.

6. CONCLUSIONS

Household damage is one of the most significant consequences of disasters. Thus, reconstruction is vital in the recovery process of post-disaster reconstruction. Emergency sheltering and temporary sheltering are the two most immediate and common post-disaster reconstructions given to the affected communities. Nevertheless, these provisions are mostly not up to the standards of the victims' pre-disaster housings. The emergency shelters and temporary shelters are often provided in an alien environment as disaster aftermath. However, the victims need a place to stay safe along with their physical, social, cultural, and other similar requirements, until they shift to their permanent residences. This is where the transition from temporary housing to permanent housing occurs. Even though the temporary housing allows the victims to continue their normal day to day life, studies have found out their unfeasibility in several aspects. The sustainability and cultural inadequacies are the two major criticisms placed on the temporary housing solutions. Post-disaster temporary housings are found to be unsustainable in the long term due to the cost implications and environmental issues. Further, these temporary housings lead to the loss of the victim's symbolic inclusions of a 'house' such as social, cultural, religious, political, economic, environmental, technical, and other interactions. Therefore, these temporary housings become culturally inadequate in prolong nature. Thereby, the victims tend to modify the given temporary houses to fulfil their needs and wants for long term occupation by considering a 'second life' of temporary housing. 'Planning ahead' and 'design beyond the unit' were found as the strategies to facilitate an effective transition for temporary housing second life. In addition, the failure of addressing the socio-cultural needs of the affected communities has led to social and physical transformations in many post-disaster housing reconstruction projects. Hence, the

requirement of the people must be appropriately captured during the design feasibility stages to accommodate their needs and create access for transformations for long-term sustainable performance in temporary housing. Therefore, the study findings serve as a way forward to investigate a transformational space in temporary housing units as a third space to accommodate social and physical transformations to achieve long-term sustainable performance.

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