

**PAKISTAN FLOOD 2010:
AN OPPORTUNITY TO BUILD BACK BETTER**

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INTRODUCTION

In Pakistan floods have been causing large scale devastation in the past. However the historic flood of 2010 caused large scale destruction of property, agricultural area, livestock and human life. The cause of this large scale devastation has mostly been the inadequate arrangements for dealing with the floods. The developed countries have established adequate systems for managing the flood disaster. These systems involve the stages of preparedness, rescue and relief and post-disaster rehabilitation and reconstruction in a planned manner. Consequently, the flood disaster is restricted to the minimal loss of life and property in those countries. Learning from the experience of the developed nations, we need to employ the principles of Town Planning in our flood disaster management system. Thus proper Town Planning intervention in flood disaster management helps in building back better. In fact, the disaster risk reduction (DRR) is a part of any plan whether it is prepared at regional level or local level. It means that if the concept of total planning i.e. planning of all areas of the country is adopted, the nation will be prepared to face all types of disasters including flood disaster. Today the new technology can help us avert the flash flood disasters also. For example, a watch and ward system can be established through a continuous study of satellite imageries of the northern and north western mountainous areas to note down the development of natural lakes which burst out to cause flash floods. Similarly, the river plains and areas liable to flooding would be strictly avoided for development of any settlement through a national planning law and local development control regulations. At regional planning level dykes and flood water channels may be built and maintained along all rivers to avoid flooding of human settlements. In countries like Pakistan, most of the settlements that are destroyed due to heavy floods are the unauthorized and unplanned settlements. In normal circumstances, it is almost impossible to demolish these houses or settlements and evict the dwellers for the purpose of redevelopment according to the principles of DRR. However, the flood disaster provides an opportunity to relocate settlements developed on dangerous sites or areas liable to flooding. Later holistic planning can be followed at the stage of rehabilitation and reconstruction of these settlements. In case the settlement is located on safe site, onsite redevelopment may be carried out with flood proof material and provision of infrastructure in a planned manner. The redevelopment works may be carried out on the basis of aided self-help so that financial burden of the government may be reduced. New land acquisition law may be promulgated to procure land for housing the flood affected poor people. Moreover, the local planning and land sub-division by-laws may be suitably modified to allow for construction of affordable houses for the flood affected people on the basis of aided self-help.

FLOODS IN PAKISTAN

There were more or less 15 flood disasters in Pakistan since its independence. However, the recent flood of 2010 was the worst of all in the history. It affected more than 20

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million people and took more than 1781 lives. The following table gives the record of various floods in Pakistan[1].

Historical floods in Pakistan From 1950 till 2010		
Year	Fatalities	Villages affected
1950	2,190	10,000
1956	160	11,609
1957	83	4,498
1973	474	9,719
1976	425	18,390
1978	393	9,199
1988	508	1,000
1992	1,008	13,208
1995	591	6,85
2001	219	50
2003	484	4,376
2004	85	47
2005	59	1,931
2007	918	2 million+[2]
2010	1,781+	20 million[3]

Source: http://en.wikipedia.org/wiki/List_of_floods_in_Pakistan

TYPES AND CAUSES OF FLOODS IN PAKISTAN

There are many types of flood that occur in the country almost every year.[4]

- **Monsoon floods** are common in Pakistan. Monsoon rain can fill river basins with much water coupled with melting snows. Torrential rains from decaying monsoon low pressure area can also produce river flooding.
- **Flash floods** also occur in Pakistan, they are common in the northern areas of the country and cause great loss of life there.
- **Floods due to the breaches** of river embankments and canal breaches are a frequent occurrence in all the districts of Pakistan.
- **Urban floods** occur in the major cities of Pakistan, they are also common in the monsoon season.
- **Coastal floods** occur when a tropical storm makes landfall in the coastal areas of the country. The south eastern Sindh and the Makran coast bear the burnt of such floods.

In Pakistan, heavy concentrated rainfall in the catchments during the Monsoon season, which is sometimes augmented by snow melt flows – primarily outside the Indus Plain, generally cause floods [5]. Monsoon currents originating in the Bay of Bengal and resultant depressions often cause heavy downpour in the Himalayan foothills. These are additionally affected by weather systems from the Arabian Sea (by seasonal lows) and from the Mediterranean Sea (through Western Disturbance) which occasionally produce destructive floods in one or more of the main rivers of the Indus system if they interact with the monsoon currents. However, exceptionally high floods have occasionally been caused by the formation of temporary natural dams by landslides or glacier movement and their subsequent collapse. These are large seasonal variations in almost all the river discharges, which further aggravates the river course and morphology. The major rivers cause losses by inundating areas along their banks, by damaging irrigation and communication facilities across or adjacent to their banks, and by erosion of land along the riverbanks. In the upper part of the Indus Basin System, flood water spilling over the riverbanks generally returns to the river. However, in the lower Indus Basin, where the Indus primarily flows at a higher elevation than adjoining lands, spills do not return to the river. This phenomenon extends the period of inundation, resulting in even greater damages. Although embankments built along almost the entire length of the river in Sindh and at many locations in the upper Indus Basin have provided some protection against floods, poor maintenance of the bunds causes breaches. Such breaches often cause great damage because of their unexpected nature and intensification of land use following the provision of flood protection. Floods are a potential threat to land, property, lives, and the ecosystem. Floods cause revenue loss and damage irrigation and drainage channels.[6]

2010 FLOOD IN PAKISTAN

In 2010, almost all of Pakistan was affected when massive flooding caused by record breaking rains hit Khyber Pakhtunkhwa (KPK) and Punjab. The 2010 Pakistan floods began in late July 2010 following heavy monsoon rains in the Khyber Pakhtunkhwa, Sindh, Punjab and Balochistan regions of Pakistan and affected the Indus River basin. At one point, approximately one-fifth of Pakistan's total land area was underwater. The number of individuals affected by the flooding exceeds the combined total of individuals affected by the 2004 Indian Ocean tsunami, the 2005 Kashmir earthquake and the 2010 Haiti earthquake. At least 2,000 people died in this flood and almost 20 million people were affected by it [7].

The National Disaster Management Authority (NDMA) of Pakistan has reported the following damages of the 2010 Flood of Pakistan:

DAMAGES IN 2010 FLOOD IN PAKISTAN

Summary of Damages	BALUCHISTAN	KPK @	PUNJAB	SINDH	AJ&K	GB	G.Total
Deaths	48	1156	110	234	71	183	1802
Injured	98	1198	350	1201	87	60	2994
Houses Damaged	75,261	200,799	509,814	1,114,629	7,106	2,830	1,910,439

Source: National Disaster Management Authority, Islamabad, 22 September, 2010 Update.

KPK @ = Khyber Pakhtoon Khwa province + Federally Administered Tribal Area (FATA), AJ & K = Azad Jammu and Kashmir, GB = Gilgit Baltistan Province .

The infrastructure damages in Flood 2010 have been reported on the website of Urban Unit, Government of Punjab, as follows:

FLOOD 2010 (Infrastructure Damages) (26-09-2010)			
Data received & evaluated for PDMA Notified Districts			
Sector	Completely Damaged	Partially Damaged	Details Received to date
C&W			
(i) Flood affected	-	3489 kms	Details of 835 kms have been received to date
(ii) Rain affected	-	261 kms	
Irrigation & Power			
(i) Irrigation Channels	-	461	Details of Irrigation works was provided. No data on prescribed proformas has been received to date
(ii) Flood Bunds	-	67	
HUD&PHED			
(i) R.W.S Schemes		218	Most of the PHED schemes have been rehabilitated and 80 are reported as damage as of 23rd September 2010.
(ii) R.D. Schemes		20	
School Education			
(i) School Buildings	603	2317	Data for 1264 schools has been received as of 26th September 2010
(ii) Equipment	603	2317	
Higher Education			
(i) College Buildings	3	1	Data for all 4 has been received as of 26th September 2010
(ii) Equipments	3	1	
Literacy & Non-Formal Education			
(i) School Buildings	215	189	Data from 396 Non Formal Schools has been received as of 26th September 2010.
(ii) Equipments	215	189	
Health			
(i) BHUs	3	36	Data for all 44 BHUs has been received. 5 of 44 BHUs were still underwater as of 9 September 2010
(ii) RHCs	-	7	Data for 6 RHCs has been received as of 9 September 2010
(iii) Dispensaries	-	3	Data for 3 Dispensaries has been received and all partially damaged as of 9 September 2010
(iv) THQ	1	3	Data for all 4 THQs has been received as of 9 September 2010
(v) Residences	1	26	Data as reported at District level till 9 September 2010
LG&CD			
(i) No. of Ucs affected			
Agriculture			
(i) Area			Total inundated area = 2.04 Million acres, Crop area irreversably loss = 1.74 Million acres. Information on Godowns was not under the Agriculture Department but had
(ii) Crop loss			

(iii) Buildings			under the Agriculture Department but had to be provided by Food Department.
Livestock			
(i) Loss of Animals (Private)	4193	-	Information of 90 buildings at District level has been received. Tehsil level information is still awaited.
(ii) Buildings	-	99	
Forestry, Wildlife, Fisheries			
(i) Area in acres			Received summary shows 723 acres damage including areas not notified by the PDMA but not in line with District level data.
(ii) Buildings			
(iii) Equipments			
Industries			
(i) Private Industries Unit			Summary showing 800 baseline industrial units in flood affected areas was provided by concerned DCO/EDO IP, however, no damage reports have been received to date.
(ii) Public Buildings			
Others			
(i) Buildings			No buildings and equipment data has been received under other sectors namely Energy, SWM, WSS, Housing etc. Data on Auqaf Department's Buildings are under its heading below.
(ii) Equipment			
Police	21	34	Received data for shows different numbers than earlier estimated.
Population Welfare			
(i) Buildings	30	3	Summary data has been received from Population Welfare Department as of September 09, 2010
(ii) Equipment	19	15	
Lahore High Court	-	2	Data for both buildings has been received as of September 22, 2010
TEVTA			
(i) Buildings	-	5	Data of 4 buildings has been received as of September 22, 2010 .
(ii) Equipment	-	5	
Auqaf (Shrines)	-	9	Data of 9 shrines and 15 buildings has been received as of September 22, 2010
(i) Buildings	5	10	

Source: The Urban Unit, Government of Punjab.

RESCUE AND RELIEF

According to Pakistani government data, the floods directly affected about 20 million people, mostly by destruction of property, livelihood and infrastructure, with a death toll of close to 2,000. UN Secretary-General Ban Ki-moon had initially asked for \$460 million for emergency relief, noting that the flood was the worst disaster he had ever seen. Only 20% of the relief funds requested had been received as of 15 August 2010.[8] The U.N. had been concerned that aid was not arriving fast enough, and the World Health Organization reported that ten million people were forced to drink unsafe water.[9] The Pakistani economy has been harmed by extensive damage to infrastructure and crops.[10] Structural damages have been estimated to exceed 4 billion USD, and wheat crop damages have been estimated to be over 500 million USD.[11] Officials have estimated the total economic impact to be as much as 43 billion USD.[12] [13]

In response to previous floods of the Indus River in 1973 and 1976, Pakistan created the Federal Flood Commission (FFC) in 1977. The FFC operates under Pakistan's Ministry of Water and Power. It is charged with executing flood control projects and protecting lives and property of Pakistanis from the impact of floods. Since its inception the FFC has received Rs 87.8 billion (about 900 million USD). FFC documents show that numerous projects were initiated, funded and completed, but reports indicate that little work has actually been done due to ineffective leadership and corruption.[14]. Now after the earthquake of October, 2005, the National Disaster Management Authority (NDMA) is in charge of the flood relief and reconstruction efforts.

FLOOD DISASTER MANAGEMENT

Flood disaster management involves various stages of preparedness, early warning system, rescue and relief, and rehabilitation and resettlement of flood affected people. The developed countries have established adequate systems for managing the flood disasters. These systems involve the science of Town Planning at appropriate levels. Consequently, the flood disaster is contained to the minimal loss of life and property in those countries. No doubt, the proper management of disasters requires a huge expenditure which developing countries cannot afford to spend. However, disaster management efforts can be made affordable by involving local people and with the help of international donor agencies. For example, by creating awareness among people, deforestation in northern mountainous areas can be avoided which may reduce the occurrence of floods in the plain areas. Similarly, by controlling the carrying out of developments in the areas liable to flooding, a great loss of human lives, crops, property and livestock can be avoided. Sincere and planned efforts can not only save a huge loss of capital, infrastructure and precious lives, but they can also result in building safe and disaster resilient settlements. Thus disaster can be converted into an opportunity for building back better through proper Town Planning [15].

TOWN PLANNING INTERVENTION AT THE STAGE OF PREPAREDNESS

Disaster preparedness refers to measures taken to prepare for and reduce the effects of disasters. That is to predict, and where possible, prevent disasters, mitigate their impact on vulnerable populations, and respond to and effectively cope with their consequences. Preparedness for disaster management includes:

1. Early warning systems based on meteorological forecasts and satellite imageries.
2. Construction of Dams to store excess water during flood season.
3. Construction of Dykes and Flood Water Channels/ Canals and water reservoirs.
4. Preparation and implementation of Regional Plans to control development of human settlements in all urban and rural areas.
5. Restricting developments on areas liable to flooding through development control regulations at local level.
6. Arrangement of camps equipped with food supply and health services to serve the displaced persons during floods.

John Ratcliffe [16] says that town planning is 'concerned with providing the right site, at the right time, in the right place, for the right people'. It means that if the town planning principles are properly followed, there will be no unauthorized development anywhere in the country. One of the basic principles of town planning is that 'areas liable to flooding should be avoided for development' [17]. The past experience of floods in Pakistan clearly demonstrates that most of

the settlements that suffered heavy loss of lives and property were located in the flood prone areas due to lack of any planning at the regional level. Moreover, the building material used in the construction of buildings, particularly in our rural areas is usually not flood proof. As a result all such buildings collapse during floods. Therefore, it is imperative to prepare regional plans covering all urban and rural areas of Pakistan so that the human settlements may be located on safe sites away from the low-lying, flood prone areas. The flash floods are usually caused by the bursting of natural lakes which are formed by landslides in the high mountainous areas. Today the remote sensing and Geographical Information System (GIS) technology is available to monitor and keep a continuous watch on such situations. Thus catastrophic damage to human life and property can be avoided through timely measures taken to avoid collapse of natural lakes developing in the high mountainous areas. Preparedness also includes creation of awareness among people and development of early warning systems to avoid flood damage. There is a need to develop building codes for all areas of Pakistan, including the flood prone rural areas [18]. Proper implementation of these building codes will help to avoid major disasters caused by floods. In this connection, it is worth mentioning the Hugo Framework of Action (HFA) developed in Japan. The five principles adopted in HFA are:

1. Make Disaster Risk Reduction (DRR) a priority
2. Know the Risks and Take Action
3. Build Understanding and Awareness
4. Reduce Risks
6. Be Prepared and Ready to Act

A DRR consultant of UNDP in collaboration with the Ministry of Housing and Works, Pakistan has proposed to prepare a set of guidelines for preparing the following five types of DRR Guided Development Plans to be implemented at different levels [19]:

- i) DRR Guided National Development Plan (DRR-GNDP) at National level
- ii) DRR Guided Regional Development Plan (DRR-GRDP) at Regional level
- iii) DRR Guided Structure Development Plan (DRR-GSDP) at District level
- iv) DRR Guided Master Development Plan (DRR-GMDP) at City level
- v) DRR Guided Local Development Plan (DRR-GLDP) at Local Neighbourhood level

If all of the above plans are prepared by incorporating DRR factor, there is every possibility of achieving proper preparedness for the disasters in the country.

POST DISASTER RECOVERY AND RESETTLEMENT: AN OPPORTUNITY TO BUILD BACK BETTER

In the normal circumstances, it is almost impossible to demolish the unauthorized and unplanned settlements built in the areas liable to flooding since the residents pose a great resistance to eviction and resettlement. However, in the post disaster scenario, when most of the houses and settlements have been wiped out from the face of the earth in the flood affected areas, there is a great opportunity to build model villages and model neighbourhoods in the cities at suitable sites using modern planning principles. In order to reduce the cost of redevelopment, the concepts of incremental development and aided self-help should be used as in the case of Khuda-Ki-Basti in Hyderabad. The post disaster recovery may include the following type of projects [20]:

1. Projects for preventive measures, such as construction of dams, dykes, flood water channels and water reservoirs should be developed alongside reconstruction work in the flood damaged settlements. These projects should be financed by government or NGOs.
2. Flood Damage Mapping and estimation of flood damages in various settlements should be quickly done as a first step to post disaster recovery using satellite imageries and GIS technology. This job must be done by the National Disaster Management Authority (NDMA).
3. On-site improvement projects for various settlements/ villages partially damaged should be given priority provided the settlement is located at a safe site. This type of projects may be implemented by people (or their local organizations) themselves. Fixed amounts of assistance or grants decided on case to case basis may be decided and be paid to the individual persons affected by flood. However, these amounts should be given to the flood affected persons after proper scrutiny and estimations on case to case basis and with the condition that they will rebuild their houses according to flood proof technology and building materials.
4. The settlements located in the areas liable to flooding or other high risk areas should be relocated on the safer sites. Such settlements should be developed in the form of fully planned model villages. The location and layout plans of these villages should be decided by the qualified Town Planners working in the local planning agency or in the consultancy firms.
5. Enforcement of standards and codes should be ensured in all flood damaged areas. If no building codes exist in the flood affected areas, new codes should be developed by the local Tehsil Municipal Administrations (TMAs).
6. No plan or project can be implemented without the provision of a proper institutional framework. Suitably qualified staff should be appointed for handling the technical and administrative work. The principle of right man for the right job should be adopted every where. Thus capacity building of the local planning agencies such as TMAs should be done on priority basis.
7. Flood Disaster Management is a complex task and it requires coordination among various line departments and various levels of government. For example, redevelopment of a village or an urban settlement cannot be carried out without coordination and help from the departments which provide water, electricity, gas and telephone etc. Therefore, in order to implement the provisions of a Disaster Management Plan effectively, the coordination among the line departments such as Water and Sanitation Agency (WASA), National Highway Authority, WAPDA, SUI GAS, PTCL etc. must be achieved.
8. The reconstruction of buildings should be done using disaster resilient designs and flood proof material. Qualified engineers, architects and planners should be consulted for this purpose.

CONCLUSION

Flood disaster management in Pakistan has been suffering from the lack of Town Planning. It is high time to give priority to holistic Planning in the whole country so that all the human settlements in Pakistan are developed in a planned manner by incorporating Disaster Risk Reduction (DRR) concepts. Necessary steps should be taken for capacity building of the

local planning authorities so that DRR guided development plans may be prepared and implemented at all levels. Monitoring and evaluation of these plans should also be carried out regularly to ensure proper implementation of these plans.

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