

APPRAISAL OF FLOOD MITIGATION PRACTICES IN TIMERGARA CITY DISTRICT DIR LOWER, PAKISTAN

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Abstract: Flood mitigation involves the managing and controlling of flood water movement such as redirecting flood runoff through the utilization of flood protecting walls or retaining walls rather than trying to prevent floods altogether. This study is an attempt to evaluate flood mitigation practices in Timargara city. The capacities of relevant organizations and local communities regarding flood mitigation was worst before flood 2010 in the study area. This study aims, to analyze different sectors/Non-Government Organization (NGOs) involved in flood mitigation practices, their role and responsibilities, and to explore traditional methods practiced for flood mitigation. To achieve objectives of the study a descriptive survey method was adopted for collection of data while sampling and sample size was selected through purposive sampling. At stage one Government departments were targeted which includes, Agriculture Department, Communication and Works Department (C&W), Irrigation Department, Soil Conservation Department, Civil Defence Department, District Disaster Management Unit (DDMU), Health Department]. At stage two relevant Non Government Organizations (NGOs) including MERLIN, Inter Cooperation (IC), and Pakistan Red Crescent Society (PRCS). Analysis revealed that majority of the Government and Non Government Organizations have inadequate capacities for flood hazards. Local government also need flood forecasting system for flood warning dissemination. Lack of funds and trained man power are the major constraints. It is suggested that Government should focus on the needs of the study area and avoid political interference due to which the mitigation are properly prioritized by responsible to provide proper resources and enough funds to the local government and concerned departments for efficient floods mitigation and proper management. The provincial government needs to introduce new laws and legislation for land use, to control construction and other activities near rivers and streams.

Keywords: Flood, mitigation, Timergara city, government departments, NGOs.

Introduction

Flood are the extreme events of nature in which the flow of water cannot be contend or held within the banks of rivers as a result it over flow on the river banks into area with human settlements, infrastructure etc. Measure taken to reduce the impact of any disaster causing phenomena, whether natural or man-made, are called mitigation measures. These measures are normally taken up prior

to the occurrence of disaster, including preparedness and long-term risk-reduction techniques. Disaster mitigation includes scientific analysis on risk assessment; social economic, legal, and technical processes in the development of mitigation measures; and administrative and political processes in application of these measures (Blaikie et al., 1994).

Flood mitigation involves the managing and controlling of flood water movement such as redirecting flood runoff through the utilization of flood protecting walls or retaining walls rather than trying to prevent floods altogether. It also involves the management of people through measures such as evacuation and dry/wet proofing properties, for example the prevention and mitigation of flooding can be studied on a number of levels such as individual properties small communities and may be whole towns or cities (FEMA, 2010). The cost of protection rise as more people and properties are protected. Flood mitigation offers property level protection from the destructive effects of flooding (C. Zevenbergen, *et al*). The flood mitigation practices have been traditionally focused on reducing flooding and reducing susceptibility to flood damages through a verity of interventions such as structure and non-structure measures, physical and institutional implementation before, during and after the flood. These

interventions include source control to reduce runoff, storing of runoff through detention basins or reservoirs increasing of the river channel capacity, separating of rivers and population through emergency management by flood warnings or flood emergency works and flood recovery measures.

Flood mitigation measures are adopted after the occurrence of huge damages in flood 2010 in the study area (Timergara City). Study area is located on the bank of river panjkora (Fig. 1). Many Government and Non Government organizations play its due role in flood mitigation. Government department included are Agriculture Department, Communication and Works Department (C&W), Irrigation Department, Soil Conservation Department, Civil Defiance Department, District Disaster Management Unit (DDMU), Health Department, whereas, active Non Government Organizations (NGOs) are MERLIN, Inter Cooperation (IC), and Pakistan Red Crescent Society (PRCS).

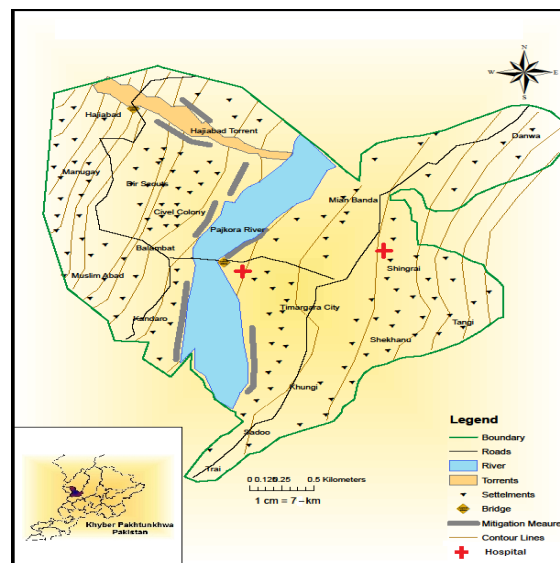


Fig.1: Map of the Timergara City District Dir Lower

Materials and Methods

The current study is conducted in three phases. In the first phase, available relevant literature was reviewed for better understanding of various aspects of the study. This was taken from different Reports, Journals and Electronic Sources. In the second phase, structural survey was developed. The survey instrument was tested to remove the duplicate statements and identify problems in questionnaire. In third phase, data obtained through questionnaire from relevant organization and analyzed statistically. The statistical package for Social Science (SPSS-16) for windows and MS Excel were used for data analysis. Purposive sampling method is used for data collection. The interview schedule was conducted with different government and non government organizations. 25 staff members from each organization were selected for interviews. The number of total surveyed Organizations is 10, including seven government organizations and three non government organization, working in District Dir Lower for flood mitigation. The required data is collated through structured questionnaire along with interviews. Multi stage sampling method has been employed for collection of data. At stage one the government organizations are targeted including Agriculture Department, Communication and Works Department (C&W), Irrigation Department, Soil Conservation Department, Civil Defiance Department, District Disaster Management Unit (DDMU), Health Department. At stage two relevant non government organizations are targeted for data collection which includes MERLIN, Inter Cooperation, and Pakistan Red Crescent Society (PRCS). And in stage, three Focus Group Discussion (FGDs) were conducted in

the local community where 15 to 20 participants involved. The list of the required organization was provided by Deputy Commissioner (D.C) office and District Disaster Management Unit (DDMU). Which are responsible for Disaster Risk Reduction and Disaster Risk Management in the district.

Results and Discussion

This research aimed to identify and analyze different government department/sectors and Non-Government Organization (NGOs) involved in flood mitigation practices in Timergara City. Selected government departments include, Agriculture Department, Communication and Works Department (C&W), Irrigation Department, Soil Conservation Department, Civil Defiance Department, District Disaster Management Unit (DDMU), Health Department. On the other hand relevant Non-Government Organizations (NGOs) were MERLIN, Inter Cooperation (IC), and Pakistan Red Crescent Society (PRCS).

Mitigation Measures adopted by Non Government Organizations (NGOs)

Merlin

MERLIN is a non government international organization working for health services. The main role of the particular organization is to provide technical support to the local government and provide contingency DRR and mitigations to the local government. Table 1 shows that Marlin has 98% logistics resources available while 2% are required to adopt mitigation (structure & non structure) measures for flood hazard in the study area. organization has conduct an awareness campaign regarding flood hazard with emphasize diseases and their f protective

measures in the local community. There are 10 to 15 specialized personals in Timergara office. 90% of the organizational staff have hazard knowledge and are fully equipped. The organization have more than 70% life saving and emergency equipments, drugs and 100% vaccination stock.

Pakistan Red Crescent Society (PRCS)

The International Red Cross and Red Crescent Movement is the world's largest humanitarian network, with a presence and activities in almost every country. In 2002 Disaster Management (DM) became a number one priority area for PRCS, leading to the establishment of the Disaster Management Department. In table 1 it is cleared that PRCS is fully equipped with vehicles and can help for 200 families in the study area. However, more logistics equipment is needed to cover 400 families of the community. Its focus on non structure programs in which the organization conduct awareness campaign regarding flood hazards. There are 100 sessions they have conducted to create awareness among the community people regarding flood mitigation and preparedness.

Inter Cooperation (I.C)

Inter cooperation (IC) is a Swiss Foundation for Development and International Cooperation with the Head Office in Bern, Switzerland. Its works on development and to alleviate poverty in rural areas. In Pakistan IC has an independent status of an International Development Organization. IC has been actively engaged in the development sector right from its inception in 1982. IC performed duties in both component of mitigation (structure and non structure program) particular in

infrastructure mitigation program. 6-7 flood protections structure were constructing by IC in the study area. Regarding construction of Gambian walls, 40% of the Gambian walls were constructed by the organization. In case of sand bags activities which 60% has done by IC. In non structure mitigation programs, they are fully cooperating. They have specialized and trained staff. The overall staff of the organization is fully familiar with flood mitigation measures. Present staff is regularly doing drill and exercise and they following rules and regulation for flood mitigation.

Structured and non structured measures by government organization

Agriculture Department

Agriculture department is public sector organizing its mandate is to increase production of Agriculture, awareness regarding Agriculture, to utilized registered farmers and their skills.

The above table No. 2 reveals that the agriculture department has 50% resources for structure mitigation in flood hazards. There are 5 tractors available in the office. The department organizes 3 to 5 session per month. The organization has 30% pesticides for agriculture mitigation but it is not enough.

Communication & works Department (C&W)

Communication and works department is established and is committed to provide presentable, economical, sustainable and durable physical infrastructure for nation building, compatible with economic constraints to improve the quality of life of the citizens. The table 2 shows that structure and non structure mitigation has been done by C & W department. 25% of flood protection

structure is constructed including Gambian walls. Logistics and available resources of the department is 20% available. The department has 20% of specialized and trained staff and further more training are needed.

Irrigation Department

The development of irrigation Agencies has strong linkages, and interfaces with the physical infrastructure as well as system design and management practices.

Table 2 shows that irrigation department has 25% of flood protection structure. Constructed of Gambian walls (4875 feet in length) is an achievement to protect local people and their properties. Department has negligible logistic supports and don't have resources. The department needs logistic supports minimum of 3 vehicles. One session per month is included for awareness.

Health Department

The Department of Health is responsible for provision of health services in order to achieve the optimum benefit within the available resources for the people. 95% of resources are available to cope with flood disaster. It is also replied by the concerned employees that 60% medical care medicines are present. Contribution in non structure mitigation programs the health department has campaign programmes for flood hazards and how can reduce its impacts on human health. There are 90% staff is trained. There is no drill and exercise for the present staff. In their stock for emergency and life saving 100% medicines are available.

Defense Department

Civil Defense is an organization of the citizens to minimize the effects of any enemy action. It is organized to give service to victims and take action to minimize damage to human life and property. In structure mitigation programs there are 200 existing and 400 required sand bags and existing logistics 40% while 60% required for the flood mitigation practices in the study area. They are also playing a key role in creating awareness and coping mechanism to flood events.

Soil conservation Department

This department is a sub part of the Agriculture department. Mandate of organization is to protect the fertile soil and cultivated land & water conservation in the study area. They are actively involved in flood protection activities

They have one 1 vehicle and are demanding for 3 more vehicles and equipment for providing search, rescue and to provide relief activities.

District Disaster management Unit

Provincial Disaster Management Authority (PDMA) is an authority at district level, to deal at grass root level with disasters. Due to newly establishment, 80% resources are required including vehicles and equipment.

There are 2 specialized and trained personals and 100 more personals are required to train the community people about flood hazard. There is no drill and exercise which need improvement to respond efficiently.

Table 1. Flood Mitigation measures by Non-Government Organizations (NGOs) in Study Area

Organizational Information's	Name of the of the organizations		
	MERLEN	Inter-Cooperation (I.C)	Pakistan Red Crescent Society (PRCS)
Mandate of organization	Health care services delivery.	Climate change Adaptation	The Organization works on Disaster Preparedness and Response
Role of org; In Disaster Management Planning	To provide technical support to the local Gov: And provide contingency DRR and Mitigations to the local Gov:	Organization do not participate in disaster management planning with local Gov: The Organization follows its own strategies.	Conduct Hazard Assessment, and provide suggestions to the local Gov: and line Agencies.
Capability Level of org; in flood Mitigation	Technical support provision, planning, and Mapping are slightly occurred through out the year.	The Organization have fully skilled staff and well trained personals, The Organization is fully prepared for future hazards.	The Organization support 200 families on District level. Conduct Awareness sessions and Provide different trainings to volunteers on community level like First Aid, And capacity building sessions to the community.
Flood Mitigation Measures for Future Flood	No Mitigation measure for future.	Organization have different Structured & Non- Structured measures like; A forestation in river banks, Community training/awareness regarding flood hazards, water shed management in steep slops.	Organization have District Disaster Response team (DDRT) consist of 25 volunteers works on mitigation activates and educate the local community regarding flood hazards, they are well trained.
Role & Responsibilities	To provide medical care like Inoculation & Vaccination for the vulnerable community Prone to flood hazard.	Organization working on climate change adaptation and the Organization is responsible to provide awareness and trainings regarding flood hazard.	Organization working on awareness in flood prone communities, They also work on response and recovery phases during flood hazards.
Steps for Enhancing organizational potential for flood Mitigation	Organization is fully prepared and does not need any enhancing steps further more.	Fund requirement, Human Resources. And well organized and valuable state polices, Co-ordination with Local Gov:	Required Gov: Support for Legislation, Organization also needs full Co ordination with Gov: officials.
Types of Training the organization have done	No trainings will be done by staff members	Special Training Regarding DRR/DRM.	1-National Disaster Response training (NDRT). 2-First Aid

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Required Resources for future Plan	Bugged relocation, Technical experts and proper working environment required	Organization does not need resources for future flood mitigation plan.	Organization does not need resources for future flood mitigation plan.
Major challenges in Utilizing the available resources for flood Mitigation	Organization doesn't have any challenges during flood mitigation practices.	Organization have faced budgeted constraints some time Lack of Co-ordination with Gov: Departments.	Organization have faced budgeted constraints some time Lack of Co-ordination with Gov: Departments.
Role of organization; in previous flood hazard	Non-structural mitigation measure for flood mitigation like vaccination, and awareness campaign.	Structural mitigation measure for flood mitigation like Gabion walls Protection Structures, Water Shed Management and in bio Engineering the Organization use all the activates as a package .	Organization doesn't have any experience in previous hazard.
Best Practices in the current flood mitigation measures taken by organization	Organization has technical experts and specialized trained personals, and is fully equipped for future upcoming flood hazards.	Structural mitigation measure for flood mitigation like Gabion walls Protection Structures, Water Shed Management and in bio Engineering the Organization use all the activates as a package .	Conduct First Aid Trainings regarding for police Department, and Local Community Volunteers.

Table 2 Flood Mitigation Measures by Government Departments in Study Area

Organizational Information's	Name of the of the organizations						
	C & W Department	DDMU	Irrigation Department	Agriculture Department	Health Department	Civil Defenses	Soil conservation
Mandate of organization	Construction of Gov: roads, bridges and caveats	The Organization in closed contact coordination with local and Provencal Departments like PDMA, Home Deptt: and work on interpretation and implementation of Disaster Management Policies.	Irrigation and flood mitigation and protection on different tributes	To increase production of Agriculture, awareness regarding Agriculture, To utilized registered farmers and their skills	Health care and Public safety .	Focus on civil defiance trainings, Managing fire hazards & flood hazards & rescue operations	Protect the fertile soil and Cultivated land & water conservation
Role of org: In Disaster Management Planning	To give suggestion regarding construction & development to the local Gov	Provision of basic information, Placement of demands for Logistic support, Identification of vulnerable places/settlements etc, And discuss needs of human & capital resources.	To give suggestions, discussing ADP schemes & demanding funds for flood mitigations from the local Gov:	To give suggestions regarding protection of agriculture from flood hazards	To discuss emergency planning, prepared doctors team for flood mitigation measure and special response team, and also alerting of sanitation staff are also discussing	To give suggestions regarding disaster management to the local government	Share ideas with local government regarding Strengthen the banks of rivers and streams
Capability Level of org; in flood Mitigation	Department have level of capability after 2010 flood that's why department is highly capable compete with upcoming hazards	The Organization supports 200 families on District level. Conduct Awareness sessions and Provide different trainings to volunteers on community level like First Aid, And capacity building sessions to the community.	Department is Partially Capable	To warn people regarding flood hazard & to protect agriculture land, seeds reservoirs, Organization is fully capable for future events	To ensure the required medicine & doctors, that's why the department is fully capable to cope upcoming flood hazard	Capable for awareness to the people regarding disasters& play an important role in early warning system	Department have skilled and motivated personals & the department is capable to compete with upcoming flood hazards

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Flood Mitigation Measures for Future Flood	Not yet	Department is not capable to cope upcoming hazards, the Organization have low mitigative level due to lack of skilled and specialized staff, and insufficient funds and technology.	Protection walls on both sides of Panjkora river and on all of its tributaries	The organization have flood cell through which they inform the local community and as well as District Gov:	Department is fully prepared for future flood & the department is fully equipped with required medicines and other available resources	Awareness campaign regarding flood mitigation practices & the department is well equipped for flood mitigation practices like; trained swimmers, tugs, etc	Water Poundings, Check dames, are modified through which the department is able to reduce the intensity of upcoming hazard.
Steps for Enhancing organizational potential for flood Mitigation	Technical & skill staff are required	Skilled Human Resources, Provision of Machinery and equipments skilled person's, Extension and Implementation of some bye Laws to remove encroachment.	The department Just depend on fund allocation	To ensure skilled staff in the department on district level, & to increase the required logistics for the department	To ensure required budgeted & to make sure the skilled and technical staff, and the major step is to fill the vacant positions	Different trainings are required for available staff for flood hazard management	Need topographic maps, flood hazard mapping, latest equipments, & Introduce new designed structures
Types of Training the organization have done	No Training are conducted	Only Software Operation trainings	Early warning system	DRR in Disaster Management	Nil	Rescue trainings and First aid training	Nil
Required Resources for future Plan	Nil	Required funds, skilled and specialized staff, Logistics and Technology	Nil	All the available resources are adequate	All the available resources are adequate	Different equipments like; tubes, Mega phones, vehicles & sufficient funds are required	All the resources are sufficient
Major challenges in Utilizing the available resources for flood Mitigation	Lack of technical experts	Insufficient funds, Lack of awareness in the community and vacant positions, and limited as well as untrained staff.	Lack of available resources and insufficient funds, and lack of logistics	Political Interference, Lack of knowledge & lack of awareness in the local community	Lack of specialized persons, Vacant positions & budgeted constraint are the worst challenges	Fund constraint, Improper equipments and the major challenge is the lack of awareness in the community	Lack of Funds

Role of organization; in previous flood hazard	To excavate debris in flooded region in past 2010 flood	Organization doesn't have any experience in previous hazard. DDMU was not established at that time	Introducing sloping spurs for flood mitigation, & protection walls are building.	The overall staff are engaged in survey of the damaged Agriculture land after 2010 flood	Provide medicines, Ambulance care, & medical staff to the affected area	The volunteers of the department play an important role in previous flood hazard	Technical support to the line agencies and provide subsidies to the affected communities for flood protection.
Best Practices in the current flood mitigation measures taken by organization	Excavation of debris from roads, reconstruction of roads and bridges.	Early warning system, Establishment of relief camps.	Sloping spurs which is very valuable & formal for flood mitigation.	Fully prepared & trained staff, available equipments and machinery is read for unwanted events.	To aware the people regarding flood hazard & to engage the overall staff and provide available resources for flood mitigation in the affected area.	Rescue & evacuation.	Water pounding and slop spurs are the best practices for flood mitigation.

Conclusion

This study is an attempt to evaluate flood mitigation practices in Timergara city. After analyzing the data, it is concluded that most of the relevant government department have not provided with resources and trained staff for flood mitigation. There is insufficient funds and resources with local government and concerned organizations like vehicles, heavy machinery, and other equipments like flood warning system etc. Due to unskilled and unspecialized officials the flood mitigation skills are not enough. The study also indicated that poor flood mitigation flood mitigation were going by the concerned organizations. The local community has no capacity and education on flood mitigation measures. The study also indicated that these local communities participated in previous disaster risk management to build some retaining walls to save their agriculture fields and roads, however, participation in planning and disaster risk reduction activities of the local is limited. The study also revealed that

there is no proper legislation regarding land use to stop construction of houses and markets in flood prone areas. Political interference in the study area also negatively affect the flood mitigation practices and reduce its effectiveness as well, because the proposed funds for flood mitigation are diverted by politicians towards unnecessary activities for the sack of their interest. Traditional methods are not adequate for flood in the study area, because the flood disaster occurs suddenly and affect the local community along the river and streams banks. There is a need for adopting the improved mitigation practices to reduce the flood disasters and minimize the losses, for which it is necessary to aware the community train the stakeholders and service providers to respond timely and efficiently.

References

- Hazrat, A., Shah, M. A. and Iqbal, I., 2007.
Medicinal value of Ranunculaceae of
Dir valley. Pak. J. Bot., 39(4): 1037-
1044.
- Federal Emergency Management Agency
(Female). 2011. Mitigation Best
Practices.
- Federal Emergency Management Authority
(Female).
[Htt://nhma.info/uploads/bestpractices/2011](http://nhma.info/uploads/bestpractices/2011).
- Blaikie, P., Cannon T., Davis, I., Wisner
B., 1994. At Risk: Natural Hazards
People's Vulnerability, and Disasters
Routledge Publishers, London.
- Zevenbergen C. , Cashman A. , Evelpidou N.
, Pasche E. , Garvin S. , Richard . A,
2010 Urban Flood Management, CRC
Press, p 340.
- www.gfdrr.org/sites/.../World_Bank_Cities_and_Flooding_Guidebook, Global
Facility for Disaster Reduction and
Recovery, March 20, 2011.