Research Paper River Science

A Study on the Discharge Rate of the Ganga at Farakka

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ABSTRACT

A study on the variation of the discharge rate of the Ganga River at Farakka has been made herein. Probable causes of the variation and probable effects of the variation have also been discussed. Similar study from time to time in respect of the Ganga and also other rivers may be very effective for ensuring good health of rivers.

KEYWORDS Discharge rate (w.r.t. time), Mass of water, Riverbed, Silt.

Introduction –

River takes a vital role in progress and development of civilisation. History is the best witness to this truth. Due to this reason, river is worshipped as God or Goddess. In River Science, we discuss about observation and analysis of the reasons of spate, flood control and proper utilisation of the water mass of flood, sustenance of the speed of flowing stream etc. Accordingly, we can learn about the nature of a river, capacity of containing water, causes of change of river way, causes of flood etc. By the way of analysis, decisions and remedial measures are taken in order to control flood, increase the speed of flowing stream and matters alike. The problem of maintaining the river bed fit for speedy flow of stream is more important than the problem of river pollution. Bend of river, Barrage, Bridge etc. cause retardation of the flow. Canal at upperpart of a river causes slowing down of the speed of stream at lower part; as a result silt is deposited in the river bed and the depth of riverbed decreases. At the same time, silt creates strip of sandy land rising out of river bed and also delta at the conduit of river and ocean. These cause rise in water level and may cause flood. Destruction of forest results in soil erosion. Rain water carries soil to riverbed and reduces depth of riverbed. As a result, river is losing capacity of containing water, discharge is getting resisted and flood is taking place. Scientist Meghnad Saha advised that care should be taken in regard to maintaining appropriate depth of river bed, riverbed cleaning and removal of silt, prevention of soil erosion in order to control flood. Furthermore, he advised that the water mass of flood should be utilised for welfare of mankind.

Discussion –

River tries to break the administration with greater power when we attempt to administer the river. If the normal environment of a river gets disturbed, the river reacts. Flood, act of bringing down riverbanks and creation of sandy lands and deltas are challenges so far as our mother land is concerned. Under current and wind from opposite direction cause act of bringing down riverbanks. In this way a river can even deviate from the normal river way and can completely avoid barrage. In this context, natural slope of land also takes an important role.

If the width of riverbed is large, the riverbed may not be flat and horizontal. There will be ups and downs in the riverbed and such ups and downs are variable, especially in effectively rainy months. Result of barrage construction may be unwell in case of such variable riverbed. Rising sandy land at bank disturbs river way and causes erosion.

A river maintains dynamic equilibrium in plain land. River way oscillates like a pendulum within Meander Belt. The indication of good health of flow is the depth of riverbed. Scientist Meghnad Saha advised that small dams should be constructed at the hilly catchments instead of constructing dam only in the lower part of the river. According to specialists, attempt should not be made to create any obstruction in the natural river way, otherwise riverbed will gradually fill up. A strong opinion is arising against construction of large dams.

Source of data, scope of present study and methodology –

Discharge rate data of the Ganga at Farakka, Rainfall data and Monsoon type data have been collected from the following free and open access sites respectively:

i) www.sage.wisc.edu/riverdata/

ii) www.indiawaterportal.org › Articles

iii) www.tropmet.res.in/~kolli/MOL/Monsoon/Historical/air.html

Here, effectively rainy months are June to October and the remaining months of a calendar year are effectively non-rainy months. Location of Farakka is 24.83 N, 87.92 E. Discharge rate data are available for the period 1949 – 1973 (excluding 1961 – 1964). Annual runoff is nil and discharge is into the Bay of Bengal.

Total quantity of discharge (in cubic metre) during whole year, effectively non-rainy months and effectively rainy months have been calculated and the corresponding mean discharge rates (in cubic meter per seconds) have been computed. The graphs display mean discharge rate – year curves and trend lines corresponding to whole yearly data, effectively non-rainy months data and effectively rainy months data.

The table exhibits the data corresponding to the highest and lowest mean discharge rates during effectively rainy months in the period, being in years 1955 and 1972 respectively.

Conclusion –

The graphs and the table unambiguously narrate the following:

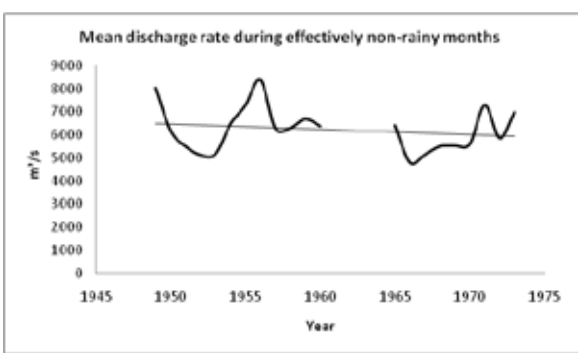
i) Discharge rate is gradually falling with reference to passage of years in the mentioned period, in whole yearly, in effectively non-rainy months and in effectively rainy months consideration.

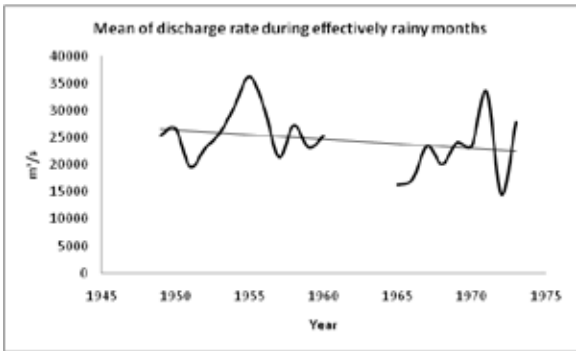
ii) In the mentioned period, lowest discharge rate in effectively rainy months was in 1972 - a declared draught year.

The falling of discharge rate during the mentioned period is of a great concern and at the same time draught years are very significant so far as lowest discharge rate in effectively rainy months is concerned.

Acknowledgement –
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Table

Year of extrema of mean discharge rate (effectively rainy months)	Maximum discharge (m^3/s)	Minimum discharge (m^3/s)	Rainfall in catchment districts in effectively rainy months (mm)	
1955 (maxima)	36319.5	----------	Hardwar	829.6
			Allahabad	1059.3
			Varanasi	925.1
			Patna	922.3
			Sahibganj	1151.8
1972 (minima)	----------	14463.0	Hardwar	777.8
			Allahabad	721.2
			Varanasi	740.6
			Patna	840.2
			Sahibganj	888.3

REFERENCES

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