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Governance and disaster vulnerability reduction: A community based perception study in Pakistan

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Key words: Disaster, Vulnerability, Governance, Mitigation, Community participation

Abstract

The present paper investigates the effectiveness of governance in vulnerability reduction to disasters from a community perspective. The basic aim of the study is to explore views of disaster-affected communities regarding deficiencies and weaknesses in terms of vulnerability reduction governance. The study, quantitative in nature, was conducted in three selected districts (i.e. Charsadda, Nowshera and Swat) of the Khyber Pakhtunkhwa province during 2018-2019. Cluster sampling technique was used to select three Union Councils in each district on the basis of their vulnerability and past disaster impact. The total sample size is 384 community level respondents. The study findings reflect a substantial association of multi-hazard nature of disaster management policies, implementation of policies, preparedness planning, land use planning, mitigation planning, budg*et al*location, early warning system and community participation with vulnerability reduction to disasters. The study recommends that governments at district, provincial and national level require to reformulate the disaster management policies, develop people friendly preparedness and mitigation planning, allocate sufficient resources in annual development budgets and involve the local communities in risk assessment, planning and implementation phases.

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Introduction

From the very beginning hazards like floods, earthquakes, landslides, and droughts, etc. are accompanying human beings. But a hazard in itself doesn't cause a disaster. A disaster occurs when a hazard interacts with vulnerable conditions. Vulnerability is the main driving force in the conversion of a hazard into a disaster. By definition, a "*disaster occurs when a significant number of vulnerable people experience a hazard and suffer severe damage and/or disruption of their livelihood system in such a way that recovery is unlikely without external aid*" (Wisner *et al.,* 2003). In other words, disaster is a serious disruption in the day to day functioning of a society or community with significant impact and losses to the human, social, economic, physical or environmental sector exceeding the ability of the affected people, society or community to cope within the available resources (UNISDR, 2009; Pearce, 2000). On the other hand vulnerability in the context of disaster is the characteristics of a group or person and their situation negatively influencing their capacity to anticipate the future situation, cope with, respond to and recover from the impacts of a disaster (Wisner *et al.*, 2003). In disaster risk reduction, the concept of vulnerability is of fundamental importance for understanding the negative consequences of disasters, identifies systemic weaknesses and pinpoints strategies to mitigate and prevent damages.

Experts suggest that vulnerability reduction strategies should concentrate on evaluating "vulnerability in daily life", along with approaches to community-wide involvement and participation in disaster risk management (Pandy & Okazaki, 2005). Disaster vulnerability is directly concerned with the economic and political power in a society (Cannon, 1994). Governments remain the most influential players in vulnerability reduction in its regional, provincial, district and sub-district resolution. Proper governance develops and implements strategies to take necessary steps to maintain compliance with agreed policies; provides curative action where rules, regulations, policies, strategies, and plans have been overlooked or misunderstood, and monitors the ongoing projects for risk-sensitive development (Kefela, 2011). It is evident that supportive governance guarantees society's coping capacity to prepare for and respond to disasters. It has an impact on how public servants, civil society, parliamentarians, private sector, and media coordinate their actions to address long-term vulnerabilities to disasters. Countries with an effective legal framework, comprehensive risk reduction policies, operational structure, multi-hazard early warning system, adequate budgeting, risk communication, public awareness, focused research and an effective civil protection system are considered as resilient to disasters. But counties like Pakistan where these components are negligible or still a development stage, vulnerability to disaster is still very high and vulnerability reduction governance is questioned with each episode of disaster.

Being a low-income country, Pakistan has suffered from a series of disasters including floods, landslides, cyclones, droughts, avalanches, earthquakes, industrial and urban fires, oil spills and transportation accidents (Government of Pakistan, 2007; UNISDR, 2005a). Between 1993 and 2015, more than 89,000 people have been killed, and 86.67 million people have been affected by multiple disasters (IFRC, 2016). In general, the entire country was affected by disasters but Khyber Pakhtunkhwa province was one of the hard-hit provinces in the country. This province, populated with 35.525 million people in 35 districts, is burdened by a disturbing portfolio of disasters including a continuing complex emergency in the form of terrorism and insurgency (PDMA, 2014; Government of Pakistan, 2017). The province has experienced several disasters in the recent past due to its varied topography with divergent negative impacts on its inhabitants. Many people have suffered long-lasting damages to their lives, well-being, assets, environmental resources, substantial damages to infrastructure functions such as power supply, transportation, communication, water, sanitation, and security, etc. (PDMA, 2019).

Following the devastating earthquake of 2005 and the ratification of the Hyogo Framework for Disaster Risk Reduction 2005-2015 (UNISDR, 2005b), the need for adopting a holistic approach to deal with disasters was considered a priority action on part of the government. In reaction, the government promulgated the National Disaster Management Ordinance in 2006, which was afterward passed from the national legislative assembly in the form of National Disaster Management Act-2010 (Gazette of Pakistan, 2010). Under the said legislative document, the government established National, Provincial and District Disaster Management Authorities between 2007 and 2010.

Both the provincial and national governments claim to have evolved from a reactive to a proactive disaster management approach. But the recent incidences of floods, earthquakes, and landsliding have exposed the failure in terms of reducing the vulnerabilities to disasters. Despite claims of having a comprehensive governance structure from top to bottom level, disasters are still affecting people lives and livelihoods. Many authors such as Shah *et al.* (2018); Ullah *et al.* (2018); Shah *et al.* (2017), Mahmood and Ullah (2016); Arai (2015); Rehman (2015); Khan (2013) and Kurosaki, *et al.* (2011), have conducted research in the relevant field in the study area but all these studies are focusing only on the causes and consequences of disaster and don't cover the management aspect of disasters with a governance approach. As such no study has been conducted systematically to analyze the governance mechanism and its efficacy in vulnerability reduction. The present study is first of its nature to analyze governance mechanisms for disaster vulnerability reduction in Khyber Pakhtunkhwa province from a community level perspective. The study identifies problems, issues, deficiencies, and weaknesses in terms of governance in efforts towards vulnerability reduction to disaster. The study also aims to investigate the effectiveness of disaster management plans and policies in vulnerability reduction from a community perspective. The paper further explores people centeredness of the disaster management system in the study area.

Material and method

Universe of the study

The study, being quantitative, was conducted in three designated districts i.e. district Swat, Nowshera, and Charsadda of Khyber Pakhtunkhwa province. As mentioned earlier, the province consists of 35 districts and out of them, the National Disaster Management Authority, Pakistan has declared twelve districts to be the most vulnerable by their Relative Severity Index Score. Within these twelve districts, Charsadda, Nowshera and Swat are the top three most vulnerable districts (Government of Pakistan, 2012). Bearing in mind the highest severity index score, the above districts were selected as universe of this study. Another rationale behind the selection of sampled districts was the launching of vulnerability reduction projects during flood 2010 recovery operations by government and development sector organizations.

Sampling Method and Sample Size

Cluster sampling method was used to select three Union Councils (UCs) in each district. These Union Councils were selected on the basis of their most vulnerable status as described in the target Districts Disaster Management Plans. As per Krejcie & Morgan (1970) analogy, a sample size of 384 was taken with proportion allocation strategy for further breakup of sample size in each Union Council in the selected districts through proportion allocation method formula of Cochran (2007). The total number of sampled union councils is nine as set out in Table 1.

Table 1. Sample size

SN	District	Sampled Union Councils (UC)	Total Population of the Union Council (UC)	Selected Sample Size Within each UC
01	Charsadda	Nisatta	36311	53
		Umerzai	34621	50
		Agra	29930	43
02	Nowshera	Muhib Banda	27223	40
		Aman Kot	17566	26
		Kabul River	24448	35
03	Swat	Bahrain	27312	40
		Kalam	30505	44
		Khwazakhela	35779	53
Total			263695	384

Source: (UNOCHA, 2013; Cochran, 2007)

The study population consists of locals affected by disasters and still living in vulnerable locations in these sampled Union Councils.

Tool of Data Collection

Primary data was collected through structured interview schedule (close ended) with a three options based Likert Scale i.e. *Agree, Disagree and Don't Know*. To get a clear picture of the prevailing situation and accurate response of the study respondents, each statement in the interview schedule was explained in local language (i.e. Pashto).

Data Analysis Strategy

Data was analyzed through Statistical Package for Social Sciences (SPSS). Univariate analysis was carried out through simple frequency and percentage and then presented in tabular form. To test the association between independent and dependent variables, bivariate analysis was carried out. Cronbatch's Alpha test was used to test the internal consistency and reliability of scales used for measurement of variables, whereas, Chi-square test was used for measuring the association between independent and dependent variables at bivariate level. Formula for Chi-Square is given below:

Equation no 01: formula of chi-square

$$\chi^2 = \sum_{i-1}^{c}\sum_{j-1}^{r}\frac{(O_{ij} - e_{ij})^2}{e_{ij}}$$

Where

χ^2 = Categorical variables of chi-square

O_{ij} = Frequencies which are observed in the cross-classified category at jth columned *i*t rows

e_{ij} = the expected frequency, considering no association between dependent and independent variables under study.

The chi-square formula is obtained by taking the square of summation of these frequencies and then divides by the expected frequency. After obtaining the resultant frequency, then distributed it on chi-square test with the relevant degree of freedom. The degree of freedom can be calculated as follows:

Dof= (r-1) (c-1) Where

dof = Degree of freedom

r= Rows number

C = Column number

Source: (McCall & Kagan, 1975)

Results and discussion

Disaster profile and experiences of losses from disasters

The topographic characteristics of the sampled districts have distinct characteristics from each other. District Nowshera and Charsadda are located in plain area while district Swat is a mountainous region. Seismically, all three districts are in Zone 2B and Zone 3 but due to the poor construction practices and proximity to fault lines, vulnerability is very high. At the same time, floods have adversely affected these districts by the presence of two major rivers, i.e. River Kabul and River Swat (Government of Pakistan, 2007). During 1998-2002, droughts also affected the area. Periodic incidents of settlement fire due to lack of implementation of fire codes is another disaster affecting people in the sampled districts.

Being a mountainous terrain, landslide poses serious threats to the residents of District Swat. Local communities in the study area have experienced multiple disasters and have been affected negatively in the recent past. As per contingent table No. 02; 73.4% study respondents have experienced earthquake, 98.7% experienced riverine floods, 43% flash floods, 66.4% by settlement fire, 23.4% land sliding and 79.4% experienced drought and desertification. The floods of 1982, 1988, 2004, 2006, 2007 and 2010 are some of the devastating floods that have affected the study area. Historic earthquakes include the 1974, 2004, 2005 and 2015 earthquakes (PDMA, 2016; PDMA, 2014). District Swat is located in the Hindu Kush series of mountains (DDMU Swat, 2015).

Swat was affected by river floods, flash floods, earthquake, soil erosion, heavy snowfall, hail stone, landslides and epidemic diseases such as dengue, etc. Furthermore, during 2007-09, the Swat district was severely affected by insurgency and terrorism (Elahi, 2015). District Nowshera is situated on the banks of

the Kabul River and has frequently been affected by riverine floods. The district was further affected by frequent earthquake and desertification in the form of water logging and salinity, settlement fire and wind storm (PDMA, 2014). Charsadda district has suffered from riverine floods, settlement fires, soil erosion, earthquakes, wind storms, salinity and water logging (Moazzam, Vansarochana, & Rahman, 2018; Ullah *et al.*, 2018; Qasim *et al.*, 2017)**.** The impacts of these disasters were widespread and were not limited only to loss of lives and houses. Study results (Table No. 02) divulge that 28.6% of the respondents lost their family members to disasters, 55.4% sustained injuries, 75.3% respondents' houses and property were damaged, 50.3% livelihoods were affected and 11.5% experienced damages to their businesses.

Table 2. Experiences of disasters and losses incurred.

Experiences of Disasters	Yes		No		Total
	Frequency	Percent	Frequency	Percent	
Occurrence of Earthquake	282	73.4	102	26.6	384 (100)
Occurrence of Riverine Floods	379	98.7	5	1.3	384 (100)
Occurrence of Flash Floods	165	43.0	219	57.0	384 (100)
Occurrence of Fire	255	66.4	129	33.6	384 (100)
Occurrence of Landsliding	90	23.4	294	76.6	384 (100)
Any Other (desertification and droughts)	305	79.4	79	20.6	384 (100)
TYPES OF LOSSES INCURRED FROM PAST DISASTERS					
Loss Life of family members	110	28.6	274	71.4	384 (100)
Injuries to self or family members	213	55.4	171	44.5	384 (100)
House and property loss	289	75.3	95	24.7	384 (100)
Loss of Livelihood	193	50.3	191	49.7	384 (100)
Business damages	44	11.5	340	88.5	384 (100)

Source: (Field Survey, 2018)

The flood 2010 killed 1070 people and damaged 312477 housing units in the province with direct impact on 3.8 million people (PDMA, 2012; PDMA, 2014; Shaw, 2015). During 2010 floods, 101427, 34000 67892 houses were damaged in district Charsadda, Swat, Nowshera districts respectively. Similarly, the October 2015 earthquake damaged 1331, 12159 and 110 houses in Nowshera, Swat, and Charsadda respectively (Talal, 2017).

Bangash (2012) in a study on post conflict socio-economic situation of Swat found that housing sector in District Swat was severely affected during insurgency crises in 2009. According to World Bank & ADB (2009) post conflict need assessment report, a total of 8125 housing units were damaged in 2009 militancy in the area. Such traumatic events resulted not only in damages to local infrastructure and economy but also caused physical and mental health anomalies to the victims. The victims experienced severe forms of post-traumatic disorder (PSTD), apart from injuries and disabilities.

Association between Governance and Disaster Vulnerability Reduction

Governance and vulnerability reduction have very close nexus with each other. Legislative Frameworks, policies, plans, budget allocation and institutions are the hallmark of risk and vulnerability reduction in society. As per Table No 03, study results reveals that a highly significant association (p=0.000) was found between formulation of multi-hazard disaster management policies and vulnerability reduction. Bronfman *et al.* (2019) believes that communities are exposed to compound categories of hazards due the convoluted social structure and heterogeneous topographies. Policies developed through a multi-hazard approach are not only useful for development planning, but it also direct DRR practitioners to adopt an inclusive approach as mitigation for a single hazard can intensify vulnerability to other hazards. The guiding principal of Sendai Framework for DRR 2015-2030 advocates on adopting a multi-hazard approach towards vulnerability reduction (UNISDR, 2015). The results further articulate that 62.5% of the population is highly vulnerable to disasters due to lack of strict implementation of DRR policies by government departments despite the significant association (p=.003) of strict implementation of DRR policies and vulnerability reduction. These results support results of another study by Rehman *et al.* (2019). Their study shows that the government, through its district, provincial and national level systems, has taken couple of disaster risk management measures, but collaborative framework

toward DRR policies implementation is still lacking. The study suggests that disaster management institutions can reduce vulnerabilities through cooperation and building synergies.

As per data presented in Table No. 03, a highly significant association (p=0.000) was found between risk assessment studies and vulnerability reduction.

Table 3. Association between governance and disaster vulnerability reduction.

Attributes	Attitude	Level of Vulnerability			Total	Statistics
		Low	Medium	High		
National and local level disaster management policies have been formulated through a multi- hazard approach	Agree	0 (0.0%)	2 (15.4%)	11 (84.6%)	13	(p =.000) χ2=26.847)
	Disagree	14 (6.0%)	69 (29.6%)	150 (64.4%)	233	
	Neutral	31 (22.5%)	28 (20.3%)	79 (57.2%)	138	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Government is strictly implementing these policies to reduce future vulnerabilities	Agree	3 (33.3%)	4 (44.4%)	2 (22.2%)	9	p=.003 χ2=15.819
	Disagree	36 (12.3%)	64 (21.9%)	192 (65.8%)	292	
	Neutral	6 (7.2%)	31 (37.3%)	46 (55.4%)	83	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Government is regularly conducting risk assessment before formulation of vulnerability reduction plans.	Agree	00	00	00	00	(p=.000) (χ2=16.297)
	Disagree	45 (12.0%)	92 (24.5%)	239 (63.6%)	376	
	Neutral	0 (0.0%)	7 (87.5%)	1 (12.5%)	8	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
A district and local level preparedness plan has been formulated by government with active involvement of communities	Agree	24 (12.8%)	30 (16.0%)	134 (71.3%)	188	(p=.000) (χ2=39.094)
	Disagree	17 (14.2%)	53 (44.2%)	50 (41.7%)	120	
	Neutral	4 (5.3%)	16 (21.1%)	56 (73.7%)	76	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
District government has ensured preparation/implantation of risk sensitive land use planning to reduce vulnerabilities to disasters	Agree	3 (37.5%)	0 (0.0%)	5 (62.5%)	8	(p=.005) (χ2= 15.087)
	Disagree	37 (12.6%)	68 (23.1%)	189 (64.3%)	294	
	Neutral	5 (6.1%)	31 (37.8%)	46 (56.1%)	82	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Disaster management authorities have played a key role in disaster preparedness and mitigation in my community	Agree	1 (2.3%)	15 (34.1%)	28 (63.6%	44	(p=.000) (χ2=70.985)
	Disagree	29 (11.4%)	37 (14.5%)	189 (74.1%)	255	
	Neutral	15 (17.6%)	47 (55.3%)	23 (27.1%)	85	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
A plan for mitigation and retrofitting of critical infrastructure exist for our community.	Agree	00	00	00	00	p=.000 χ2=26.493
	Disagree	40 (12.0%)	71 (21.3%)	222 (66.7%)	333	
	Neutral	5 (9.8%)	28 (54.9%)	18 (35.3%)	51	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Development planning is risk sensitive and environment friendly	Agree	5 (11.4%)	17 (38.6%)	22 (50.0%)	44	(p= .000) (χ2=37.678)
	Disagree	29 (9.1%)	79 (24.8%)	210 (66.0%)	318	
	Neutral	11 (50.0%)	3 (13.6%)	8 (36.4%)	22	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Government is investing sufficient budget in disaster preparedness and mitigation.	Agree	2 (12.5%)	1 (6.3%)	13 (81.3%)	16	(p=.000) (χ2=37.613)
	Disagree	42 (12.2%)	80 (23.2%)	223 (64.6%)	345	
	Neutral	1 9 (4.3%)	18 (78.3%)	4 (17.4%)	23	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Building codes policies have been strictly implemented in my area	Agree	1 (4.8%)	6 (28.6%)	14 (66.7%)	21	(p=.000) (χ2=36.855)
	Disagree	43 (12.8%)	73 (21.7%)	220 (65.5%)	336	
	Neutral	1 (3.7%)	20 (74.1%)	6 (22.2%)	27	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Standard and People Friendly Early Warning system has been established in my area.	Agree	2 (40.0%)	3 (60.0%)	0 (0.0%)	05	(p=.004) (χ2=15.138)
	Disagree	42 (12.3%)	81 (23.8%)	218 (63.9%)	341	
	Neutral	1 (2.6%)	15 (39.5%)	22 (57.9%)	38	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Local communities have been involved in vulnerability reduction activates at the local level.	Agree	3 (50.0%)	2 (33.3%)	1 (16.7%)	06	p=.005 χ2=14.673
	Disagree	38 (11.2%)	81 (24.0%)	219 (64.8%)	338	
	Neutral	4 (10.0%)	16 (40.0%)	20 (50.0%)	40	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	

These findings are consistent with Kappes *et al.* (2012) study, stating that the risk assessment toward multiple hazards can contribute to vulnerability reduction efforts. Kappes *et al.* (2012) state that indicators based assessment is quite agile and shall be tailored to the needs of users for different disasters. Li *et al.* (2011) further suggest that vulnerability is an inbuilt influencing factor and vulnerability reduction mitigates the consequences of disaster. However, these intrinsic factors need to be assessed in the context of future

requirements and existing development. In the text, the Disaster Management Framework of Pakistan stresses on comprehensive risk assessment. The framework directs the government departments to develop institutional arrangements and technical capacities at all levels for conducting hazard, vulnerability and risk assessment through a multi-disciplinary approach (Government of Pakistan, 2007). But in practice, none of the institutions tailored the resources and capacities to conduct risk and vulnerability assessment of the study area. Furthermore, results of association between availability of preparedness plan and vulnerability reduction are highly significant (p=0.000). The Disaster Management Authorities have prepared plans with the support of NGOs but these plans are not based on the ground realities as at the moment these authorities lack proper risk assessment studies. The 2010 National Disaster Management Act directs the National, Provincial and District level disaster management authorities to conduct disaster preparedness at all level, and all sectors (Gazette of Pakistan, 2010). Tsakiris (2016) suggests that it is necessary to change the approach from crises management to risk management through disaster preparedness planning. Risk management approach is proactive in nature and count the prevailing risk per hazard type while the crises management approach failed to reduce vulnerabilities of the majority of the population. Palliyaguru *et al.* (2014) reported that preparedness strategies are effective in decreasing vulnerability and largely overcome factors creating vulnerability.

Besides, Srinivas & Nakagawa (2008) are of the view that disaster preparedness plans shall also take into account the environmental dimensions such as pollution, deforestation, contamination and land degradation. These dimensions create multiple disaster risks and disaster preparedness plans shall ensure protection measures in their strategies. Likewise, risk sensitive land use planning is considered one of the best strategies for disaster prevention. Such a land use plan prohibits inhibition in hazard prone locations. As per data presented in table No. 03, a significant association (p=.005) exist between preparation/implementation of land use planning and vulnerability reduction. Besides, this study further describes the role of district, provincial and national level disaster management authorities in vulnerability reduction and found that these institutions have not played key role in disaster prevention, preparedness and mitigation. In this regard, a highly significant (p0.000) association was found between the proactiveness of disaster management institutions and vulnerability reduction. These findings are consistent with the results of another study by Khan & Khan (2008). They stated that disaster management efforts in Pakistan primarily are roaming around the flood management and mitigation for other hazards which are ignored. At the moment, vulnerability reduction activities gyrate around the sharing of community losses through cash compensation, search and rescue and contingency planning. Disaster management authorities have not yet conducted any mega project focusing on risk reduction through land use planning. The study further describes a highly significant association (p=.000) between retrofitting/mitigation planning and vulnerability reduction. Through mitigation planning both structural and non-structural vulnerabilities can be reduced and community capacity can be enhanced to withstand the disasters. But in Pakistan, due to lack of dedicated resources and political will, mitigation and retrofitting have been ignored till date. Zeshan & Khan (2015) in a study conducted in Sialkot, Pakistan, demonstrates that government response to disaster mitigation is negligible. Disaster mitigation is crucial for reducing vulnerability as it saves lives and reduces damages. Ahmed *et al.* (2016) suggest that government should incentivize mitigation policies such as floodwater harvesting and irrigation enhancement. In a comparative study on flood risk reduction in Bangladesh and Pakistan, Abbas *et al.* (2016) found that Pakistan has not yet taken meaningful action to manage and mitigate disasters. The author has attributed this inadequacy to lack of synergies between DRR planning processes and policy formulation. Not only DRR planning is defective but the physical and social sector development planning is adhoc in nature and mainstreaming DRR into development planning is missing at all.

The study further explores a highly significant (p.000) association between mainstreaming disaster risk reduction into social and physical sector development plans and vulnerability reduction. Development plans and programs should be risk-sensitive and people-friendly in order to alleviate the miseries of vulnerable populations. Mainstreaming DRR into development means to critically examine each project, program, intervention and activity from a risk reduction paradigm and to decisively examine development process for potential risks associated with it. The post 2015 Sustainable Development Agenda, Paris Agreement and Sendai Framework for DRR provide new windows of opportunity to mainstream DRR into development planning. The Sendai Framework highlights the crucial deficiencies in workflows and recognizes unplanned and rapid urbanization, poverty and inequality, climate change and weak land management strategies as major causes of vulnerability (UNISDR, 2015). In addition, building blocks and scope Pakistan's national DRR policy encourages priority action to reduce current vulnerabilities to various types of disasters and further direct departments to ensure resilience through development planning (Government of Pakistan, 2013). Furthermore, a highly significant association (p.000) exists between budget allocation and vulnerability reduction. Dedicated budget for DRR contributes to the well-being of vulnerable communities and individuals. Ex-ante budgeting boosts savings by alleviating adverse effects of disasters and promotes preparedness and pre-disaster commitment to emergency response, relief and recovery operations. The National Disaster Management Act 2010 empowers the National Commission to provide and oversee funding for preparedness, mitigation and response measures (Alam, 2015). In addition, these results are consistent with studies conducted by Heo, Park, & Heo (2018), Warner, Bouwer, & Ammann (2007) and Javaeed *et al.* (2018). Similarly, building code policy implementation is also trifling while a highly significant (p.000) association has been found between building code implementation and vulnerability reduction. Inclusion of building codes in public and private structures guarantee mitigation and reduce damages to buildings and other installation. Banerjee (2015) reported that implementation of building codes minimizes structural vulnerability through inclusion of mitigation measures and subsequently ensure safety of the inhabitants of a home or building. It also ensures cost avoidance as the structures are resistant to cope with the impact of hazards. The enforcement of Pakistan's building code policy is a major challenge for local, provincial and national authorities. Apart from other causes, the apathy of local authorities at district level to enact building codes is a major reason for increased vulnerability to disasters (NDMA, 2015). In addition, a significant (p.004) association was found between establishment of early warning system and vulnerability reduction. These results confirm a similar outcome of another study conducted in Charsadda District on the early warning system. It shows that the absence of an early warning system has increased the vulnerability of flood-prone communities in Charsadda district (Khan, Khan & Jehan, 2013). Moreover, Mukhtar (2018) stated that the early warning system in Pakistan is one-dimensional in nature and participation of the local population is almost negligible in Pakistan's entire early warning system architecture. Early Warning System provides real time information on the likelihood of a disaster and can warn people in good time to evacuate or take precautionary measures. Community participation not only in early warning system but also in other aspect of DRR helps government agencies in preparedness and mitigation of disasters. It empowers the local communities and enables them to make decisions about their own future. A significant (p.005) association was found between the government consideration of community participation as a pre-requisite in disaster related projects and vulnerability reduction. Ensuring community participation in DRR projects is a major challenge for the government. Majority of the officers working in disaster management agencies lack capacity to take a bottom-up strategy and keep the statuesque aside. These officers are still practicing top-down approach in disaster related project.

Disaster management is a decentralized subject and requires the active participation of local communities. People-centered vulnerability reduction activities are cost-effective and sustainable. But local communities in the study area don't have access to decision making process regarding vulnerability reduction projects neither they are consulted before formulation of such projects. To summarize the discussion in view of above discussion and study findings (presented in Table No. 03) 62.5% population in the study area are highly vulnerable, 25.8% population is medium vulnerable and 11.7% status of vulnerability is low.

Conclusion

On the basis of study findings, it is concluded that the local communities are not satisfied with the disaster management system and its operations in the study area. Government has adopted a linear approach toward vulnerability reduction and vulnerable communities don't have access to decision making process. Governance structure is not adaptive in nature because the officials practicing DRR lack knowledge at all levels ranging from political leaders to bureaucrats, technocrats and filed staff. Crises management approach has dominated the rule of business and proactive DRR paradigm is yet to take place. Policy level arrangements still roam around contingency planning for floods and extreme weather events. The province doesn't have any mitigation plan, which is the core component of DRR. Government needs to synchronize disaster, climate change and development related policies to make it more endemic to the context of the vulnerable population. Moreover, coordination for emergency response exists but it is not leading to a strong collaboration DRR. Each organization is working in isolation and it affect DRR operation. Disaster management authorities shall conduct micro and macro level risk assessment to determine the nature of vulnerabilities per hazard type and devise strategies for mitigation. Budget allocation for DRR projects shall be allocated on the basis of vulnerability of the concerned area. Moreover, proper strategies should be developed to decentralize DRR into district level. At present the centralized decision making affect the operation of the field staff and enhances vulnerability to disaster.

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