

Implications of Environmental Considerations for Floods in Pakistan

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Abstract : World is making significant progress in different fields meanwhile facing plethora of natural and manmade disasters. Disasters provide opportunity in positive realm meanwhile disasters setback advances. Developing countries are more prone to disasters because of more physical, social, economic and environmental vulnerabilities. Pakistan is facing different natural and man-made disasters since few decades. World major disasters comprises of Pakistan's 2005 earthquake and 2010 floods as well. Lesson learnt from these major disasters clearly depicts that many factors like lack of institutional framework, preparedness plan and other shortcomings leads to disaster which have adverse impact on society. Past profile of major disasters also indicated that these disasters have adverse impact on country economic conditions like fiscal deficit affected, GDP falls so it is clear that environmental issues has direct linkage with economic vulnerability. Disasters like floods not only affect people but environment too. The relationship between environment and disaster is interdependent, Manmade hostile environmental activities like pollution, deforestation, water erosion, salinity, industrial wastes leads to disastrous conditions and disaster has adverse impact on environment like environmental degradation, diseases outbreak, poor sanitation conditions and ecological disturbance. The purpose of this study is to identify recurrence interval of floods in Pakistan with subsequent environmental problems leads to degradation and also resilience of environmental considerations in response to floods in Pakistan.

Keywords: Environmental degradation, resilience, ecological disturbance

I. INTRODUCTION

Floods are major disaster of Pakistan causes destruction to build and natural environment and wreckage to human settlements. Widespread flooding affected 20million Pakistanis Lesson learnt from 2010 floods depicts that floods cause's damage to almost every sector from housing to financial. Flood disasters occur when it affects human population and environment. There is a need to pay attention to considerations of floods. A different disaster leads to different environmental impacts. Categorization of disasters versus environmental impacts is as under

1. Some disasters have minor impacts on environment (earthquakes)
2. Some disasters have moderate impact on environment (normal flooding, landslides)

Flash and other severe floods).All adverse impacts of disasters lead to disruption in biodiversity and ecological balance.

II. FLOODS IN PAKISTAN AND SUBSEQUENT ENVIRONMENTAL ISSUES

Floods create devastating effect on flood plain ecosystem. During phase of low flow river occupy waterways. During rainy season river spills in flood plain. During severe floods upstream also cause water to move to downstream so ultimate effect on crops, animals and plant and causes ecosystem disturbance. The environmental issues includes

- Natural vegetation and clearance of trees
- Poor drainage
- Increased air and water pollution
- Increased litter and waste
- Loss of plants and wildlife
- Loss of aquatic habitats
- Reduced water quality

A. ADVERSE IMPACTS OF FLOOD

Floods adverse impact categorize in following ways

- Physical damage (damage to crops, vehicle, infrastructure)
- Casualties (killed or injuries minor, severe)
- Environmental (contamination, damage ecological system)

B. CURRENT ENVIRONMENTAL ISSUES IN PAKISTAN

Current environment issues in Pakistan which have emerged from on-going land degradation, depletion of natural resources, marginal settlements, unplanned settlements, disposal of waste, shortage of irrigation water, variable melting pattern of glaciers, control of water regulatory system over river by adversary are major problems.

C. CAUSES RESPONSIBLE FOR ENVIRONMENTAL DEGRADATION IN PAKISTAN

In Pakistan following are the environmental degradation causes includes shortage of grass, forests, timberland due to increased population, water declining at alarming rate, global warming. Natural disasters like flood, landslide, erosion increasing so main causes and impacts associated with environmental degradation are shown in Fig-1

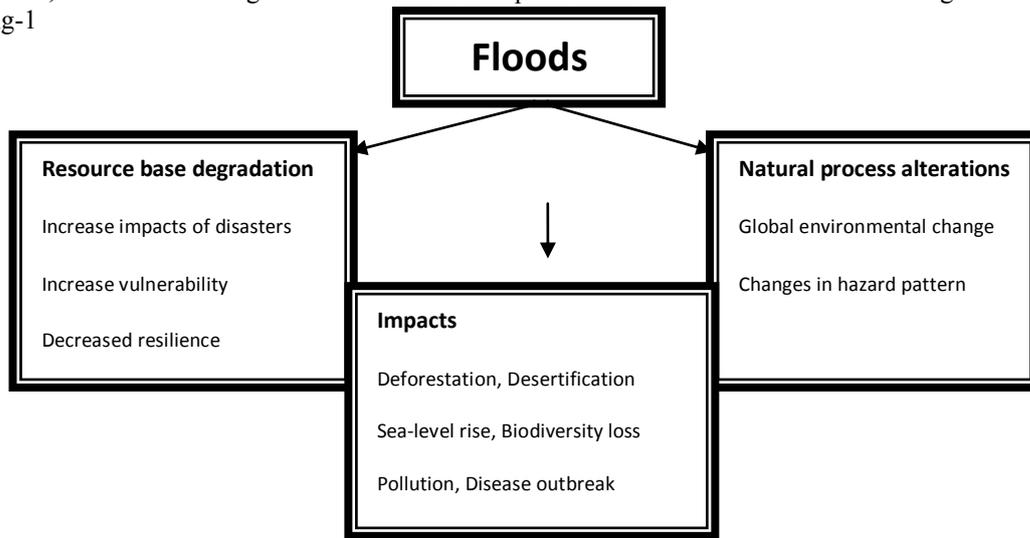


Fig-1 Floods and its impact

D. DEFORESTATION

Among all impacts currently deforestation is most common in Pakistan. Cutting of trees without consideration of forest as productive, protective, regulatory and accessory benefits needs attention. So ultimate disturbance to environment and more vulnerable to flooding environment.

E. POLLUTION DUE TO FLOODS

Flooding leads to water and air pollution. When cities and other areas used by humans are flooded, it is possible that various contaminants will be washed away by flood waters and spread into environment. Solid waste in flooding season can be washed away with the flood.

F. DISEASE OUTBREAK DUE TO FLOODS

Flooding leads to many diseases malaria, hepatitis and others because of poor sanitation conditions. Researches also indicate that oxygen concentration in flooding soil approaches to zero. Without oxygen certain plants cannot survive. Many non-agricultural plants can submerged in water. Cases reported from recent 2010 floods indicate that many deaths occurred due to diarrhea, cholera.

III. Literature Review

Pakistan has experienced severe and dangerous flooding in the recent past. One source indicates that serious flooding has affected what is now Pakistan at least 12 times since 1928. ^[1]The environmental impacts of extreme flooding are complex interesting, and largely unused in policy making. In recent times, the focus of water management has changed from the need to dominate and control water resources to a more harmonious philosophy that seeks a balance between the structural flow control required to support and protect growing populations and environmental well-being. ^[2] The 2007 Intergovernmental Panel on Climate Change (IPCC) report stated that scientists project more frequent and more intense weather events due to global warming. ^[3] There are certain challenges of floods. Rebuilding challenges include reconstruction of destroyed or damaged housing and infrastructure, including electrical generation and distribution, roads, bridges, rail lines, levees, dams/barrages, and irrigation works. ^[4] Floods shut down some electricity, oil, and gas facilities. According to various media reports, floods closed approximately 3 gig watts of power generation capacity. (Pakistan's maximum power generation capacity before the flood was around 19 gig watts ^[5]

While the floods are causing severe negative effects on agricultural production in the current season, the damage and impacts will likely have broader implications for future agricultural production and food security in Pakistan. [6] However, the report and other scientists contend that a longer time range is needed to attribute single weather events, such as the 2010 floods in Pakistan, to global warming. The IPCC report also stated that an increase in precipitation is projected in the Asian monsoon associated with man-made global warming. The report points out, however, that the role of aerosols in general and carbon aerosols in particular, complicates the nature of monsoon precipitation, especially Asian monsoon. Detecting a global-warming induced fingerprint in the current flooding may prove elusive until more detailed and focused scientific studies of the nature of the current flooding are completed. [7]

IV. ENVIRONMENTAL ASSESSMENT AND FLOOD HAZARD

There are three principles apply to assessment of exciting geophysical events to environmental system. First is some damages are quantifiable which causes destruction to infrastructure and economies. It includes number of marine communities affected, number of trees affected. Physical aspect can be measured easily but monetary losses cannot be quantified it easily. Secondly ecological systems have adapted to forces created by extreme events such as floods or drought.

The effects of extreme events include natural disturbances but there are certain critical factors which includes frequency, intensity, and extent to damage. If extent of disturbance is severe than it affects large area than only short lived, opportunistic species survive. If disturbance occurs too intermittently than there is superior competition for light, water and nutrients. Maximum diversity is maintained by moderate level of disturbances which more often handle with caution. Third, many disasters are indeed "natural" they often benefit some part of natural system and losses to others. For example, some thinning of tree branches caused by high winds, diversity of vegetation affected during floods and floods also provide opportunity to farmers for alternative source of livelihood that is fishing.

V. Environmental Impacts Of Flooding

The environmental impacts of flooding includes

- Landslides or instability of earth caused by oversaturation of liquid in soil.
- Crops destruction when they flooded out of roots being oversaturated with water
- Chemical and industrial waste put into waterways.

VI. Environmental Aspects Of Integrated Flood Management In Pakistan

Since past many decades flood is engineering centered with reliance on structural measures embankments, dams, dykes with no consideration on environmental aspect. As regular occurrence of floods and their adverse impacts and concerns for sustainable development there is need of flood control from integrated flood management. It includes following considerations

- Why ecosystem protection is important?
- How can sound ecosystem contribute to flood mitigation?
- What are the environmental consequences of structural flood management measures?
- What is needed to factor environmental consideration in decision making?

Flooding causes erratic flow from sewerage and shallow water outfall lead to hostile effects on water quality. These impacts reduce dissolved oxygen leads to degradation and also cause increase concentrations of ammonia, bacteria which is harmful for health. If flood measures are not put in place leads to increase risk.

Bacteriological contamination caused by wastewater after floods and vegetables grown at that area leads to health related problems.

Direct loss: It includes following

- Areas affected by flooding
- Recreational areas
- Public parks
- Housing

Indirect loss: economic impacts leads to damage to infrastructure, industries.

VII. Recommendations

The following recommendations are drawn from implications of environmental considerations for floods in Pakistan

- Environmental problems vary from area to area within country and even from within city as well so need is to investigate it locally.
- Rules and laws are required to be formulated and implemented at Government level to improve the environmental resilience.

- Implementation of environmental considerations has positive contribution towards the resilience.
- Institutional framework for environmental issues in Pakistan is the need of time.
- Particular attention should be given to deforestation in Pakistan.
- Non-structural measures including awareness to community, trainings to community strengthen resilience.
- Education curriculum at university levels should have some space for environmental related issues related to disasters in general and floods in particular.
- Government organizations/institutions at local level should be equipped to deal with environmental degradation caused by adverse impacts of floods.
- Ministry of Climate change and Pakistan Meteorological department should play role for awareness of the environmental degradation to the communities.
- There is a need to involve all the stakeholders (Army, NDMA, PDMA, DCO'S) for better planning and execution of plans made for environmental resilience.

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