Flood Realities, Development Faults and Perceptions – Natural and Anthropogenic causes of 2014 Flood in Kashmir

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Research

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Abstract

The regularity of risk in modern societies permeates everyday life— from the air that we breathe, to the food that we eat, to the water we drink and to where we work and live. We live in a globalized world associated with risk societies which is caused by a myriad of global processes. These processes interact to produce an unforeseen dangers and endless array of risks. Kashmir being politically and ecologically fragile area needs a special understanding in terms of its physical and political geography. Kashmir suffered the worst flood in last 109 years in the year 2014. The present research analyses the disaster management in Jammu and Kashmir with special emphasis on causes of 2014 flood in Kashmir Valley. It digs deeper into the politics of urbanization and how the state has turned a blind eye to lake encroachment and land grab. The flood occurred due to the mismanagement of the resources and the faulty means of development. Increased level of urbanisation and its unplanned growth, and encroachment on the banks of Jhelum River proved to be detrimental to the environment and people. The other factors like deforestation, glacial melt and destruction of wetlands in the fragile Himalayan ecosystem particularly in the Western Himalayas, lack of proper disaster management plan in the valley, climate change, land grab, extensive catchment of Jhelum River, administrative laxity, lack of proper flood channel for Jhelum River etc. corroborated in the occurrence of the flood. The combination of these factors increased the vulnerability of the people to the 2014 flood in Kashmir Valley. Natural calamities are known to change politics, and floods are a great leveller. The political instability and unsettled conditions in Kashmir compound problems many times over.

Introduction

The greater Himalayan region “the roof of the world” – contains the most extensive high altitude areas on earth. The water resources from this region drain through ten of the largest rivers in Asia and about 1.3 billion people find their livelihoods in their basins. The region and its water resources play a crucial role in biodiversity, global atmospheric circulation, irrigated and rain fed agriculture, hydropower and production of commodities exported to markets throughout the world. The water resources of Himalayas are facing threats from a number of driving forces. The most serious alterations are related to the magnitude and frequency of extreme weather events, such as high intense rainfalls leading to landslides and floods. Kashmir Valley is situated in the highest mountain ranges in the world i.e, the Himalayas. It is surrounded by Himalayan ranges from all sides and thus the Himalayas have a profound impact on the climate and its variations in the Kashmir Valley. The weather changes in the Himalayas directly affect the Kashmir Valley.

Jammu and Kashmir has had a long history of flooding, especially in the Kashmir Valley. The Kashmir Valley is one of the most flood hazard-prone Himalayan regions (Meraj et al., 2013). The unique geomorphologic set-up of the Jhelum Basin, with heterogeneous lithology and varied hydrological condition, renders the basin particularly vulnerable to flooding (Meraj et al., 2015). The area most affected area in the valley is the floor stretching from Anantnag in south Kashmir to Baramulla in north Kashmir. Kashmir witnessed devastating floods during 1841, 1903, 1929, 1948, 1950, 1957, 1959, 1996,

2002, 2010, 2014, 2015, 2017 and 2019. The flood of 2014 was the worst flood in the last 109 years in Kashmir and caused the death of 287 people in Jammu and Kashmir.

Study area: The study area for the present study is the Kashmir Valley, which is called the paradise on earth. The oval shaped valley extending between latitudes 33°30' N to 34°40' N and longitudes 73°45' E to 75°35' E stretches over an area of 15,853 km² giving the appearance of an old lacustrine bed.

Insert here - Fig. 1: Study area map (Kashmir Valley)

Significance of the study: The present study is significant in the sense that it analyses the 2014 flood with the prism of political and social geography and provides the ground reality of what actually caused the flood, as no previous study has provided a detailed account of the causes. The significance of the study can be understood in the context that it was the worst flood that the Valley experienced in last 109 years and it affected every aspect of the society and its effects are still felt.

Objectives: The study is based on following four objectives;

1. To examine the factors that contributed to a huge disaster of 2014 flood in Kashmir.
2. Were there any indicators toward such a massive disaster?
3. The nature of the state response to the disaster.
4. Impact of land grab and conflict on flood.

Data base and methodology: The present study is based on both primary as well as secondary data. The primary data was collected through extensive field surveys, focused group discussions and interviews. The secondary data was collected from Indian Meteorological Department, Department of Ecology, Environment and Remote Sensing J&K, J&K Irrigation and Flood Control Department and NASA. The softwares used are Erdas Image, Arc GIS 10.2 and R software. R software was used to analyse the climate change. For the purpose of extraction of flood disaster footprints, HH (horizontal horizontal) polarization acquired from RISAT-1 (6, 7, 8, 9, 10, 11, 12, 13, 17, 20 21, 22 and 23 September 2014), Synthetic Aperture Radar (SAR) satellite datasets operating in C-band (5.35 GHz) and Radarsat-2 (10 and 15 September 2014) were used. From high-resolution IRS Cartosat 2A satellite, cloud-free optical data acquired during floods (8 September 2014) was used to visually assess embankment breaches and flood situation in Kashmir. Landsat 8 (30 m spatial resolution) data of post-flood (11 September 2014) and pre-flood (28 August 2014) was used. Tropical Rainfall Measuring Mission (TRMM) was used to analyse the precipitation data (0.25° 0.25 degree) and its spatial distribution in the Jhelum River basin.

Results And Discussion

The 2014 flood in Jammu and Kashmir was the result of the combination of both natural as well as anthropogenic causes but anthropogenic causes played a far greater role in the occurrence of the flood. These causes are discussed below.

- Natural causes
- Anthropogenic Causes

(A) Natural causes:

1- Excessive Rainfall in Kashmir Valley (Combination of Southwest Monsoon and Western Disturbances):

Southwest monsoon causes rainfall in Jammu division but in Kashmir Valley rainfall usually occurs due to Western Disturbances. The intensely widespread rainfall in Jammu and Kashmir from 28th August 2014 to 8th September 2014 was the result of rare combination of both Southwest Monsoon as well as Western Disturbances which resulted into heavy down pour in Jammu and Kashmir. The combined effect of western disturbance and southwest monsoon caused excessive rainfall in the Kashmir Valley during the month of September which is unusual because September is one of the least rainfall months in Kashmir. The high rainfall in Pir Panjal Mountains and the districts of South Kashmir gives credibility to the influence of the monsoons in the extreme rainfall during 2014 flood in Kashmir.

The low pressure area (9th -11th August) formed over north Bay of Bengal and its north westwards movement and dissipation, led the monsoon trough to shift towards the foot hills of the Himalayas on 13th Aug. With the formation of 2 well marked low pressure areas (23rd -24th Aug.) & (27th Aug – 6th Sept), one each over the Arabian Sea and Bay of Bengal, the rainfall activity over major parts of peninsular India enhanced during the last week of August. Monsoon activity in general remained weak outside this areas and northeastern parts of the country, which received rainfall associated with the north-south trough in the lower and mid tropospheric Westerlies. The formation of the well-marked low pressure area over the Bay of Bengal and its west-north westwards movement across the central parts of India along with the formation of the low pressure area (2nd -4th Sept.) over Saurashtra & Kutch and adjoining northeast Arabian Sea revived the rainfall activity over central and northwest India. The above well marked low pressure area took a more northward course from 4th Sept and thereafter interacting with the trough in the mid-latitude Westerlies in the lower tropospheric levels, caused heavy to very heavy rainfall resulting severe floods in Jammu & Kashmir during first week of September (Monsoon 2014 A Report, India Meteorological Department, 2015).

Southwest monsoon set over entire Jammu and Kashmir on 1st July 2014 on its normal date and withdrew from the entire state during 28th September -1st October 2014, a delay of 12-15 day from its normal withdrawal date i.e. 15th September. For the state as a whole, the monsoon (June to September) rainfall remained above normal (+22). July and August received deficient rainfall. However, due to interaction of strong monsoon and mid-latitude system during 1st week of September the state received continuous widespread rainfall with heavy to very heavy fall during 1st week of September which balanced the deficient rainfall (Lotus, 2015). Nearly 45 cm of rainfall was recorded in one week. The state had a deficit of 32% on September 3 which in a span of five days was transformed to 18% excess rains – a change of 50 percentage points. It is estimated that about 100,000 cusecs of water gushed down the river Jhelum at Sangam. (Department of Ecology, Environment and Remote Sensing, J&K Govt., 2014).

As per the analysis of the archived meteorological data for the last 125 years for the Kashmir Valley, September is the least rainy month for the valley with the mean rainfall of 26.6 mm but Srinagar, the summer capital of the state, recorded about 173 mm of rainfall in the first week of September, crossing its 25 year high of 151.9 mm preceding the 1992 floods. 7-day antecedent rainfall recorded at certain places in the south Kashmir like Qazigund crossed 617 mm of rain. From the analysis of the precipitation records from the Automatic Weather Stations, it is observed that South Kashmir, on an average, received rainfall almost twice to that of the central and north Kashmir that generated enormous surface runoff and base flow leading to a deluge in the basin (Ramshoo, 2014).

Insert here - Table 1: 24 Hours Daily Rainfall (25th August 2014 – 15th September 2014)

The highest amount of rainfall was recorded at Qazigund (623.3 mm) in South Kashmir (Table 1) followed by Kokernag (506.6 mm), Gulmarg (334.4 mm), Pahalgam (281.4 mm), Srinagar (186.3 mm) and Kupwara (148.2 mm). Thus, south Kashmir received more rainfall as compared to central and north Kashmir and the water of the south Kashmir gushed down all the way to the north Kashmir and inundated the low lying areas.

Insert here - Figure 2: 24 Hours Daily Rainfall (25th August 2014 – 15th September 2014)

Insert here - Table 2: Rainfall in the month of September at six stations of Kashmir (1991-2014)

The rainfall in the month of September, 2014 is highest as compared to the previous years (Table 2) as the rainfall of 329 mm, 484 mm, 157.2 mm, 276 mm, 625 mm and 185 mm at Gulmarg, Kukernag, Kupwara, Pahalgam, Qazigund and Srinagar respectively is higher to a greater extent as compared to the previous years. Kashmir Valley received the highest amount of rainfall in the month of September in the year 2014 as compared to last 24 years of rainfall in the month of September, thus the resultant excessive rainfall caused September 2014 flood in Kashmir

2 - Extensive Catchment Area of Jhelum River: River flow is measured as discharge, the volume of water passing a point per unit time (m^3 per second, or “cumecs”). The largest flow, or peak discharge, Q , can be related to catchment area, A , by a nonlinear parametric equation: $Q = CA^n$. The catchment area of Jhelum River is the whole Kashmir Valley which also contributed to floods in Kashmir especially in Srinagar city. The Jhelum river flows through Srinagar city which makes the city more vulnerable to floods and that is exactly what happened during September 2014 flood that Jhelum spilled its water in almost the whole of Srinagar city. The complex interrelation between anthropogenic and geomorphic factors caused variability in the flood hazard scenario in the Kashmir during the 2014 flood.

Due to its geographic, climatic and geological setup, the Kashmir Valley is vulnerable to all types of the hazards (Meraj et al. 2015; Ray et al. 2009; Romshoo et al. 2012; Ganju and Dimri 2004; Bilham et al. 2010; Maqsood and Schwarz 2010). The hydrographic features of the Jhelum river system establish that the frequency of floods has been very high ever since the valley assumed its present form after draining out of the primeval Karewa Lake, the Satisar (Raza et al. 1975; Dar et al. 2014). The extreme rainfall

event, as evident from the seven day antecedent rainfall data observed in the Jhelum basin, turned into one of the worst disasters in the flood history of the Jhelum compounded by the existence of the injudicious socioeconomic structures (Hassan et al. 2015) and massive land system changes (Rather et al. 2016; Oza 2003) in the floodplains that interfered with the hydraulic and hydrological processes during the flooding (Negi 2001).

Insert here - Fig. 3: Drainage Network of Kashmir Valley

Insert here - Table 3: Catchment of Jhelum River

The analysis of data acquired from Tropical Rainfall Measuring Mission (TRMM) and Indian Metrological Department (IMD) reveals that between September 1 and September 2, 2014, 8 catchments, i.e, Vishaw, Rambiara, Bringi, Lidder, Sindh, Kuthar, Romshi and Sandran, located in the north western and southern parts of Kashmir received a moderate rainfall in the range of 20-50 mm. Subsequently, the rainfall increased to 50-100 mm in these 8 catchments and the remaining sixteen catchments in Kashmir received the rainfall in the range of 20-50 mm. There was heavy rainfall in the Jhelum Basin on 3rd and 4th September 2014. The Lidder, Sindh, and Arpal catchments received the rainfall of more than 100 mm, 10 other catchments (Sandran, Bringi, Lower Jhelum, Romshi, Kuthar, Vishaw, Doodhganga, Gazan, Rambiara and Dal) received the rainfall of 50-100 mm while as the rest of the basin received the rainfall of 20-50 mm.

Insert here - Fig. 4: Rainfall spatial variation for Jhelum basin between 1st&6th September 2014

Insert here - Fig.5: Watershed-wise cumulative precipitation received in Jhelum basin between 1st&6th September 2014

(B) Anthropogenic Causes:

In Kashmir the entire scheme of thinking, research, organisation, forecasting and distributing relief depicts disasters as natural calamities and tragedies where the agents of killings and destruction are the natural phenomena. There exists what Thomas Kuhn calls a paradigm in which the disaster has become synonymous with the associated agent. But in reality there is absolutely no reason to infer the existence of one from the appearance of the other. Just because a flood precedes the killings and damage, it doesn't automatically mean that it is the cause for the latter. The anthropogenic causes of 2014 flood in Kashmir Valley are;

1 - Rapid, Unplanned and Increased rate of Urbanisation: Urbanisation can potentially magnify flooding intensity by ten-fold (Hollis, 1975). Flooding results from the interaction between rainfall, surface run-off, sea level, catchment size and local topography. These factors can in turn be modified by land use, urbanisation, deforestation, agricultural practices, irrigation, dams and water management (McMichael, Woodruff & Hales, 2006). Flooding is the most common disaster both in developed and developing countries and is expected to occur with increasing frequency (Patz & Kovats, 2002).

The rate of urbanisation has increased in Kashmir in the present decade, particularly in the district of Srinagar. Srinagar city is the fastest growing city in Himalayan region. There is unplanned urbanisation in many areas of Srinagar city like Lal Chowk, Jawahar Nagar, Raj Bagh, Maisuma, Chanapora, Natipora etc. The unplanned urbanisation has resulted into the horizontal expansion of Srinagar city. During September 2014 flood, water from South Kashmir flowed down and got accumulated in Srinagar city. Due to congested infrastructure and poor drainage, the flood water in Srinagar could not pass which resulted into its accumulation in many parts of Srinagar which in turn resulted into inundation of areas like Lal Chowk, Natipora, Jawahar Nagar, Raj Bagh, Ali Jan Road, Safa Kadal, Soura, Gulshan Nagar, Mehjoor Nagar, Newshehra, Gogji Bagh, Eidgah, Bemina and Wazir Bagh. It caused great damage to people and infrastructure. The urban areas of Kashmir like Anantnag town, Kulgam town, Bijbehara town, Pulwama town, Srinagar city and others got inundated due to 2014 flood in Kashmir Valley because the urban areas are usually prone to flooding due to unregulated urbanization which generates more run off.

In 1972, urbanization was limited near Dal Lake and some parts of Srinagar city (Fig.6) but in the year 2013 urbanization has spread to other parts of Srinagar and Jhelum floodplain in areas like Anantnag, along the Lidder River in Pahalgam and also Kulgam.

Insert here - Fig.6: Comparison of urbanization in Jhelum river floodplains in 1972 & 2013

Insert here - Fig.7: Decadal Growth of Urban Population in Jammu and Kashmir

The banks of the river Jhelum are home to several historic towns and cities like Anantnag, Awantipora, Srinagar, Parihaspura, and Varmul. The Jhelum Basin as a whole is inhabited by 5.4 million people living in 34 towns and 2846 villages. Based on the census estimates of 2001, 91% of the urban population lives on the banks of the Jhelum river (JK Environmental Information Sensing Centre, 2008).

2 - Encroachment on the banks of Jhelum River: In times of flood, Jhelum River overtops its natural banks, while as at the time of high intensity of flood the water passes over the artificial embankments which have been constructed on either side of Jhelum. Development initiatives are not risk neutral. They can exacerbate vulnerabilities and increase the number of hazards if they are poorly formulated or implemented, or if they cause serious environmental damages. Encroachment on the banks of Jhelum especially in some parts of Srinagar like Raj Bagh has resulted into lowering down the water holding capacity of Jhelum River and the structures along its banks were greatly damaged by the flood. The state has turned a blind eye towards the encroachment on the banks of Jhelum and the subsequent governments have failed to stop the encroachment.

Insert here - Fig.8: Road network, Embankments and Railway line along with breach locations in Jhelum river basin

The Jhelum floodplain is occupied by roads and railway line which has led to encroachment on its banks (Fig.8) and reduction in the carrying capacity of the river during the 2014 flood. Houses, huts and other

building have also been constructed along the banks of Jhelum River.

3 - Conversion of Wetlands into Agriculture and Built-up areas (Loss of Wetlands): Kashmir is bestowed with numerous wetlands locally known as “Dembs” that act as sponges during the floods and share the waters of the Jhelum. Due to encroachment, urbanisation and excessive siltation these wetlands have lost the water absorption capacity which decreased their chances to provide help during the floods. Hokersar, Shalabugh and Haigam wetlands have been converted into agriculture and built-up areas over the last two decades which has aggravated susceptibility of the flood in 2014. In the last 100 years about 50% of the wetlands have been lost. In 1911 the total extent of water bodies with marshy areas was 356.85 km² which has been reduced to 158.54 km² in 2011 (DEERS, 2014).

Insert here - Table 4: Extent of wetlands and lakes in Kashmir (1911-2011)

Insert here - Fig.9: Extent of Wetlands and Lakes in Kashmir (1911-2011)

The 2014 flood in Kashmir can be termed as an ecological disaster. The disastrous damage caused to life and property could have been minimised if the large number of wetlands that once existed in the valley, had been preserved. Wular Lake which was once spread across 20,200 hectares, now remains restricted to a mere 2,400 hectares (Bombay Natural History Society, 2014).

4 - Loss of Floodplain along Jhelum River: The marshy areas (wetlands) in the upper Jhelum basin decreased by 50 % between 1961 and 2001. In Kashmir, swamps covered an area of 209 km² during 1911–1946. These swampy areas shrank by 14.8 % between 1946 and August 25, 2014 due to expansion of built-up area and cropland (Tali, 2011). The floodplain along Jhelum has been converted into agricultural lands and built-up areas at many places especially in Anantnag and Srinagar city. This has resulted into lowering down of water holding capacity of Jhelum. The construction of elevated railway track and newly developed highway from South Kashmir to North Kashmir resulted into shrinking of Jhelum flood plain and acted as a physical barrier during 2014 flood.

Insert here - Fig.10: Wetlands in Jhelum floodplain (a) 1972 and (b) 2013

5 - Deforestation: There is a close correlation between floods and deforestation; one leads to another. Kashmir recorded a massive loss of forests since 1992. Timber smuggling is at its peak in Anantnag and Shopian. At present, J&K is having only 13.09 % area of its total geographical area under forest cover which also includes tree cover outside the forest area. As per the official data of the Jammu and Kashmir Government, forest cover in Jammu and Kashmir is 22,539 sq km which is 10.14 per cent of the total geographical area whereas the tree cover outside the forest area is 6,550 sq km which is 2.95 per cent of the total geographical area of the former state. Nearly 20 to 30% of the forest cover has been declined due to illegal cutting of the forest trees which indicates that ability of forests to retain water has been reduced. It caused flowing of more rainwater directly into Jhelum River causing flooding in Kashmir. Kashmir lost about 10% of its dense forest cover during last 30 years indicating that ability of forests to

retain water has been reduced. It meant more rain water flowed directly into Jhelum River causing flooding (DEERS, 2014).

6 - Construction of Railway line and Quarrying of Karewas: The intra Kashmir railway line was completed in 2008. This resulted into the inundation of areas like Lasjan and Nowgam in Srinagar and Kakpora in Pulwama. When the Indian Railways built tracks, it raised a bund without providing for drainage. As a result, it contributed to the flooding by blocking the path of water. Nobody cared, or no one was aware, that Kashmir's hydrography requires proper drainage. Quarrying is an intensive activity in the direct catchment of Jhelum River, especially along Srinagar-Bandipora road and these quarries run the whole year and dislodge tremendous quantity of loose slush and pebbles which enter into the Jhelum during rain.

Fig. 11: Quarrying of Karewas

7 - Administrative laxity and slow official response: Any calamity is a great leveller sparing none. There is no proper administrative setup for disasters in Jammu and Kashmir. The official response to floods in Kashmir was too slow to contain the damage. The authorities felt clueless to save people and did not put proper efforts to rescue people. The rescue operations were done by the local people. The water pumps used to pump out water from Srinagar city were not enough and water got stuck for several days and thus left the places and houses silted. This caused many water borne diseases like diarrhoea.

The flood waters inundated the army's 15th Corps headquarters at Badamibagh in Srinagar under more than 6 metres of water. The civil administration's offices and residences were also submerged. High and low, rich and poor, military men and civilians, and tourists and locals were affected alike in Jammu and in the Kashmir Valley. The full extent of destruction caused by landslides in Reasi and Udhampur, and floods in parts of Rajouri and Poonch took two weeks to be known. Once the water receded in Jammu, the situation improved, nevertheless leaving behind a trail of loss and destruction. However, the submergence of large parts of Srinagar, the key to coordinating rescue and relief activities in the Valley, meant that the civil administration and military could not respond in an adequate manner (Navlakha, 2014).

8 - Breaching of Dikes and Laying of Water pipe lines in the Jhelum Bund: Water supply pipes were laid through stretches of the Jhelum bund by ERA in 2009-2010 as part of its MPIR project. The experts saw the faulty and unsafe pipe laying as a primary factor in the weakening of the bund, and nine large breaches along the stretch, which led to an unprecedented flooding, and water logging of Srinagar's Central Business District and administrative offices in the recent floods. For several weeks after the flooding, before the embankments were repaired, the exposed 600mm pipeline served as a precarious pedestrian bridge over the breaches. Local residents of Abi Guzar and Lal Chowk recalled that when the pipes were being laid, they had objected to their location, because of fears that the pipe line would cause damage to the stability of the bund, and adjacent buildings, including their mud-cemented and timber framed shops and homes (JKCCS, 2015). The dikes along the Jhelum are weak and porous. Due to high water intensity, these dikes were breached which caused water to gush into the residential areas.

Insert here - Fig. 12: Embankment breaches in Kashmir Valley

9 - Tourism Industry: Every year more than a million tourists visit Kashmir which has caused environmental degradation. It has resulted into deforestation and construction of hotels and restaurants and pilgrimage related constructions along the Lidder River at Pahalgam and in Srinagar city. War, the unplanned growth of towns, and tourism and pilgrimage- related construction, such as in the forests around Pahalgam and on the bank of the Lidder River, have contributed to a dismal record on the environment and thus became some of the important contributors of the flood in Kashmir Valley.

10 - Lack of proper flood channel for Jhelum River: The Jhelum River has one flood channel at Padshahibagh in Srinagar, whose original capacity was 17,000 cusecs which has been reduced to about 6000 cusecs due to encroachment and siltation. The overflow of this flood channel means the inundation of south Srinagar. The flood channel has been filled up with waste material which has reduced its carrying capacity. The drainage capacity of the main Jhelum and the flood spill channel proved inadequate to carrying the enormous discharge of floodwater measuring more than 120, 000 cusecs (Romshoo, 2014).

11 - Climate change: Flooding and drought are the two extreme events associated with climate change. The PRECIS run for 2030's indicate that annual rainfall of Kashmir shows an increase up to 50% (SAPCC, 2013). Kolahoi Glacier at the West Lidder Valley in Kashmir, locally known as "Goddess of Light", feeds river Jhelum. Satellite data and measurement of mass balance show an incremental pace of melting in the Kashmir Himalayas. Glacier area change for Kolahoi from 1980 to 2015 using satellite images show a decline in length by 10%, loss in volume by 18% and reduction of glacier boundary by 13.5%. Almost 7.4% of Snow Cover Area (SCA) has been lost in Jhelum river basin since the year 2000. About 1% of the length of the glacier was reduced from 1980-90 and a loss of 1.1% length from 1990-2000. About 62% water of the Lidder River (tributary of Jhelum River in Pahalgam) is derived from the Kolahai glacier. The average minimum temperature in Kashmir has risen in last three decades (Fig.13-16) and is showing an increasing trend.

Insert here - Fig.13: Average Minimum Temperature of Qazigund, Pahalgam & Gulmarg in Kashmir (1986-2015)

Insert here - Fig. 14: Average Minimum Temperature Srinagar, Kupwara & Kokernag in Kashmir (1980-2015)

Insert here - Fig.15: Average Maximum Temperature of Qazigund, Pahalgam & Gulmarg in Kashmir (1986-2015)

Insert here - Fig. 16: Average Maximum Temperature of Srinagar, Kupwara & Kokernag in Kashmir (1980-2015)

12 - Land Grab and Heavy Militarization: Land grab is generally defined as the large-scale lease or purchase of land by domestic or international corporations for agricultural production or for industry.

Recently, land acquisition by the state, where there is no clear public purpose defined, is also bracketed as a 'land-grab'. This does not mean that the state is not involved in the corporate-led land-grabs. The state plays a pivotal role in all the land deals. While land-grabs loosely refer to the large-scale land expropriations by foreign companies from Global South in the Global North, however land-grabs have been taking place from north to south, south to south, south to north, and inside the countries by the national corporations (Borras and Franco, 2012).

Land grabs in Kashmir have to be understood in its unique political and geographic setting. The state used extra-economic and extra-judicial forces to control land in Kashmir. The issue of land grab in Kashmir is to a great extent linked with the presence of heavy militarization. The depeasantization, dispossession and displacement in Kashmir are purely state-induced and state directed, whereby the existence of 'state of exception', through the presence of Armed Forces (Special Powers) Act (AFSPA) together with use of 'extra-economic coercion' makes the land acquisition possible without any strong resentment against it.

Warfare and militarisation are widely acknowledged to be among the most ecologically destructive human activities (Mitchell and Coco, 2004). Commentators and reports on the Kashmir floods, have overwhelmingly attributed the devastating nature of the flooding to the degradation of Kashmir's ecology, including the effects of trans Himalayan climate change, and the fragmentation and destruction of wetlands, depletion of forest cover, soil erosion, urbanization of flood plains, and encroachments on water bodies and river embankments (Chauhan, 2014). The heavy militarisation of Jammu and Kashmir, which has had some considerable bearing on each of these, has largely remained untouched and uncommented upon in these analyses, and in articulating demands for accountability and answers. For instance, while many have noted the ineffectual functioning of the flood control department, and the lack of dredging in recent years (Hussain, 2014), none have remarked upon the physical occupation of the Khwajbagh (Baramulla) Flood Mechanical Division, the largest in the valley, by the CRPF, for a period of about twenty years (early 1990s to 2009-2010) with a direct bearing on the department's dredging works, and the state of disrepair of its equipment (Jammu Kashmir Coalition of Civil Society, 2015). It is estimated that about 700,000 armed personnel are present in Kashmir. The encampment and stationing of huge numbers of armed personnel have resulted in a pattern of dangerous land use where almost every relief feature of Kashmir's dynamic ecosphere, whether it is mountains, hills, paddy fields, forests, glaciers, stream beds or lakes have been subject to the environmentally destructive implications of military manoeuvres and permanent as well as temporary military establishments. It aggravated the flood situation in Kashmir in 2014 and would be considered as one of the causes for the flood.

13 - Hydropower Politics, Unresolved Kashmir dispute and Indus Water Treaty: Just a few months after India and Pakistan came into existence, they realized that modalities of Partition were still incomplete, when on 1 April 1948 India stopped water from Satluj River from flowing into West Pakistan, which irrigates 8 per cent of the cultivable area of Pakistan (Dar, 2011). This made it clear that a water-sharing agreement between the countries was crucial for the survival of these two countries. Thus, with the intervention of the World Bank, the Indus Water Treaty (IWT) was signed between India and Pakistan in

1960. Article III of the treaty, for which the World Bank is also a signatory, allows Pakistan unrestricted use of waters from the western rivers of Indus-basin—Indus, Jhelum and Chenab—which flow through the disputed territory of Kashmir and enter West Punjab in Pakistan. India, being in control of part of Kashmir, has been given rights to use the water for domestic use, non-consumptive use, agriculture use, and hydroelectricity use, on the basis of ‘run-of-the-river’ plant that ‘develops electricity without live storage as an integral part of the plant, except for poundage and surcharge storage’ (IWT Annexure D, part 3). On the other hand, Article II of IWT gives India unrestricted use of the water of eastern rivers- Satluj, Ravi and Beas. However, Pakistan can use waters of these rivers for irrigation and other agricultural purposes (Suhail, 2018).

But Kashmir’s scholars, political leaders, civil society groups, and many other sections of the society have observed it as, an injustice done to the people of the region by not giving them water rights despite the water flowing through its territory. The data presented in Table 5 reflects that concern.

Insert here - Table 5: Total Storage of Water Permitted to J&K under IWT in Million Acres Feet (MAF)

Because of the IWT we have immensely suffered on account of producing hydro-electricity. Under this treaty we cannot build dams beyond specified height prescribed in this treaty. Moreover, all the power projects have to be made on the run-of-the-river. We cannot store water, so the optimization of the electricity project varies because from time to time water levels vary. In winters it decreases but in summers it increases. However, during summers we cannot harness the potential of electricity; this treaty is at worst to the interest of Kashmir (Suhail, 2018). Kashmir issue has been one of the most debated issues in the world. The dispute has hampered the socioeconomic development in the region. The unresolved Kashmir dispute has brought out grave deficiencies in the Indus Water Treaty (IWT), which prohibits Jammu and Kashmir from building dams with water storage upstream. Despite Pakistan building large dams and storage facilities downstream, it has not been able to insulate itself from floods upstream. The ban on dams with storage facilities upstream, and enlarging the catchment area of the Wular Lake to prevent damage downstream, makes flood control schemes difficult. The severity of the floods in Pakistan-Kashmir and south Punjab, which inundated Multan, strengthens this view. But the main reason for the logjam over the Indus Water Treaty is that Pakistan fears India will up the ante during a conflict through “strategic wartime usage” of dams and storage, which can cripple it because it depends on the Jhelum, Chenab, and Indus for nearly 77% of its water requirement (Dar, 2014). In other words, the unresolved dispute and unsettled conditions compound problems many times over. It is not local politics, where severe restrictions remain on “separatists” even holding peaceful protest meetings that does this. It is national chauvinism and the politicking over Jammu and Kashmir that is an overriding factor. Natural calamities are known to change politics. And floods are a great leveller.

Conclusion

The 2014 flood in Kashmir Valley was greatly caused by the anthropogenic causes ranging from unplanned urbanization to poor developmental policies, encroachment on Jhelum flood plain and lakes,

ill-conceived dredging, human greed, breaching of dikes and a neglected history. These factors worked together to bring misery to the people of Kashmir and its environment. A proper future trajectory is needed to save the people and environment.

Declarations

Availability of data and material: The data supporting the results reported in the article can be found in J&K's Department of Ecology, Environment and Remote Sensing, Irrigation and Flood Control Department and Indian Meteorological Department. Some of the data generated or analysed during this study are included in the published articles which is mentioned in the paper. Some of the data is not available online which was taken from the Indian Meteorological Department by paying the concerned authorities.

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Tables

Due to technical limitations, Tables 1 - 5 are only available for download from the Supplementary Files section.

Figures

Fig. 1: Study area map (Kashmir Valley)

Figure 1

Study area map (Kashmir Valley)

Figure 2

24 Hours Daily Rainfall (25th August 2014 – 15th September 2014)

Figure 3

Drainage Network of Kashmir Valley

Source: TRMM data.

Rainfall categories: More than 100 mm (red colour), 51-100 mm (pink), 21-50 mm (light brown), 1 - 20 mm (yellow) and 0 (green).

Figure 4

Rainfall spatial variation for Jhelum basin between 1st&6th September 2014

Data Source: Tropical Rainfall Measuring Mission, TRMM data

Figure 5

Watershed-wise cumulative precipitation received in Jhelum basin between 1st&6th September 2014

Figure 6

Comparison of urbanization in Jhelum river floodplains in 1972 & 2013

Note: No Census recorded in Jammu and Kashmir in 1991 due to conflict.

Data Source: Census of India, 1981, 2001 and 2011.

Figure 7

Decadal Growth of Urban Population in Jammu and Kashmir

Figure 8

Road network, Embankments and Railway line along with breach locations in Jhelum river basin

Figure 9

Extent of Wetlands and Lakes in Kashmir (1911-2011)

Figure 10

Wetlands in Jhelum floodplain (a) 1972 and (b) 2013

Figure 11

Quarrying of Karewas

Figure 12

Embankment breaches in Kashmir Valley

Figure 13

Average Minimum Temperature of Qazigund, Pahalgam & Gulmarg in Kashmir (1986-2015)

Average Minimum Temperature

Figure 14

Average Minimum Temperature Srinagar, Kupwara & Kokernag in Kashmir (1980-2015)

Average Maximum Temperature

Figure 15

Average Maximum Temperature of Qazigund, Pahalgam & Gulmarg in Kashmir (1986-2015)

Figure 16

Average Maximum Temperature of Srinagar, Kupwara & Kokernag in Kashmir (1980-2015)

Supplementary Files

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