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CLIMATE CHANGE, FLOODS AND DISEASE IN KASHMIR; A HISTORICAL STUDY OF LAST TWO HUNDRED YEARS (1815-2015).

SHAHID NABI WANI

RESEARCH SCHOLAR, DEPARTMENT OF HISTORY
UNIVERSITY OF KASHMIR

ABSTRACT:

Floods have been occurring in Kashmir right from its very origin ,also there have been many spells of climate change throughout history .Many scientists today believe that climate change is real and it has increased risk of disasters .The researcher looked into the Primary sources of Kashmir history of last two hundred years to find weather there has been any climate change in Kashmir in this period and has there been any increase in frequency of floods in Kashmir ? and also to see whether there is any link between climate change and post - flood related diseases .The Research demonstrated that towards the last decades of nineteenth century climate began to get milder in Kashmir and this change was all of a sudden, there has also been an increase in frequency of floods as compared to earlier centuries but within twentieth century the magnitude, frequency and severity of floods has almost remained same. Further there has been an increase in post - flood related diseases after 1960 A.D .Thus all things pointed towards the thing that there has been climate change in Kashmir in last two centuries and it has bearing on floods and post flood related diseases.

Keywords:

Flood;
Climate;
Frequency;
Disease;
Kashmir.

Author correspondence:

SHAHID NABI WANI
RESEARCH SCHOLAR, DEPARTMENT OF HISTORY,
UNIVERSITY OF KASHMIR
Email: snwani21@gmail.com

INTRODUCTION:

Floods have been occurring throughout world and in recent times the frequency has increased owing to the changing nature of man -environment relationship .As the concept of Climate change has gained currency in last few decades and many scientists consider the climate change real and an important contributor of increasing environmental disasters in world Today sun is considered the main agent in climate change ,thus it is held that due to increasing green house gases the global temperature is increasing and thus it is disturbing global ecological system.Kashmir is a flood prone area ,floods have been occurring in kashmir since its very beginning .Wingate writing in 1880s writes that floods are very rare in kashmir, this study was based on study of kashmir from 1815 - 1885[1] , as very few floods occurred in this time period i.e. he made such a generalisation otherwise recorded history makes a mention of about 30 floods up to first half of nineteenth century. Since kashmir is part of global environmental system thus it becomes necessary to look into the climate change ,floods and disease as these are interlinked [2] .

Regarding this period we have a variety of sources ,Travelogues of European visitors are an important source ,walter Lawrence's magnum opus The valley of Kashmir is an important source that gives us information about climate in kashmir also he was one of the first who conceptualized the flood problem in kashmir, Charles Bates's Gazetter of Kashmir is another important source about climate in valley in nineteenth century, another important source is Pir Hassan shah's Tarikh -i- Hassan this is an primary source about climate and floods in valley up to 1885 A.D , Tarikh -i- kabir and wajeez ut Tawarikh are also important primary sources about the said time period . No research has been so far done on this Subject .

Research Method

The researcher makes a historical study of floods and climate of last two hundred years of Kashmir by looking into Primary sources of Kashmir History and making use of chronological and geographic approach. Researcher makes use of historical method of causation of Direct and Indirect causes and makes a regressive and comparative analysis. Overall the research is interdisciplinary in nature

Results and Analysis.

Climate is one of the deciding factors in flood occurrence in Kashmir. Towards the last two decades of nineteenth century the climate was changing in Kashmir .Walter Lawrence who worked as settlement operation officer in last decade of nineteenth century on the basis of interviews of natives writes' that they unanimously say that climate is changing and they are positive that there are no such winters as such which they remembered as boys , in Gulab Singh's time snow was up to height of man's shoulders, in Ranbir Singh's time up to knees and now winter passes without any snow. Nearly every man who talks on this holds to this belief and they all believe that now very less water comes into valley. They point to villages which once grew rice and to canals which are now dry and they mention that mountain springs are decreasing and that climate of kashmir is getting milder and more like that of Punjab.[3]'Another argument that can be made in this respect of climate change in kashmir is that earlier kashmir used to witness severe winters and freezing of rivers and lakes and it would start from mid November. Charles Bates in Gazzter of kashmir writes that once in seven or eight years the Jhelum is said to be frozen over at Srinagar [4]Hasan in his Tarikh Hasan has made a mention about the years in which Jhelum froze. Hasan writes that "in winter yeth (Jhelum) often froze and people walk over it ,at times the lake wular freezes for two to three months ,one such case was in 1763 AD yeth and wular froze and fourteen horses once grazed over it ,people would carry loads over frozen wular and it served as a path between people of pargana of south and pargana of Khoyhama in north ,after three or four years ,the lake along with other lakes was in a frozen state and often the river was also in the same condition" .During years 1656,1763,1780,1832,1835,1878 yeth (Jhelum) froze[5] . During last century we don't have any evidence of Jhelum being frozen though Dal lake froze in 1963-64 and 1986-87 [6]Contrary to this ,post 1900 AD there has been an increase in droughts in Kashmir.Though even

prior to this there used to be short spells of drought season but they were never universal or Pan Kashmir. But now drought frequency as well as the period over which drought season would lost increased. From 1893 AD to1964 AD kashmir witnessed 45 droughts, twenty six of which lasted for three months, nine for four consecutive months , four for five consecutive months and six droughts for six consecutive months.

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INCIDENCE OF DROUGHT (CASES WHEN DROUGHT EXTENDED OVER THREE OR MORE CONSECUTIVE MONTHS)			
OVER 3 CONSECUTIVE MONTHS	OVER 4 CONSECUTIVE MONTHS	OVER 5 CONSECUTIVE MONTHS	OVER 6 CONSECUTIVE MONTHS
MAY- JULY (1913 ,19191,953)	MAY-AUGUST (1922)	JUNE-OCTOBER (1963)	MAY -OCTOBER (1918,1936,1946)
JUNE-AUGUST) (1905,1954)	JUNE SEPTEMBER (1986,1914)	JULY-NOVEMBER (1910)	JUNE NOVEMBER (1920,1934 1945
JULY-SEPTEMBER ((1895,1949,1961)	JULY-OCTOBER (1899)	AUGUST-DECEMBER (1913, 1931)	
AUGUST -SEPTEMBER (1902,1959)	AUGUST NOVEMBER (1894,1932)		
SEPTEMBER-NOVEMBER (1892,1912 1919,1925,1927,1943,1946, 1948,1951, 1952, 1958, 1960)	SEPTEMBER-DECEMBER (1897,1907 ,1916)		
OCTOBER-DECEMBER (1901,1906,1910,1950,)			

Source : Moonis Raza ,Alson Rasool Ph D Thesis, water in kashmir History, submitted to university of Kashmir

Table: 1

The frequency of Droughts has increased drastically after 1950 [See Table 2] . Technically Baramulla , Pulwama, Ganderbal, Shopian, Bandipora and Kupwara satisfy the criteria for drought area, because here frequency of drought is more than 20% of the years studied. Tough State has not seen successive drought years but individual districts have witnessed. 1951 A.D and 1971 A.D almost witnessed pan – Kashmir drought .It is important to note that there have been more years of drought form 1950 – 2000 A.D, than years of excessive rainfall [see Table 3]

S.NO	Name of District Affected [Data Period under Consideration]	Years Of Drought	Years of Successive Drought	Years of Severe Drought
1.	Anantnag [1951 – 2000]	1961, 1962, 1970, 1971, 1980 , 2000.	1961 - 1962, 1970 – 1971.	1970 [49%]
2.	Budgam [1959 – 2000]	1962, 1970, 1971, 1974.	1970 – 1971.	1971 [49%]
3.	Bandipora [1951 – 1994]	``````````	1970 - 1971.	1964 [47%]
4.	Baramulla [1951 – 2000]	1955, 1960, 1962, 1968, 1970, 1971, 1973, 1974, 1975, 1976, 1977, 1978, 1980, 1981.	1970 – 1971, 1973 – 1974-1975 - 1976 – 1977 – 1978, 1980 – 1981.	1970 [22%], 1971, 1973, 1977, 1981.
5.	Ganderbal [1951 – 1994]	1951, 1955, 1960, 1961, 1069, 1970, 1971, 1973.	1960 – 1961, 1969 – 1970 – 1971.	1955, 1960 [38%]

6.	Kulgam [1951 - 1982]	1951, 1952, 1967, 1968, 1971, 1978, 1979.	1951 – 1952, 1967 – 1968, 1978 – 1979.	1951 [32%]
7.	Pulwama [1951 – 2000]	190, 1970, 1971, 1977, 1979, 1980, 1981, 1982.	1970 – 1971, 1979 – 1980 – 1981 – 1982.	1981 [47%]
8.	Kupwara [1951 – 2000]	1955, 1958, 1960, 1962, 1970, 1971, 1999, 2000.	1970 – 1971, 1999 – 2000	
9.	Shopian [1960 – 1994]	1974, 1977, 1979, 1980.	1979 – 1980.	1977 [49%]
10.	Srinagar [1951 – 2000]	1952, 1970, 1971, 1974, 1977, 1999, 2000.	1970 – 1971, 1999 – 2000	

Source ;Climate Of Jammu & Kashmir , Climatological Summaries Of States Series – NO .2 Indian Meterological Department, Pune, pp 17 - 24

Table:2

S.NO	Name of District Affected [Data Period under Consideration]	Years Of Excessive Rainfall	Successive Years Of Excessive Rainfall	Highest Amount Of Rainfall In Cm	Rainfall In % of normal	Year
1.	Anantnag [1951 – 2000]	1966, 1972, 1986, 1987, 1988, 1989, 1990, 1994, 1996	1986 – 1987 – 1988 – 1989 – 1990.	153.9	155%	1972
2.	Budgam [1959 – 2000]	1966, 1975, 1992.	NIL	123.9	184%	1992
3.	Bandipora [1951 – 1994]	1961, 1967, 1969, 1972, 1982.	NIL	100.2	146%	1961
4.	Baramulla [1951 – 2000]	1986, 1987, 1988, 1989, 1990, 1992, 1995, 1996, 1997, 1998.	1986 – 1987 – 1988 – 1989 – 1990 , 1995 – 1996 - 1997 - 1998	202.1	184%	1988
5.	Ganderbal [1951 – 1994]	1956, 1957, 1982.	NIL	209.6	2095	1956
6.	Kulgam [1951 - 2000]	1961, 1962, 1966, 1972, 1982, 1986, 1988, 1994, 1995, 1996, 1997.	1961 – 1962 , 1994 – 1995 – 1996 – 1997.	189.8	174%	1996
7.	Pulwama [1952 – 1982]	1954, 1956, 1966, 1969, 1972, 1973, 1976	1972 – 1973.	81.0	160%	1954
8.	Kupwara [1951 – 2000]	1954, 1972, 1980, 1986, 1996.	NIL	148.4	141%	1996
9	Shopian [1960 – 1994]	1962, 1972, 1973, 1995	1972 – 1973.	168.7	206%	1972
10.	Srinagar [1951 – 2000]	1957, 1966, 1983, 1986, 1996	NIL	117.3	168%	1957

Source ;Climate Of Jammu & Kashmir , Climatological Summaries Of States Series – NO .2,Indian Meterological Department, Pune, pp 17 - 24

Table: 3

Now floods have been occurring in kashmir for thousands of years and these are continuing but there has been increase in the frequency of floods in Kashmir, so from 1888 AD to 2014 AD about 42 floods struck kashmir, though this can be also be explained in context of historiography in Kashmir as earlier historians had not much interest in documentation of floods and never thought of them being complex events ,but it is noticeable that two important researchers in nineteenth century Kashmir Wingate and Walter Lawrence Who worked as Settlement officers in Kashmir and travelled widely in Kashmir even could not find information about floods of nineteenth century .As relation between climate change and increasing frequency of floods is well established throughout world [7] so in Kashmir its bearing is also evident .The important thing to notice about it is that though there has been increase as compare to earlier centuries but within the said time period the frequency and magnitude has almost been uniform. So kashmir witnessed floods in 1885,1891,1893,1894 then in 1900,1902,1903 ,1905 then in 1909 ,1911 then again in 1928,1929,1931 then in 1940, 1944 ,1948 then in 1950's one of the worst food affected decade it witnessed flood in 1950 ,1954,1956,1957 and in 1959 perhaps the biggest flood of century then in1966 followed by floods in 1975 and 1976 AD. Then comes the decade of 80's which continuously saw floods from 1985 to 1988, then in 1990's Kashmir again was hit by floods in 1992,1995,1996,1997 then after a gap of 16 years in 2014. So few decades have seen more floods as compared to other decades like first and decades of 40's,50's,80's and 90's.

Now the discharge carried by floods this too hasn't seen any marked deviation only four times in said period has flood discharge crossed one lakh cusecs .It might be that in 1841,1893 ,1903 or in 1928 it might have been close to around 1,00,00cusecs but we don't possesses any accurate information about the discharge carried by these foods .

STATEMENT SHOWING THE DISCHARGE CARRIED BY FLOODS RECORDED AT SANGAM (1930-2104)

S.NO	YEAR	DISCHARGE IN CUSECS
1	1931	24,100
2	1941	51,000
3	1944	21,500
4	1948	84,600
5	1950	92,400
6	1953	53,000
7	1954	80,000
8	1955	34,300
9	1957	90,000
10	1959	1,20,000
11	1966	1,01,400
12	1969	32,700
13	1973	1,05,000
14	1975	56,000
15	1976	90,000
16	1985	33,600
17	1986	26,435
18	1987	29,390
19	1988	48,900
20	1992	62 305
21	1995	59,400
22	1996	59,700
23	1997	62,876
24	2006	47,300
25	2014	1,20,000

SOURCE; PRELIMINARY REPORT FOR FLOOD CONTROL ABOBE WULAR 1977 AND REPORT OF I & FC 2014

Table: 4

Even the studies of rainfall done by experts has not shown any marked deviation e.g. the study done by Dr Uppal for the years between 1930 -1951 [8] .and the administration reports point around 20-30 inches annual rainfall in this period. Post 1950 global raining season change also began to affect the raining season of Kashmir ,as Kashmir witnessed heavy rainfall in 1957 AD and after a gap of thirty five years such rains were again seen in 1992 AD when rainfall exceeded 1400 mm out of which 895 mm was experienced only in the month of August (only exception being 1975 and 1977 when rainfall exceeded 700 mm in August but as it was evenly distributed it did not cause flood) . Meteorological experts held the view that this has been happening almost every eight to ten years.[9]

So the point is that though we can say climate change has affected flood occurrence as compared to earlier centuries but within this one and a half century there seems to be no impact on occurrence, frequency and magnitude of floods.

Now lets us come to the disease in Kashmir. Kashmir has witnessed a number of diseases in last four hundred years when Cholera first made its appearance here ,but on very few instances we find reference to post flood disease in pre- 1950's era. Only instance we have is 1828 AD when cholera spread post earthquake [10] second in 1893 A.D and third in 1903 AD when there was threat of disease in Kashmir. Last two decades of nineteenth century witnessed death of more than 40,000 people due to cholera but these were independent cholera breakouts ,none of these was a post -flood incidents

Post 1950's we have seen a number of incidents of post – flood related diseases , mostly Cholera breakouts. After the flood of 1969 AD cholera broke out in Loli pura and nearly 2500 migrated [11]. Similarly after flood of 1973 AD[12] about three dozen cases of Cholera were reported mostly from Batangoo Anatnag , two lakh seventy thousand injections where given to people of valley . but situation deteriorated in flood affected area mostly from Batangoo , khashipora , Donpawa over 39 cases were reported of which 3 died ,1000 doctors and compounders were put on duty. [13] .After flood of 1986 AD it was reported on 9th may that there is threat of epidemic [14] . Similarly after flood of 1987 AD [15] threat of epidemic was reported in flood hit areas . About one and a half lakh injections and spray to control flood diseases were sent to affected areas , as reported by Director health services Kashmir [16] . chief Minister asked for combating epidemic and rabies and heath mister was asked to take measures [17] ,fumigation machines were sent for spray to affected areas[18] . After the flood of 1988 Cholera broke down in Sopore and several people were feared dead [19] . Cholera also was reported from Rafiabad in which four people lost life [20] .After flood of 1995 AD cholera broke down in Humshalina in Anantnag resulting in epidemic deaths[21] . After flood of 1997 to contain flood related diseases 62000 O.R.S packets and one lakh chlorine tablets were distributed[22] .

CONCLUSION

The climate of Kashmir began to get milder after second half of nineteen century and it was all of a sudden change as it occurred within a very short period of time ,we see the end of severe winters and lakes and Jhelum getting freeze and the beginning of drought seasons which continued for many consecutive months and all these changes occurred within few decades ,the flood frequency increased as compare to previous centuries but within the last one hundred and thirty years frequency and intensity has remained uniform and though there used to occur severe epidemics but none of them was a post flood epidemic, overall there has been increase in post - flood related disease in Kashmir from the second half of twentieth century.

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