

Analysis of the efficiency of crisis management of local communities in the face of floods due to climate change: five selected villages of port Chabahar County, Iran

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ABSTRACT

The threat of natural hazards in urban areas is normally addressed through land-use zoning and building regulations. The phenomenon of climate change forces rural planners to devise comprehensive measures to conform to common and greater excessive hazards. This paper discusses the capabilities mainstreaming of resilience in disaster in local development programs as a trendy comparative measure. Therefore, the motive of this article is to assess the responsiveness of the crisis management system of local communities in 5 selected villages of port Chabahar County which will deal with floods due to climate change. The current research is written primarily based totally on the descriptive-analytical approach, which is used to acquire the records of the usage of the questionnaire field method. The contributors encompass 380 humans from the local community of 5 selected villages of port Chabahar County, who had been randomly decided on. The findings of the study display that the resilience additives of settlement communities are at a low level, and the foundation of this situation should be especially discovered inside the weak point of rural disaster management. The three predominant indicators representing the resilience components of residential communities are sensitivity to flood risks with a minimum rating of 0.85 discount of exposure to risk and consequences of floods with a minimum score of 0.76 and increased adaptability of selected rural settlements with a minimal rating of 0.72. Therefore, the findings of the study imply the existence of significant gaps in the planning system of rural settlements in the face of floods, which calls for the adoption of multilateral measures.

1. Introduction

Climate change is one of the major elements in inflicting heavy rainfall on a planetary scale, which has introduced negative floods and has immediately and in a roundabout way, affected nearly all nations in any respect ranges of development [1]. According to the United Nations report [2], more than 3351 coastal regions were identified, of which 64% are uncovered to flood dangers as a result of weather change. Most of those regions are a mixture of rural and concrete regions that don't have the right plans or measures to cope with disasters caused by climate change[3]. Interestingly, a huge variety of folks

are afflicted by its bad consequences stay in rural regions in less advanced countries [4]. Rural communities in developing countries are closely laid low with floods because of their excessive dependence on rain fed agriculture and their restrained ability to reply to weather-associated disasters [5]. Rural groups are in particular at risk of those dangers because they rely on herbal resources, restricted infrastructure, and socio-monetary constraints, so that floods resulting from weather alternate have devastating outcomes on the livelihoods of rural communities [6]. These results are multifaceted and large and affect now no longer simplest the short-term monetary

wellness of villagers but additionally their long-time period resilience and capacity to conform to dynamic environmental conditions [7].

Since rural groups depend closely on agriculture, floods can spoil crops, livestock, and infrastructure [8], [9], [10]. Also, lack of earnings and livelihood can result in food insecurity, growth in poverty, and social unrest [11] [12] in a manner that its social effects can cause displacement of the population, lack of social networks, and growth in social vulnerability. Considering this fact, lowering the damage resulting from floods has usually been one of the issues of human societies [13]. This is regardless of the reality that the problem of flood and its control and harm discount has now no longer been given severe interest inside the country and most effective whilst a detrimental flood happens and a catastrophe happens, the eye of officers and specialists is attracted to it [14], [15].

Based on its natural geography, Iran has usually been subjected to natural disasters including landslides, earthquakes, droughts, and floods [14]. Based on its natural geography, Iran has usually been subject. Chabahar region reviews variable annual rainfall, which performs a tremendous function in the incidence of floods. Consequently, the vulnerability of Chabahar villages to floods because of climate change is a pressing concern [16]. According to the announcement of the National Meteorological Organization, the average annual rainfall in the region has reached 110 mm, in line with reports that have broken the past 40 years' precipitation record. This approach that the province is the maximum critically affected [17]. In recent years, this region has confronted common and devastating floods that have had great economic, social, and environmental effects [18].

According to the statistics of the International Organization of the Red Cross Society, in the last flood of the Chabahar region in 2024, greater than 109 villages have been involved, which affected 11/251 households, which have been equal to 56/255 people. Also, in the first days of the flood, electricity turned into reduced in 73 villages, 69 roads in towns and rural areas have been blocked, more than 20 irrigation canals in the village network have been damaged, the telecommunication system was cut and plenty of homes and agricultural infrastructures have been destroyed. The financial losses resulting from floods in Sistan and Baluchistan had been

significant. Recent floods have reportedly precipitated greater than \$10 million in damage, usually affecting roads, agricultural fields, and home infrastructure [19]. The floods have also blocked rural roads, destroyed homes, and displaced thousands of people, causing economic losses to agricultural fields, aqueducts, roads leading to farms, livestock units, and fish hatcheries [18]. These damages aren't constrained to monetary and non-bodily components and encompass social components also.

The social consequences of the flood on this place were enormous and feature brought about a lack of life, and as a minimum 8 human beings were killed inside the latest flood. Flooding has additionally affected water supplies, with reviews of water ranges in dams growing because of heavy rains, which can cause additional flooding [20]. Investigations show that the crisis system of the villages of port Chabahar County is referred to as one of the primary elements because of the inefficiency in handling floods. Lack of effective early warning systems, inadequate infrastructure, and limited resources have hampered society's ability to prepare for and respond to floods [21]. Therefore, it's miles vital to expand extra powerful control systems, management systems, and infrastructure to lessen the vulnerability of rural groups to floods and grow their resilience to climate-associated disasters. Therefore, rural crisis management systems are a multifaceted process that can help lessen the vulnerability of rural communities to climate hazards including floods with specific measures, research displays that making plans and edition techniques are a powerful component in growing the resilience of prone rural communities [22]. However, the responsiveness of the disaster management system of local communities specifically demanding situations in rural areas stays in a vital vicinity of research. This study aims to assess the potential of the rural planning framework in Sistan and Baluchistan to put together and respond to the growing risk of floods because of climate change. By assessing the strengths, weaknesses, and gaps in the present planning system, this study presents insights to tell more potent and extra-inclusive adaptation strategies that could better defend rural communities in the port Chabahar County in the face of those environmental shocks.

2. Background

To effectively manage flood risks and adapt to the effects of climate change, it is crucial to first assess

vulnerability. Previous research has highlighted the importance of incorporating climate change and vulnerability assessments into environmental impact assessments for sustainable planning and future development [2], [23],[24]. Rural areas are susceptible to natural disasters, including floods, which must be taken into account in rural development planning[25]. The rural areas require significant attention due to the weak physical infrastructure and financial base of the rural people. Maintaining the production of the agricultural sector and investments made is crucial. In case of any natural disasters like floods, there can be severe financial, physical, and environmental losses. Moreover, in the long term, the sustainable livelihood of the villagers will be affected.

Many studies have examined how rural communities adapt to floods caused by climate change, with a focus on the response of local crisis management systems [26]. It is important to incorporate indigenous coping strategies into local development programs to build resilience in the face of disaster Ahmadi [6] identifies social and economic factors as key determinants of vulnerability and calls for political interventions to increase resilience. Neef [27] highlights the importance of access to resources and local socio-cultural contexts in increasing adaptive capacities. Dano, U. L. et al. [28] emphasize the effectiveness of disaster-resilient design strategies in reducing vulnerability in flood-prone areas. These studies emphasize the importance of a comprehensive and community-based approach to flood adaptation planning. Notably, the research literature rarely includes attitudinal vulnerability in multidimensional assessments.

As a result, by providing a framework for multidimensional vulnerability assessment in rural communities located in the study area, this study sought to address this gap. In addition, the research examined how integrating this framework into disaster risk management strategies can increase efficiency and effectiveness (Shrestha et al, 2023). The study and management experiences of different countries reveal that the first step towards reducing flood vulnerability is to assess the vulnerability of households to flood risk so that based on the results and information obtained through flood management, flood mitigation can be achieved by comprehensive rural planning to

prevent harmful effects of flooding [29]. Effective rural management systems can provide "local vulnerability reduction programs", a tool used to guide local authority-level physical development in the face of floods. Contemporary rural planning practices are becoming more participatory as they involve stakeholders in decision-making the text emphasizes the importance of increasing the resilience of local areas through strategic interventions that involve stakeholders to understand inherent resilience. Resilience is the natural potential of people, communities, and habitats to cope with and adapt to catastrophic events [30]. When individuals are aware of their vulnerability to hazards, they can minimize exposure to hazards and strengthen social organizations to cope with recurring hazards. This creates inherent resilience[31].

The civil society's indigenous knowledge about the nature of risks and the methods to deal with them displays remarkable resilience. In the presence of various environmental stresses, such as those caused by climate change, the inherent flexibility and adaptability of civil society act as the first line of defense[32]. In other words, when civil society and its organizations are more aware of their vulnerabilities to risks, reduce their exposure, and strengthen their capacity to cope with risks, they become more resilient to environmental stress [33]. As a result, Matthews et al. [34], Chan et al. [35](2023), Shrestha et al. and Miri et al [36] have pointed out the importance of a participatory approach in the crisis management system of local rural communities in the face of natural hazards and the use of indigenous knowledge of inherent resilience in formulating rural planning strategies to adapt to climate change. However, there is a lack of empirical evidence on rural planning practices and products that take inherent resilience into account or improve it through strategic interventions resulting from the participatory rural planning process. Here, local stakeholders include civil society at large, which represents the demand side of disaster risk reduction, village officials in general, and village planners and managers in particular represent the supply side. The demand side of disaster risk reduction is represented by civil society, while the supply side is represented by village officials, particularly village planners and managers. Ahmadi [6] explains that lack of infrastructure capacity, non-resilient and informal settlements, and construction in vulnerable areas make villages in developing countries particularly

vulnerable to climate change disasters. Azizi et al. [14] point out that Climate change has increased the frequency of disasters, putting more pressure on rural planning and local authorities. Effective disaster response requires rural planning that integrates climate change prevention measures. Failure to do so can lead to devastating consequences for communities, making it crucial for local authorities to prioritize this task. Local government officials must understand how climate change disasters affect vulnerable areas and their resilience. In other words, rural planners and managers need to have a deep understanding of vulnerability and resilience issues. This knowledge facilitates effective decision-making processes and helps ensure that the needs of the rural community are met. Planners and rural managers face challenges in addressing the factors influencing climate change and protecting vulnerable communities due to the vagueness of concepts such as risk, vulnerability, and resilience, insufficient knowledge about the processing of relevant data, and the technical complexity of scientific research [12].

3. Methodology

This section explains the details of the study area and the motive for its selection. Port Chabahar County was chosen as the study area. The sampling plan and statistics series technique also are defined in this segment. Finally, the indicators selected for the study and the technique adopted for data analysis are discussed in detail.

3.1 Areas of the Study

Chabahar is a city located in the Sistan and Baluchistan province of Iran. The city is situated at an altitude of seven meters above sea level, at a longitude of 60 degrees and 37 minutes east, and a latitude of 25 degrees and 17 minutes north. This city is located in southeastern Iran and is bordered by Iranshahr and Nikshahr to the north, Pakistan to the east, Oman Sea to the south, and Kerman and Hormozgan provinces to the west. The latest census indicates that Chabahar city includes three districts, six rural districts, and 135 villages. The rural population of Chabahar has 40,918 households and 170,778 people. Chabahar has a moderately tropical climate, which includes relatively high humidity. It is the hottest part of the country in winter and the coldest southern port of Iran in summer. The climate of this city and its surroundings is always mild and spring-like. "That is why it is called Chabahar. The name derives

from the fact that all four seasons in this place are like spring."

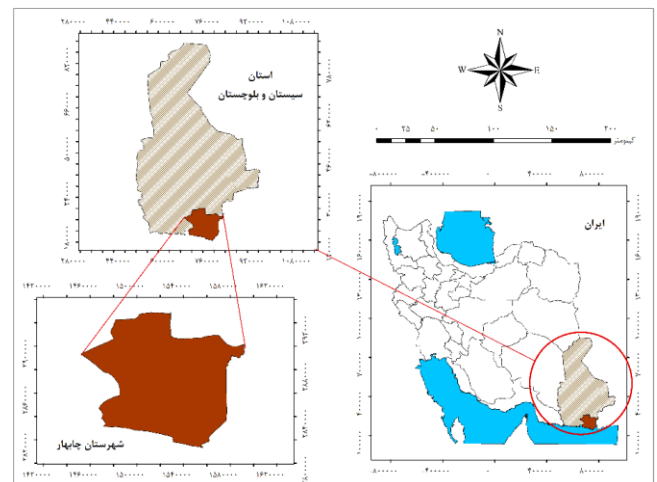


Figure 1. Geographical location of the study area
Source: Authors, 2024

3.2 Method for collecting data

The data collection for this research was done in two stages. The first stage involved library and documentary research, which was used to obtain general information such as definitions and key concepts, the research background, the necessity of the research, description of applications, plans, and indicators, and the theoretical basis. b) This method involves creating questionnaires and interviews, as well as specialized checklists and impressions. Researchers administered a Likert scale questionnaire to collect data from selected villages to determine the statistical population. The five selected villages - Ramin, Owraki Bozorg, Morad Abad, Tis, and Osman Abad - are more vulnerable to floods than other villages in the city and have a larger population. The total population of these villages is 27,525. According to Cochran's formula, the sample size of 380 people was estimated proportionally based on the population of the village and the five selected villages. Also, the participants were selected using a simple random sampling method. A researcher-made questionnaire was used to collect data. An index-based method was used to assess vulnerability. The measurement of vulnerability was based on three components, which are exposure, sensitivity, and adaptive capacity. The indicators were established based on previous studies, and focus group meetings with academic experts and specialists. To weigh the indicators, a questionnaire was prepared by three groups of experts, including university professors, members

of engineering consulting companies, and experts of agricultural jihad. To calculate resilience, it is necessary to express the dimensions of exposure, sensitivity, and adaptive capacity for each sub-index in the range of 0 to 1. Then, using the formula, the total vulnerability was calculated. Cluster analysis was utilized to classify respondents into three groups based on their level of vulnerability: low, medium, and high. In the next step, a one-way analysis of variance was used to identify indicators affecting the vulnerability of rural households. The questionnaire's validity was confirmed by experts. Its reliability was acceptable with a Cronbach's alpha test of 0.84. Data were analyzed using SPSS 20 software.

3.3 Method of Analysis

This research aims to apply the descriptive-analytical method. The analytical framework that was formulated for this study consists of three steps. The initial step was to assess the vulnerability level of rural inhabitants in port Chabahar County by gathering data from respondents' perceptions. To obtain this information, a social survey was conducted using a questionnaire. The survey was conducted in five settlement areas that are most affected by the risk of flooding in the villages of Chabahar (see table 1). The questionnaire not only deals with the vulnerability of the respondents and their houses and properties against flood risks but also with the expectations of the respondents from the management and planning institutions to reduce the vulnerability and improve the resilience of their settlements. In the second step, the most obvious vulnerability factors were prioritized as well as socio-physical dimensions related to community resilience, based on the responses of the social survey. The findings of steps 1 and 2 were considered on the demand side of disaster preparedness in selected villages of port Chabahar County. For weighting, the weighting method of the average points was used, which was weighted respectively based on the percentage of answers (100% agreement = 1, 75% = 0.75, 50% = 0.50, 25% = 0.25, and 0% = 0, respectively). The ratio W_i/n was calculated using the equation: W_i for the individual weighted score (or 1, 0.75, 0.50, 0.25, and 0) for each question, n is the number of

questions) and W_i/n for the weighted mean score where W_i is the weighted score and n is the frequency of a specific score.

Table 1. Characteristics of the research sample size (statistical population of 2022)

Row	The name of the selected village	population	Population share of the total	number of samples
1	Ramin	3821	13.9	53
2	Owraki Bozorg	1770	6.4	24
3	Morad Abad	12906	46.9	178
4	Tis	6348	23.1	88
5	Osman Abad	2680	9.7	37
Total aggregation		27525	100	380

4. Findings

The analysis of the data presented in this section includes (1) the vulnerability of people and their settlements, (2) socio-physical resilience in the study area, and (3) the response of planners to people's needs to prepare against disasters as reflected in planning interventions.

4.1 Respondents' perceptions of the vulnerability of people and their settlements

Identifying vulnerabilities is a crucial step in increasing the resilience of human settlements against disasters. This article examines the actions that managers and officials of selected villages in Chabahar should take to reduce vulnerability to floods. This index is utilized to measure the degree of vulnerability and sustainability of rural communities. During the survey, participants were presented with a list of possible reasons for making their habitat more resilient. These reasons were selected from theoretical literature on the subject. Table 3 displays the top reasons mentioned by respondents for a multiple-choice question. The responses were weighted using a five-point Likert scale, ranging from strongly agree to strongly disagree. Based on the survey results, the main reason why the villagers consider relocating is the challenges they face during floods. Specifically, the disruption of roads, public transport services, and private vehicles during floods makes life difficult for them. Nearly 63% of the respondents reported that obtaining necessities like food and clean drinking water was extremely problematic during floods. Their ability to move around and access daily essential items is severely impacted due to the breakdown of infrastructure and transportation facilities. The weighted mean score (WMS) for reason number 1 is 0.86 points. This

score indicates that if local authorities fail to address the increasing frequency and intensity of flood hazards and their impact, most respondents will choose to relocate to a different area.

The respondents' answers were used to calculate a weighted average of the scores, which highlights the priority actions that the authorities should take. A weighted mean of 0.75 or higher suggests that authorities should prioritize (1) improving public and private transportation in rural areas, (2) addressing severe flooding in residential areas, and (3) mitigating the fear of loss of life due to flooding by implementing appropriate planning and developmental interventions. Although the reduction of security and environmental health

was mentioned in the questionnaire, it was not among the top five reasons for the relocation of villagers. More than 54% of respondents cited the loss of property value, asset value, and reduced agricultural productivity as the primary reasons for migration. During flooding in selected villages of Chabahar, the low quality of life and unfavorable economic conditions have convinced people to seek relocation. This has made the villagers vulnerable and officials have a responsibility to protect their assets and lands. It is important to help them continue their livelihood and gain the trust of civil society by devoting all efforts towards this cause.

Table 2. vulnerability against flood risks and relocation reasons

Row	Reasons to move to a safer area	(%100 = 380 = total) Participant					weighted average score (WMS)
		I Strongly (0) disagree	I Disagree (0.25)	No idea (0.50)	I agree 0.7 (5)	I Strongly (1) agree	
1	Disruption of village infrastructure and services	4	15	34	87	239	0.86
2	severe flooding in residential areas	6	8	11	93	262	0.89
3	Disruption of private and public transportation	9	8	15	67	281	0.90
4	loss of value of property and assets	14	15	24	87	239	0.84
5	Reducing the sense of security and environmental health	19	49	65	27	220	0.75
6	Disruption of earning opportunities	15	57	19	53	236	0.79
7	fear of loss of life	0	27	17	87	249	0.87
8	reduced productivity of agricultural land	8	19	15	133	205	0.84

According to Table 2, the participants did not show a significant difference in their perception of the vulnerability aspects of the selected rural areas of Chabahar. However, some aspects were given priority with a slight difference. The respondents expressed their greatest concern about the physical aspects of vulnerability. Then, the psychological aspect such as the fear of losing one's life was the next priority. According to a recent study, economic factors such as loss of income and decrease in agricultural productivity are not the primary reasons for displacement due to floods. Instead, respondents believe that the physical weaknesses in their village planning and infrastructure make their settlements vulnerable to floods. This suggests that they may not have confidence in the resilience of their village economic systems against natural disasters. The residents are aware that their settlements are situated in an area that is prone to flooding. However, they believe that they cannot control the physical effects of vulnerability, and therefore,

they expect local officials and planners to play an important role in making the village a safe place. As a result, adapting to disasters should mainly focus on safeguarding vulnerable areas and elements of the villages. Local and provincial authorities should prioritize physical adaptations for settlements to reduce vulnerability and strengthen resilience against flood disasters.

4.2 Analysis of Physical-Social Aspects of Resilience

The social survey aims to gather opinions from respondents about their needs to improve their resilience through rural management planning and interventions. Although villagers may have various needs to enhance their flood resilience, the analysis only considers the views of rural planners. Providing hazard awareness programs for villagers is considered the direct responsibility of local management and not planners. For the analysis, we excluded such needs. In Table 4, the findings were grouped into three dimensions of resilience:

sensitivity to risk, reducing exposure, and increasing adaptive capacity.

4.3 Susceptibility to flood hazards

According to Table 3, the results indicate that 73% of the participants desire rural planners and managers to prioritize risk reduction measures for housing, transportation, infrastructure, and facilities based on the level of risk in each village. They also expect them to be sensitive to the system's needs and make it their priority. Currently, the crisis management structure in the selected villages of Chabahar is inadequate during times of emergency. As a result, the village of Kamb Morad Abad, which is one of the most populous villages in the country, is lacking a

village head. According to the survey, the respondents believe that a management system should be in place at the rural district level to assist during times of crisis. This finding is consistent with the concern expressed in Table 2, where severe flooding and residential destruction were identified as the most vulnerable aspects during floods. The survey participants highlighted the importance of ensuring risk mitigation measures are in place for every critical aspect of the village. This includes the provision of rescue routes and emergency evacuation plans, as well as the need for prompt action and timely warnings to raise awareness and ensure the safety of residents in each area.

Table 3. The respondents need resilience improvement

Row	Susceptibility of villagers and planners to flood hazards	Respondent (total = 380 = 100%)					weighted average score (WMS)
		I don't need (0) strongly	I don't need (0.25)	I have no idea (0.50)	I need (0.75)	I strongly need (1)	
1	The need for an emergency rescue and evacuation route system in the village	0	15	16	64	285	0.91
2	Need for risk mitigation measures for housing, transport, infrastructure, and facilities	0	0	26	75	279	0.92
3	Prioritize "safer and safer environments" as a goal for local plan development	0	7	14	102	257	0.90
4	The need to regulate land development according to the level of risks	0	8	34	141	198	0.85

The research suggests that rural officials, as well as village heads, need to be more sensitive to the needs of the villagers to reduce the risks of disasters. However, the findings show that the efforts made by authorities so far have not been satisfactory to the villagers. This dissatisfaction is indicated by an average score of more than 0.66. The descending order of the hierarchy of sensitivity-needs also shows that villagers prioritize risk reduction needs related to housing, transportation, infrastructure, and water and electricity services through effective interventions to integrate risk reduction in targeting and implementing the development plan. The need for land regulation based on the level of risks due to construction records and village population growth has the lowest priority.

4.4 Reducing exposure to flood risk and impacts

During the resilience assessment, the second dimension that was evaluated was the reduction of exposure of villagers and their settlements to the risks and effects of floods. The survey respondents recognized the significance of relocating the

construction of residential, industrial, and commercial buildings to safer areas. This is considered one of the crucial needs that rural planners should address to minimize the risk to residents. During disasters, public schools and gymnasiums are often used as evacuation sites and temporary shelters. However, victims face numerous issues due to the lack of available facilities to accommodate them during floods. It has been found that the current public schools are facing issues related to the quality of construction and lack of sufficient space for temporary accommodation. Moreover, these schools lack the necessary facilities for civic purposes. Respondents have expressed the need for social facilities such as multi-purpose halls like sports halls. These facilities can be utilized during natural disasters effectively without disrupting their primary use.

Table 4. Responders need to improve resilience.

Row	Reducing exposure to flood risk and impacts through planning and development interventions	Respondent (total = 380 = 100%)					weighted average score (WMS)
		I don't need strongly) 0(I don't need)0.25(I have no idea) 0.50(I need)0.75(I strongly need (1)	
5	Providing social facilities for use as evacuation centers and temporary shelters	0	42	29	33	276	0.86
6	Limit the construction of residential, industrial, and commercial buildings to safer areas	0	0	14	61	305	0.94
7	Regular maintenance of drains, canals, and embankments	4	19	14	147	196	0.84
8	Construction of new flood and water storage ponds	0	53	26	124	177	0.78
9	Recommending protection measures for property and buildings	2	51	76	94	157	0.76
10	Protection of natural slopes, structures, and waterways	54	65	55	53	153	0.62

This finding supports the findings in Table 2, which identify the destruction of living and working areas as a primary factor contributing to residents' vulnerability to flood risks. Therefore, residents are looking for more practical solutions to minimize exposure. This finding supports Table 2, identifying the destruction of living and working areas as a key factor in residents' vulnerability to floods. The local planning authority is expected to take stricter measures to limit construction in flood-prone areas and strengthen defenses through new embankments and drainage channels. An interesting finding is the expectations of residents from planners. This means taking appropriate measures to protect property and buildings. For example, reacting to the selfish actions of some people, such as raising the ground, which increases the vulnerability of their neighbors. This finding implies that rural planners and managers should develop appropriate construction techniques and retrofitting measures to help residents adapt to future climate change floods.

4.5 increasing the adaptation capacity of settlements

The third aspect of resilience was the ability of rural settlements to adapt. As mentioned earlier to reducing the risk of exposure, the respondents believed that the planners and village managers of port Chabahar County should prioritize "enhancing infrastructure, water, and electricity networks for disaster resistance." While rural leadership plans are supposed to allocate a significant portion of land for open spaces and public places, a recent study suggests that the current distribution of land use in certain villages does not meet the public's requirements. Moreover, the respondents of the survey expect that the zoning plan will display hazard zoning maps based on the level of danger. While rural leadership plans aim to reserve a suitable portion of land for open spaces and public areas, a recent study indicates that the current distribution of land use in certain villages does not adequately cater to public demands. Furthermore, the respondents anticipate that the zoning plan will display hazard zoning maps corresponding to the degree of danger.

Table 5. Responders need to improve resilience.

Row	Improving the adaptive capacity of settlements through development planning and interventions	Respondent (total = 380 = 100%)					weighted average score (WMS)
		I don't need strongly) 0(I don't need)0.25(I have no idea) 0.50(I need (0.75)	I strongly need (1)	
11	Allocation of land for public use for emergency use	17	64	38	97	164	0.72
12	Showing hazard rating measures in the zoning plan (disaster awareness)	0	26	54	184	116	0.76
13	Increasing access to perform daily activities (work, school, business, etc.)	4	28	72	112	164	0.77
14	Improving infrastructure and water and electricity networks to resist hazards	0	0	0	123	257	0.92
15	Establishing laws and regulations in the field of disaster reduction	3	15	64	143	155	0.78
16	Incorporating indigenous knowledge of coping strategies into the local plan	11	34	54	96	185	0.77

According to the results, two key areas require improvement with a weighted mean score exceeding 0.66. These are enhancing accessibility and fortifying flood resilience of rural infrastructure and services. These measures are essential to mitigate the impact of floods induced by climate change in the study regions. However, these measures have not been taken into consideration by the planners of the selected villages of Chabahar. Interestingly, the respondents support showing hazard rating measures in the zoning plan (disaster awareness) with a weighted mean score of 0.76 and introducing specific rules and regulations for disaster preparedness with a weighted mean score of 0.78. This finding indicates that individual adaptation measures are being carried out in an extreme manner that endangers the safety of neighbors as well as the community. According to the responses received, it appears that enforcing strict command and control measures can be an effective approach to prevent individual selfish actions. Additionally, the respondents emphasized the need for planners to be well-versed in local wisdom and indigenous knowledge to better handle hazards and to incorporate these forms of knowledge into their planning processes.

5. Discussion

This study has focused on assessing the response capabilities of local communities in five selected villages of port Chabahar County to manage crises caused by floods resulting from climate change. The results indicate that the resilience of these rural settlements is significantly affected by the inadequacy of their planning system. As a result, their crisis management strategies are in a critical state, and they are unable to respond effectively in critical situations. The management system's policies and strategies for dealing with natural hazards, particularly floods, lack a systematic structure that fails to consider flood risk sensitivity, reduce risk exposure, and increase settlement adaptation. An analysis of the physical and social dimensions of resilience reveals that the local crisis management system overlooks some critical needs of the villagers in its programs. It came as a surprise that the planners had failed to take adequate measures to ensure vital resilience needs such as determining rescue and evacuation routes and implementing risk reduction measures for housing, transportation, infrastructure, and facilities. This lack of action was due to their

insensitivity towards flood risk. The findings mentioned are consistent with the studies conducted by Alves et al. in [37], which highlight the importance of having proper infrastructure systems, such as transportation, to reduce the risk of flooding and enhance the flexibility of settlements. Moreover, it is essential to recommend flood protection measures for individual buildings and properties, which have been overlooked by planners. On the other hand, traditional planning measures like determining the planning goals and constructing buildings outside the danger zone are more effective than developing constructions beyond village boundaries and protecting natural ranges. According to a study conducted by JM Bodoque [38], complying with safety regulations and construction rules in rural settlements is crucial for crisis management systems to enhance resilience during floods. The research findings suggest that local planners and managers in the surveyed villages must organize themselves and expand their efforts to minimize rural settlements' vulnerability to natural hazards, such as floods. Increasing knowledge and cooperation between local and extra-local institutions is necessary to make studied communities resilient against natural disasters. This can be achieved by implementing principles that improve the crisis management system of settlements. However, there is a need to incorporate local knowledge of strategies to deal with flood risks in their plans, which has not been given due attention. It has been inferred that over 70% of the respondents believe that indigenous knowledge should be considered an important factor in development plans related to hazard preparedness. It has been observed that local plans have completely ignored indigenous knowledge. This discovery relates to a significant flaw in the follow-up of the participatory planning process that involves local stakeholders. It appears that this flaw is due to the lack of institutionalization of local management institutions. Overcoming this inadequacy is challenging until the planning and institutional capacity at the local level is strengthened. Adapting to hazards caused by climate change at the local level requires the use of indigenous knowledge. Furthermore, this discovery confirms the studies of Harahap [39]; These researchers emphasize that there is a need to include resilience in disaster into local planning practices, as vulnerability reduction and adaptation cannot be achieved by addressing climate change

alone. Vulnerability reduction appears to be the best motion when combined with other planning strategies at the local level. From the point of view of participation in rural planning methods in response to climate change, the study in five villages of port Chabahar County strengthens the argument that resilient rural planning measures should be formulated according to the needs of local people in developing countries and should not be expected to implement physical programs on a larger scale or plan an inter-level structure to guide actions at the local level. This study showed that the local development plan prepared by the federal-level planners was not effective enough to reduce the vulnerability and improve the resilience of the local people in the five villages of Chabahar. A local development plan without the participation of stakeholders and local knowledge will certainly not be very effective. Therefore, this paper calls for the strengthening of participatory planning and capacity development of local authorities to more decisively mainstream disaster resilience in local development plans.

6. Conclusion

Given that villages contribute very little to greenhouse gas emissions, adaptation measures should be prioritized over measures aimed at reducing emissions. The long-term resilience of rural communities heavily relies on their ability to adapt and recover after floods. To reduce the vulnerability of local communities, adaptation strategies such as early warning systems, flood-resistant infrastructure, and legal and institutional measures against floods can be implemented. However, the effectiveness of these strategies depends on the availability of resources, the capacity of local governments, and the participation of local communities. Therefore, adapting to global climate change requires relevant and effective local measures. Local adaptation measures should be integrated with existing hazard preparedness measures, rather than being separate and exclusive measures. When adaptation to climate change becomes part of general hazard preparedness measures in a local development planning process, it is automatically included in the development plan. Sectoral structured development programs tend to ignore cross-cutting issues such as disaster preparedness and climate change adaptation or divide them into specific development sectors such as housing and social welfare. This study demonstrated that the failure to institutionalize the crisis management

principles of local communities is the main reason for the physical, social, and economic resilience of the settlements of port Chabahar County. Therefore, this article recommends that a prerequisite for resilient settlement construction in these areas is the institutionalization of local crisis management systems. Local development should be prepared based on the important issues facing civil society in the respective area. Indigenous knowledge should be the basis of such local development programs.

To improve the responsiveness of the local crisis management system in the face of floods caused by climate change, it is suggested that the management institutions of the rural planning system be effective in responding to natural disasters such as floods, measures such as creating a system of rescue routes and emergency evacuation in villages, implementing risk reduction measures for Prioritize housing, transportation, infrastructure, and facilities, and prioritize the creation of safer and more secure environments in local development plans. Also, to increase the physical resilience of rural settlements put the zoning policies of risk areas and adhere to them in new constructions effectively. On the other hand, the use of rural social capacities to improve the adaptation capacity of the settlement, such as integrating programs with local knowledge and creating a collaborative environment in preparing programs, should be put on the agenda. Finally, these measures help to improve the adaptive potential of rural settlements to discount the risks of floods caused by climate change.

7. References

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