

Representation of the Villagers' Minds Regarding the Post-earthquake Reconstruction of Housing; Case Study of Kanzagh village in Ardabil*

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ABSTRACT

In the village, housing is a part of the general identity of the village and plays a multifunctional role. The post-earthquake reconstruction process of rural housing due to the recent earthquakes in Iran is a significant matter considered by the planners and designers of rural housing. Meanwhile, attraction people's participation leads to positive results in the adaptation of the proposed architectural designs for the reconstruction of the housing with the needs, demands, limitations, and facilities based on the villagers' opinions. The current research aimed to consider the mindset of the residents of Kanzagh village to understand the influential attributes and factors in the post-earthquake reconstructed housing from villagers' point of view. The current study used library studies and field surveys to recognize the characteristics of rural housing and identify and classify the villagers' mindsets and concerns in the reconstruction process of rural housing by using Q methodology and interviews with the villagers. The people with high correlation were divided into two groups by extracting the statements, sorting them, and statistical analysis in the SPSS software. The mindset of the first group included the propositions regarding the context and public land uses of Kanzagh village and the general decisions regarding the collective and public feedbacks of the village environment, and the placement of the land uses in the context of the village raised as the environmental factors. The second group presented the propositions regarding the design of the rural housing and the issues related to the interior spaces of the housing and often indicated the private feedbacks of the households, architecture of the house, the interrelationship of the interior spaces, and alike studied as the physical factors. By taking into account the villagers' mindset and participation in the design process, the designer can enhance the satisfaction and success in the reconstruction by analyzing and comparing the opinions of the villagers struck by the earthquake to understand their needs and demands.

Keywords: Housing Design, Kanzagh Village, Q Methodology, Public Participation.

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1. INTRODUCTION

In the recent century, the disasters, such as earthquakes, have caused human loss and numerous damages to housing, and a considerable number of national resources and capital are allocated to their rapid reconstruction. The location of Iran on the Himalaya-Alp earthquake belt has made this country among the most earthquake-prone countries of the world, and our villages are considered among the most vulnerable contexts to these disasters (Akbari, Zareei, & Rafiei, 2016). For example, the 2003 Bam Earthquake has damaged 20-70 % of the villages around Bam city (USAID, 2004). Furthermore, in the 1990 Roudbar-Manjil earthquake, many villages, including Barehsar village, have had numerous damages and irreplaceable losses (Aslani, Hoseinzadeh, & Mousavian, 2017). Meanwhile, the most significant issue is constructing the housing, which enjoys identity values while being earthquake-proof to meet the new demands of the villagers and is based on the vernacular patterns of the rural housing. Many efforts have been made by managers and officials to reconstruct these villages when occurring various disasters in the rural regions of the country. However, regardless of the quantity of these efforts in reconstructing the villages, it seems that it lacks a fundamental and profound perspective on villagers' economic, livelihood, social, and cultural criteria (Taghvaei, Bahrampour, & Shahin Rad, 2009). Housing in the village is a part of the general identity of the village and plays a multifunctional role. In addition to dwelling, housing is a part of the occupation and production space originating from the role of dwelling, lifestyle, and using the environment and economy ruling the villages, rural customs, and latent and obvious norms. Undoubtedly, housing reconstruction after the occurrence of natural disasters is one of the significant axes in the process of natural crises management process. Studying the aspects of the housing and lifestyle is a phenomenon formed based on the social system ruling the human culture in every nation or ethnic, and its material and spiritual forms are created in the living space. The reflection of these changes in the rural regions based on the cultural structure of villagers is significant in the reconstruction process after the disaster. Disregarding the people's lifestyle and customs of the affected area has failed the reconstruction plan many times (Aslani, Hosseinzadeh, & Mousavian, 1987). The importance of selecting the proper approach of the post-disaster housing reconstruction regarding public participation makes it one of the most challenging issues of disaster-prone countries, such as Iran. Post-disaster reconstruction is a complicated process, which is a combination of political, architectural, economic, cultural, psychological, and social processes (Asadian Zargar, 2017). Considering that public participation in the reconstruction can lead to positive results in meeting the victims, removing the victims' participation can lead to the loss of financial resources, human force, equipment, and waste of time.

Reducing or eliminating the victims' participation due to accelerating the reconstruction neglects the people's long-term needs, and the housing reconstruction is failed by making physical changes or leaving the region by the residents. Studying the previous reconstruction methods showed that although reconstruction might seem successful in the initial stages by ignoring the participation of the affected people, affected people's dissatisfaction with their houses, people's incuriosity to continue the reconstruction, the disagreed people with the reconstruction, and alike will appear after a while. However, the affected people's participation in the physical reconstruction process can significantly contribute to its success and the residents' satisfaction due to taking into consideration of their needs and opinions.

The current study investigated Kanzagh village, as the case study, which was relocated after the 1996 earthquake. The previous studies on the location of the post-earthquake reconstruction in this village show the development priority as the in-site construction and relocation from villagers' opinions (Vaziri, Naghizadeh, & Joudi, 2019). Another study regarding the sense of the place in this village was conducted by Hatami et al., indicating the enhancement in the villagers' satisfaction by increasing the welfare facilities and reducing the identity and attachment to the place (Hatami, Vaziri, & Naghizadeh, 2019). The current study sought to use the lived experiences of the residents after the earthquake to achieve the desirability of rural housing in post-earthquake reconstructions.

The research questions were as follows: 1. What is the mindset of the Kanzagh residents regarding the post-earthquake reconstruction of the village and rural housing design? 2. What is the priority of the influential factors in the design of the rural housing from villagers' opinion?

Given the above questions, the current study aims to understand the mindset of Kanzagh Village residents and extract the influential attributes in the post-earthquake reconstruction of rural housing. To this end, Q methodology was used to extract some of the significant and influential factors in the design of rural housing to create a more profound perspective in the designers regarding the design aspects of the housing in the villages after the earthquake.

2. RESEARCH LITERATURE

Recording the previous experiences in post-disaster reconstruction will be helpful in similar cases in the future. One of the cases that are often neglected is monitoring the practical experiences in the post-earthquake reconstructed residential contexts over the years. Considering the demands, desires, and particular tendencies of each population group is to maintain and survive off the reconstructed context. The cultural and livelihood characteristics of the villages are among the cases that will play a significant role in the desirability of the implemented plans in the reconstruction of the rural contexts. Extracting the lived experiences of the

villagers in the post-earthquake reconstructed housing in the villages will involve the actual users in future decisions.

2.1. Post-disaster Reconstruction

Post-disaster reconstruction is a holistic and complementary approach covering various aspects (physical and non-physical) of the ruined settlement. The complexity of this process is under control when the reconstruction includes all these aspects and their interrelationship. Finally, reconstruction is a developmental process that can lead to economic rehabilitation, providing the opportunities for the interaction and integration of the affected society, improvement of the cultural-social identity, and establishing a relationship between the past, present, and future to increase the sense of belonging to the built environment (Awotona, 1997).

2.2. Participation in the Reconstruction

Participation means the two-way and interactive cooperation of the people to do something. In recent years, the engineering and economic approaches were shifted to the social and humane sciences approach in the criteria of the reconstruction and relocation of the settlement. The social approach to the displacement of the settlement generally focuses on the organizational aspects of the society, people's participation in the decision-making process, attention to the social and individual demands, etc., and considers consulting with people the most important factor for success

in choosing the right place and proper design of the settlement (Fallahi, 2011). According to the previous experiences and studies, the researchers found out that whenever people were involved in the plans, they were less resistant to innovation and changes. Other researchers know the participation as the third revolution of the management and showed that the plans with participation gained more success (Coburn, Leslie, & Than, 1984; Shaw, Shiwaku, Hide, & Kobayashiand, 2004; Ying, 2009). They believe that the ideal society is a society that can implement its social and economic development plans based on public participation (Mahmoudian, 2017). Generally, participation in society will change the economic-social and demographic dynamics (Garip, 2007). Thus, people's participation in the reconstruction leads to the adaptation of the plans and design with the people's needs, reduction in the costs, plan's sustainability, increase in the society's satisfaction, and acceleration in the rehabilitation (Davidson, Johnson, Lizarralde, Dikmen, & Sliwinski, 2006).

2.3. Conceptual Framework of Research

According to the conceptual model of the research (Fig. 1), as one of the available methods, the Q method (Brown, 1997; Van Exel & de Graaf, 2005; Duenckmann, 2010) scrutinized the villagers' mindset regarding the post-earthquake reconstruction and helped the designer has a more comprehensive understanding of the influential factors in the design, resulting in improving the design and planning.

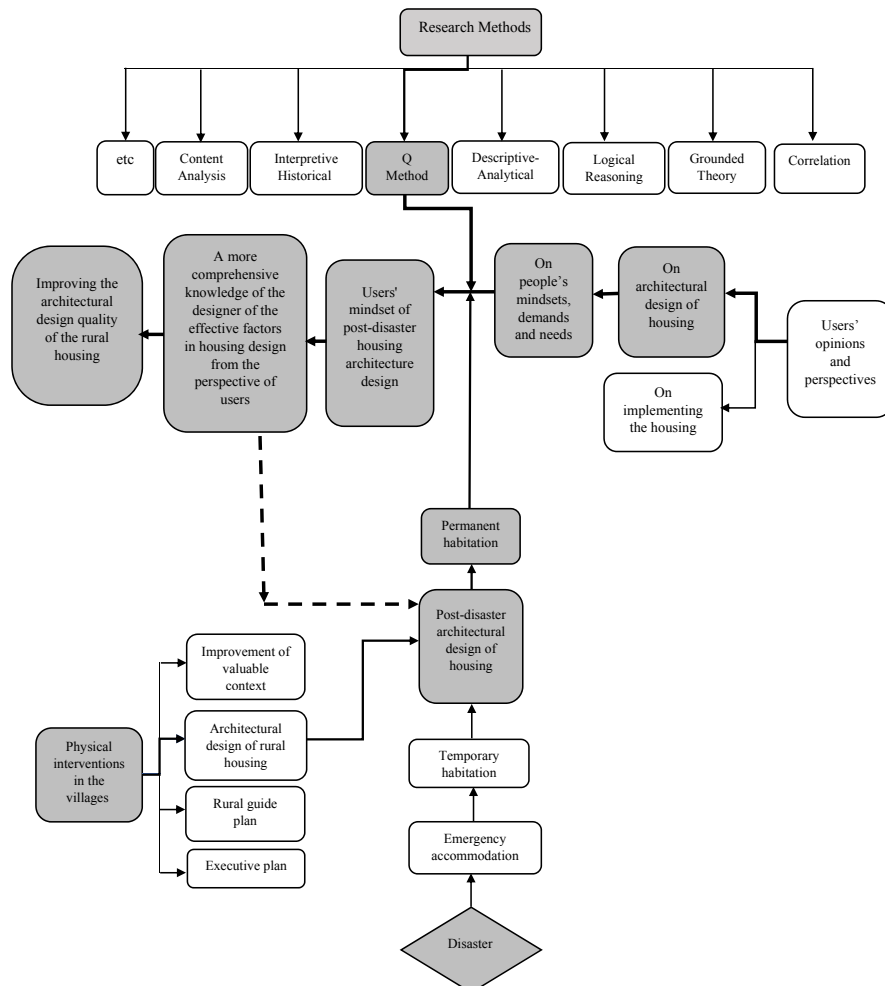


Fig. 1. Conceptual Model of the Research

3. RESEARCH METHOD

The current research attempted to identify the characteristics of rural housing using library studies and field surveys. Also, the present study aimed to extract and prioritize the perspectives and opinions regarding the rural housing to consider the villagers' mindsets on post-earthquake reconstruction using the Q method and interviewing with the residents of the village under study and analyzing their mindset in SPSS software. Q method is a technique, which enables the researcher to identify and classify the individual perceptions and beliefs, first, and second, classify the groups based on their perceptions (Khoshgouyan Fard, 2007). It is also

a powerful tool for easier understanding of the values, desires, and individual perspectives and concerns (Steelman & Maquire, 1999). This method includes five stages that will be explained in the following.

3.1. Case Study

Kanzagh village is one of the towns around the Sarein Township of Ardabil County (Fig. 2). This village is limited to the Irdimousa lands from the north, the historic village of Kalkhuran from the south, Agh Ghalee village from the east, and Sarein touristic city from the west. The elevation of this village above the mean sea level is 1550 meters.



Fig. 2. The Aerial Photo of Kanzagh Villages, the Location of the Old and New Village

4. RESEARCH PROCESS

The current research focused on a comprehensive set of the subject literature, including academic papers, newspapers, journals, and other resources, and implementing the qualitative, interview, and group discussion. The main purpose in this step was to provide the sufficient constituent content of the discourse space to apply the maximum opinions, feelings, beliefs, and attitudes of the participants, and did not necessarily include the facts but included the personal beliefs perceptions (Brown, 1997).

4.1. Providing the Q Propositions

First, the initial materials were extracted from the papers, books, dissertations, etc., to achieve a proper understanding of the subject. Then, a discourse space was created. To this end, by referring to Kanzagh village and contacting people in the coffee house, mosque, gathering places, and participating in villagers' ceremonies and the continuous presence in the village, we discussed with any person with any education level or orientation and wrote their opinions on the research subject. Thus, the primary propositions were extracted from the villagers' discussions. Then, using the results obtained from the interview, 54 propositions were gathered as sentences. Finally, the propositions were edited, and each proposition was written on a card.

Then, the design of the cards was conducted.

4.2. Selecting People for Direct Participation

The second step is identifying and selecting the participants to sort the propositions in the table. Since the purpose of the Q methodology is to sort different mindsets, the individuals must be selected who have different and particular opinions (Khoshgouyan Fard, 2007). The statistical population of Q was selected among those who were involved in the subject, and their houses were reconstructed after the earthquake. These people are usually aware of the research topic and are not indifferent. The statistical population is often smaller than the set of propositions. The purpose of this method is to have four or five specific people regarding each mindset or the predictable opinion by the researcher (Kitzinger, 1987). Accordingly, first, 25 were selected regarding the research purpose using the convenience sampling method. Finally, given the cooperation and tendency of the people, 14 individuals were selected and directly participated in sorting the table.

4.3. Sharing Data

In this step, the participants were asked to place the propositions in the Q sort table based on their priorities, assessments, or feelings about the subject (Pouya & Loghmani, 2013). 54 propositions resulted

from the interview were written on the separated cards to be sorted by 14 selected individuals of Q. In each session, after the researcher's explanation, by observing impartiality in the subject, the Q sort table, including the Likert Scale ranging from -5 to +5, was given to the participant to be sorted. After sorting by each participant, the numbers behind each card were

recorded by the researcher. Then, the results obtained from sorting by all participants were presented in Table 1 and prepared for the statistical analysis. Finally, the results obtained from Q sort were inputted into SPSS software, and the Q-data set was prepared for the Q-Factor analysis.

Table 1. Results Obtained From Sorting the Data

Row	Propositions	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	The divided lots must be the same size for the assignment.	-2	1	-4	-3	-4	-3	3	-3	-1	-5	-2	-1	-4	0
2	It was better to have three 10-20 meters spaces in a 40-meter building instead of two 20-meter rooms.	1	-2	-5	2	-3	0	-4	-2	-4	-2	-3	2	0	5
3	The possibility of future development of the built part should be in the stories rather than the ground floor.	0	0	-2	-1	1	1	-3	4	-2	2	0	-1	1	-1
4	Cattle and sheep stables should be aggregated near the village.	-5	1	4	1	0	-3	1	-5	-1	-3	-2	-3	5	0
5	Empty earthen roads must be predicted for livestock passage.	3	1	-4	0	3	0	-2	1	0	4	0	3	0	-4
6	The yard should be on both sides of the building (livestock yard and human yard).	0	-1	-1	1	2	-1	-1	3	2	4	-1	2	1	3
7	In the initial recon-struction plan, the plan should be com-plete and everyone would be able to complete it based on their needs and ac-cording to the plan.	2	-2	0	3	4	-1	4	-1	-1	-1	-1	3	2	3
8	Steel and concrete structures increase the cost of the build-ing and do not increase its earthquake resistance.	-3	-4	-3	-4	-4	-4	-5	-2	-2	-1	-4	-5	-5	-4
9	The dry forage stor-age place on the roofs of the houses should not be connected and should be away from the public space and the road.	2	2	2	2	2	4	2	1	0	2	1	1	-2	-1
10	The bathroom and the toilet should be designed inside the house.	5	3	-2	4	-4	3	2	-2	1	0	3	-4	1	-2
11	A specific and fixed space must be provided for holding weddings instead of scaffolding in front of houses.	1	-2	4	2	1	0	5	0	3	4	-4	0	1	-1
12	A vestibule and ante-room must be designed at the en-trance of the house.	5	2	0	3	1	0	1	1	1	1	3	0	-1	4
13	If the building has two floors, the second floor must have a terrace.	-2	0	-1	0	-2	1	0	2	5	0	0	-3	1	0
14	The roofs of the houses should be sloping.	0	-2	-1	-2	-1	-2	-4	2	-5	-4	-3	-2	3	-2
15	After the earthquake, a livestock hall should be built in public.	-4	-2	3	-1	0	1	0	-4	-3	-2	-2	-4	-2	0
16	The process of build-ing a house after the earthquake should be left to the resi-dents.	1	-1	3	3	2	0	-2	0	0	1	2	-2	4	5
17	I would like to have an extra room in the house and rent it to travelers and tourists.	2	1	-3	-5	-5	2	-2	-4	-1	5	5	-3	-2	-3
18	In the village, a resi-dential building should be designed for tourists.	-1	4	-2	1	-1	2	1	0	1	0	5	1	0	1
19	The orientation of the house should be towards the sun.	3	2	-2	1	-2	4	2	3	-2	-1	1	5	5	-1

Row	Propositions	Participants													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
19	The orientation of the house should be towards the sun.	3	2	-2	1	-2	4	2	3	-2	-1	1	5	5	-1
20	In assigning the land after an earthquake, priority should be given to those who want to be neighbors.	1	-5	3	-2	-1	1	3	-3	0	1	-4	-4	-1	2
21	The proposed pat-terns must be de-signed on two floors.	3	0	0	1	-2	2	-3	5	-2	3	1	-1	-1	2
22	The 70- square meter designed plot is suffi-cient for a villager.	-4	-4	-5	0	0	-5	-5	2	-5	-4	-5	2	-3	-5
23	If the building is de-signed on two floors and does not over-look the neighbor's house, I agree with the two floors.	4	1	0	4	3	1	-1	4	3	0	2	3	-1	1
24	Due to the increase in the price of land in-side the village (due to its proximity to the city of Sarein), the possibility of the vil-lage development must be provided.	-2	3	2	-1	4	3	0	2	-1	1	4	0	2	2
25	The construction of a park and green space is necessary despite the lack of land in the village.	2	2	2	-1	-2	-2	2	-1	1	1	0	0	2	-1
26	The 500-square me-ters of the allocated plots are suitable for livestock and agricul-tural life.	-2	4	5	-3	1	-4	4	-2	3	-1	1	-3	-1	-2
27	The house should be built on a platform at least 20 cm higher than the yard (to prevent the penetra-tion of the moisture, etc. into the house).	3	4	2	2	0	-1	3	3	3	3	1	3	3	0
28	The plan of rural houses should be different from the plan of urban hous-es.	-3	-5	-1	1	4	-5	-3	3	1	2	-1	3	-1	4
29	Land and buildings for the school must be considered up to middle school.	2	5	2	3	5	5	0	4	4	3	4	5	3	3
30	The courtyard of the mosque should be large.	0	3	1	0	1	0	3	0	2	-1	-1	-2	-1	1
31	In choosing a new location for the vil-lage, it is better to have flat land than not to have wind-ward land.	-1	3	1	0	3	0	-2	2	4	3	2	-3	-2	2
32	Instead of two rooms, it is better to build one room with a stable.	-4	-1	-3	-3	-3	-3	1	3	-3	-2	-2	-2	-4	-3
33	The space of the house must be divid-ed into several small rooms instead of one large room to make it warm easily.	-3	0	-4	-4	-2	4	4	-1	0	-3	3	4	-3	5
34	The new village should preferably be built in a new loca-tion at a suitable distance from the previous village.	-2	1	3	-2	1	-1	-1	-1	0	0	-2	2	0	3
35	Neighboring houses must be connected (sound transmission, common wall, energy loss, and future de-velopment).	3	-3	-3	-3	-3	-2	-4	-2	5	2	-3	1	-3	-3
36	A 60-meter four-wall should be built and I would implement the division of interior spaces and finishing.	-2	-1	-2	0	2	-2	-1	1	0	0	-1	0	2	-4
37	The vestibule should be provided at the entrance of the house (it is costly and cumbersome but it prevents energy loss).	4	-2	-1	5	0	2	2	1	2	2	3	1	0	1
38	A bedroom with a toilet and bathroom inside the house is better than two bed-rooms that only have a toilet in the yard.	1	2	1	1	-1	2	-1	-2	3	-1	2	0	-2	2

Row	Propositions	Participants	1	2	3	4	5	6	7	8	9	10	11	12	13	14
39	The stable must be in the yard; however, for some houses, an area for drying cattle manure should be provided.		1	-1	0	-3	3	-2	2	0	-1	2	0	-2	-5	-1
40	The location of the tractor parking must be predicted inside the village.		-1	0	1	-1	0	0	-2	-3	-3	3	0	1	0	4
41	The rainspout of the roof must be inbuilt (frost problem).		0	-3	0	4	2	3	-1	0	1	1	4	1	2	0
42	If I have a place for livestock next to the village, I would like to demolish the barn and turn it into resi-dential land use.		1	0	5	0	3	3	1	-5	2	-3	0	-1	3	-2
43	The village school must neighbor the houses (enclosed between the houses).		-3	-3	1	2	-1	-1	-1	-3	-4	-3	3	0	0	2
44	Composite and alu-minum must be used in the facade.		0	-4	-2	-2	-1	-3	-3	-3	-2	-2	1	-1	1	1
45	Bathrooms and toi-lets should be on the terrace instead of inside the house.		0	-3	1	-2	-3	-4	0	-1	1	-1	-1	-1	-3	-3
46	The yard should be large on one side and the building should be built on the other side.		2	2	-3	2	2	3	0	0	-3	0	1	-2	4	0
47	The width of the vil-lage alleys must be eight meters.		-1	0	4	0	-3	-1	3	-1	-2	-3	-5	4	0	-2
48	The living place of the stockmen must be separated from others.		-3	1	2	3	5	1	1	-4	-1	-2	-1	2	-2	-1
49	The livestock should not cross in front of the mosque.		0	-1	3	-2	1	5	1	-1	0	0	2	0	3	1
50	The bathroom and toilet doors must be opened to an inde-pendent hallway.		-1	5	-1	-4	-2	2	0	0	-3	-2	-3	2	1	3
51	A wall around the roof must be built to protect the forage.		-1	-1	-1	-1	0	1	0	1	2	1	-2	1	-4	0
52	The steel frame is better than the concrete frame.		-5	-3	0	-5	-5	-3	-2	1	2	-4	2	-1	2	-2
53	I am willing to pay extra to be able to build the second floor in the future (structural rein-forcement).		4	3	1	5	-1	-1	5	5	4	5	0	4	4	1
54	The rooms should be intricate.		-1	0	0	-1	0	-2	-3	2	-4	-5	-3	-5	-3	-3

4.4. Q-Factor Analysis

Using the factor analysis will enable us to classify all the gathered opinions. The correlation between the Q propositions based on the participants' opinions must be evaluated for this classification. The set of correlated propositions were placed in the specific classes and represent a particular factor. Moreover, the intensity of a person's relationship with a factor attributed to that person was also assessed. In other words, several people might be classified in the same factor, i.e., they all have the same mindset. However, the intensity of their belonging to that mindset might be different. Recognizing this difference in the factor analysis method, which shows the correlation between each person and each factor, is possible (Khoshgouyan Fard, 2007).

Accordingly, the correlation between the participants' opinions on the Q propositions were studied using SPSS software (Table 2). In the following, Q participants in Kanzagh village with high correlation

were classified into two specific groups. Each of these groups represents a particular mindset in this village. According to the nature of the propositions, the mindset of the first group indicates the priority of the general and demographic factors of the environmental design of the village, such as locating the new village, placing the land uses in the village, the width of the roads, the dimensions of the assigned lands, the green space, and alike, in the post-earthquake reconstruction of the village, which was mentioned as the environmental factors. The second mindset shows the priority of the factors related to the physical and design issues of the rural housing, such as the built-up area and the number of floors, plan, structure, façade, the living place of the livestock and alike in the mind of some villagers mentioned as the physical factors.

Given 54 propositions and the confidence level of 99%, the factor loading must be higher than

$$\frac{1.96}{\sqrt{\text{the number of propositions}}} = 0.35 \text{ to be significant.}$$

Table 2. The results of the Q-factor Analysis

Q Participants	Correlation (Pearson)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1													
2	0.278	1												
3	-0.037	0.190	1											
4	0.491	0.175	0.164	1										
5	0.078	0.152	0.351	0.451	1									
6	0.405	0.425	0.109	0.299	0.201	1								
7	0.198	0.394	0.422	0.210	0.083	0.244	1							
8	0.256	0.187	-0.198	0.273	0.210	0.055	-0.089	1						
9	0.319	0.270	0.287	0.227	0.170	0.141	0.342	0.178	1					
10	0.543	0.195	0.075	0.284	0.279	0.261	0.083	0.353	0.480	1				
11	0.302	0.394	0.017	0.261	0.164	0.532	0.109	0.112	0.313	0.319	1			
12	0.227	0.170	-0.098	0.348	0.261	0.213	0.181	0.345	0.149	0.198	0.092	1		
13	0.230	0.250	0.305	0.408	0.210	0.299	0.164	0.135	0.083	0.115	-0.250	0.0241	1	
14	0.107	0.135	0.150	0.288	0.256	0.317	0.121	0.550	0.089	0.176	0.291	0.303	0.207	1

	Factor Loading		Weights ($W=1-f^2$)	
	Factor Loading 1 (Environmental Factors)	Factor Loading 2 (Physical Factors)	Factor 1 Weight (Environmental Factors)	Factor 2 Weight (Physical Factors)
1	0.677	2.208	1.249	0.217
2	0.284	0.538	0.308	0.757
3	-0.283	0.774	0.307	1.93
4	0.575	0.375	0.859	0.436
5	0.319	0.393	0.355	0.464
6	0.417	0.490	0.504	0.644
7	0.055	0.710	-0.055	1.431
8	0.699	-0.206	1.366	-0.215
9	0.332	0.439	0.373	0.543
10	0.667	0.174	1.201	0.179
11	0.455	0.381	0.573	0.445
12	0.564	0.094	0.827	0.094
13	0.265	0.476	0.285	0.615
14	0.294	0.354	0.321	0.404

In Figure 3, the horizontal axis indicates the first factor, and the vertical axis shows the second factor, and the correlation of the people with these two factors of the research subject has been identified. Therefore, In Kanzagh village, individuals 1, 8, 10, and 12 had a significant correlation with the factor loading of the first factor (environmental factor), and their most concern was the public issues of the housing, and their focus was on the public attributes related to the context of housing. Also, they cared less about the private

aspect and the interior spaces of the housing. However, according to individuals 3, 7, 2, 13, 9, 5, and 14 had a significant correlation with the factor loading of the second factor (physical factors, the private aspect of the housing, and its interior spaces are of more importance than its public aspect and attributes related to the context. Individuals 4, 11, and 6 had a significant correlation with both factors. However, individuals 4 and 11 had more tendency towards factor 1, and number 6 was more interested in factor 2.

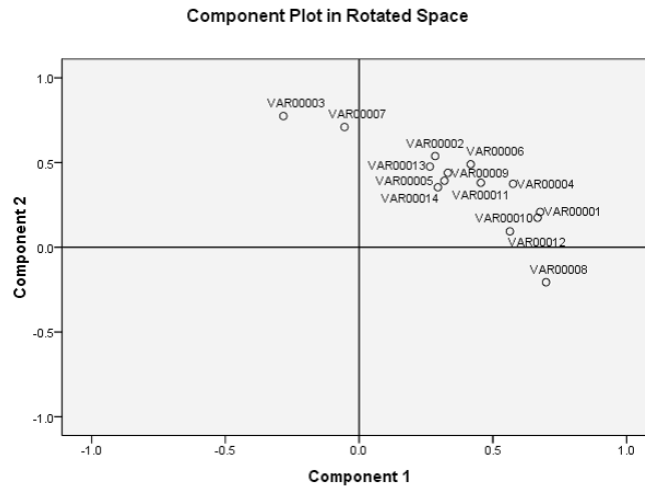


Fig. 3. The Correlation between the Q Participants and the Factor Loadings in Kanzagh Village

4.5. Discussion and Analysis of Findings

In Q-factor analysis, the interpretation of the Q factors depend on the content of the Q propositions. Accordingly, the factor scores of the propositions establish a relationship between the content of the Q propositions and the Q-factors, providing the possibility for interpreting the factors. More weight must be given to the participants who have a stronger relationship than others with the stated factor when calculating the factor scores for each proposition. Furthermore, in the interpretation of the factors, the propositions that separate the two factors (distinct propositions) and the propositions that there is no significant difference between their scores among the factors (agreeable propositions) were identified. Recognizing the distinct and agreeable propositions obtained from the difference of the absolute value of the difference of the variance of a proposition for a factor on the variance score of the same proposition for another factor helps interpret the factors as the main reason for the formation of the various factors (Hatami

Khanghahi, Haj Ebrahim Zargar, & Sartipour, 2015).

Considering the last column of Table 3 and the absolute value of difference value of the factor arrays, the maximum absolute value of difference was 9 and related to propositions number 4 and 26. That is, the people in two groups disagree on this proposition based on two factors. In other words, these two propositions have the maximum effect on dividing the participants into two separate groups. Furthermore, proposition number 42 with the absolute value of the difference of 8 in the next step and proposition number 5 with the absolute value of the difference of 7, and propositions 15 and 21 with the absolute value of the difference of 6 in the next step were the distinct propositions between two-factor groups. Moreover, the minimum value of the absolute value of the difference of the factor arrays of each proposition on two factors in Kanzagh village was zero and related to propositions numbers 9, 10, 13, 27, 33, 39, 40, 41, 44, 45, 50, and 54. That is, the people in two groups agree on these propositions based on the two factors.

Table 3. The Results of Calculating the Factor Scores, Factor Arrays, Distinct Propositions, and Agreeable Propositions

Propositions	Factor Scores		Factor Arrays (Resorting)		The Absolute Value of the Difference of the Factors Arrays of Each Proposition on the Factors
	Related to the Environmental Factors	Related to the Physical Factors	Related to the Environmental Factors	Related to the Physical Factors	
1	-1.441	-0.606	-4	-1	3
2	0.447	-1.461	1	-4	5
3	0.890	-1.024	2	-3	5
4	-2.154	1.412	-5	4	9
5	1.511	-1.047	4	-3	7
6	1.213	-0.384	3	-1	4
7	0.253	0.723	1	2	1
8	-1.387	-2.290	-4	-5	1
9	0.608	0.768	2	2	0
10	0.383	0.584	1	1	0

Propositions	Factor Scores		Factor Arrays (Resorting)		The Absolute Value of the Difference of the Factors Arrays of Each Proposition on the Factors
	Related to the Environmental Factors	Related to the Physical Factors	Related to the Environmental Factors	Related to the Physical Factors	
11	-0.192	1.143	0	3	3
12	1.109	0.496	3	1	2
13	0.016	0.053	0	0	0
14	-0.490	-1.329	-1	-3	2
15	-1.916	0.456	-5	1	6
16	0.326	0.836	1	2	1
17	0.051	-0.711	0	-2	2
18	0.546	0.451	2	1	1
19	1.246	0.080	3	0	3
20	-1.297	0.600	-3	1	4
21	1.383	-0.848	4	-2	6
22	-0.274	-2.893	-1	-5	4
23	1.725	0.009	4	-1	5
24	0.347	0.971	1	3	2
25	-0.295	0.647	-1	2	3
26	-1.698	1.591	-4	5	9
27	1.099	0.954	3	3	0
28	0.799	-1.158	2	-3	5
29	2.093	1.404	5	4	1
30	-0.463	0.886	-1	2	3
31	0.511	0.350	1	0	1
32	-0.777	-1.526	-2	-4	2
33	-0.10	0.102	0	0	0
34	0.538	0.443	-2	1	3
35	-0.322	-1.570	1	-4	5
36	0.036	-0.659	-	-2	2
37	1.336	0.262	3	0	3
38	0.021	0.605	0	2	2
39	-0.229	-0.288	-1	-1	0
40	-0.133	0.062	0	0	0
41	0.844	0.291	2	0	0
42	-1.231	1.853	-3	5	8
43	-0.838	0.042	-2	-1	1
44	-0.546	-0.907	-2	-2	0
45	-0.890	-0.662	-2	-2	0
46	0.621	0.149	2	0	2
47	-1.157	0.465	-3	1	4
48	-0.802	0.938	-2	3	5
49	-0.277	1.151	-1	4	5
50	-0.353	0.043	-1	-1	0
51	0.171	-0.527	0	-1	1
52	-1.157	-0.730	-3	-2	1
53	1.871	0.908	5	3	2
54	-1.030	-1.117	-3	-3	0

Then, the Q propositions for each factor and based on the factor scores presented in Table 3 were sorted from highest to the lowest and reconstructed in the Q-sort table (Table 4 & 5). The propositions that have the maximum factor score were placed in +5 degree and the other propositions were placed in the Table based on their factor scores, which are called factor arrays.

Given the position of each statement, a more accurate interpretation of each factor (mindset) can be obtained (Khoshgouyan Fard, 2007). Tables 4 and 5 are the logical result of the sum of the Q participants' opinions on the content of the propositions of each factor, i.e., the mindset ruling the considered village adjusted based on the factor arrays.

Table 4. Re-Sorting the Q Propositions Related to Factor 1 (Environmental Factors)

+5	+4	+3	+2	+1	0	-1	-2	-3	-4	-5
29	5	6	3	2	11	14	32	20	1	4
53	21	12	9	7	13	22	34	42	8	15
	23	19	18	10	17	25	43	47	26	
		27	28	16	33	30	44	52		
		37	41	24	36	39	45	54		
			46	31	38	49	48			
				35	40	50				
					51					

Table 5. Re-sorting the Q propositions Related to Factor 2 (Physical Factors)

+5	+4	+3	+2	+1	0	-1	-2	-3	-4	-5
26	4	11	7	10	13	1	17	3	2	8
42	29	24	9	12	19	6	21	5	32	22
	49	27	16	15	31	23	36	14	35	
		48	25	18	33	39	44	28		
		53	30	20	37	43	45	54		
			38	34	40	50	52			
				47	41	51				
					46					

According to Table 4, the participants of Factor 1 had the maximum agreement on propositions 29, 53, 5, 21, and 23 and the maximum disagreement on propositions 4, 15, 1, 8, 26. Similarly, the maximum agreement and disagreement of factor 2 on the Q propositions can also be identified according to Table 5.

5. CONCLUSION

After extracting the propositions and sorting them, and statistical analysis in SPSS software, the individuals were divided into two main groups. According to the nature of the propositions, the mindset of the first groups indicates the priority of the factors of the environmental design of the village, such as locating the new village, placing the land uses in the village, the width of the roads, the dimensions of the assigned lands, green space, and alike in the post-earthquake reconstruction of the village studied as environmental factors. The second mindset shows the priority of the factors related to the physical issues and housing design of the village, including the built-up area, the number of the floor, plan, structure, façade, the living place of the livestock, and alike, were in the villagers' mind stated as physical factors.

Finally, using the Q method to identify the influential characteristics in the housing design of the village understudy led to re-sorting the Q propositions (Tables 4 and 5) for each factor. This table is the result of the sum of the villagers' opinions in different groups of this village. For example, the participants as the first factor had the maximum agreement on propositions 29 (land and building must be considered for the school up to the middle school) and 53 (I would like to pay extra to be able to build the second floor in the future (Structural reinforcement)). Also, they had the maximum disagreement on propositions 4 (Stable must be aggregated near the village) and 15 (The public stable must be constructed after the earthquake). Also, the participants of the second factor had the maximum agreement on the propositions 26 (500-square meter assigned lands is suitable for the agricultural and husbandry lives) and 42 (If I had a place for the livestock near the village, I would like to demolish the stable and turn it into the residential land use). Furthermore, the maximum disagreement was on propositions 8 (The steel and concrete structures increase the cost of the building and do not increase its earthquake resistance) and 22 (70-square meters of a designed plot is enough for a villager). The designer's knowledge

of the agreeable and distinct propositions lead to the knowledge of the differences and commonalities between different mindsets in the village, resulting in a logical interpretation of the prevailing mindset of the community to be created in the interventionist mind. The designer's knowledge of some important aspects from the perspective of the villagers and their mindset

that may be neglected by the designer on the one hand and the possibility of classifying these aspects in the discourse created, on the other hand, is one of the important results of this test. Following this awareness, the designer takes a proper approach to this mindset and the differences and agreements between different mental groups in the village.

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