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Flood (2010) Effects on Agriculture, Livestock, Infrastructure and Human Health: A Case Study of Charsadda District

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Abstract

This study was conducted to evaluate the main causes and damages of flood (2010) in district Charsadda. Most of the villages in Charsadda District are prone to floods during summer mainly because of torrential rainfall, melting of snow and ice, deforestation and over grazing in the catchment areas of rivers flowing across Charsadda. Overflowing the natural levees, the 2010 flood caused tremendous damages to houses, agriculture, standing crops and other infrastructures. The houses were damaged and resulted the displacement of 5500 families. All governmental and private health facilities and water supply schemes were damaged completely. Based on the study findings, it is recommended that flood relief channels and embankments should be improved along with the active flood areas to minimize the flood hazards.

Keywords: Flood hazards, agriculture, livestock, houses, infrastructure

Introduction

Floods are natural and recurrent events and become a big problem mainly because of human interference with a river for the use of flood plain or encroachment (White, 1974). Flood risk is defined by the probability of flooding and the damage caused by the flood event. There is a general belief that extreme flood events will occur more frequently due to changes in climate and land use (Reynard et al., 2001; Brown and Damery, 2002). Flood has many types including river flood,

coastal flood and flash flood. However, flash flood is the cause of damages in the study area. A flash flood is a disaster that gives no warning. One place may be affected by a cloud burst, while another a few kilometers away may be untouched. This makes it impossible to predict when a river will burst its banks (Lockyer, 1996). Flash floods are a common disaster in Pakistan and often hit Khyber Pakhtunkhwa (KPK). Flash floods are a direct result of tampering with nature in a cruel way. There are evidences of flash flood and its hazards in the past, such as on 1st July, 1977, about 229 mm of rain fall occurred in a single day in Karachi. This heavy rainfall caused flash flooding in Malir and Layari river courses, killing 280 people, rendering 18,000 homeless and destroying 5,000 dwellings, many of them washed away in the bed of Malir. Low lying areas of Karachi City were flooded to a depth of 1.5 m, railway tracks near Mauripur were washed out, telephone, power supplies and drinking water supplies were cut and the whole city was separated for several days from its sources of supply of food. The 1992 floods wreaked havoc in Abbottabad and Mansehra. Village Batangi and Keri Raih in district Abbottabad, saw massive landslides which buried many people alive in their homes. Like other regions of Pakistan, Charsadda District is also prone to flood hazard. Along with flash floods, it receives a number of rivers and seasonal torrents flowing through it.

Catastrophic floods through the entire decade of 90s caused heavy losses to life and property in Charsadda District. In 1991, flood affected 6111 acres of crop-land and the cost of damages was7 million Pakistani rupees.

Similarly, the flood in 1992 has affected 16 villages and 3645 acres of crop-land and the estimated loss was of 13 million rupees. Charsadda is a densely populated district and has a fertile agricultural land; therefore, it cannot afford such a calamity (DRO, 2000). Charsadda was one of hardest hit districts by the summer 2010 flash floods (Fig1). The flood disaster hit Charsadda on 28th July, 2010 early in the morning and about one million people were stranded in their houses. The heavy showers continued for 3 days, causing floods in all the rivers and streams in this District. This flood was reported to be of much more severe intensity compared to all the past occurred in the area (DCO, 2010).

The present study was conducted in district Charsadda to assess the damages caused by flash and river flood, its effects on human settlement, agriculture, livestock and commercial areas.

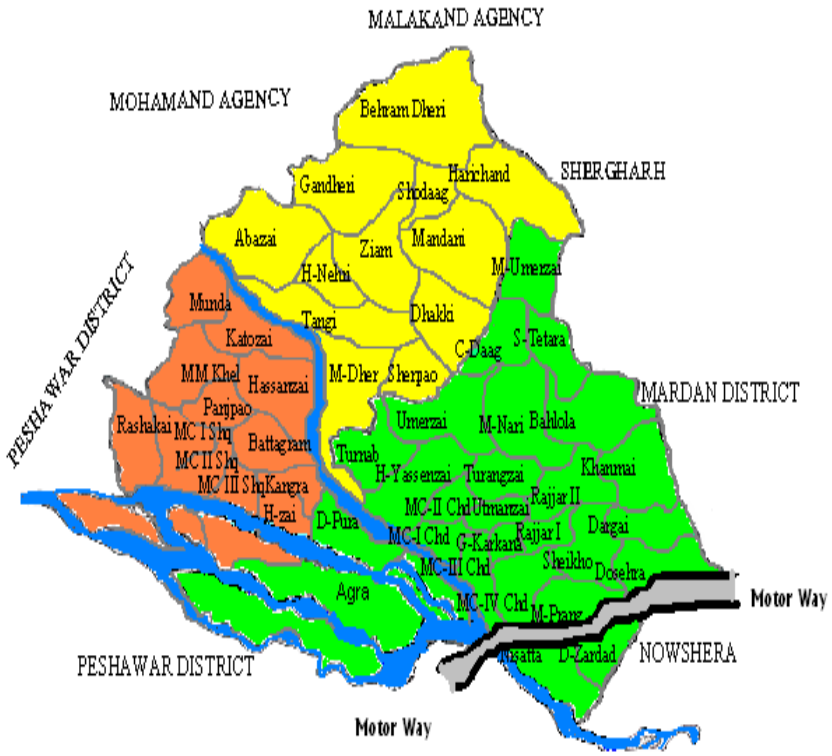

Figure1: Location map of the study area

Materials and Methods

Secondary data were collected from concerned departments including maps, topographic, sheets, research reports, data base searches, research papers, and journals that provided information regarding flash floods, especially in the study area. The following concerned line agencies/ departments were visited/ consulted to collect secondary data:

- District Coordination Office Charsadda (DCO).
- Health department.
- District Revenue Office, Charsadda (DRO).
- Union Councils Charsadda and Utmanzai.
- Irrigation and drainage authority, Peshawar.

- Provincial Disaster Management Authority, Peshawar.
- Provincial Reconstruction, Rehabilitation and Settlement Authority, Peshawar.

Primary data were collected from field survey and interviews. Property loss assessment was conducted by classifying various damaged to infrastructure such as houses, mosques, schools and shops. Similarly, agricultural losses and livestock damages were also estimated disease and drinking water supply and quality were assessed.

Results and Discussion

Flood effects

The data collected from the affected villages indicated that the 2010 flash- flood in the study area has affected 41956 families and 297923 people. The number of affected families in Charsadda Khas was 24,135, and 17,821 was reported in Utmanzai, while the number of affectees were 166,337 and 131,586 in Charsadda Khas and Utmanzai, respectively.

Besides this flood also caused human casualties and loss of human lives. In these villages, 5 people were reported dead. A total of 12 people were injured in Charsadda whereas, only 1 injury was reported in the village Utmanzai.

Infrastructure damages

The intensity of damage to house in the study area was very much dependent upon the construction materials. On the basis of this survey of different villages, property loss assessment was conducted.

A total of 3929 houses were damaged in the selected villages, which resulted in the displacement of about 5500 families' i.e 3091 families in Charsadda and 2409 in Utmanzai.

Total of 34 schools were damaged in the study area including private and government schools. Flood also caused a partial damage to about 125 mosques in the study area. Likewise, flood washed away a total of 68 shops and caused partial damage to about 104 shops.

Table 1: Damages to buildings/ infrastructure in the study area

Village	Houses		Schools		Mosques		Shops	
	Total	Damaged	Total	Damaged	Total	Damaged	Total	Damaged
Utmanzai	2300	2208	15	11	60	55	109	104
Charsadda Khas	1840	1721	27	23	74	70	73	68

Impact on Agriculture

Flood in Bangladesh caused damage to crops in different proportions. On average, yearly crop damage was about 0.5 million tons (Paul and Rasid, 1993). However, during an exceptional flood such as that of the magnitude observed in 1998, crop damage was estimated in the range of 2.2–3.5 million tons (GOB, 1998; Ahmed, 2001). During the floods of 1987 and 1988, crop damage was estimated at 1.32 and 2.10 million tons, respectively. High crop damage caused by the floods in 1998 was due to the long duration of floods above the danger levels.

Table 2a: Crop Damage in Charsadda (Khas) and Utmanzai

Location	**Maize**				**Sugarcane**			
	Area (Acre)	**Lost (Acre)**	**Loss (%)**	**Loss in (Rs. m)**	**Area (Acre)**	**Lost (Acre)**	**Loss (%)**	**Loss in (Rs. m)**
Charsadda	200	200	100	2.84	250	250	100	7.26
Utmanzai	660	528	80	7.52	4456	2228	50	64.7

Table 2b: Crop Damage in Charsadda (Khas) and Utmanzai

Location	**Rice**				**Vegetable**			
	Area (Acre)	Lost (Acre)	Loss (%)	Loss in (Rs. m)	Area (Acre)	Lost (Acre)	Loss (%)	Loss in (Rs. m)
Charsadda	NR	NR	NR	NR	150	150	100	12.48
Utmanzai	13.8	11	80	0.034	433	346	80	28.78

Because of the flood (2010) total 3,702 acres of agricultural land came under water and with an estimated loss of PK Rs. 12295 million. Of the inundated fields included the fields of maize, sugarcane, rice and vegetables. Total 728 acre area were destroyed of maize crop which cost Rs. 10.36 million, 2478 acre area of sugarcane were destroyed which cost Rs. 71.33 million, 496 acre area were

destroyed of vegetables which cost Rs. 41.26 million and 11 acre area were destroyed of rice crop which cost Rs. 0.034 million, present only in Utmanzai.

Livestock Losses

Crop livestock systems in developing countries play a major role in the livelihoods of millions of people whilst providing significant quantities of both livestock and crop food products (Herrero et al., 2010). Recent estimates indicated that over two thirds of the human population lives in intensive and extensive mixed systems and the cities within them, with a significant portion of their income coming from diverse livestock-related activities. These are not only livestock rearers but also traders, market agents, and processors. Currently mixed systems produce 65% of the beef, 75% of the milk and 55% of the lamb in the developing world as well as almost 50% of global cereals (Herrero et al., 2009; Herrero et al., 2010). Livestock rearing is usually associated with agricultural activities. Average livestock holding per farming house is about 3-4 animals (including cows, buffalos, sheep and goats as well as poultry) in the study area. During the flood a total of 63 buffalos, 58 cows, 87 goats and sheep, 01 poultry farm were reported lost or dead.

Table 3: Livestock losses in Charsadda Khas and Utmanzai villages

Locations	Buffalos	Cows	Goats/Sheep	Poultry Farm
Charsadda	42	39	52	1
Utmanzai	21	19	35	no
Total	63	58	87	1

Impact on Health

Bangladesh is a flood-prone country with 80% flat low-lying alluvial plain of the deltas of the Ganges, the Brahmaputra and the Meghna rivers with nearly 230 tributaries and rivulets. The 1998 flood disaster was regarded as much worse than the 1988 flood in terms of extension and duration. The flood had recorded the longest duration, from early July to late September (up to 75 days in some places), exceeding the 21 days of the 1988 flood, and inundated two thirds of the country with a peak flood level of over 20 meters at some points, surpassing several historic record water levels. The disaster affected more than 30 million people in 5 million houses, among whom 1 million people were evacuated. (Siddique, et al., 1988) Although many reports described an increase in diarrhoeal diseases in the previous post-flood period, this flood induced epidemics before water receded, and finally left over 400,000 cases of and 500 deaths due to diarrhoea out of a reported total of 918 deaths related to the flood. However, the number of the

reported cases might not represent the real incidence in the communities affected by floods. There have been few reports clarifying the factors associated with the incidence of diarrhoea in flood disasters (Shears, 1988).

A number of diseases are caused by the consumption of poor water quality. It has been reported in the "community health study" that 50% of all reported causes of illness, and 40% of deaths in Pakistan are due to water borne diseases; the main reason is poor water quality (Chhatwal, 1990).

Flood water caused and spread various communicable diseases in the affected area. There were common complaints of conjunctivitis and skin allergies. Total of 223 persons were affected by skin allergies, likewise cases of malaria, diarrhoea, and eye infections were reported 24, 85, and 114, respectively (Table 4).

Total of 3 government health units and 23 private health units were damaged due to flood in the study area. The situation was further worsened because of the damages caused to 26 health units (including 3 public and 23 private health facilities) as shown in Table 5.

Table 4: Impact of flood (2010) on Human health in the study area

Locations	Skin allergies	Malaria	Diarrhoea	Conjunctivitis
Charsadda	143	14	55	74
Utmanzai	80	10	30	40
Total	223	24	85	114

Table 5: Health units damaged in the study area during flood 2010

Locations	Damaged govt. health units	Damaged private health units
Charsadda	1 civil dispensary	16
Utmanzai	2 primary health units	7
Total	3	23

Effects on Drinking Water Sources

The frequency of flooding and the damage caused by urban flood events have increased over the past decades, mainly due to accelerated urbanization. When urban flooding occurs in areas with combined sewer systems, floodwater is likely to be contaminated by faeces, and may pose health risks to citizens exposed to pathogens in these waters (Ashley et al., 2005).Floods make an enormous

impact on the environment. Floods destroy drainage systems causing raw sewage to spill out into bodies of water. Flood water picks up numerous contaminants from roads, farms, factories and storage building, including sewage and chemicals. Nowshera district (80%) has been badly affected by the current devastative flood and torrential rains (Saeeda, et al., 2011). Flood affected the drinking water sources in the study area due to which different diseases spread due to the using the contaminated water.

A total of 1556 wells were contaminated by flood water, including 1451 bore wells, 26 tube wells, and 102 hand pumps.

While water quality analyses were beyond the scope of this study, we were able to confirm that due to flood water entering dints, a total of 1556 ground water wells had sanitation water and sludge, as well as other surface contaminants, which made the ground water undrinkable becoming a cause of many communicable diseases.

Table 6: Contaminated Water sources in Charsadda Khas and Utmanzai

Areas	Bore wells	Tube wells	Hand pumps
Charsadda	858	17	43
Utmanzai	593	9	59

Conclusions and Recommendation

The 2010 -flood resulted in tremendous losses of property, livestock and damages to agricultural lands, which affected community's livelihood. It resulted in human sufferings, including loss of precious human lives, injuries and diseases to men, women and children. It has been concluded that the severe flood of 2010 has resulted loss of life and property, health, destruction of agriculture and commercial places in the study area. It is a fact that floods are the most destructive of all the natural hazards and the greatest cause of large scale damages to lives and property. In the study area flood are caused due to climate change which brings torrential rainfall during the monsoon season. It was found that there is an immediate need to extend support to the population of effected villages in the study areas in the form of reconstruction of houses, schools, roads, basic health units (BHUs), bridges and streets. In the post flood scenario it was observed that the top soil became more fertile as indicated by greater crop production in the preceding year. For rehabilitation of flood affected area flood relief channel and embankment should be improved along with the active flood plan to minimize the flood hazards.

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