



Explaining the Model of Post-Disaster Temporary Accommodation Strategy (Case Study: Sarpol-e Zahab, Kermanshah)

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Received: 5 February 2021

Accepted: 9 July 2021

Abstract

Purpose- The study aims to identify the main problems of temporary accommodation strategies and to discuss some principles and guidelines in order to assist decision-makers for choosing the most suitable strategy and reach better temporary accommodation solutions.

Design/methodology/approach- The present research is of applied type and has been done by descriptive- analytical method. Documentary and library methods have been used to collect information. In this study, the main focus is on providing qualitative components of post-disaster accommodation in the form of a strategic model as a platform for decision makers in crisis situations.

Findings- This research presents a comprehensive strategy in temporary accommodation planning for decision makers by separating the two organizational and technical parts into three main parts (strategic, programmed and project level). To make the necessary decisions based on the personalization of the effective factors in each situation.

Research limitations/implications- At the time of the disaster, due to emergency, it is impossible to address all the parameters affecting the planning of temporary accommodation. In addition, each affected area has its own individual circumstances, which lead to the choice of its own strategy. It is essential to address the pre-disaster planning process and to have a model that can cover human error and consider the correspondence between the former and the new.

Practical implications- By applying a systematic strategy of temporary accommodation, in each area according to local data, while determining the stages of necessary activities in the time pre- disaster, disaster and post- disaster, can reduce the risks of crisis and increase resilience in the affected communities.

Originality/value- This article initiated an innovative systematic strategy of temporary accommodation which, be considered a series of actions as processes for fulfilling certain needs rather than as objects only such as tents or buildings.

Keywords- Post disaster temporary accommodation, Temporary housing, displaced people, Resilience, Strategy.

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How to cite this article:

Asgari Namin, E., Javan Forouzandeh, A., Asefi, M. & Shakeri, K. (2021). Explaining the model of post-disaster temporary accommodation strategy (Case study: Sarpol-e Zahab, Kermanshah). *Journal of Research & Rural Planning*, 10(3), 39-60.

<http://dx.doi.org/10.22067/jrpp.v10i3.88506>

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1. Introduction

Over the last decade, 200 million people have been affected by natural disasters and hazards, 98% of whom lived in developing countries where climate change causes extreme temperatures, increased flooding, intense heat waves, and droughts (Aquilino, 2011). Those who lost their homes to natural disasters needed somewhere to live while their houses were rebuilt or needed to find alternative accommodations (Collins et al. 2010; Davis, 1982). The years between living in emergency accommodations and permanent houses present a time gap that needs to be bridged by temporary housing (TH) (Johnson et al. 2006). However, these temporary houses have, to date, been criticized for their inability to meet the expectations of displaced people (DP) (Chen et al., 2013).

People affected by a natural disaster have the right to live with dignity and to receive assistance to alleviate human suffering (Sphere Association, 2018) In general, to recover natural-affected population there are three different recovery phases: (1) emergency, (2) temporary, and (3) permanent accommodation (Lizarralde et al. 2009). During the reconstruction of permanent housing, it is a challenge to provide temporary accommodation that can supply security and personal safety, as well as offer protection from the adverse weather conditions, immunize people of diseases, and other possible dangers (Collins et al. 2010; Davis 1978; Félix et al. 2013).

Additionally, to bridge the time gap between natural disaster and permanent housing reconstruction, the DP need a place which enhance their opportunity to return to their normal activities (Davidson et al. 2007; Corsellis & Vitale 2011; Quarantelli 1995).

Furthermore, the provision of temporary housing (TH) is a crucial issue in terms of sustainability due to the economic, social, and environmental aspects involved (Barakat, 2003; Chandler et al., 2007; El-Anwar et al., 2009; Hadafi & Fallahi, 2010; Johnson, 2002; Sadiqi et al., 2012; Wei et al., 2012). TH planning has usually been accomplished in emergency situations after natural disasters (Johnson, 2002). The large amount of TH needs and DP pressure on authorities have a considerable negative impact on the decision-making processes. In general, recovery programs end into failure, when decision-makers neglect to consider

correspondences between short- and long-term requirements of all local stakeholders and the characteristics of the chosen TH. Furthermore, strategies, which are provided by a restrained group of professionals, often fail to address the DP expectations (Lizarralde & Davidson 2006). To deal with this objective problem it is necessary to consider a wide range of factors involved, which derive from TH systems and actors beyond this system (Johnson 2007a).

These mentioned problems can be lessened by considering all factors involved in the whole life cycle of TH with regard to special conditions of each case and context. As different areas with diverse local living standards and prosperity require particular strategies (Johnson, 2007a; United Nations Disaster Relief Organization, UNDRP, 1982), a response to different natural affected-areas need to have an individual approach (Kennedy et al. 2008). In this regard, Nigg et al. (2006) stated that the post-disaster accommodation (PDA) typology is not particular or collectively comprehensive; the refinement of typology of these accommodations is required to achieve suitable customized solutions. Additionally, Da Silva (2010) declared that the most adequate programs should be chosen based on: the DP skills and capacity, the availability of the local materials, the housing design and construction type, the reconstruction timescale and the funding availability.

Therefore, it is necessary to consider all factors in terms of fitting with different situations and priorities of stakeholders, including some factors of less importance than others. For instance, site location, which seems to have lower priorities than timing, has a considerable impact on TH delivery time (Johnson, 2002) as one of the major indicators. Furthermore, the importance of indicators can vary from case to case based on natural disasters types and scales. To this end, awareness about outcomes of used PDA in previous recovery programs with the particular circumstances is vital to utilize some PDA approaches for a new case. In line with this, it is difficult to guarantee that the PDA program which has been useful for one case will be suitable for another case with different conditions. In other words, the determination of factors involved in each PDA provision and revealing outcomes, can provide explicit initial outlines.

Therefore, the objective of this research is to present a platform for decision-makers in hazard-prone areas for selecting the suitable post-disaster

accommodation (PDA) strategy to implement, based on short-term and long-term requirements. This platform considers the integration of all associated factors which are organized into three main vertexes: (1) local characteristics, (2) natural disasters, and (3) PDA properties. Additionally, this study aims to display influences of these elements on choosing strategies, which were previously used for PDA provision. In this sense, the main questions to be solved in this research are:

- Which are the main requirements involved in PDA strategies and the constituents?

2. Research Theoretical Literature

2.1. Research Background

Numerous significant research studies have focused on defining the issues related to TH, especially organizational system. However, only a few studies consider TH optimization (El-Anwar et al. 2009), sustainable construction (Yi & Yang, 2014), and technical aspects. Additionally, to provide a proper PDA it is necessary to distinguish between two different areas of recovery programs (*organizational* and *technical* systems). To this end, other researches that deal with issues and aspects (provision, location, and second life) also considered in this research have been previously carried out (see Table 1)

2.2. Post-disaster housing phases

According to (Johnson et al. 2006; Quarantelli, 1995), the post-disaster housing phases are in general as follow: (1) emergency shelter (within

hours), (2) temporary shelter (within days), (3) temporary housing (TH) (within weeks), and (4) permanent (within years). Quarantelli (1995) makes a distinction between sheltering and housing. While sheltering refers to a place to stay during the aftermath of the disaster suspending daily activities, housing Immediate denotes the return to household responsibilities and daily routine. (Johnson, 2002). Additionally, UNDRO (1982) considered three phases for post-disaster recovery program: (1) intermediate relief (impact to 5 day), (2) rehabilitation (day 3 to 5 months), and (3) reconstruction (3 month onward).

2.3. Temporary housing provision approach

In general, post-disaster recovery programs in terms of TH provision can be organized into (1) *separate (individual) stages* and (2) *joint stages*, in the first approach, a specific accommodation is used for each recovery phase encompassing the emergency, temporary, and permanent housing phases. However, some materials of these houses can be reused for the next housing phase or a complete unit can be utilized without advanced planning. (Khazai & Hausler, 2005). In the second approach, a settlement that had been used for one of the recovery phases can be operated for other phases with or without modification. (Hadafi & Fallahi, 2010). Furthermore, TH can even play a transition role or permanent housing when the DP does not desire to leave or cannot return to their permanent housing (Peacock et al. 2007).

Table 1. Previous studies on post-disaster accommodations based on considered issues by this study.

Issue	Sub-issue	Research
State-of-the-art	Definition	Abulnour, 2014; Barakat, 2003; Biswas, 2019; Davis & Alexander, 2016; Davis, 1978; DFID, 2010; Félix et al., 2013; Félix& et al., 2015; Johnson, 2009; Hadafi & Fallahi, 2010; Peacock et al., 2007; Perrucci & Baroud, 2020; Quarantelli, 1995; Sphere Association, 2018.
Technical	Provision	Asefi & Farrokhi, 2017; Askar, et al., 2019; Barakat, 2003; Chen et al., 2013; Davidson, et al., 2007; Hosseini et al., 2016a; Johnson, 2002, 2007 b; Johnson et ai., 2006; Yu, & Bai , 2018; Sphere Association, 2018.
	Location	Celik, 2017; Chandler et al., 2007; Chen et al., 2013; Chua & Su, 2012; Hosseini et al., 2016b; Kelly, 2010; Lizarralde & Davidson, 2006; Nojavan & Omidvar, 2013; Omidvar, Baradaran-Shoraka, & Nojavan, 2013; Soltani et al., 2014; Wagemann, 2017; Sphere Association, 2018.
	Second life	Arslan, 2007; Arslan & Cosgun, 2007, 2008; Johnson, 1995, 2007a; Sphere Association, 2018.

2.4. Post-disaster accommodation arrangement

The factors involved in PDA provision, especially TH, from planning to second life, have been considered in PDA arrangement as housing properties. Table 2 and Figure 1. Presents PDA arrangement, which includes: the time-scale, provision, and second life of TH. The *time-scale* index embraces different post-disaster phase,

diverse requirements, and features of accommodations which must be provided for DP. The *provision styles* index considers the PDA variety in order to provide this accommodation type and associated factors. The *second life* index takes into account the alternative scenarios of using TH after moving DP to the permanent housing.

Table 2. Post-disaster accommodation arrangement.

Post-disaster accommodation arrangement	Parameters of PDA	REFERENCES
Time-scale	PDA phases differ from each other in terms of the time - (emergency shelter, temporary shelter, temporary housing, and permanent housing, and, within hours, a day or two, weeks, and few years, respectively)- of the provision process, operation, and also services	Quarantelli (1995) Johnson et al. (2006)
Housing styles	(1) available TH that does not need to be provided, such as available rental apartments and some of collective living quarters, and (2) Not Available TH (NATH) that needs to be constructed, such as mobile housing units (shipping containers, trailers, etc.)	Johnson (2009) Wei et al. (2012) UN (2013)
Site location	- involves many steps from planning to construction, consisting of an initial inventory, alternative analysis, assessment, detailed design, and construction procedures and services. - The NATH site location can be chosen by two approaches: camp (grouped) and yard of DP' pre-disaster housing (dispersed).	Davis (1978) Johnson (2002) Aquilino (2011) Kelly (2010)
Construction system (Not available temporary housing (NATH))	TH units for the provision of NATH have been using on-site masonry construction and prefabrication system consists of (1) ready-made units that are totally constructed in a factory and moved to the site, such as containers or mobile homes; and (2) supply kits whose elements have been produced in a factory and subsequently assembled on-site.	Hosseini et al. (2016) Félix et al (2013)
Labor	There are four labour methods: direct, community, contract, and self-help labour. Meanwhile, by focuses more on technical aspects, the labour methods organized into a couple of main categories: participation and third-party labour methods. The participation method embraces construction approaches when DP only (self-built) or DP with community (semi self-built) undertakes to provide the PDA The third-party labor method considers the construction approaches to provide DPs' accommodations by other people without the participation of the DP in the construction process.	Davidson et al. (2007)
Materials and building typology	(1) conventional materials which include the common materials of the building construction industry and (2) non-conventional materials	Arslan & Cosgun (2007) Barakat (2003) Bedoya (2004) Lizarralde et al., (2009) Davidson

Post-disaster accommodation arrangement	Parameters of PDA	REFERENCES
Temporary housing second life	<p>TH normally be used for a maximum of five years, after this time, named the “<i>second life</i>” of TH; include of (1) reuse and (2) storage for potential use, such as future post-disaster TH.</p> <p>According to other author there are two diverse approaches for TH units (THUs), reuse; (1) complete building and (2) component usage. Complete buildings of THUs can be used in different ways in terms of <i>location</i> (same or another location), <i>property condition</i> (THUs can be sold, rented or donated), and <i>function</i> (same or other function). The components of THUs are used as main building components, raw materials, and recycled materials.</p>	<p>Johnson (2009) Arslan (2008) Cosgun (2008)</p>
Local characteristics	<p>(1) <i>Local potentials</i>, which consider local possibilities of providing temporary accommodation for DP groups based on material and immaterial properties; and (2) <i>affected population</i> by natural disaster with different-features which include DP and others, that play an important role in PDA provision.</p> <p>In other studies, local characteristics have been defined by vulnerability; include of population’s capacity to resist and cope with natural disaster</p>	<p>Blaikie et al. (2014) UNDRO (1982) Sliwinsky (2007)</p>
Local potential	<p>Economic, social, and environmental aspects of affected area that are essential to be assessed in terms of (1) vulnerability of the local population against probabilistic natural hazard and (2) alternative temporary accommodation which can be utilized after the disaster.</p>	<p>Davidson et al. (2007)</p>
Stakeholders	<p>It is useful to consider the similarities and differences in the interests of stakeholder groups affected by temporary settlement. This might help to develop common operational guidelines which could improve co-ordination and co-operation between different organizations in the field.</p>	<p>Corsellis (2011), Shelter Center (2012)</p>
Debris removal	<p>Is a priority to enable the provision of shelter and the establishment of appropriate settlement solutions, The use, management, ownership and environmental impact of disposal sites should be considered.</p>	<p>Corsellis (2011), Shelter Center (2012)</p>
legal context	<p>An awareness of local and national laws is essential in order to understand the socio-political context of a settlement: local and national laws will affect the use of land for settlements.</p>	<p>Corsellis (2011), Shelter Center (2012)</p>

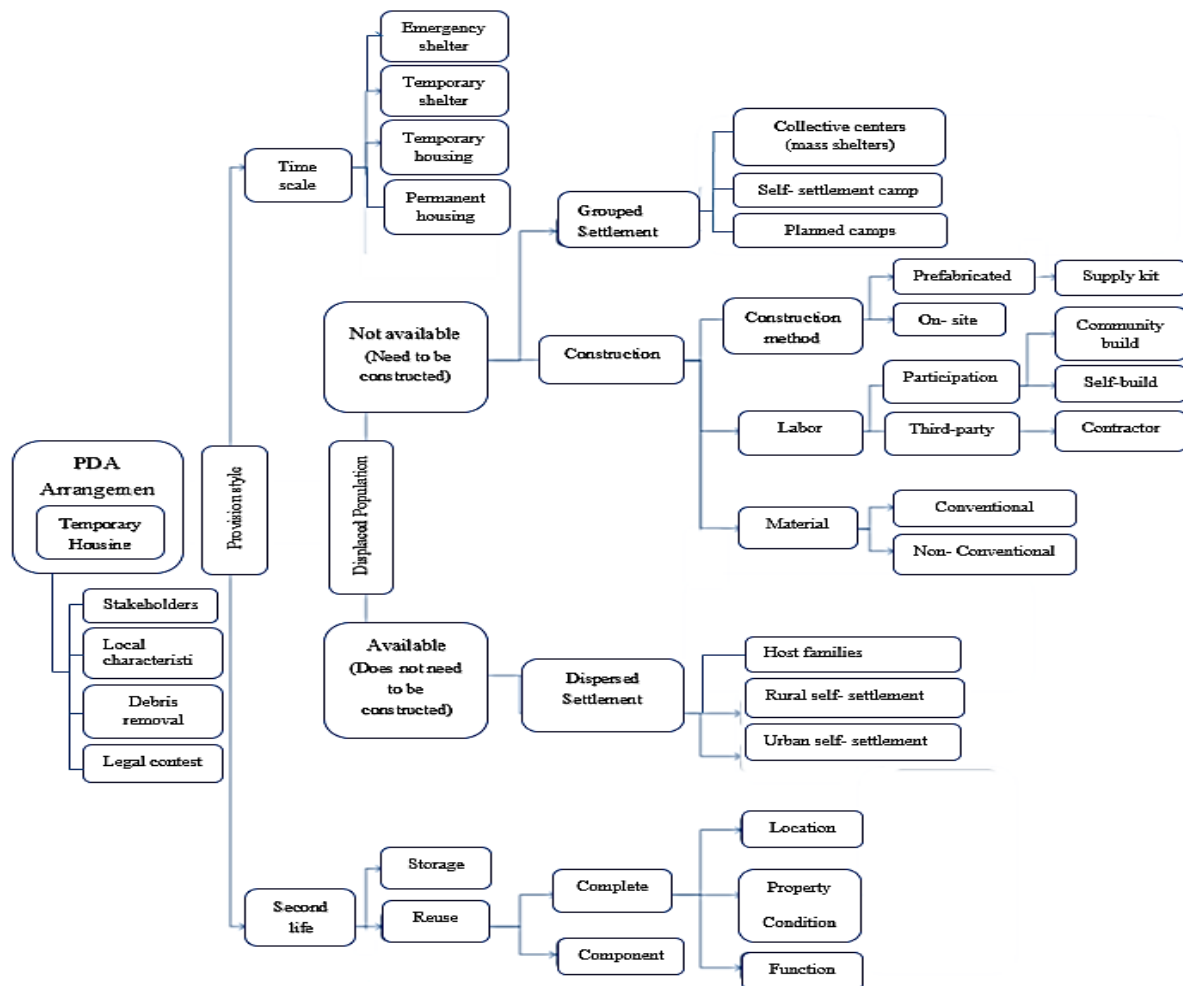


Figure 1. PDA arrangement.

2.5. The minimum standards of Shelter and settlement

The Humanitarian Charter expresses all people affected by disaster or conflict have a right to receive protection, security and assistance to ensure the basic conditions for life with dignity.

Shelter is a critical determinant for survival in the initial stages of a disaster. Beyond survival, shelter is necessary to provide security, personal safety and protection from the climate and to promote resistance to ill health and disease. It is also important for human dignity, to sustain family and community life and to enable affected populations to recover from the impact of disaster. (Sphere Association, 2018)

Non-displaced disaster-affected populations should be assisted on the site of their original homes with temporary or transitional household shelter, or with resources for the repair or construction of appropriate shelter. Individual household factors including the extent of the

assistance provided, land-use rights or ownership, the availability of essential services and the opportunities for upgrading and expanding the shelter. Displaced populations who are unable to return to their original homes often prefer to stay with other family members or people with whom they share historical, religious or other ties, and should be assisted to do so. When such dispersed settlement is not possible, temporary communal settlement can be provided in planned or self-settled camps, along with temporary or transitional household shelter, or in suitable large public buildings used as collective centers. (Sphere Association, 2018)

The minimum standards are not a complete expression of the right to adequate housing as defined by the relevant international legal instruments (Fig. 2). Rather, the minimum standards reflect the core content of the right to adequate housing and contribute to the progressive

realisation of this right. this right of minimum standards of Shelter and settlement assorted in follow [table 3](#).

Table 3. the Minimum Standards of Shelter and Settlement.

The minimum standards of Shelter and settlement	
Standard 1: Strategic planning	Contribute to the security, safety, health and well-being, promote recovery and reconstruction.
Standard 2: Settlement planning	The planning of return, host or temporary communal settlements enables the safe and secure use of accommodation and essential services by the affected population.
Standard 3: Covered living space	People have sufficient covered living space providing thermal comfort, fresh air and protection from the climate ensuring their privacy, safety and health and enabling essential household and livelihood activities to be undertaken
Standard 4: Construction	Local safe building practices, materials, expertise and capacities are used where appropriate, maximizing the involvement of the affected population and local livelihood opportunities
Standard 5: Environmental impact	Shelter and settlement solutions and the material sourcing and construction techniques used minimize adverse impact on the local natural environment.

3. Research Methodology

3.1. Geographical Scope of the Research

Sarpol-e Zahab earthquake with magnitude 7/3 occurred at 21.48 pm local time on November 11 2017, near Azgaleh city in Kermanshah province in northwestern Iran. The earthquake destroy large parts of Sarpol-e Zahab city and many cities and villages of Kermanshah province. Earthquake power to it was so big that it was felt even hundreds of kilometers from the earthquake center, even in Tehran. At least eight cities have been affected by the earthquake in Sarpol-e Zahab (Qasr-e Shirin, Azgaleh, Salas Babajani, Gilan-e Gharb, Sar-e Poltabah, Dalahoo, Islamabad West and Javanrood) and 1933 villages were damaged. According to forensic statistics as of 18 December 2017, Over 579 people were killed in the earthquake and thousands were injured. (IEES, 2017)

3.2. Methodology

The present research is of applied type and has been done by descriptive-analytical method. Documentary and library methods have been used to collect information. In this study, the main focus is on providing qualitative components of post-

disaster housing in the form of a strategic model as a platform for decision makers in crisis situations.

3.3. Review of measures taken in the area of temporary accommodation and reconstruction

The magnitude of damages caused by the Kermanshah earthquake and the dispersal of the affected areas have caused the resettlement process Temporary and reconstructed earthquakes pose different challenges in terms of physical, social and economic aspects. In this Section Summary of Actions in the Area of Temporary settlement and Reconstruction, Challenges Overview Hint will be put:

3.4. Provision of temporary accommodation

Due to the destruction of most public buildings in affected areas, especially schools, it was not possible to use these places for the temporary accommodation of earthquake survivors. As a result, the government's main program is provided the container houses, for temporary accommodation. For this purpose, a contract was signed between the Housing Foundation of the Islamic Revolution and the IRGC 15,000 container houses, were provided for the quake-hit areas, In addition, people, donors and celebrities have taken action to provide shelters for the affected areas there are various ways to providing container

houses, in some cases, prefabricated parts are in place they are shipped and assembled in the workshop and then transported. Figure 2 also in some cases prefabricated shelters are sent and

installed to the area in a relatively complete manner by truck or trailer.



Figure 2. (a) Left: The container houses, Construction Workshop near the Quick Villages.

Figure 2. (b) Right: A fully prefabricated temporary shelter carried by a trailer.

(Source: IEES, 2017)

There were major challenges in providing temporary housing for survivors, some of which are as follows: (IEES, 2017)

3.5. Problems Related to Infrastructure Requirements

One of the problems related to the camps and Temporary shelters, water supply needed for drinking, sanitation, and health issues, as well as electricity supply and Phone access. Thus, it was necessary to prepare and install them before the camps were set up Water pipelines, electricity and telecommunication equipment, sewage disposal facilities are also considered. This dilemma has led to, for example, the use of toilets or Bathrooms, residents of temporary shelters may in some cases have many problems.

3.6. Climatic Problems

The container houses, is not a good fit for the climate conditions of the region Not very compatible with the climate of the region. In recent days, there has been talk of displacement and reversal some of the container houses, have been released due to local storms. It seems like providing temporary housing to the affected villages with using local materials and capabilities can also create Employment for survivors will perform better and accelerate the process.

In some villages indigenous tents are being developed by people using fabrics such as cloth, straw and nylon, which is also more adaptable to the climate of the region. The heating mechanism of these tents is often petroleum heaters or valve lights which can endanger the health of survivors through the limited space inside the tent.



Figure 3. (a) Left: Manufacture of native tents by some survivors. (Internal space)

Figure 3. (b) Right: Manufacture of native tents by some survivors. (Outdoor space)

(Source: IEES, 2017)

3.7. Cultural Issues

Considering that the establishment of shelters without regard to cultural issues and with the social going on in the region, privacy and ethnic issues can be dealt with the future will create problems for the affected community. Such problems in past seismic events The Bam earthquake in particular has also been frequently reported.

3.8. Rights and Ownership

Putting container houses, on land owned by other people is tense There are some villages. For example in the village of zarde payin the landowner desired of the IRGC prevented the camps from setting up camps on their land and tensions in the village Created thereafter.

3.9. Creating Secondary Problems in Reconstruction

Many prefabricated units on private land and they are installed in the vicinity of damaged houses. This can restructure due to limitations Space has problems. Also building temporary housing in the vicinity of damaged units has caused some problems with the removal.

3.10. Feeling Discriminated

Differences in the type of shelters offered to people in temporary housing, it has created a sense of discrimination among the people of the region. While some people in tents they have a hard time living, some of them taking advantage of well-built shelters. Even the difference the type of prefabricated shelters has also intensified the feeling among the people. Shelters All funded by the government have the same size and specifications, but the shelters People's donations range in size from small to large. Hence the conflicts at the regional level Damage is observed when receiving shelter.

3.11. Debris Removal

Many of the buildings in the area were destroyed by the earthquake, and a large amount of debris remained. Thus, the debris removal operations were carried out with the aim of searching and rescuing, reopening roads and preparing the ground for Housing and reconstruction began in the early hours after the earthquake by heavy machinery sent to the area. There are, of course, a number of problems in the removal operations, the most important being the following the problem of lack of proper space for the debris depot has caused the debris to discharge in areas where Can have future environmental consequences. The riverbeds, the roads, the proximity Slopes and ... are some of the

places used to dump waste. In general, the necessary location for this important It's not done Rubble depot in different plains and areas that can have environmental consequences there is no plan for earthquake recycling. Only available iron by local buyers it is separated from the rubble and the rest of the rubble removed by truck is transported out of the city. It seems if such programs exist, the volume of debris would be reduced and in addition to saving the need Materials during the reconstruction, it was possible to preserve the environment in a more desirable way.

3.12. People's Participation

Residents of affected areas should be directly involved in the reconstruction process in Participate in remediation actions. This increases the acceptability of the result of the work, creating the job and the social consequences of the earthquake will be reduced and the work process will accelerate. Also because the reconstruction process is acceptable to the disadvantaged sections of the community; Obtain people's opinions, or at least their representatives, in decision-making sessions. Without the opinion of the affected people was not a successful reconstruction process and the result was widely used it won't take. In this regard, in the process of temporary housing, unfortunately, the participation and how to use it for the affected people has not been given much attention.

3.13. Livelihoods

Currently, the region's economic infrastructure is often damaged and in the future as a major problem, employment and livelihoods will grip people. Many livestock in the village has been destroyed or inevitably sold out, and livestock in these conditions are almost impossible. Therefore, besides paying attention to housing reconstruction, there are ways to ensure people's livelihood Think about reducing the effects of unemployment as much as possible. Some of the solutions available in these relationships are as follows:

- Craftsmanship training and creating handmade cooperatives for the sale of manufactured items
- Providing employment with new apprenticeships
- Creating job opportunities by distributing micro loans in affected villages
- Helping restore the region's economic infrastructure, particularly in agriculture and livestock, by providing loans or private sector investments

- Providing facilities for resumption of earthquake-affected jobs

4. Research Findings

This research presents a comprehensive strategy in temporary accommodation planning for decision makers by separating the two organizational and technical parts into three main parts (strategic, programmed and project level), to make the necessary decisions in disaster areas.

This new strategy has the ability to be generalized in similar examples, based on the prioritization of components according to the local context of each disaster.

Regardless of the prosperity level of populated areas, almost all affected areas are struggling with post-disaster housing (PDH) aftermath of natural disasters. In these areas TH is the first priority phase for the government (Hidayat 2010) because TH offers security and safety to Displaced People (DP) so they can return the pre-disaster conditions (Collins et al. 2010; Johnson 2007a). However, most Temporary Housing Units (THUs) that have been used for previous recovery programs are rejected by most experts (Johnson 2009). In general, THUs usually do not satisfy all stakeholders due to numerous weaknesses. According to numerous experts (Barakat 2003; Chandler et al., 2007; El-Anwar et al. 2009; Hadafi & Fallahi 2010; Johnson 2002), these units have had economic, social, and environmental problems.

According to Lizarralde & Davidson (2006), PDH strategies often fail to address the DP expectations. In this regard, Simon (1996) stated that dealing with complex emergency situations cannot rely only on decision-makers due to the bounded rationality (cited by (Kapucu & Garayev 2011)).

Additionally, decision-making processes are usually implemented after natural disasters under high pressure and stressful conditions in extremely tight timeframes. Meanwhile, it is necessary to consider long-term planning (Kennedy et al. 2008) and all stakeholders' participation in decision-making to achieve suitable outcomes. Furthermore, Davidson (2009) stated that even for building construction in normal situations it is necessary to consider stakeholders' characteristics, such as culture in order to achieve appropriate organizational forms. Additionally, it should be emphasized that the organizational strategy has great impact on the supervisors' roles, which is one

of the key issues for PDA provision (Gharaati & Davidson 2008).

Additionally, according to United Nations Disaster Relief Organization (UNDRO) (1982), each affected area has individual conditions that lead to choose its particular strategy. Furthermore, different natural disasters have diverse impacts (Lindell & Prater 2003), which need to be considered individually. Therefore, decision-makers need to choose a suitable strategy to deal with PDH issue, which embraces intertwined interior and exterior factors that could have antithetical impacts on each particular case (Hall, 1962) (cited by (Johnson 2007a)). Thus, if decision-makers do not apply previous recovery strategies there is no platform for decision-making process. Moreover, when previous strategies are used there is no guarantee to achieve similar outcomes. In this regard, Kapucu & Garayev (2011) stated that traditional decision-making approaches cannot be used in emergencies, which need flexible tools. Therefore, it is necessary to have a model that could cover human errors and consider the correspondences and interconnections between previous cases and new cases.

The provision of well-planned settlement solutions for people who have been displaced by conflict or natural disasters is crucially important. Bad planning of settlements can have a number of negative effects, in the worst case destabilising whole countries or even entire regions. In contrast, well-planned settlements can have a positive impact which extends beyond the provision of basic shelter.

The influx of large numbers of displaced people into an area, and any TH response to their needs, will have consequences beyond the displaced population itself. Both the local and displaced populations

can expect temporary settlement to have an impact on their lives in many ways:

- protection and security
- survival and health
- social needs, such as privacy and dignity
- livelihoods
- natural-resource management
- communal service infrastructure.

It is essential for organisations responsible for implementing TH programmes to be aware of these consequences, in order to reduce the negative effects and increase the positive effects of their work. As studied in the case of Sar-e-Pol-e-Zahab,

most post-disaster accommodation programs have problems with climate, culture, livelihood and society, which are due to misunderstanding and lack of study of the real context and conditions of people affected by the accident.

For instance, TH responses which match the cultural expectations of the displaced population are less likely to fracture social structures, or to disrupt existing communities within the displaced population. Friction between or within families, or conflicts between clans or ethnic groups, may be reduced through appropriate TH responses. Adapting generic guidelines for the temporary settlement of displaced populations to local and cultural circumstances must be based on sound assessment, monitoring, and evaluation – matters. The approach of these guidelines to the TH of displaced populations is based on a holistic interpretation of the need for ‘shelter’. It goes beyond the temporary provision of tents and camps, aiming instead to support all the settlement and shelter options that are open to displaced people have been categorised into six ‘TH programme options. Figure 4. (Corsellis & Vitale, 2011).

Based on a demand and capacity logic and based on studies of minimum standards of (Sphere Association, 2018) the temporary shelters system can be divided into three sub-systems as follow:

- Temporary housing
- Temporary social elements

- Temporary common services or facilities

Each of the above sub-systems has its specific spatial unit(s), and these units can be of three private,

Semi-private, and public type. It is suggested that these units are planned based on the following measures:

- Providing a minimum level of comfort and welfare
- Providing the mental support for refugees
- Following the standards for various functions of spaces
- Organizing the spaces based on their pre-planned functions
- Taking into consideration the local and environmental factors
- Considering multi-functioning for some spaces, if possible
- Creating the tendency of returning back to permanent residence
- Considering the sustainable development principles

Using the experiences gained form the past earthquakes as well as “post occupancy evaluation” are very helpful for meeting the above measures. According to the study of the problems of Sarpol-e Zahab in temporary accommodation, the desired solutions, experts and also the minimum standards of (Sphere Association, 2018) can be divided into four economic, social, cultural and environmental areas in the table 4 below.

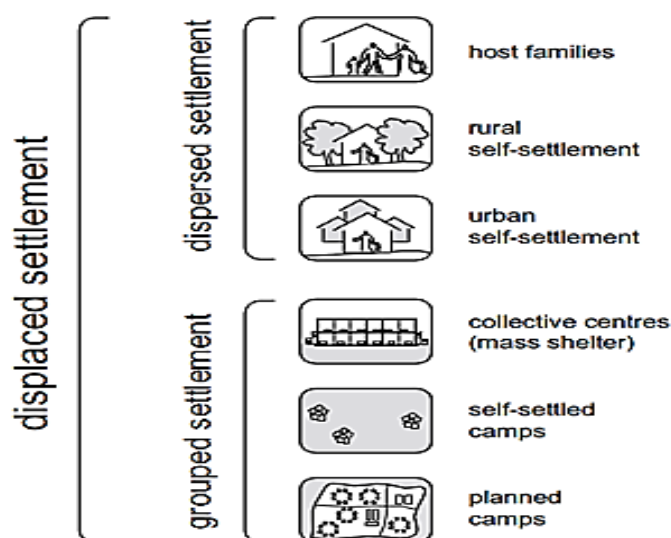


Figure 4. Six ‘TH programmed options.
(Source: Corsellis & Vitale, 2011).

Table 4. Guideline for Sustainable temporary housing solutions.

Main Index	Definition	Reference
Ec.	It is useful to consider the similarities and differences in the interests of stakeholder groups affected by temporary settlement. This might help to develop common operational guidelines which could improve co-ordination and co-operation between different organizations in the field.	Corsellis,(2011).Shelter Center, (2012)
	Livelihoods are defined as a range of resource arrangement strategies of production, consumption, and exchange for improving human living conditions.	Twigg, (2006). Allison and Ellis, (2001)
	Space surrounding the units can also be used for cultivating zones or work spaces, which may be profitable for the families' economy. Since a settlement is not just a collection of individual household's design beyond the units is a key to create greater living environments for temporary settlements.	Kellett, Moore, (2003)
	Resource management for post-disaster reconstruction projects.	Chang et al., (2010).
	simple construction systems that are easy to assembly and dismantle, and that use small elements, which are easier to handle, should be preferred	Arslan, (2007)
S.	Recovering the sense of community is very important in post disaster situations and the real meaning of the term community is in the richness of social-relationships	Kellett, Moore, (2003)
	The relation between the temporary housing units and these public spaces and buildings has to be carefully designed too. It is important to yield buffer zones from public domain to the units' private area in order to exist privacy among neighbors, as well as to facilitate social support and interaction.	Caia et al, (2010)
	The units' location has to be carefully established to ensure that people do not feel displaced, and that they are closer to their work places, services and amenities. Usually temporary housing units are built in periphery areas, which can cause social isolation and the need for extra infrastructure and services such as bus transportation.	Johnson, (2007b)
	participation has to be locally decided according to the context	Davidson et al., (2007).
	Community recovery. community-based approaches	Lizarralde & Massyn, (2008)
	An awareness of local and national laws (Legal context), is essential in order to understand the socio-political context of a settlement. local and national laws will affect the use of land for settlements.	Corsellis, (2011), Shelter Center, (2011)
	Skills training programmes and apprenticeship schemes can maximise opportunities for participation during construction, particularly for individuals lacking the required building skills or experience.	Sphere Project, (2018)
	Neighborhood planning should support existing social networks, contribute to security and enable self-management by the affected population. The plot layout in temporary planned camps should maintain the privacy and dignity of separate households by ensuring that each household shelter opens onto common space or a screened area for the use of the household instead of being opposite the entrance to another shelter.	Sphere Project, (2018)
Cul.	Local resources, such as materials, construction techniques and workforce, greatly contributes to reduce costs, to improve local economy and to provide better cultural and local integration.	Gulahane & Gokhale, (2012)
	Local characteristics: (1) <i>Local potentials</i> , which consider local possibilities of providing temporary accommodation based on material and immaterial properties; and (2) <i>affected population</i> by natural disaster with different-features which include DP and others, that play an important role in PDA provision.	Blaikie et al. (2014), UNDRO (1982), Sliwinsky, (2007)

Main Index	Definition	Reference
	ensuring adequate space provision and privacy in both individual household shelters and temporary collective accommodation. Sufficient space should be provided for culturally appropriate burials and associated rituals.	Sphere Project, (2018)
	Understand precise local context in order to provide solutions that match with their future users and environment	Johnson, (2007a). UNDRO, (1982).
	Flexibility is crucial to allow simple and quick transformations that make the unit able to accommodate these multifunctional spaces. Essential to make users capable of customizing and personalizing their units, making additions or modifications according to their needs and possibilities. In disaster scenarios housing is often a work place for families.	UNDRO, 1982. Kellett & Tipple, (2000), ElMasri & Kellett, (2001). Barakat, (2003). Bedoya, (2004). Lizarralde & Davidson, (2006). Lizarralde & Root, (2007). Arslan & Cosgun, (2008) Sener & Altun, (2009) .
	meeting people's aspirations and incorporating local forms of housing	Barakat, (2003)
	The use of local resources does not mean that innovation should not be used; if properly introduced and culturally integrated, some new materials and technologies may considerably contribute to improve housing solutions after disasters	Davidson et al. (2007). Garofalo & Hill. (2008). Shaw, Takeuchi, Uy & Sharma, (2008)
	Existing local practices in the use of covered living space accommodation of extended family members, should inform the covered area required.	Sphere Project, (2018)
En.	Construction resilience should be consistent with known climatic conditions and natural hazards and should consider adaptations to address the local impact of climate change.	Corsellis, (2011), Shelter Center, (2012)
	Reversibility of the construction process; This strategy proposes the possibility to reintroduce materials and spatial resources into another production cycle or to reintegrate them into the natural environment without production of waste or residues. Just like the reuse possibilities, the reversibility concept is only possible if properly planned ahead during the design phase.	Bologna, (2006)
	Debris removal: Is a priority to enable the provision of shelter and the establishment of appropriate settlement solutions. The use, management, ownership and environmental impact of disposal sites should be considered.	Sphere Project, (2018)
	The impact of a disaster on the natural environment should be assessed to inform the response and mitigating activities required.	Sphere Project, (2018)

5. Discussion and Conclusion

The growing international concern about the increased frequency of large-scale catastrophic disasters has increased the international drive to reduce the destructive effects on the lives and livelihoods of individuals and communities. Moving the trend of tackling disastrous incidents at global level from after to before the event, the proactive entry point, Disaster Risk Reduction (DRR), emphasized, is a shift from reactive emergency relief to proactive disaster risk. In parallel, however, the reactive entry point of post-disaster management retains its importance because earthquakes and other extreme natural

hazards do not wait until our cities get ready! Prevention following a proactive approach is better than a cure, but it has proved to be illusive in disaster research and response (Pelling, 2012).

This review of the study literature underlines the considerable complexity of post-disaster contexts. With the rising number of victims after disaster and the slow response of government to provide shelter and providing Temporary housing that is a crucial step of the disaster recovery, a new typology, will create a responsive plan to ensure the, protection, security and basic conditions for life with dignity, environmentally conscious, and ready for

implementation into the current framework of society, must be planned.

Any temporary settlement (TH) response For example, planning a post-disaster temporary housing

In the *SarPol-e Zahab Kermanshah* should be planned on the strategic, programme, and project levels. The overall process is the same on all three levels. It consists of developing the profile of a situation, followed by a detailed plan of action to reach the set objectives. The process described here intended as a checklist of factors which should be taken into account when planning temporary settlement. The generic planning process is structured in the following way: [Figure 5](#).

strategic planning- Strategic planning manages temporary settlement on a national or regional level. It deals with the TH and shelter needs of the affected population Several or even all of the six TH programmed options described above are combined to form a coherent strategy.

programmed planning- Programme planning deals with the needs of a specific group of displaced people. For instance, all projects within a particular camp are combined to form a project plan to provide for the TH needs of the camp's inhabitants.

Project planning- Project planning develops and manages the activities required to undertake each project within a programme. For example, the programme plan for the *Sar-e-Pol Zahab* camp might require the expansion of a clinic. This would involve the production of tendering documents and schedules of work – activities which are co-ordinated within the project plan.

Adaitionally, The systems approach allows a comprehensive and cross-disciplinary view of the many apparently separate facets of a complex process such as post-disaster reconstruction. Instead of considering the many elements of the complexity independently, we focus our attention on the important relationships between them, and between them and their environment.

In the systems approach, the Temporary housing projects in post-disaster reconstruction process is recognized for its two main sub-systems: (i) organizational and (ii) technical; their interdependence is (or should be) essential in the environment of chaos following a disaster. The organizational sub-system includes elements regarding 'who is to do what', for example: sources

of financing, and definition of authorization and control mechanisms;

The technical process has to respect the habitual phases of project initiation, preparation, construction and hand-over, within the constraints of limited resources (and limited time) and with the involvement of a great variety of participants, often with divergent objectives. The technical sub-system includes elements regarding 'how' to consume the resources, for example: selection of materials and construction methods.

Thus, this study presents a customizable platform which is able to be applied for each case with regard to the findings from analyzing the case studies.

To this end, the decision-making process algorithm for selecting suitable PDA is presented in [Fig.5](#). In general, this decision-making model embraces two main parts; organizational and technical. The organizational section, which contains Conditions and Availability sectors, is the initial screen phase for selecting PDA. The technical takes into account the alternative availability. Indeed, this section of the model considers whether the alternative PDA exists in the affected area or can be provided. Also, the Conditions part probes required infrastructures and conditions for utilizing each alternative by assessing local And TH characteristics with regard to the material and immaterial aspects. In the second screening phase, the detailed technical indicators are applied to assess acceptable/available alternatives based on economic, social, and environmental impacts by considering exclusive local features and demands to distinguish most suitable alternative(s) among all options. By the [Johnson \(2009\)](#),The systems approach allows a comprehensive and cross-disciplinary view of the many apparently separate facets of a complex process such as post-disaster reconstruction.

Therefore, decision-makers need to choose a suitable strategy to deal with PDA issue, which embraces intertwined interior and exterior factors that could have antithetical impacts on each particular case. It is necessary to have a model that could cover human errors and consider the correspondences and interconnections between previous cases and new cases.

In the end, decision-makers have the ability to deal with PDA for the *Sar-e-Pol Zahab* programs or each specific case by applying the strategy presented, which are derived from this study by

simplifying the complicated PDA issue into explicit steps and characteristics. This research presents a new strategy to deal with a temporary accommodation and especially temporary housing provision program for decision-makers based on customizing effective factors. Through three main

vertexes and other inherent aspects gathered within these vertexes. [Figure 6](#).

In Addition, the choice phases, which include these elements and the interconnections, have been defined. Finally, a customizable model was proposed to carry out a PDA and TH selection process. [Figure 7](#).

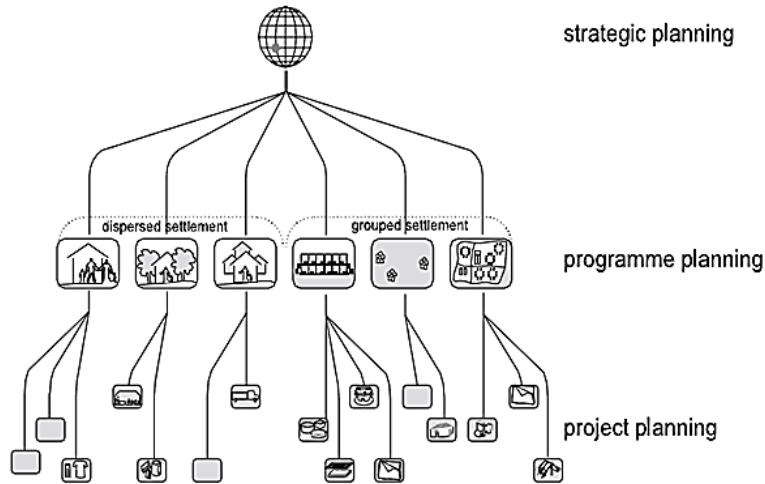


Figure 5. Temporary Settlement Response, Planning.
(Source: [Corsellis & Vitale, 2011](#)).

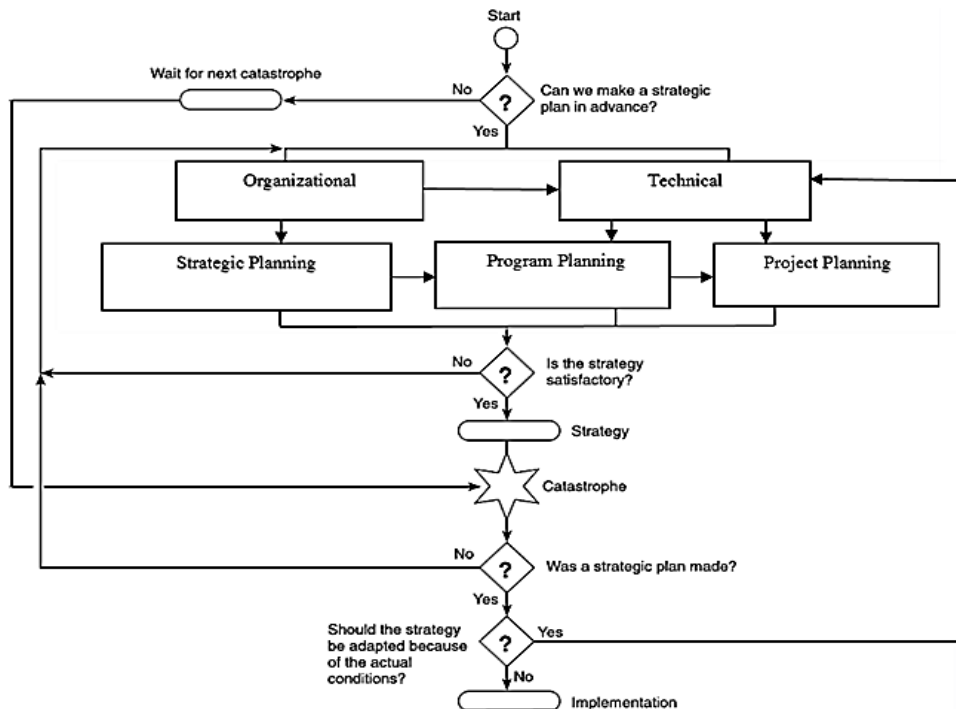


Figure 6. The authors' custom model is based on Johnson's model to perform the PDA and TH selection process.

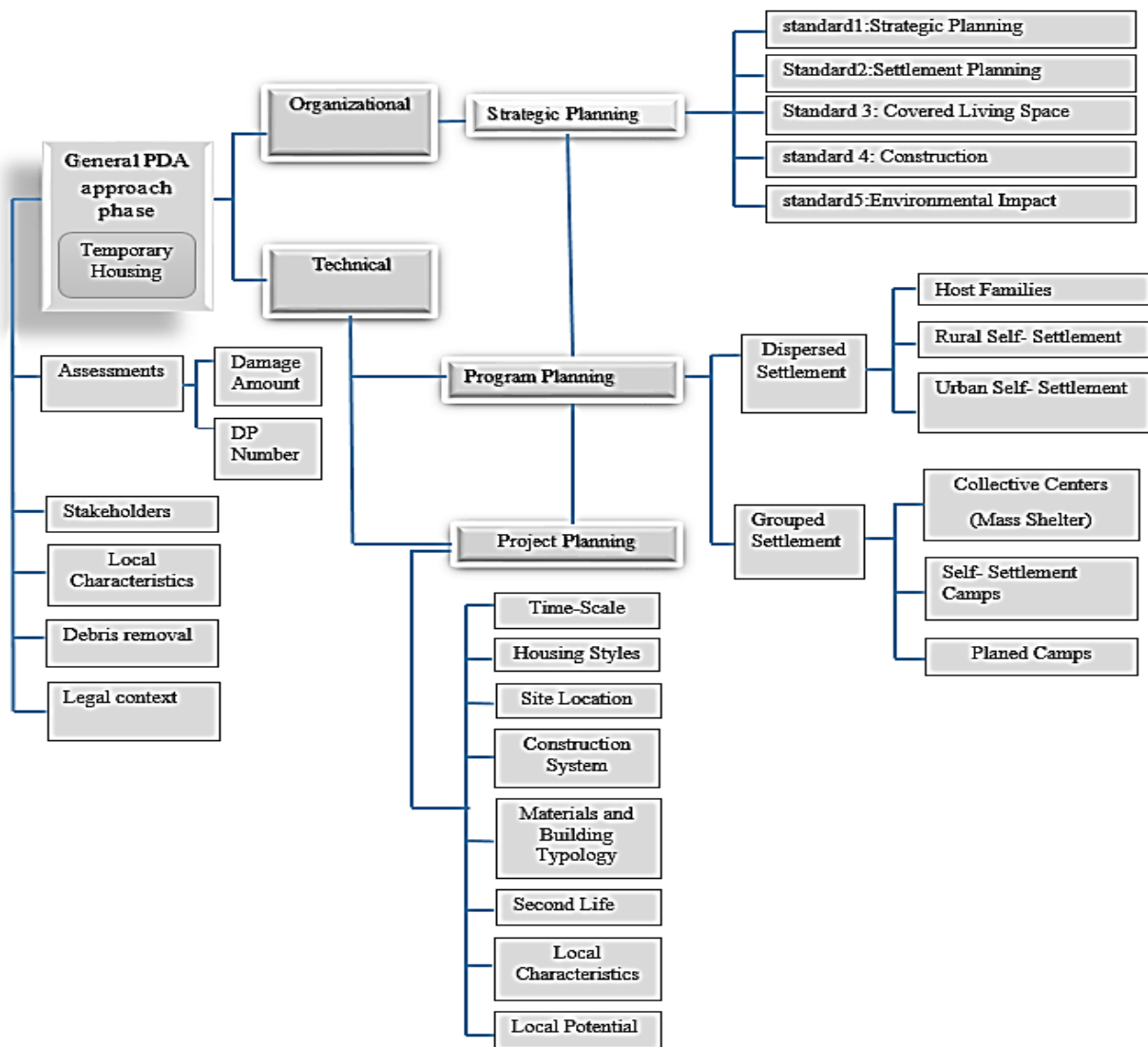


Figure 7. General PDA approach phase.

Acknowledgments

The current paper is extracted from the Ph.D. thesis of the First author (Elnaz Asgari Namin) in the Department of Architecture, Ardabil Branch,

Islamic Azad University, Ardabil, Iran. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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تبیین مدل استراتژی اسکان پس از سانحه (مطالعه موردی: سر پل ذهاب، کرمانشاه)

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تاریخ پذیرش: ۱۸ تیر ۱۴۰۰

تاریخ دریافت: ۱۶ بهمن ۱۳۹۹

چکیده مبسوط

۱. مقدمه

مردمی که تحت تأثیر سانحه قرار می‌گیرند حق زندگی با منزلت و دریافت کمک برای تسکین دردهای انسانی ایشان دارند. برنامه‌ریزی مسکن موقتی زمانی که تصمیم‌گیرندگان از در نظر گرفتن ارتباط بین نیازهای کوتاه‌مدت و بلندمدت تمام ذینفعان محلی در مشخصه‌های مسکن موقتی انتخابی غفلت می‌کنند با شکست مواجه می‌شود. با وجود اینکه مسکن موقت جزو لاینفک تمام پروژه‌های بازسازی پس از سانحه می‌باشد همواره مترتب نقدهایی بوده است. نقدهای دریافتی عمدتاً به دلیل عدم مطابقت اقلیمی بحث‌های فرهنگی و اجتماعی بوده است با توجه به بررسی مشکلات اسکان پس از سانحه در سر پل ذهاب نیز عمدتاً مشکلات گفته‌شده به تفسیر بیان گردیده است. از آنجایی که تمامی این مشکلات به دلیل عدم توانایی در پرداختن به جمیع مسائل در زمان اضطرار سانحه است، هدف از این تحقیق ارائه بستری برای تصمیم‌گیرندگان برای انتخاب استراتژی اسکان پس از سانحه بر اساس الزامات کوتاه‌مدت و بلندمدت است. این پلت فرم، کلیه عوامل مرتبط را که در سه محور اصلی (۱) ویژگی‌های محلی (۲) ویژگی‌های بلایای طبیعی و (۳) ویژگی‌های اسکان پس از سانحه در نظر می‌گیرد. لذا مهم‌ترین سؤال این تحقیق عبارت است از: اصلی‌ترین ملزومات استراتژی اسکان پس از سانحه و عناصر تشکیل‌دهنده آن کدام است؟

عوامل دخیل در تأمین اسکان موقت پس از سانحه، از برنامه‌ریزی تا زندگی دوم، به‌عنوان نظام مسکن موقت در نظر گرفته می‌شود. این نظام شامل: (۱) مقیاس زمانی (۲) سبک تهیه (۳) عمر دوم مسکن موقت می‌باشد. شاخص مقیاس زمانی شامل مراحل مختلف بعد از سانحه، شامل: (۱) پناهگاه اضطراری (در طول چند ساعت) (۲) پناهگاه موقتی (در طول چند روز) (۳) مسکن موقتی (در طول چند هفته) (۴) مسکن دائمی (در طول سال‌ها) و ویژگی‌های آن‌هاست. شاخص سبک تهیه، انواع روش‌های تهیه مسکن موقت پس از سانحه شامل: روش کیت (سرهم‌بندی در محل) و روش پیش‌ساخته می‌باشد. و نیز تقسیمات سکونتگاه پس از سانحه به دو گروه پراکنده و گروهی در ۶ زیر بخش (خانواده‌های میزبان، خود اسکانی روستایی، خود اسکانی شهری، مراکز جمعی، خود اسکانی اردوگاهی و اردوگاه طراحی‌شده) مربوط می‌شود. شاخص زندگی دوم، سناریوهای مختلف استفاده از مسکن موقتی شامل مراحل استفاده مجدد و بازیافت را پس از انتقال مردم بی‌خانمان به مسکن دائمی در نظر می‌گیرد.

حداقل استانداردها منعکس‌کننده محتوای اصلی حق مسکن مناسب و حداقل استانداردهای اسکان و سکونتگاه است، که شامل ۵ آیت اصلی: برنامه‌ریزی استراتژیک، برنامه‌ریزی سکونتگاه، استاندارد فضای زندگی سرپوشیده، استاندارد ساخت و تأثیرات محیطی است. توجه به این آیت‌ها در فرآیند برنامه‌ریزی جزو ضروریات می‌باشد.

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با دو زیرسیستم اصلی آن شناخته می‌شود: (الف) سازمانی و (ب) فنی. و وابستگی متقابل آن‌ها، سیستم سازمانی شامل عناصری در مورد "چه کسی می‌تواند انجام دهد" می‌باشد. به عنوان مثال: منابع تأمین مالی، و تعریف مکانیسم‌های مجوز و کنترل. و سیستم فنی شامل عناصر مربوط به "چگونگی" مصرف منابع می‌باشد، برای مثال: انتخاب مواد و روش‌های ساخت‌وساز.

۵. بحث و نتیجه‌گیری

هر منطقه آسیب‌دیده دارای شرایط اختصاصی است که منجر به انتخاب استراتژی خاص خود می‌شود. در این مطالعه یک استراتژی جامع که شامل عوامل داخلی و بیرونی در هم تنیده‌ای که بتواند خطاهای انسانی را در برگیرد و مکاتبات و ارتباطات بین پرونده‌های قبلی و موارد جدید را در نظر بگیرد در قالب مدل فرآیند تصمیم‌گیری برای انتخاب اسکان پس از سانحه ارائه شده است. این مدل تصمیم‌گیری شامل دو بخش اصلی است: سازمانی و فنی. بخش سازمانی، به تأمین زیرساخت‌ها با توجه به امکانات در دسترس محلی توجه دارد. شاخص‌های فنی برای ارزیابی گزینه‌های قابل قبول / در دسترس، بر اساس تأثیرات اقتصادی، اجتماعی و زیست‌محیطی با در نظر گرفتن ویژگی‌ها و خواسته‌های انحصاری محلی برای تشخیص مناسب‌ترین گزینه‌ها بین همه گزینه‌ها استفاده می‌شود.

در نهایت استراتژی برنامه‌ریزی مسکن موقت برای تصمیم‌گیرندگان با تفکیک دو بخش سازمانی و فنی در سه رأس اصلی برنامه‌ریزی، ارائه شده است تا بر اساس شخصی‌سازی عوامل مؤثر در هر موقعیت تصمیم‌گیرندگان تصمیمات لازم را اتخاذ کنند.

کلیدواژه‌ها: اسکان موقت پس از سانحه، مسکن موقت، مردم بی‌خانمان، تاب‌آوری، استراتژی.

تشکر و قدردانی

مقاله حاضر از رساله دکترای نویسنده اول (الناز عسگری نمین) در گروه معماری، واحد اردبیل، دانشگاه آزاد اسلامی، اردبیل، ایران استخراج شده است. این تحقیق هیچ‌گونه کمک مالی خاصی از آژانس‌های تأمین مالی در بخش‌های عمومی، تجاری یا غیرانتفاعی دریافت نکرده است.

پژوهش حاضر از نوع کاربردی است و به روش توصیفی-تحلیلی انجام شده است. برای جمع‌آوری اطلاعات، از روش اسنادی و کتابخانه‌ای استفاده شده است. در این بررسی تمرکز اصلی بر ارائه مؤلفه‌های کیفی مسکن موقت پس از سانحه در قالب یک مدل استراتژیک به‌عنوان بستری برای تصمیم‌گیرندگان در شرایط بحران است.

۴. یافته‌های تحقیق

این تحقیق با تفکیک دو بخش سازمانی و فنی به سه بخش اصلی (سطوح استراتژیک، برنامه‌ریزی و پروژه)، یک استراتژی جامع در برنامه‌ریزی اسکان موقت، برای تصمیم‌گیری‌های لازم در مناطق فاجعه را ارائه می‌دهد؛ که قابلیت تعمیم در نمونه‌های مشابه، بر اساس اولویت‌بندی مؤلفه‌ها با توجه به زمینه محلی هر سانحه را دارا می‌باشد. هر برنامه‌ریزی مسکن موقت باید در سطوح (۱) استراتژیک، (۲) پروگرام و (۳) پروژه انجام شود. در هر یک از این مراحل فوق چک‌لیست عواملی که بلید در هنگام برنامه‌ریزی در نظر گرفته شود، مدنظر است. که شامل:

(۱) برنامه‌ریزی استراتژیک: برنامه‌ریزی استراتژیک، سکونتگاه موقت را در سطح ملی یا منطقه‌ای مدیریت می‌کند. در این بخش همه شش گزینه برنامه مسکن موقت، برای ایجاد یک استراتژی منسجم، ترکیب شده‌اند.
(۲) برنامه‌ریزی پروگرام: با نیازهای گروه خاصی از آوارگان سروکار دارد. به‌عنوان مثال، تمام پروژه‌های داخل یک اردوگاه خاص برای تشکیل یک طرح پروژه به‌منظور تأمین نیازهای ساکنان اردوگاه ترکیب شده‌اند.
(۳) برنامه‌ریزی پروژه: برنامه‌ریزی پروژه فعالیت‌های موردنیاز برای انجام هر پروژه را در یک برنامه توسعه داده و مدیریت می‌کند. به‌عنوان مثال، برای گسترش کلینیک در یک اردوگاه با هماهنگی فعالیت‌های آن در برنامه‌ریزی پروژه انجام می‌گیرد.

افزون بر این، رویکرد سیستم‌ها یک دیدگاه جامع و مقطعی از بسیاری از جنبه‌های ظاهراً جداگانه یک فرآیند پیچیده مانند اسکان پس از سانحه را امکان‌پذیر می‌کند. به‌جای اینکه عناصر پیچیده بسیاری را به‌طور مستقل در نظر بگیریم، توجه خود را به روابط مهم بین آن‌ها، و بین آن‌ها و محیط آن‌ها متمرکز می‌کنیم. فرآیند اسکان پس از سانحه



How to cite this article:

Asgari Namin, E., Javan Forouzandeh, A., Asefi, M. & Shakeri, K. (2021). Explaining the model of post-disaster temporary accommodation strategy (Case study: Sarpol-e Zahab, Kermanshah). *Journal of Research & Rural Planning*, 10(3), 39-60.

<http://dx.doi.org/10.22067/jrrp.v10i3.88506>