

Disaster Risk Reduction against Flood Destruction

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Abstract: Every year floods come in Pakistan and made great loss of life and livelihoods. To reduce bad effects it should cover the crisis management before, during and after the flood event. Organizational schemes with a clear allocation of responsibilities and authorities on each level of floods. Preparation and provision of information for the crisis management of large-scale and local disasters sources and access to real-time information on situation development should manage for potential risks. To avoid such destruction there must be proper planning for disaster risk reduction. Evacuation plan play an important part to reduce the destruction of life and livelihoods. Community Based Disaster Risk Reduction and Web Service will minimize the Loss and danger.

Key Words: Tehsil, Community, Destruction, Infrastructure.

Introduction

A **flood** is an overflow of an expanse of water that submerges land. Everywhere flooding might occur due to direct flooding, dam or dyke-break etc. It should cover the crisis management before, during and after the flood event. Organizational schemes with a clear allocation of responsibilities and authorities on each level of floods. Preparation and provision of information for the crisis management of large-scale and local disasters sources of and access to real-time information on situation development should manage for potential risks. Provision of expertise, experts, resources, advice to the public about what to do before, during.

The authorities should have the capacity to respond to such events with a complete co-ordination of information systems and existing forms of assistance, in accordance with the relevant contingency plan. The integrated flood defense plans should collect all important technical and other relevant data on the floodplain and the defense structures at the local, regional and national level.

Evacuation plans should be based to support effective measures in saving lives, movables and livestock, to remove hazardous materials in order

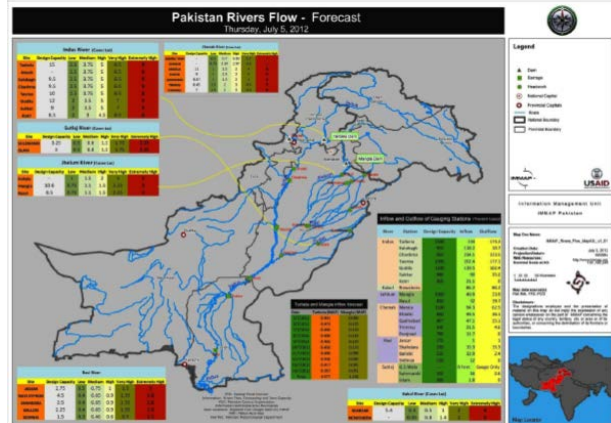
to save the environment from accidental effects. Organizations are responsible to maintain the rehabilitation plan.

Whenever floods come they make an enormous impact on the environment and society. Floods destroy drainage systems in cities, causing raw sewage to spill out into bodies of water. where severe floods, buildings can be significantly damaged and even destroyed. This can lead to catastrophic effects on the environment as many toxic materials such as paint, pesticide and gasoline can be released into the rivers, lakes, bays, and ocean, killing maritime life. Floods may also cause millions of rupees worth of damage to a city, both evicting people from their homes and ruining businesses. Floods cause significant amounts of erosion to coasts and lead to more frequent flooding.

Pakistan has characterized by the topographic and climate change, low rainfall and extreme temperatures between northern and southern areas of Country. Pakistan is vulnerable to different types of Hazards like flood, earthquake, Landslides etc. There are different causes of floods in Pakistan like monsoon, ice melting,

upstream, tsunami, flash flood etc. Most floods are upstream floods in Pakistan. Most affected areas are Mianwali, Bhakkar, Multan, Muzaffargarh, Khanpur, Rahim Yar Khan, D.G. Khan, Jaampur, Rajenpur, Khairpur, Ghotki, Nawab Shah, Haiderabad, Kashmor, Shikarpur, Sakkhar, Dadu, Larkana, Sahwen, Thattha, Badeen, Peshawer, Noushehra, Charsadda, Jhelum, Nawab Shah, Jhang, Gujrat, Sargodha, Sialkot, Wazirabad, Hafizabad, Faisalabad, Gujrat, Sargodha, Lahore, Shahdra Lahore, Sahiwal, Khanekandala Singhwala, Pakpaten, Burewala, Vehari, Meilsi. In July 2010, the Flood has made Physical damage and casualties due to heavy monsoon rain. Almost 1/5th of Pakistan was underwater Punjab, Sindh, Balochistan, Khaiber Paktun Khoah and Indus river basin has bitterly affected by flood. Similarly flood has come and made the loss of life and physical damage.

Year	Price of Property	Population	No. of villages
1950	11282	2190	10000
1956	7356	160	11609
1957	6958	83	4498
1973	118684	474	9719
1976	80504	425	18390
1978	51489	393	9199
1988	25630	508	4035
1992	69580	1008	13208
1995	8698	591	6852
2001	30450	219	50
2003	4175	484	4376
2004	15	85	47
2005	1050	59	1931
2006	1250	541	2477
2007	8900	586	6498
2008	3900	157	800



To minimize the physical damage and casualties, government of Pakistan and different National and International Organizations and NGOs has worked in Pakistan. Mobile Knowledge Resource Centre (MKRC) has launched in Karachi to reduce & help communities stay, prepared through innovative technique that reduce their vulnerabilities and increase their capacities for further disasters. Its main responsibility is Town Watching exercise sand bag preparation life saving bottles making and consulting a rescue boat. Additionally communities will receive emergency bags First-Aid trainings. Also write about UN-Habitat has worked in Pakistan for the misery and affected people of disaster to manage their life as a normal person



Risk Assessment

To Improve risk assessment, identify the high risk areas into landuse and mapping of hazards.

Make emergency and rescue planning policies for risk reduction. Check its effectiveness of the flood protection measures along the whole longitudinal profile of the river, in view of informing the frontage population of the potential risks including remaining risks e.g. Dam break, ice-jams or dyke break.

Make laws for flood retention or to restore and mobility to waterways. Its purpose is to discourage protective bank construction, embankments, impoundment and undermining, constructions or installations and any construction or works likely form an obstacle to the natural flow of waterways that cannot be justified by the protection of densely populated areas.

Stopping building construction or development where areas are at risk of floods, land-slides or dam failures.

Restrictions and prohibitions should be based on risk assessments. Storage or drainage of water in the catchment area should be guided by the underlying principle that water-related problems. It may not pass by downstream or from one part of the river basin to another.

Identify and reduce the vulnerability of existing infrastructures. All networks located in flood-prone areas like water supplies, energy systems, and transportation, communication networks, public facilities and particularly transport network which may suffer massive interruptions or hinder the evacuation and the arrival of emergency services.

Early warnings and forecasting Flood

The expected climate change indicates the early warning and flood forecasting in flood plain areas at immediate and high risk.

Flood forecasting can be effectively combined with other measures for flood prevention such as retention, land use and structural Measures, flood emergency etc.

A major risk in operating early warning systems lies in the possibility of false alarms of flood, due to either under- or over prediction of hazards.

Historical records need to be maintained for forecasting the flood.

Traditional measuring instruments rain gauges should play a fundamental role. Radar and numerical weather forecasts become more accessible. The traditional and new technologies should co-exist in an efficient manner and used for mutual data verification and comparison.

Dissemination of information is a highly diversified activity.

Use historical information and experience to the maximum potential to save lives.

A timely and reliable flood warning and forecasting system depends upon the hydro-meteorological

An effective early warning and forecasting system for extending the reaction time should be supported by meteorological information.

A compatible meteorological and hydrological information system and database with a fully automated data communication system should be created for the entire river basin.

It is possible that forecast middle does not cover the whole area. Then develop a proper link among the separate or sub-models and cover the various sub-basin. The model should be worked out and verified. It should be harmonies the technical procedures for hydrological and meteorological forecast to store and exchange data between neighboring countries.

In the mountainous areas, the warning of flash floods should be based on real-time information from an automatic precipitation gauges network combined with quantitative radar precipitation data and supported by quantitative rainfall forecasts. The system of warning flood services should be decentralized, and capable of providing local warnings with a time advance which would be impossible to be ensured by using central systems.

In urban areas short reaction time occurs in flash floods, because of the high impact of floods. Here big efforts must be taken for achieving reliable warning levels based on real time measures of rain intensities and water levels in

main sewer trunks combined with a deep knowledge of the sewer system of the city. Monitoring, research and forecasting of the prediction of Ice jam and ice break up should be developed jointly with morphological examination of river.

An automatic information system should provide and exchange the data about the operation of relevant water storage reservoirs and other hydraulic structures. It should be set up and operated together with the flood warning services and other participants involved in the flood protection, mainly administrators of watercourses and operators of hydraulic structures. It is a prerequisite for a real-time operation of dams and retention basins in the event of floods.

An effective and reliable system of flood forecasting and warning dissemination should be set up to inform flood authorities and citizens in threatened areas. Classical and new media like official warnings, state and private broadcasting services, satellite-based communication system, alarm calls on the radio, mobile telephones, the Internet and teletext etc should be used, tested and performed according to technological progress. Alarm and action plan must be used in local conditions.

It is rarely seen that large basins the benefit of the most advanced flood forecasting system will outperform have a good exchange of information between upstream and down-stream water management authorities and relevant communities.

Resilience

Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner. It includes through the preservation and restoration of essential basic structures and functions.

Resilience is the ability to “resile from” or “spring back from” a shock.

Safe and resilient communities

The safe and resilient communities understand the disaster risks. They can assess and monitor these risks and can protect and make themselves safe to minimize losses and damage when a disaster strikes.

The building structure should be against the disaster thread that the vulnerabilities continue to be reduced for the future. More safety and resilience shows the less vulnerability. It meets the development goals. It's a continuous and long term process.

Evacuation

Evacuation is an organizational movement of people from an area of risk to a safer location.

Phases of Evacuation

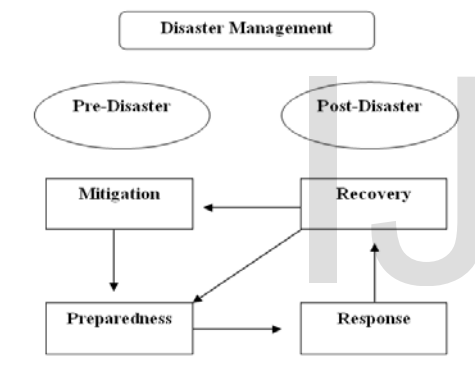
- Basic purpose of evacuation is to bring people to a safe place for it they warn the people, order them to move, manage the center and arrange a new and safe place.
- Place road sign along evacuation routes for the route guidance of people.
- Identifying and prepare requirements during evacuation like transport, gasoline, food, water, medicine, road signs, communication system etc.
- Networking, coordination and resource for the purpose of evacuation
- Basic animal husbandry training for flood to safe buffalos, cows, hoarse, chicken, ducks etc
- Floating water proof barrel and water proof plastic envelope to safe the paper documents.



Vulnerability

The characteristics and circumstances of a community system or assets, that makes it susceptible to the damaging effects of hazards.

Flood Management



1. Mitigation

Mitigation is the lessening or limitation of the adverse impacts of Flood.

Structural and non-structural measures

- a. **Structural measures:** Any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard-resistance and resilience in structures or systems;
- b. **Non-structural measures:** Any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular

through policies and laws, public awareness raising, training and education.

Structural Measures and Their Impact

Flood protection is never absolute. Only a certain level of protection against flooding can be reached. The concept of residual risk is used for "flood control structure". Build, maintain and rehabilitate, dams, flood ways, by-passing channels, dykes and other flood-control works, hydraulic structures and other water-construction works should ensure that they are safe and provide a sufficient level of flood protection. It should be done with a long term insight and by taking into consideration the impact of climate change on river run-off.

The risk of flooding, landslides and dam failures should not be increased if developing a flood-control work.

Carry out multi-criteria analysis for the flood and erosion defense measures in order to prove their effectiveness and play a role in deciding for or against funding and planning assistance. Non-monetary impacts should also be factored into this.

Major storage dams in headwaters may contribute considerably to reducing the risk of flood damage downstream especially when floodplains have low flood-dampening effect significance. Dam safety, the operation of dams during flood events and the legal framework concerning the operation of dams during flood events should be taken into consideration. Interdisciplinary cooperation within a river basin should also include owners and operators of such dams.

Complement the flood protection in residential areas with limited space by flood protection walls, mobile closures, superstructures or simple sandbags, bearing in mind that their implementation must refer to a systematic planning co-ordination. The non-permanent forms of barrier for flood protection should provide much flexibility and increased opportunities for effective management of a wide range of flood events. The level of deployment depends on the length of the warning and the

capacity for storage, transport and erection capacities without any deterioration of the evolution of floods in the down-stream direction.



Prevention

Prevention is the outright avoidance of adverse impacts of hazards and related disasters. Dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high risk zones, and seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake. The complete avoidance of losses is not feasible and the task transforms to that of mitigation. Partly for this reason, the terms prevention and mitigation are used interchangeably in casual use.

2. Preparedness

Preparedness is the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate respond and recover the flood.

Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems of flood. In contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These are supported by formal institutional, legal and budgetary capacities. The “readiness” describes the ability to quickly and appropriately respond when required.

3. Response

Response is the provision of emergency services and public assistance during or immediately after a disaster in order to save lives. To reduce health

impacts, ensure public safety and meet the basic subsistence needs of the people affected. Sometimes it is called “disaster relief”, the division between response stages and the subsequent recovery stage.

For Response emergency troops will move towards the hot spot. It will divided further in three troops.

- I. **Indicator:** This troop will indicate the Injured or dead people only.
- II. **Recue:** It will further divide into: Basic Aid & Medical Aid
 - a. **Basic Aid:** The injured people will provide the basic treatment.
 - b. **Medical Aid:** The bitterly injured people will send to the hospitals and instant treatment.
- III. **Memorial:** The Dead people will sent to the camps where they may identify through missing people.

such a division of troops responsibilities has been exercised in Iran for Earth Quake. As the result they have found less loss of life.

4. Recovery

The restoration and improvement of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

The recovery task of rehabilitation and reconstruction begins after the emergency phase, and should be based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation. Recovery programmers’ coupled with the heightened public awareness and engagement after a disaster. It applies the “build back better” principle. Recovery contains the Rehabilitation and Relief of the victims.

Rehabilitation

It starts the continuation of victim’s life; provide the basic needs, residence, services etc.

Relief

Relief contains the Shelter, medical treatment, food and clothing of victims. Relief contains the Emergency Health Services.

First Aid:

Give first aid to the victims, managing mass casualties, service nutritional deficiencies, sanitation, water supply, personal hygienic and control of communicable disease.

It controls the psychological of victims to come normal life. Engage them in different activities like play games, listening music etc.

Requirements

It's a logistic approach. It handles the damage needs, capacities Assessment (DNCA), monitoring and reporting, coordination and communication between and among victims and service agencies, Resource mobilization, Emergency operation Center/ Committee Formation.

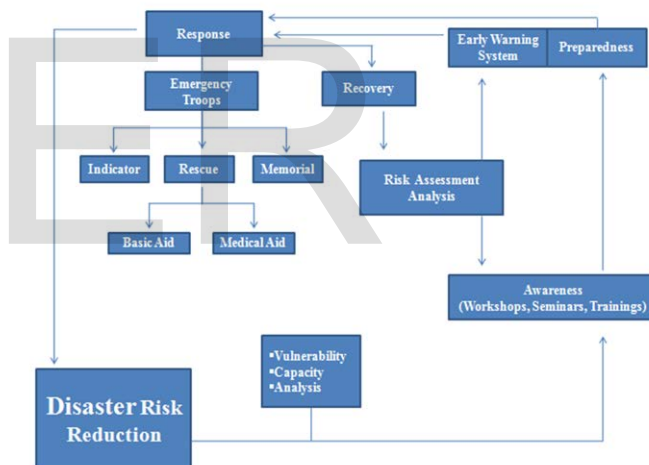
Relief Delivery Operations Process contains the steps of DNCA, Planning, Recourse generation, purchasing, warehousing, repacking, Distribution, Assessment, Reporting.

Prevention of Pollution

The disruption of water distribution and sewage systems during floods become the cause of severe financial and health risks. Preventive measures should be taken to reduce possible adverse effects of floods. In flood-prone areas, preventive measures should used to reduce possible adverse effects of floods on aquatic and terrestrial ecosystems, such as water and soil pollution.

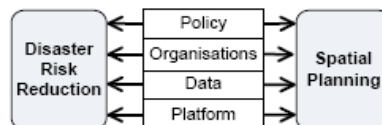


Emergency management planning and operation against the harmful impacts of water pollution on ecosystems during minor and major floods should be properly prepared on time and maintained in operational status to support effective measures and evacuation. International and regional monitoring, warning and reporting specific systems should be put into operation and aimed at ensuring timely warnings.



Disaster Risk Reduction

Disaster Management avoid the affect of disaster there must be some actions to reduce the disaster affects for individual and whole the economic, physical and human loses, the vulnerabilities, Capacity and resilience should increase to minimize the loss. Protection should be provided in the affected areas by armed forces, refuges, volunteers etc.



Community Based Disaster Risk Reduction Model



To manage the disaster reduction community should be trained to face such disasters. People should be given the training by Practical exercises and awareness. Awareness should be given through presentations, social Media, print media e.g. pamphlets, animated movies etc. Communities should understand the Risk Assessment the hazards, vulnerabilities, capacities assessment and consideration of people's different perceptions of risks. In initial plan all activities should be managed according to before flood, during flood and after flood. The focus is on flood prevention, mitigation and preparedness.



Flood Risk Assessment

In Flood Risk Assessment Govt. should participate in proper structure. People of village and a union council should contact their councilor and submit their issues containing their problem, physical loss, necessities, water contamination and sanitation, removal of garbage etc. Union Council will collect the data and arrange it in a GIS system and forward it to the Union Nazim. In Stream areas there are upstream flood and in urban areas there are urban floods.

Union Council and village are to mitigate the flood in communities. Their responsibility is to approve the annual development plan and budgetary proposal of the Union Administration. Union Nazim will Monitor and report to the concerned authorities in relation to land use and building laws, environment and health hazards. Collect the data from all union council and send in collective form to the Tehsil Nazim. Tehsil Nazim will lead the flood mitigation and relief operation and will work in consolidation with the district disaster management authority. The District/ Municipal Disaster Management Authority will formulate and implement district and municipal disaster management plans. He will collect data in collective form.



- **Roll of Community Based Organizations**

Linkages between NGOs and Relevant Local agencies should be developed. They will train for early warnings, evacuation, first aid, search and rescue, fire fighting etc.

- **Roll of Citizen Community Boards**

These are the Citizen Communities Civil Defense, Education, Forestry, Revenue, Agriculture, Health, Work Services, Information Technology, School and Literacy, Financing & Planning.

Web based System

For instant action a web based setup will be arranged. A team will collect the victim's information, issues, problems, needs and upload on the net. Then the Govt. and the NGOs, general people etc

can view the needs of the specific people. They will arrange the desired needs to the needy people instead of excess of irrelevant needs.



• Suitable Location of a Camp and Access

For Evacuation Purpose the Victims must evacuate to a safe place. most suitable places may an open area, School, College etc. Temporarily victims should provide huts or fiber houses for their stay.

Selection of Camp										
Sr No.	Date	Location	Address		Camps		Boats	Population		
			(Incase relative location)	Availability	Total (Huts)					

Necessities of Camps										
Address	Fuel			Accessories			Medications			
	Need	Availability	Time	Need	Availability	Time	Need	Availability	Time	
School (Camp)										
College (Camp)										
Open Area (Camp)										

A big issue can be seen in such situations, viral disease. one of the main cause of such disease is the unavailability of proper wash rooms. Females also have to face it as a big problem. there must provide a proper fiber wash room allotted to a family with one or two doors so that male can have their separate way to use it. Acquisition of Data may provide the help to the rescue team, estimation of requirements.



• Catch the information of Victims

Disaster brutally hit the human being. Many People loss their dear ones. To minimize such loss detailed information of victims should collect. The collector Team should have to mention the missing persons. A person who has lost his/her family members, may also report to the collectors team. The collected information will be upload on the Server so that any person can view the detailed information. by using this technology people may safe from the loss of their deer ones.

Detailed Information of Elected Families								
Sr. No.	Family No.	CNIC No.	Contact No.	Family info	Guardian	Members=(Male, female)(Old, young, children)	Missing	Vulnerability
1					(Name of Guardian)	{(1+1)/2,(2+2)/5,(1+2)/3}= 10	Yes(1 kid etc)	
2							No	

Detail Information about Missing/ Unknown Person				
Sr No.	Person		Looks	Condition
	Name	Age	(complexion, Height)	(Injured, dead, ill)
1				
2				

• Action Plan for DRR

Web Based Team will upload whole data on the server so NGO's, Govt. Departments, Volunteers, and all other responsible groups can view the situation of the affected area. Loss of life, Livelihoods can view easily and their requirements. Risk Areas can be identify through the **Action Plan.**

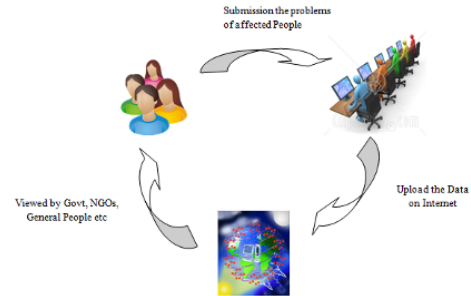
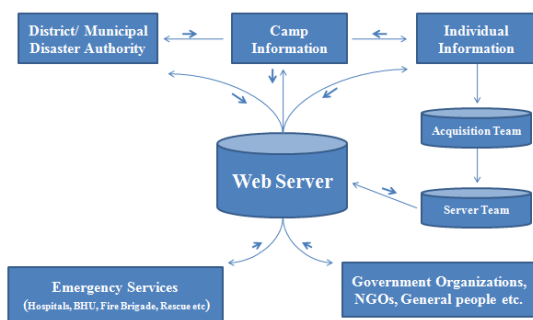
DRR Action Plan									
Sr. No.	Address	Elements at Risk	DRR Measures	Time		Resources Needed		Responsible	
				Start	End	Available	Look For	Lead	Support
1									
2									
3									
4									
5									
6									
7									

How to work

Whenever Disaster Hit any area or expected to hit. Rescue Teams, Government Departments relevant to disaster, School, Colleges and other Volunteers should ready to face such situation bravely. Camping spots should prepared and provide the basic facilities for victims, animals and important livelihoods like documents etc. Medical facilities and staff should there on duty. Web Based Team must move there for the acquisition of data.

• Role of Acquisition and Server Team

Acquisition Team will play a very important role for the collection of data. Data will acquire from the different camps and Provide to the server Team. Server Team will refine the data from the duplication and errors then Upload to the Server. Helping Teams and troops may directly contact to the Camps Admin or through Server to inform that they will help in such manner in that area. Server Team may also provide the information according to suitable routes through Satellite Imagery and Digital Elevation Model.



Analysis

Participation of Government as a village and union council will solve the affected areas problems like physical loss, necessities, water contamination and sanitation, removal of garbage etc. It will help in mitigation of communities. Mostly casualties happen due to the non-availability of proper medical treatment on time. Role of response team will minimize the loss of life and injuries. The Indicator Team will help Rescue Team to identify the injured people. The Rescue Team will provide the medications or send to the hospital or health care centre according to the situation of injury.

Conclusion

Disaster is a natural Incident which destroy life and livelihoods. It can never avoided but the loss and destruction can be minimized by doing some proper planning. Early warning system played an important role in Flood management system. It may avoid the loss of life more than livelihoods.

Proper working of Response Team may avoid the more loss of life. Strategy for victims by Response team will give the instant treatment.

Direct involvement of Union Councilor and Village councilor may increase the worth to help the needy people. Real Time sharing will provide the information of demands and remove the excess of things.

Suggestion

- Avoid the cutting of trees
- Report illegal construction of fish ponds and other establishments in waterways
- Do not throw garbage in rivers
- Help clean the neighborhood
- Support community activities intended to lessen the occurrence of floods
- Avoid throwing anything like plastic wrappers anywhere which may clog or block the drainage system.
- Build the infrastructure containing the power against floods or other disasters.
- Disaster Management team should arrange the fiber houses, medications and the basic needs on the camps
- Victims should engage in different activities. Skills should give to them so that they become the working part of country in critical time and forget about the loss. They explore new things.
- Early warnings should be given before time so that people may manage themselves.
- In flood areas such crops should grow which are suitable for those areas.
- Make some little Dams

Recommendations

Disaster is a very big issue of this modern era. Loss can be avoided by using strategies. The research is not the end it can also further prepared. Digital Elevation Models provide the detail information of flood intensity with temporal data. It can help in further research.

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