Success Factors for Community Participation in the Pre-Disaster Phase

A Enshassi[1]**, S Shakalaih**[2] **and S Mohamed**[3]

[1]Department of Civil Engineering, IUG, Gaza Strip, Palestine
[2]Projects Unit Officer, PRCS, Gaza Strip, Palestine
[3]School of Engineering & Built Environment, Griffith University, Australia

Corresponding author's e-mail: aensahssi@gmail.com; enshassi@iugaza.edu.ps

Abstract. This study aimed to characterize the factors involved in successful participation in the pre-disaster phase in Palestinian communities involved with non-governmental organizations (NGOs). Data were obtained using a purposive sampling method of 86 community members in neighborhood committees, and the collected data underwent factor analysis. Correlations between the variables revealed that five components represented the success factors for community participation in pre-disaster management: risk perception, capacity building, education and knowledge, trust and networks, and awareness of disaster management. Capacity building for community committees and volunteers is considered an important success factor for community participation in the pre-disaster phase. Community awareness of risk sustains its preparedness activities. High levels of education and knowledge are crucial for proper functioning of a community, and engender resilience to potential disaster. It is advisable to establish a disaster management fund, which can be utilized to organize disaster management activities related to awareness and training and to support the vulnerable areas. Governments should play a significant role in strengthening capacity building in local communities and support NGOs before disasters occur to reduce disasters and their impact. This study adds to the current body of knowledge about disaster management in developing countries, particularly Palestine.

1. Introduction

The Center for Research on the Epidemiology of Disasters defined disaster as "a situation or event, which overwhelms local capacity, necessitating a request to a national or international level of external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering" [1]. Dilley et al. [2] deemed disaster as the main source of risk for the poor and of loss of development gains and accumulated wealth in developing countries. Disaster management is a general term that incorporates all actions related to disasters. The United Nations [3:28] defined it as "the body of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels." Disaster management is important in the reduction of the effects of risks and the minimization of the loss of life and damage caused by economic and material losses. There is a lack of attention to the indirect effects on livelihoods and development of the vulnerable communities [4]. According to Holloway [5], the typical disaster management cycles comprise two phases: the pre-disaster and post-disaster phases.

The United Nations International Strategy for Disaster Reduction [6:30] defined vulnerability as "a set of conditions and processes resulting from the interaction of physical, social, economic and environmental factors resulting in the increase of susceptibility or actual exposure of a community to

the impact of hazards." The Human Development Report [7] revealed that the Gaza Strip has minimal experience in managing disasters and that the local disaster management system was described as being incapable of coping with disasters. Al Dabbeek [8] found that there is an urgent need to plan for disaster risk reduction in Palestine. This plan should be proactive and define the roles and responsibilities of national organizations, giving emphasis to preparedness and mitigation. Disaster management in Palestine requires efforts from all disciplines and levels of the national authorities and the civil society organizations, each according to its scope and competence, and requires all to work together in an integrated approach. The objective of this paper is to characterize the Palestinian communities who are involved with non-governmental organizations (NGOs) in the Gaza Strip, regarding the success factors of their participation in the pre-disaster phase.

2. Literature review

Ranjan and Abenayake [9] found in their case studies of Batticaloa, Sri Lanka, that the success factors of community participation and networks in pre-disaster are as follows: the support of neighbors, friends, and relatives; access to communication facilities and transportation facilities; awareness programs; traditional knowledge; experiential knowledge; level of income; type of employment; geographic location; and level of education. Lin et al. [10] studied general public and victim risk perception in pre-disaster, such as mitigation behavior toward floods and landslides, in Taiwan by using focus groups. They found that the success factors include risk perception, social trust, level of income, and level of education. Victoria [11] conducted several case studies in Asian urban areas; key success factors in pre-disaster were highlighted, such as applying best-practice methodologies in community development, tapping traditional organizational structures and mechanisms, capability building activities with the community disaster committees and volunteers, channels of public awareness and education, less vulnerable groups, and availability of donor funds.

Hosseini et al. [12] reported the success factors of community participation during the earthquakes in Iran. The participants discussed the success factors in their communities, such as availability of shelters, traffic management, high levels of education, availability of cultural and religious centers, and good family relationships. Grünewald [13] utilized a case-study approach to explore the active learning network for accountability and performance in humanitarian action during disaster in Afghanistan. He argued that community participation may entail factors that affect population, such as access difficulties, nature and impact of the crisis, number of aid actors present, social or cultural factors including local power structures and decision-making processes, previous experience, the capacity to participate, and gender segregation. McEntire [14] used a case-study method to explain the coordination of multi-organizational responses to disaster. He identified success factors contributing to effective response, comprising political support, availability of preparedness measures, networking and cooperative relationships, availability and types of technology, and using emergency operation centers.

Sadiqi [15] identified the success factors of community participation in post-disaster in the research of post-disaster reconstruction projects in Afghanistan. These include community empowerment, community culture, government support, communication, and information dissemination. Ophiyandri et al. [16] identified the critical success factors of community-based post-disaster housing reconstruction projects in Indonesia. Eleven factors were considered critical success factors of community participation in post-disaster: transparency and accountability, availability of appropriate reconstruction policy/strategy, an understanding of the community-based method, gathering trust from the community, implementer capacity, good coordination and communication, sufficient funding availability, having a significant level of community participation/control, government support, involvement of all community members, and successful beneficiary identification.

UNDA [17] clarified the reconstruction communities-related factors affecting project and community in post-disaster reconstruction in Indonesia, which include competence of contractor, selection of material suppliers, partnership and supplier management, contractor resource database system,

contractor inventory, supplier inventory, cooperation of parties in construction, coordination among agencies, communication with local authorities, local government support and assistance, and NGO competency of resource procurement. Minamoto [18] pointed out that the community-participation success factors in households in Sri Lanka were formal networks in the community, leadership of community-based organizations, and relationships of trust among the members of community-based organizations. Moe and Pathranarakul [19] revealed in their study in Thailand that 10 critical success factors must be carefully considered in community participation in post-disaster: effective institutional arrangement, coordination and collaboration, supportive laws and regulations, effective information management system, competencies of managers and team members, effective consultation with key stakeholders and target beneficiaries, effective communication mechanism, clearly defined goals and commitments of key stakeholders, effective logistics management, and sufficient mobilization and disbursement of resources.

3. Methodology
There are 148 neighborhoods located in the Gaza Strip, distributed through five governorates (see Table 1): 28 neighborhoods in the northern governorate, 27 in Gaza, 31 in the central governorate, 41 in Khan Younis, and 21 in Rafah [20]. The neighborhood committees' members were the ideal sample targeted for the survey because they represent other members and lead the committees' activities.

Table 1. Neighborhood committees.

District	Neighborhood committees	Percent %
Northern Governorate	28	19
Gaza Governorate	27	18
Central Governorate	31	21
Khanyounis Governorate	41	28
Rafah Governorate	21	14
Total	148	100

Purposive sampling was used in this study. Parahoo [21] described purposive sampling as a method of sampling where the researcher deliberately selects the respondents on the basis of their ability to provide necessary data. The rationale for choosing this approach was that the research was seeking knowledge about the communities' opinion, which the participants could provide by virtue of their experience. A total of 90 community members were targeted with personal delivery; 86 questionnaires were completed with a 95.5% response rate (see Table 2).

Table 2. Sample size of respondents.

District	Neighborhood committees	Sampling size	No. of respondents
Northern Governorate	28	17	16
Gaza Governorate	27	17	16
Middle Governorate	31	19	18
Khanyounis Governorate	41	25	23
Rafah Governorate	21	13	13
Total	148	90	86

A questionnaire survey was employed in this study because it is the most widely used data-gathering technique in research and can be used to measure issues that are related to the management and development of human resources, such as behavior, attitudes, beliefs, opinions, characteristics, and expectations [22]. The community-participation success factors in the pre-disaster phase were

compiled from previous related literature [9, 10, 11, 12, 13, 14, 14, 16, 18]. A pilot study was conducted; five experts from different professions reviewed the questionnaire, and made adjustments to suit the local conditions and removed any loaded statements, double statements, ambiguous statements, and inappropriate vocabulary. As a result of the pilot study, difficult words were replaced with simple words and options for some statements were modified. In addition, a limited number of changes were applied to the questionnaire structure and wording to provide more clarity for the intended original purpose of the statements.

The questionnaire consisted of two main sections: the first section was general information about the respondents and their organizations, and the second section comprised statements related to success factors of community participation in pre-disaster management. The respondents were asked to rate the degree of importance of success factors in the pre-disaster phase according to their experience with NGOs in the Gaza Strip. A five-point Likert scale was used in which 1 was the least important and 5 the most important. Cronbach's alpha was utilized to test the reliability of the questionnaire. The Cronbach's alpha coefficient was 0.80 which is >0.7, meaning that the test was reliable [23]. Exploratory factor analysis (EFA) was used in this study. Factor analysis operates on the notion that measurable and observable variables can be reduced to fewer latent variables that share a common variance and are unobservable, which is known as reducing dimensionality [24, 25].

4. Results and discussion

4.1. Respondents' profile

Table 3 illustrates the respondents' profile in terms of gender, age, educational level, profession, working experience in the committee, governorate to which committee belongs, city population, and committee establishment. The majority of respondents were male (88.4%); there were 39.5% community leaders, and 51.1% were more than 50 years in age. The respondents' experience indicated that 38.4% had between 6 and 10 years' experience and 36% had more than 10 years' experience in community work. The majority of respondents were located in the Khan Younis governorate (26.7%), where the population ranges between 150,000 and 300,000. Most of the local committees were established after the year 2000.

Table 3. Respondents' profile.

Personal information	Categories	Frequency	Percentage
Gender	Male	76	88.4
	Female	10	11.6
Age	Less than 25 years	0	0
	25-35 years	7	8.1
	36-50 years	35	40.7
	More than 50 years	44	51.2
Educational level	Secondary school	11	12.8
	Diploma	27	31.4
	Bachelors	37	43.0
	Master	4	4.7
Profession	Engineer	12	14.0
	Teacher	13	15.1
	Nurse	6	7.0
	Director of organization	8	9.3
	Political activist	6	7.0
	Secretary	7	8.1
	Community leader	34	39.5
Experience (years)	Less than 3 years	10	11.6

Table 3. Respondents' profile.

Personal information	Categories	Frequency	Percentage
	3-5 years	12	14.0
	6-10 years	33	38.4
	More than 10 years	31	36.0
Governorate	Northern Governorate	16	18.6
	Governorate of Gaza	16	18.6
	Central Governorate	18	20.9
	Governorate of Khanyounis	23	26.7
	Governorate of Rafah	13	15.1
City population	Less than 50,000	19	22.1
	50,000-150,000	14	16.3
	150,000-300,000	31	36.0
	More than 300,000	22	25.6
Local committee establishment	Before 1900	2	2.3
	1900s - 1950s	1	1.2
	1950s-2000s	27	31.4
	After 2000	56	65.1

4.2. Factor analysis

EFA was used to examine the pattern of intercorrelations between the identified variables of the success factors for community participation in the pre-disaster phase to attempt to reduce the number of factors. EFA is also used to group variables with similar characteristics together. The reliability of factor analysis is dependent on sample size. To obtain reliable results, a sample size of 86 participants was applied in this research, which is more than 50 and considered adequate as proposed by Winter [26] and Sapnas and Zeller [27]. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity should be applied to satisfy the use of EFA [28]. A KMO measure over 0.50 is barely acceptable, between 0.50 and 0.70 mediocre, between 0.7 and 0.8 good, between 0.80 and 0.90 very good, and above 0.90 excellent [29]. In this case, the KMO measure for all 17 success factors was 0.72, while the value of Bartlett's test of Sphericity was significant ($p = 0.000$). Therefore, this requirement for factor analysis was also met. As shown in Table 4, Cronbach's alpha for all five components was >0.70, which indicated that the data collected from the survey were interrelated and the scale was consistent with the sample.

Table 4. Preliminary KMO measure and Bartlett's test.

KMO		0.72
Bartlett's Test of Sphericity	Approx. Chi-Square	680.68
	df	136
	Sig.	0.000
Cronbach`s alpha		0.70

The principal component analysis of all 16 variables yielded five components based on Kaiser's criterion of retaining eigenvalues of >1.0 [28]. Costello and Osborne [30] and Hair et al. [31] indicated that a commonly accepted level of significance for communalities and factor loadings is at least 0.50. None of the factors had a value of <0.50; therefore, all the factors satisfied this minimum requirement. The extraction (communalities) illustrated in Table 5 shows that none of the factors has a value of <0.50 and all the factors satisfy the minimum requirement.

Table 6 shows the total variance, which illustrates that five eigenvalues exceed 1.0. The eigenvalue criterion states that each component must explain at least one variable's worth of the variability; therefore, only components with eigenvalues of >1.0 should be retained [28]. The first component

accounted for 26.58% of the total variance, the second component 19.35%, the third component 10.83%, the fourth component 9.96%, and the fifth component 6.31%. Therefore, all five components accounted for 73.03% of the variance.

Table 5. Extraction (communalities) of CP-PDSF.

No.	Pre-disaster success factors	Initial	Extraction
CP-PDSF1	Supports of neighbors, friends and relatives.	1.00	0.73
CP-PDSF2	Access to communication and transportation facilities.	1.00	0.66
CP-PDSF3	Awareness programs related to disaster management.	1.00	0.78
CP-PDSF4	Traditional knowledge system support communities to preparedness to disaster.	1.00	0.86
CP-PDSF5	Experiential knowledge enhances preparedness activities related disaster.	1.00	0.79
CP-PDSF6	High level of income strengthens community preparedness to expected disasters.	1.00	0.58
CP-PDSF7	Type of employment influences an individual's preparedness activities related to disaster.	1.00	0.59
CP-PDSF8	Geographic location of communities in a safe place increases their ability to respond to expected disaster.	1.00	0.71
CP-PDSF9	High level of education strengthens community preparedness.	1.00	0.84
CP-PDSF10	Risk perception at community level increase the chance to plan the appropriate preparedness activities.	1.00	0.88
CP-PDSF11	The social trust increases the ability to prepare for expected disasters.	1.00	0.79
CP-PDSF12	Best practice methodologies of community development.	1.00	0.73
CP-PDSF13	Tapping traditional organizational structures and mechanisms related to disaster.	1.00	0.66
CP-PDSF14	Capacity building activities of the community disaster committees and volunteers.	1.00	0.83
CP-PDSF15	Channels of public awareness and education related disaster management.	1.00	0.77
CP-PDSF16	Less vulnerable groups in the expected targeted areas of potential disaster.	1.00	0.59

CP-PDSF: community-participation pre-disaster success factors.

Table 6. Total variance of CP-PDSF.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.25	26.58	26.58	4.25	26.58	26.58	2.98	18.61	18.61
2	3.10	19.35	45.92	3.10	19.35	45.92	2.70	16.85	35.46
3	1.73	10.83	56.76	1.73	10.83	56.76	2.43	15.21	50.67
4	1.59	9.96	66.72	1.59	9.96	66.72	1.85	11.57	62.24
5	1.01	6.31	73.03	1.01	6.31	73.03	1.73	10.79	73.03
6	0.87	5.43	78.46						
7	0.69	4.31	82.77						
8	0.56	3.53	86.30						
9	0.48	2.97	89.27						
10	0.38	2.38	91.66						
11	0.31	1.92	93.58						
12	0.29	1.79	95.37						

13	0.26	1.65	97.02
14	0.20	1.26	98.28
15	0.16	1.02	99.30
16	0.11	0.70	100.00

Extraction method: principal component analysis

4.3. Discussion of the components

Table 7 shows the result of the rotated component matrix, which groups the statements/variables into five components: risk perception, capacity building, education and knowledge, trust and community networks, and public awareness.

Component 1: Risk perception

Table 7 shows that the first component, risk perception, explains 26.58% of the total variance and is represented by four success factors related to community participation in the pre-disaster phase. These include planning, geographical location, and best practice in community development. Risk perception is a field process, taking into account the unique characteristics of the local situation, which requires proper understanding of the history of disasters, nature of impacts, trends, and severity of different disasters [8]. This aligns with Ranjan and Abenayake [9], who revealed that understanding community perception of risk enables local communities to prepare to face disasters and to take steps to improve the resilience building process so that the community is able to cope with disasters. Moreover, geographic location has been identified as one of the attributes that prepare people for disasters. Further, Victoria [11] stated that applying best-practice methodologies in community development for community-based disaster preparedness is a key success factor for disaster management.

Table 7. Results of factor analysis for CP-PDSF.

No.	Components of community participation- pre-disaster success factors	Factor loading	Eigenvalues	variance % explained	Cronbach's Alpha
	Component 1: *Risk perception*				
CP-PDSF10	Risk perception at community level increase the chance to plan the appropriate preparedness activities.	0.87			
CP-PDSF8	Geographic location of communities in a safe place increases their ability to respond to expected disaster.	0.83	4.25	26.58	0.83
CP-PDSF12	Best practice methodologies of community development.	0.80			
CP-PDSF16	Less vulnerable groups in the expected targeted areas of potential disaster.	0.62			
	Component 2: *Capacity building*				
CP-PDSF14	Capacity building activities of the community disaster committees and volunteers.	0.89			
CP-PDSF13	Tapping traditional organizational structures and mechanisms related to disaster.	0.76	3.10	19.35	0.81
CP-PDSF7	Type of employment influences an individual's preparedness activities related to disaster.	0.75			
CP-PDSF6	High level of income strengthens community preparedness to expected disasters.	0.75			
	Component 3: *Education and knowledge*				
CP-PDSF9	High level of education strengthens community preparedness.	0.88	1.73	10.83	0.89
CP-PDSF4	Traditional knowledge system support communities to	0.86			

Table 7. Results of factor analysis for CP-PDSF.

No.	Components of community participation- pre-disaster success factors	Factor loading	Eigenvalues	variance % explained	Cronbach's Alpha
	preparedness to disaster.				
CP-PDSF5	Experiential knowledge enhances preparedness activities related disaster.	0.69			
Component 4: Trust and community networks					
CP-PDSF11	The social trust increases the ability to prepare for expected disasters.	0.85			
CP-PDSF1	Supports of neighbors, friends and relatives.	0.84	1.59	9.96	0.68
CP-PDSF2	Access to communication and transportation facilities.	0.60			
Component 5: Public awareness					
CP-PDSF15	Channels of public awareness and education related disaster management.	0.82	1.01	6.31	0.66
CP-PDSF3	Awareness programs related to disaster management.	0.78			

Kaiser-Meyer-Olkin measure of sampling adequacy = 0.73.
Bartlett's test of sphericity: $\chi^2 = 674.11$, $df = 120$, $p = 0.00$.
Total variance explained (%) = 70.03%.
Total reliability Cronbach's alpha = 0.67.
CP-PDSF: community-participation pre-disaster success factors

Component 2: Capacity building
The second component, capacity building for community and organization members, explains 19.35% of the total variance and contains three success factors related to community-participation success factors in the pre-disaster phase. The three success factors have high factor loadings (≥0.75). Capacity building focuses on building of local capacities in human skills, technology, data, models, and methods to face future disasters. The process of disaster risk management in which communities at risk are engaged in the identification of disaster risks provides opportunity for tapping traditional organizational structures and mechanisms, and capability building activities with the community disaster committees. This finding supported the results reported by Victoria [11]) about the benefits of community-based approaches to disaster preparedness. These benefits are realized because of the success factors of capability building activities with the community disaster committees and volunteers, and tapping of traditional organizational structures. Governments should play a significant role in strengthening capacity building in local communities and support NGOs before disasters occur to reduce disasters and their impact.

Component 3: Education and knowledge
The third component, education and knowledge, explains 10.83% of the total variance and comprises success factors with factor loadings of ≥0.69. Education can enhance personal preparedness, which is essential in mitigating disaster risks. The effectiveness of such education might be limited to a subgroup of the population, such as highly educated individuals. Living in a community with a high average level of education is beneficial in improving preparedness levels. This result is in line with Ranjan and Abenayake [9]) and Lin et al. [10], who observed that traditional knowledge, experiential knowledge, and level of education are essential for proper functioning of community, which makes people resilient to potential disasters.

Component 4: Trust and community networks
The fourth component, trust and community networks, explains 9.96% of the total variance and includes three variables with factor loadings of ≥0.60. Community networks are generated through community participation in pre-disaster management processes and capacity building programs. It becomes evident that emergency planning and training models should include a wide array of community actors, social information, logistics, and law enforcement elements. Community networks contribute to emergency preparedness. In line with this result, Lin et al. [10] argued that the trust and community networks status is a positive predictor for mitigation intentions, whereas vulnerability is a negative predictor.

Component 5: Public awareness
Public awareness accounts for 6.31% of the total variance and comprises two factors with loadings of >0.78, which suggests that these items are relatively associated with this component. Public awareness is the first step in engaging the community in disaster management. Community-based disaster management is the best preparation for disasters in the Gaza Strip [17]. This result is in line with [9, 11], who concluded that public awareness activities enable communities to increase participation and, eventually, to sustain their own preparedness activities. In addition, public awareness focuses on information dissemination, gaining consensus, building interest, and commitment in the actual community risk reduction assessment and action planning.

5. Conclusion and recommendations
The objective of this paper was to elicit the understanding of the Palestinian communities who are involved with NGOs in the Gaza Strip, regarding the success factors of their participation in the pre-disaster phase. The data analysis in this paper yielded five components which represent the success factors in pre-disaster phase, these are: risk perception, capacity building, education and knowledge, trust and community networks, and public awareness. With regard to the first component about risk perception, results show that risk perception at community level increase the chance to plan the appropriate preparedness activities. Therefore, understanding risk factors by local communities will prepare them to face disasters ad to improve the resilience of building process.

Concerning capacity building component, it focuses on building local capacities in human skills, technology, data, and methods to face future disaster. Governments should play a significant role in strengthening the capacity building in local communities and support NGOs before disasters occur to reduce disasters and their impact. With regard to education and knowledge component, it is an essential component to make the community resilient to potential disasters. Education can enhance personal preparedness, which is essential in mitigating disaster risks. With respect to trust and community networks, it is considered very important for the mitigation process. Trust and community networks is considered a positive predictor for mitigation step.

The final component about success factors for community participation in the pre-disaster phase is public awareness which will sustain its preparedness activities. It is important to reach the general public and to impart awareness in schools. The use of media (such as TV, mobile messages, internet, and social media) for disseminating awareness programs should be broadened and encouraged so that the message will reach most of the population. Community participation in the pre-disaster phase is considered very important in Palestine. This is because of the cultural influence of community leaders, which is considered a success factor in a homogeneous community. This will contribute positively to community resilience to any disaster situation. This study adds to the current body of knowledge about disaster management in developing countries, particularly Palestine.

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