Empowering Communities to cope Flood Risk: Learning from Flood affected Community in Narowal District, Pakistan

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Abstract

Community empowerment plays a significant role in adapting and organizing flood risks and impacts. The flood impacts the livelihood, infrastructure, production system and sustainable development. The flood in 2014 has severely affected the Narowal district and has put a momentous impact on the communities residing in those places. The six most affected villages in Narowal were selected for this research study. The data was collected by conducting field surveys followed by structured interviews in study area. This study was carried out to assess the role of government institutions and to evaluate the status of community empowerment.

The structured interviews were conducted with the officials of the various institutions and 121 affected respondents were identified to conduct the primary survey. This study concluded that more than 42% respondents did not leave home because of the non-availability of the shelter point. More than 75% respondents were dissatisfied with the efforts of government during a flood. This study inferred that 9.09% and 67.77% respondents were highly dissatisfied and dissatisfied respectively with the efforts of the Government during flood in empowering communities to cope with flood risk. The government institutions should take suitable actions to comprehend the issues of the communities to bring them in sustainable trends.

Keywords: Flood Risk, Community Empowerment, Narowal District, Pakistan.

Introduction

Flooding is one of the utmost water-related environmental disasters well known to us along with effects on human, material and ecological costs. Floods affect the livelihoods, infrastructure, production system and impact on sustainable development[12]. Flood impacts and social vulnerability are significant threats for sustainable development of the developing world[9]. It is estimated that 520 million inhabitants were affected annually across the globe, causing around 25,000 deaths in a year and costing the economy of the world approximately $50 to $60 billion per year[17]. It is also recorded that 96% of deaths linked to natural disasters in the previous decade happened in the developing countries. It is estimated that more than 1200 floods claimed an average of 5300 lived per event between 1900 to 2006 in Asia and resulted in economic loss of $207 billion[17].

Most of the people living in this areas are vulnerable to destructive flood, which is projected to increase owing to the rapid process of urbanization, population growth in flood-prone areas, vibrant land-use changes, climate change and rise in sea level. Therefore, there is urgent need for workable disaster reduction strategies to address the above-mentioned challenges.

Community empowerment plays a vital role in adopting and preparing towards risks and impacts of the flood[5]. Community-Based Disaster Risk Management (CBDRM) is a strategy to cope with the risk of flood. It can be defined as "A process of disaster risk management in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks to reduce their vulnerabilities and enhance their capacities. This means that the people are at the heart of decision-making and implementation of disaster risk management activities"[1].

Community empowerment shows a central concept in reducing health inequalities and attaining quality of life. Community involvement can lessen the impact of any disaster. Several factors such as socio-demographic characteristics (gender, age, income level, education level etc.) can determine the involvement of the community[5]. Salajegheh and Pirmoradi [10] conducted a research study and suggested that the model of community base management is feasible for Iran to reduce the disaster risk. Also, it said that disaster risk management is most suitable and relevant at the community level.

Some cities are experiencing rapid population growth in Asia[2]. Pakistan is the most urbanized in South Asia[16]. According to the 2017 population census, the total population of Pakistan is 207.77 million people in 2017 which was 132.35 million in 1998. It is estimated that 36.44% of the population lives in urban area with the urban population growth rate of 2.52% in 2017. This figure stood at 32.5% in 1998[3]. Narowal district was affected during flood 2014 and therefore, this area provides opportunity to carry out research on community preparedness. It is estimated that the total population of Narowal district is 1.71

million inhabitants in 2017. The rural population contributed to 84.95% of the total population in the district.

In this research study, impediments among the institutions were identified. This research also identified the actors that are responsible and involved in flood risk management. Furthermore, this research suggested the approach that can improve the existing flood management process and effective participation of community in this process.

Review of Literature

The natural disasters like floods are becoming complex and climate change further triggers the harmful impacts of such hazards. These disasters have a massive impact at the local level, particularly on the lives of people who are affected by a disaster. Disaster is described as a "severe disruption of the functioning of a community or a society causing extensive human, material, economic or environmental losses which go beyond the ability of the affected community or society to cope using its own resources[14]. In order to address the impact of a disaster and to overcome the occurrence of future disasters, it is pivotal to take remedial measures by managing disasters in the most effective way by engaging the local communities.

The term public engagement has been mentioned as community participation, people participation and civic engagement[14]. They also define the engagement as" a process which is an essential part of human growth, which is the development of self-confidence, pride, initiative, creativity, responsibility and co-operation". In addition to that, they also redefined public engagement as "a tool of enhancing the capacity of the affected community in order to create a resilient community".

Also, literature suggested the following way to achieve the public engagement in flood reduction including the formulation of decentralized units and local specific plans, better coordination among stakeholders, understanding the perceptions of community and effective dissemination of updated information and motivating the community and developing their capacities. Several organizations use the term public engagement as a tool for improving the capacity of the affected community to create a resilient community[14].

In Thailand, the resilience of flood-affected communities was improved by the provision of structural and non-structural assets. The structural assets included flood staff gauge, enhanced security measures, flood information board, loudspeaker and water purification while non-structural assets are first aid kits, speed card games, cadre equipment, technical and specialist medical equipment for health care units, life jackets, flood pocket manual, flood preparedness pamphlet and maps and hazard ready toolkit[8].

Few more researchers suggested that participatory video methods for disaster risk reduction were effective tools for empowering young people to raise pivotal problems with decision-makers and advocate change on the behalf of their communities[4].

Some international efforts in empowering communities for disaster risk management were carried out in the world. These efforts include the Yokohama Strategy and Plan of Action 1994, Johannesburg Plan of Implementation 2002, HYOGO Framework for Action 2005-2015, Intergovernmental Panel on Climate Change (IPCC).

Flood in the world

Weather-related disasters are becoming gradually frequent largely due to a sustained rise in the numbers of floods and storms. Over the last 20 years, the devastating majority (90%) of disasters have been triggered by floods, storms, heat waves and other weather-related events. Flooding alone accounted for 47% of all weather-related disasters (1995-2015) affecting 2.3 billion people, the majority of whom (95%) live in Asia. The total 6,457 weather-related disasters were noted worldwide by EM-DAT, the leading international database of such events. Over this period, weather-related disasters claimed 606,000 lives, an average of some 30,000 per year, with an additional 4.1 million people injured, left homeless or in need of emergency assistance in the world.

While less frequent than flooding, storms were the deadliest type of weather-related disaster, killing more than 242,000 persons in the past 21 years which accounted for 40% of the worldwide total for all weather-related disasters. Most of these deaths (89%) happened in lower-income countries, even though they experienced just 26% of all storms. The economic cost of weather-related disasters was estimated at about US$ 1,891 billion[18]. The five worst reported disasters in terms of lives lost occurred and economic losses occurred in the world as presented in the table 1 and table 2.

Flood in the Pakistan

Pakistan has suffered heavily due to floods every year primarily due to the lack of a disaster management mechanism and community empowerment. The years of 2010, 2011, 2012 and 2013, 2014 observed the worst floods in the history of Pakistan damaging crops, infrastructure and settlements. This caused a significant loss of livestock while causing unimaginable and prolonged suffering amongst the affected population.[6] National Disaster Management Authority (NDMA), Pakistan classified the floods as the worst natural disaster in the country. The scale of devastation is obvious from the fact that figures are much higher when compared with the natural disasters, the country has faced in the past i.e. 10 million people affected in 1992 floods and 3.5 people affected in the 2005 earthquake[15]. In Pakistan, the floods affected the area of 599,499 km^2, 180,234 villages, 11,239 deaths and economic loss of over 39 billion rupees[7].

Material and Methods

Study area: Narowal was notified as district and separated from Sialkot on 1st July, 1991. It is located on the north-

eastern border of Punjab province of Pakistan. The district is delimited on the northwest by Sialkot district, on the north by Jammu State, on the east by Gurdaspur district (India) and on the south by Amritsar (India) and Sheikhupura District. It is situated at the latitude 32°06'0.00" N and longitude 74°52'59.99" E.

According to the 2017 population census, the total population of the district recorded 1.71 million inhabitants in 2017 which was against 1.26 million people in 1998[3]. The urban population contributed 15.05% of the total population while the rest of the population is rural. The total area of the district is 2337 km^2. The total density was recorded 732 persons/ km^2 in 2017 which was 541 persons/km^2 in 1998[3]. It is estimated that the total number of households is 239,916 in district in 2017. The share of the urban household is 39,482 while a number of rural households is 200,434.

Table 1
Worst floods and storm in terms of lives lost

S.N.	Country	Disaster Type	Year	Deaths (No.)
1	Bangladesh	Storm	1970	300,000
2	Bangladesh	Storm	1991	138,866
3	Myanmar	Storm (Nargis)	2008	138,366
4	Venezuela	Flood	1999	30,000
5	Bangladesh	Flood	1991	28700

Source: World Meteorological Organization, 2012 [19]

Table 2
Worst floods and storm in terms of economic losses

S.N.	Country	Disaster Type	Year	Economic Loss (US$ Billion)
1	United States	Storm (Katrina)	2005	146.89
2	United States	Storm (Sandy)	2012	50.00
3	United States	Storm (Andrew)	1992	43.37
4	China	Flood	1998	42.25
5	Thailand	Flood	2011	40.82

Source: World Meteorological Organization, 2012[19]

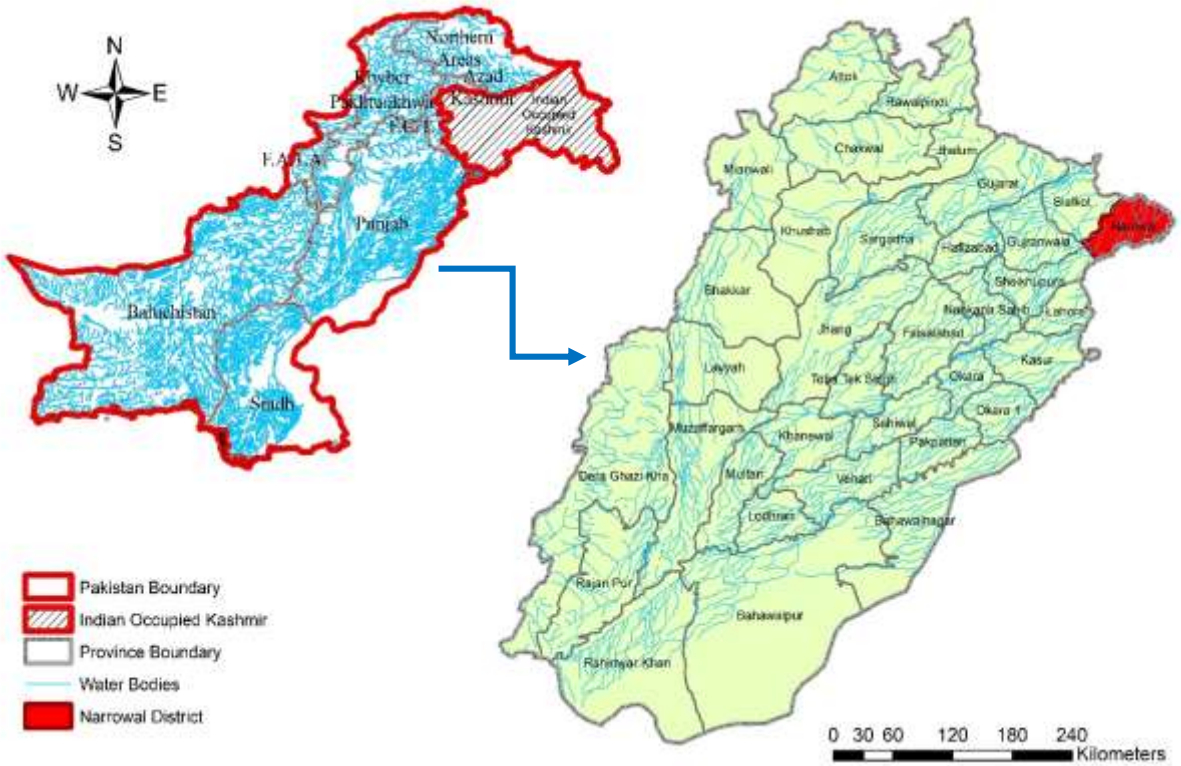

Fig. 1: Map showing study area

The Narowal district consists of three tehsils including Narowal, Shakargarh and Zafarwal with the total number of Union council so-called blocks as 98[3].

The district is popular for the production of high-quality rice but other crops such as wheat, corn and sugarcane etc. are also produced largely here. As the district economy depended on agriculture, the agro-based industries like rice mills, flour mills and brick kilns are present in a large number in this district. There are a total of 103 industries such as agro-based industries, cold storages, engineering industries and about 400 brick kilns in Narowal district.

In Punjab, the major disaster is flood and floods are regular phenomenon. In Punjab, floods not just arise in rivers but in some of their tributaries as well. In the upper part of Punjab, Narowal district is situated near foothills of the Himalayas in the border areas. In 2014, heavy monsoon rains in the catchment areas of the eastern rivers of Chenab, Ravi, Sutlej and Jhelum resulted in flash floods and rain hit areas in various districts of the province. Narowal district was severely affected by the floods causing damages of public and private infrastructure, agriculture land and communication facilities and people.

Research Methodology

This research is qualitative and quantitative in nature. Narowal district is selected as a case study due to its location. Given the contribution of the district to agriculture and economy of the country, the flood is an annual disaster which causes damage to the property and government infrastructure as well. The extensive literature was reviewed to conduct this research study.

The sample size was determined to conduct the primary survey in the study area. The sample size is selected as 2% of the total number of people affected by floods in the district. According to the Deputy Commissioner Office, Narrowal, approximately 1008 houses were affected in the flood of 2014. For calculation of the number of people, the household size of 6 person was taken from the census report of 1998. It is calculated that the total number of affected people was around 6,048. From the calculation, it is computed that the sample size of 2% of 6,048 affected people was 121.

Furthermore, six highly affected villages from three tehsils of Narowal district (two from each Tehsil) are selected to conduct the detailed survey for the target community. The selected villages are Agrian, Thalli Maliyan (Narowal Tehsil), Nangli, Saatowal (Shakargarh Tehsil), Raju Marl, akruri (Zafarwal Tehsil). Questionnaires from 20 interviewees from each selected village were distributed in this research.

Primary data was collected by conducting the field surveys in the study area with objectives to assess the socio-economic condition of the target community of Narowal district, awareness level of the community regarding flood risk and its management and to find the level of satisfaction of community regarding the performance of institutions and their key stakeholders. Also, data was collected by conducting the structured interviews with the officials of DCO office and AC Offices in Narowal, TMA's in Narowal district and District Emergency Officer Rescue 1122 to identify the impediments on their behalf while managing flood risk hazard in Narowal district.

Secondary data was collected from the previous reports in DCO office, Punjab Bureau of Statics reports, Pakistan Bureau of Statistics reports, United Nations Development Program reports etc. Data were analyzed by using Statistical Package for the Social Sciences (SPSS) and MS Excel. The findings and recommendations were drawn from data analysis.

Results and Discussion

Institutional Response and Role in Flood Risk Management and Community Empowerment: The interviews were conducted with officials of various departments who were involved in flood management at different levels with different responsibilities.

Response and role of provincial government: The main functions performed by the provincial government of the province of Punjab are to provide with a policy framework regarding flood management and to give guidelines and instructions important for the implementation of rescue, relief and rehabilitation process.

The following are the departments (Punjab Disaster Management Authority, Home Department, Irrigation Department, Meteorological Department, All Divisional Commissioners in Punjab) under provincial government of the Punjab playing key role in pre-flood arrangements and post flood management. The performance and evaluation of above-mentioned departments was carried out by the Chief Secretary and Chief Minister of Punjab. The meeting of the Cabinet Committee is held in the Cabinet Committee to review Pre-Flood arrangements in Civil Secretariat, Lahore, every year at the start of Monsoon season.

According to the structured interviews, the Prime Minister of Pakistan visited once and the Chief Minister of Punjab visited twice during both years (2013 and 2014) when flood hit Narowal district. Chief Minister's visit in flood affected villages along with local politicians (MNA, MPA etc.) and Local Administration (DC and other officials) during flood of 2014 showed merely a political activity of a political party for its election campaign. The following findings are given below:

- The implementation of major policies in executing flood risk management remained absent with poor coordination and transparent distribution of resources. The evaluation of these policies should have been

integral part of initial plan, but it was also not evident verified by the response from community.

- It was concluded from analysis of above-mentioned instructions that the pre-flood arrangements mostly focused on dealing with rescue, relief and rehabilitation of a damaged disaster affected community, while the strategy was required to be focusing on reducing flood risk by analyzing the vulnerability of flood prone communities.
- It is inferred that the strategy did not focus at identifying flood prone areas with their locations and level of vulnerability of flood prone areas and using such map for the rescue and relief operations too.

Response and role of District Government: According to the section 39 of Punjab Local Government Ordinance 2001, the functions of District Government are to provide education, health, public infrastructure, to implement the government policy and to manage flood and storm water drainage. District Government Narowal further directs the departments involved in the disaster management process. People and departments involved including their roles are:

- Assistant Commissioners, Revenue Department (to supervise, manage and monitor relief and rescue activities during flood).
- Livestock (to safeguard the livestock, provide vaccine during flood to save lives of cattle).
- Health (to provide medicine and other related facilities in relief camps).
- Building (to identify vulnerable public buildings).
- Roads (to repair and maintain important routes during flood).
- Education (to identify places for mock exercise and training).
- Police (to control violence and abuse during disaster situation).
- Civil defense (to coordinate with Rescue 1122 and to provide safety equipment to the staff involved in flood mitigation).
- TMA (to ensure proper working of de-watering sets and disposal stations, to establish relief camps in coordination with Rescue 1122 and Civil Defense).

The officials disclosed data that the total 1,749 people were evacuated, 21 deaths occurred and 20 people were injured in the flood of 2014. Further, they stated that the compensation of 29 million rupees was given to the families of those people who were killed/injured and 12 boats were used to rescue the affected people in Narowal district in the flood of 2014 by the District Administration.

13 relief points/camps were established where the representatives of every key Department were sitting under the District Administration of Narowal. 25,464 patients who suffer from different diseases caused by the flood and heavy rainfall, were treated in all health facilities and in the established relief camps. The 21,055 food hampers and 450 flour bags were distributed. In the floor of 2014, 93,092 animals were vaccinated and 1,760 bags of cattle feed were distributed. Also, 60 tents were provided to the people who were forced to leave their homes due to flood.

As per information provided by the District Administration, 262 villages were affected due to that flood, 1,010 houses were damaged making the residents of these houses most vulnerable to the flood. The area of 30,450 acre was declared flooded. All major routes linking the Narowal district to the other district remained functional while some of the roads linking different urban centers to the district headquarters were damaged and repaired when flood water passed away after three to four days. While explaining the flood dynamics in Narowal district, Assistant Commissioner (AC) of Narowal Tehsil described that it is a natural phenomenon here in Narowal district as there exist frequent topographical basins having potential of storing rainwater and creating floods and many villages thus become vulnerable to this water, however, the breaches in Nala Dek and Nala Bayin are the major sources of flood in Narowal district.

The Nala Dek's overflow water affects Tehsil Zafarwal and Narowal while Nala Dek only imparts its impact on the villages of Tehsil Shakargarh. He also mentioned some usefulness of this flood water to the higher fields/crop's owners because of its origin from mountains of Jammu containing fertile soil causing more healthy cultivation and increased production of rice. Old traditional methods of flood management are quite evident from the interview with AC Narowal, whereby he stated that no flood risk perception is required as since people living in rural areas are already aware of flood and its impacts.

Response and role of revenue department: Role of revenue department is pivotal because of the key officers involved in district government belong to the revenue department before, during and after flood. For example, District Collector is District Coordination Officer, Additional District Collector is the Administrator of TMA present in District Headquarters and Assistant Commissioner is the Administrator of TMA present in Tehsil Headquarters.

The District Coordination Officer has to remain alert 24/7 during flood as he is responsible for any lapse in the process of flood management. He has to brief higher authorities at different platforms about the preparation before flood, relief and rescue activities during flood and also assist in the rehabilitation process after flood has affected the district.

Moreover, all relief facilities are provided through revenue department as it manages the record of loss/damage occurred due to flood to an individual. Thus, this makes every official of revenue department very important for public. This can be considered as an impediment to the efficient and effective flood management as more and more responsibilities are

given to one single department with its limited capacity to deal with flood risk.

Response and role of TMAs: There are two TMAs currently working in District Narowal i.e. TMA Narowal and TMA Shakargarh. TMA Narowal has two cities (Narowal and Zafarwal) and CO Units (Baddomalhi and Qila Ahmadabad) under its jurisdiction while TMA Shakargarh has only one city i.e. Shakargarh city under its jurisdiction.

TMA was made aware of occurrence of flood just 12 hours before the flood hit the Narowal district. Government instructions were made to TMAs, two or three weeks before occurrence of flood, to plan and prepare for flood. Therefore, TMA had planned to combat the infiltration of water in urban areas such as Narowal city, Shakargarh city and Zafarwal city.

This preparation of TMA included the assignment of emergency duties to the sanitation staff and sub engineers and preparedness of dewatering sets and disposal stations to pump out any flood/rainy water from the urban areas. TMA does not have capacity to cope with flood but can help in dewatering of flood/rainwater in urban areas. TMA Narowal and Shakargarh allocated funds to repair the flood damaged roads in urban areas upon the provision of funds from local government.

Government must focus on repair and maintenance of canals, drains, dikes and other natural water channels to improve the natural flow of water without affecting the communities prone to flooding. There must be announcements in every Jamia Masjid of the district to make the people aware of time of flood well before its occurrence to avoid unwanted circumstances. Role of TMA is also post flood management effort oriented rather than preventive flood risk management due to its efforts only in relief and rehabilitation process.

Response and role of union councils: Role of Union Councils is to record and maintain statistics at local level such as births, deaths and marriages etc. They are also important as they are involved in implanting every policy of the Government regarding flood at grass root level.

However, in case of Narowal district, they were not actively involved before, during and after flood. They are not even involved in pre flood arrangements, flood relief camps, post flood damage assessment and during preparation to meet with flood during monsoon season. However, they could have been involved in the provision of early warning of flood to the flood prone area as well as in the process of sensitizing the people of flood prone areas.

In other countries like Bangladesh, the vulnerable communities can be empowered at the level of Union Councils because they play a vital role in disseminating every type of required information to the target community effectively by making the people of target community realize that they are the first responders and they are encouraged to suggest and apply different preventive and precautionary measures keeping in view the flood risk.

Response and role of Rescue 1122: At the time of the interview with the District Emergency Officer of Rescue 1122 Narowal, he has highlighted the main functions of Rescue 1122 during flood situation as:

- Training of staff as well as people from local community to deal with flood risk through drills and mock exercises.
- Provision of relief camps and halt points for rescue 1122 vehicles during flood.
- Evacuation of people trapped by flood water through boats.

Concepts like importance of role of First Responder, Disaster Risk Reduction (DRR), Community Based Disaster Risk Management (CBDRM) and First Aid Training must be promoted to get more people aware of flood risk and its management and get people safety oriented. Community organization and coordination with NGOs must be promoted to effectively deal with flood situation and to get the local community empowered with all tools to deal with flood. Safeguarding the natural drains by stone pitching and safeguarding natural water channels, culverts on highways and bridges to ensure that flood / rainy water should not infiltrate the populated areas. It takes a well-organized and coordinated effort by all institutions mentioned as above along with Rangers and Pakistan Army working together to save lives and property of public.

It is also important to note that all institutions work together but there is very little involvement from public while dealing flood risk and flood mitigation, which needs to be improved. It seems like instructions regarding preparedness of vulnerable communities to deal with flood risk from Provincial Government do not reach at the bottom level in true letter and spirit (at local level) because of the absence of involvement of vulnerable community in the decision-making process in flood management before and after occurrence of flood.

- The concept of flood risk is not understood properly by the local administration or if understood, not taken more seriously as required.
- Evaluation process of performance of institutions and indicators indicating level of flood mitigation and its effects remains missing after flood relief and rehabilitation has been done in case of Narowal district.
- The absence of early warning system requires immediate attention of the Government of Punjab. The information regarding occurrence of flood in Nala Dek and Nala Bayin from meteorological department could not reach the target community and suddenly flood turned into disaster causing major losses and damages.

Table 3
Performance of departments for flood in Narowal district

Name of organization	Assigned task	Performance	Issues in performing assigned task	Suggestions
Provincial Government	To provide with a policy framework regarding flood management and to give guidelines and instructions important for the implementation of rescue, relief and rehabilitation process	The implementation of major policies in executing flood risk management remained absent.	• Poor coordination and transparent distribution of resources. • Lake of community participation in policy making process	• Coordination should be enhanced with the aligned department. • Community representatives should be engaged in policy making for any disaster
District Government	District Government to provide education, health, public infrastructure, implement the government policy and to manage flood and storm water drainage	• Total 1,749 people were evacuated • The compensation of 29 million rupees was given to the families of those people who were killed/injured. • 12 boats were used to rescue the affected people • 13 relief points/ camps were established	• Poor coordination • Lack of staff • Lake of community participation in policy making process	• Coordination should be enhanced among all departments • Capacity building should be increased • Community should be engaged in the process of policy making
Revenue Department	• Taking preventive and protective measures against floods and rains • Distribution of relief funds and goods to the calamity affects and maintenance of accounts regarding such distribution	Relief facilities are provided through Revenue Department as it manages the record of loss/damage occurred due to flood to an individual	• Community did not corporate in the relief activities • Poor coordination among departments	• Community should be trained for flood disaster in Narowal District • Strong coordination mechanism should be developed among departments
Town Municipal Administration	To assign the emergency duties to the sanitation staff and sub engineers and preparedness of dewatering sets and disposal stations to pump out any flood/rainy water from the urban areas	Dewatering of flood/rain water in urban areas	TMA does not have capacity to cope with flood	• Government must focus in repair and maintenance of canals, drains, dikes and other natural water channels to improve the natural flow of water without affecting the communities prone to flooding • There must be announcements in every Jamia Masjid of the District to make the people aware of time of flood well before its occurrence to avoid unwanted circumstances
Union Councils	Not involved in flood activities	Not involved in flood activities	Not involved in flood activities	It should be involved in implanting every policy of the Government regarding flood at grass root level and ensure the involvement of community

Rescue 1122	• Training of staff as well as people from local community to deal with flood risk through drills and mock exercises • Provision of Relief camps and halt points for Rescue 1122 vehicles during flood • Evacuation of people trapped by flood water through boats	• Rescued and evacuated 2,542 people during flood 2014 • Rescued and evacuated 1,749 people during flood in September 2013 • 3 to 4 mock exercise sessions were carried out	Very little involvement from general public while dealing flood risk and flood mitigation	Public engagement needs to be improved

Source: Tarchiani et al[20]

Table 3 shows the performance of the above-mentioned departments for flood in Narowal district.

Response from Community regarding Flood Risk Management and Community Empowerment: Primary survey was conducted to assess socio-economic condition of target community of Narowal District, awareness level of the community regarding flood risk and its management and to find level of satisfaction of community regarding performance of institutions and their key stakeholders.

Socio-economic characteristics: The socio-economic characteristics of the respondents were measured in six dimensions including gender, age group, qualification, profession, household size and household Size (table 4).

Table 4 represents that predominantly the respondents are male which shared more than 71.07% of the total respondents who are residing in the rural areas. The young people are the most self-efficient. The majority (38.84%) of the respondents ranged from 46 to 60 years old and young people between 19 to 30 years only contributed 17.36% of the total respondents. Education has a direct relation with the employment rate in a society and its effect is so deep on a society that flood risk also tends to increase with a low level of awareness/education about flood risk and flood management in any community.

Table 4 demonstrates that mostly people are semi educated (more than 47% of the respondents are passed the level of primary and less than 20% passed the level of the middle). More than 62% of respondents are associated with the profession of agriculture and remaining respondents are belonging to the other profession. This clearly shows that people are largely dependent on their crops, fields and income from their crops in the target community. So, it becomes a matter of life or death for the poor farmers when their crop is destroyed by floodwater and they are left helpless without any home.

Table 4 represents that the size of a household of 65.29% of respondents is 5-8 persons which means a significant portion of the population lives in the villages of Narowal district that are more vulnerable to flood. Most of the respondents (48.76%) were low-income earners with a household income of less than 20000 and more than 32% of respondents earned less than 10,000. Community lacking in middle- income and high-income people may become more vulnerable to the flood risk as it will face the deficiency of resources while managing flood. As a result, the risk of flood becoming a disaster increases with more unprepared and poor people exposed to river like floodwater flowing across their villages.

Awareness level of community and information about flood risk: The following information (table 5) was collected to assess the awareness level regarding flood risk among respondents:

Table 5 represents that more than 80% of respondents did not get any type of early warning regarding the occurrence of flood in their respective villages. It is also shown that more than 73% of respondents came to know about flood just two hours before its occurrence. They did not have any idea whether the flood is going to hit their locality or not. Therefore, the vulnerable community has very low response time and they fail to react in a manner required to react during the flood situations.

This indicates the negligence of all institutions and key stakeholders in disseminating the information about flood risk to the vulnerable communities of Narowal district. Some people obtained information about flood water coming to their respective locality by social media print media and electronic media etc.

Table 5 represents that 64.46% of respondents were informed about the flood and its occurrence by local people who were coming from the places where the flood had hit while some people were told about flood water coming to their respective villages by already flood-affected relatives. This information could have been passed to the vulnerable community through proper channels or by some officials of the local administration or by some representatives of local community if community-based disaster management system would have existed in flood-affected villages.

When people of the flood-affected community were asked about that whether they were provided with the shelter point by the Government, all of them responded that they were not provided with any shelter point for their protection by the Government after becoming homeless or having their home partially damaged by floodwater.

Table 4
Socio-economic characteristics of respondents

S.N.	Indicators	Statistics
1	Gender	Male (71.07%), Female (28.93%)
2	Age	Less than 18 years (6.61%), 19 – 30 years (17.36%), 31 – 45 years (28.93%), 46 – 60 years (38.84%), above 60 years (8.26%)
3	Qualification	Primary (47.11%), Middle (19.83%), Matriculation (15.70%), intermediate (8.26%), Graduation (6.61%), Post-graduation (2.48%)
4	Profession	Farmer (62.81%), Student (10.74%), Shop keeper (7.44%), Doctor (1.65%), Business man (2.48%), Govt. employee (3.31%), Private employee (11.57%)
5	Household Size	2 – 4 (26.45%), 5 – 8 (65.29%), 9 – 12 (5.79%), more than 12 (2.48%)
6	Household Income	Less than 10,000 (32.23%), 10,000 – 20,000 (48.76%), 20,001 – 45,000 (9.09%), 45,001 – 70,000 (5.79%), more than 70,000 (4.13%)

Almost 47.11% of respondents mentioned that they require 1 hour time to reach a nearby safe place or village or town or higher place while more than 35% of respondents said that they require half an hour and only 11.57% and 5.79% of respondents said that they require 1.5 hours and two hours reaching a safe place respectively.

More than 75% of respondents mentioned that they have not been provided with food and other logistics by any governmental institution or by any NGO while less than 25% of respondents mentioned that provisions of food and logistics were provided by revenue department when floodwater had been passed.

Predominantly 42.15% of respondents did not leave home because of non-availability of time and shelter points during the flood while 14.88%, 19.83%, 7.44%, 6.61%, 5.79% and 3.31% of respondents came after 2 days, 4 days, 1 week, 2 weeks, 3 weeks and one month respectively when flood water was passed.

More than 72.73% of respondents highlighted that there was no post-flood damage assessment survey carried out in their respective locality by any governmental institution or by any NGO. This shows a lack of seriousness on part of the Government and not having a true picture of flood effects on the local community in Narowal district by conducting some useful surveys after the flood.

When respondents were asked about the information required to be disseminated before the occurrence of the flood as flood warning, they responded that the information regarding time and location of the flood (16.53%), location of shelter points (34.71%), time and intensity of the flood (17.36%), time, location and intensity of the flood (3.31%), time of flood with the location of shelter points and relief camps (18.18%), time and duration of flood (3.31%), time of flood (3.31%), information regarding areas likely to be flood affected (1.65%), location and intensity of flood (1.65%) etc. must be provided to the community prone to flooding, so that people could manage and plan their safety at an early stage. There are more than 70% of respondents who mentioned that they helped others during a flood by providing them food and other essential items such as clothing and medicine etc. and other ways. While 29.75% of respondents said that they were not able to extend help to the others. The culture of helping others is an encouraging sign for one who is looking for a community-based flood risk management in the case of Narowal district.

Opinion of respondents regarding performance of institutions in flood risk management and empowering communities to cope with flood risk: Table 6 of respondents was carried out regarding performance of institutions in flood risk management and empowering communities to cope with flood risk in Narowal district.

Table 6 highlights that more than 65% of respondents were dissatisfied and 10.74% of respondents were highly dissatisfied while just 9.92% of respondents were satisfied with the efforts of the Government during the flood in recent years. They started their grievances against the Government during flood in current years when they were asked about the role and response of Government institutions to deal with flood in their respective locality. Local people were displeased with the efforts of the Government in supplying food and other much-needed items to the flood affected people. They were not happy with the pre-flood arrangements in their respective locality as they were not informed about the flood in time.

Table 6 also represents that more than 67% of respondents were dissatisfied and 9.09% of respondents were highly dissatisfied while only 9.92% and 13.22% of respondents were satisfied and neutral respectively with the efforts of the Government during the flood in empowering communities to cope with flood risk. People were unable to understand the term of empowering the community in the local language too but grasped the concept when they were told about the involvement and right of decision making them to cope with the flood. They emphasized that there must be such workshops, seminars and lectures for the training of local representatives and involvement of the community in the decision can be ensured by giving them sufficient resources and guidance with collaboration with key officials from the local administration.

Table 5
Awareness level of community and information about flood risk

S.N.	Indicators	Statistics
1	Did you get early warning about flood?	Yes (19.17), No (80.83%)
2	When received warning about flood before its occurrence?	2 hours before (73.55%), 4 hours before (14.88%), 8 hours before (6.61%), 12 hours before (4.13%), 24 hours before (0.83%), 2 days before (0.00%)
3	Who provided you information about flood risk?	Local people (64.46%), TV, radio, mobile phone (16.53%), Social Media (9.09%), Police (5.79%). Imam Masjid (1.65%), No one (2.48%)
4	Were you provided with any shelter point?	Yes (0.00%), No (100%)
5	How much time do you require to reach a safe place?	0.5 hour (35.54%), 1 hour (47.11%). 1.5 hours (11.57%), 2 hours (5.79%)
6	Were you provided with food and logistics?	Yes (24.79%), No (75.21%)
7	How much time it took you to come back your home?	2 days (14.88%), 4 days (19.83%), 1 week (7.44%), 2 weeks (6.61%), 3 weeks (5.79%), one month (3.31%), did not leave the home (42.15%)
8	Were there any surveys regarding post flood damage assessment?	Yes (27.27%), No (72.73%)
9	What information should be disseminated regarding flood warning?	Time and location of flood (16.53%), location of shelter points (34.71%), time and intensity of flood (17.36%), time, location and intensity of flood (3.31%), time of flood with location of shelter points and relief camps (18.18%), time and duration of flood (3.31%), time of flood (3.31%), information regarding areas likely to be flood affected (1.65%), location and intensity of flood (1.65%)
10	What type of help did you extended to others during flood?	Helping in repairing structures (6.61%), helped in providing food and other essentials (33.88%), helped in paving the way to village (6.61%), helped in providing transport (5.79%), helped in storing feed for cattle (6.61%), helped in rescuing some people (1.65%), helped in saving the crops (1.65%), helped in saving cattle from flood (1.65%), helped in providing feed for cattle (4.13%), helped in provision of food and feed for cattle (1.65%), no help could be provided (29.75%)

Table 6
Opinion of respondents regarding performance of institutions in flood risk management and empowering communities to cope with flood risk

S.N.	Indicators	Statistics
1	Are you satisfied with the efforts of government during flood in recent years?	Highly satisfied (0.00%), Satisfied (9.92%), Neutral (14.05%), Dissatisfied (65.29%), Highly Dissatisfied (10.74%)
2	Are you satisfied with the efforts of government during flood in empowering communities to cope with flood risk?	Highly satisfied (0.00%), Satisfied (9.92%), Neutral (13.22%), Dissatisfied (67.77%), Highly Dissatisfied (9.09)

Conclusion

Flood is a severe hazard to the safety and social-economic comfort of the inhabitants in the world. The trend of the flood is increasing due to the rapid process of urbanization, rapid growth and climate change. There is a need for the time to take necessary actions to control the flood risk but in the case of Pakistan, at this phase community is not involved. Therefore, the first responders remained absent in actions against impact of hazard. It is not possible to completely reduce the flood risk, there is a need to develop strategies with high weightage to give the local institutions and community participation to cope with the flood risk. This study inferred that the concept of flood risk is not understood suitably by the local administration or if understood, not taken more seriously as required in Narowal district and also rural areas.

This study revealed that the process of performance evaluation of institutions and indicators indicated the level of flood mitigation and its effects which was missing after

flood relief and rehabilitation carried out in the case of Narowal District. Also, the early warning system (EWS) is totally absent at grass root level, which requires serious attention from the Government of Punjab. The information regarding the occurrence of flood in Nala Dek and Nala Bayin from the meteorological department could not reach the target community at all and suddenly flood turned into a disaster causing major losses and damages.

This study concluded that mostly respondents are male and most of the respondents are associated with the profession of agriculture. The household income of the mostly respondents (72.08%) is less than 20,000 PKR per month. They have resounded that the Government has not provided them with shelter after the occurrence of flood in Narowal district, therefore more than 42% of respondents did not leave their home at the time of flood. This research inferred that the Government has not carried out the post flood damage assessment in the district with community involvement, which accounted for more than 72% of respondents.

More than 75% respondents were not satisfied with the current efforts of Government during the flood. This study determined that more than 76% of respondents were not satisfied with the efforts of the institutions during the flood in empowering communities to cope with the flood risk in Narowal district.

Further, this study recommended that there is a need to arrange workshops, seminars and training session for officials for engagement of local community in decision-making process. The government institutions should take suitable actions to comprehend the basic issues of the communities to bring them in sustainable trends.

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