

A Brief Introduction to Kangsabati River

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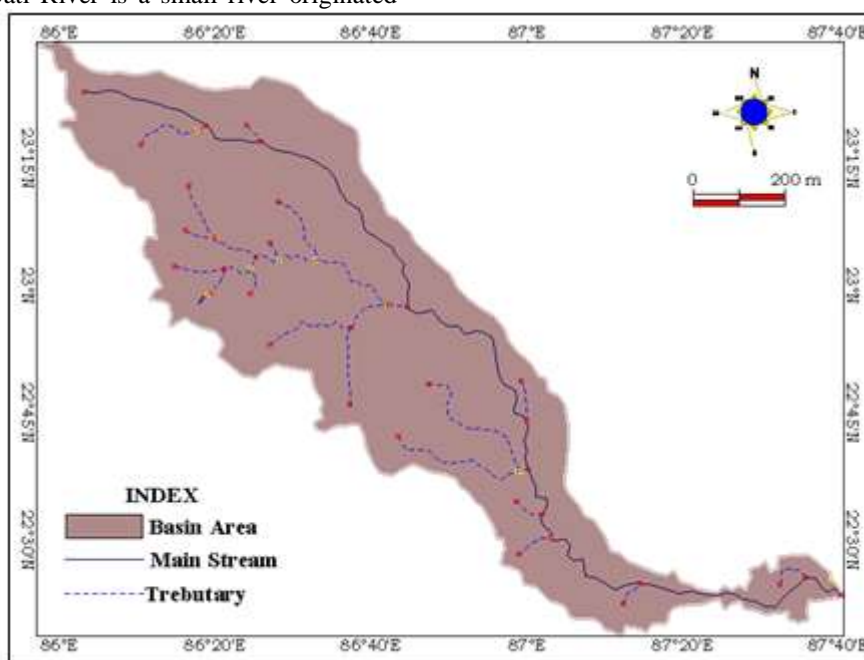
Introduction: River is the birth place of human civilization. From history we find the Indus Valley Civilization (Indian Civilization), Nile Civilization (Egypt Civilization) etc. The importance of Rivers in Human life and civilization is visual in spiritual, moral, as well as water transport, irrigation, and agriculture system. That is why; the great Greek Geographer Herodotus said that “Egypt is the gift of Nile”. After the development of human civilization, the rivers were become threaten. Construction of Dams, mixing of industrial and urban liquid and solid garbage and other human activities collapsed the natural river eco-system. After the Earth Summit programme (1991-1992; Rio de Janeiro), the concept sustainable development has been brought up. Geographers and common people thought to rejuvenate the river ecosystem. For the rejuvenation of river ecosystem, we have to know each river individually, because of every river are individual and have some unique physical character.

In our study we select the Kangsabati River for a brief. Kangsabati River is a small river originated

from the Eastern part of Chotanagpur plateau and flow east-south direction in the district of Puruliya, Bankura, and undivided Midnapore. The river has a great impact on that region. Kharagpur Industrial belt, Kharagpur, Midnapore, Khatra etc urban region develops on the bank of Kangsabati River bank.

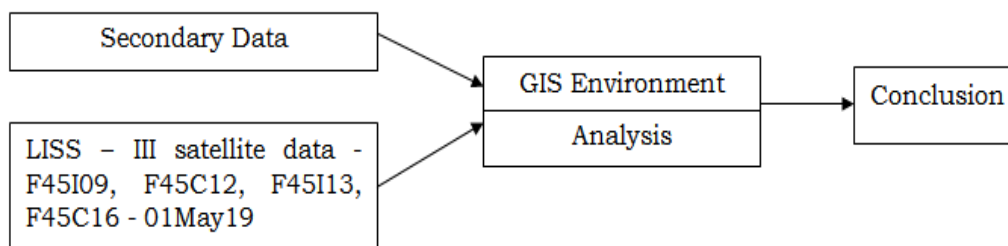
Key Words: Kangsabati River Course, River Basin Geology & Morphology, Biodiversity, Ethnicity, Flood Vulnerability, River Ecosystem Rejuvenation.

Study Area: Kangsabati River is also known as the Kasai and Cossye. The right hand secondary tributary of Bhagarathi Hoogli River, is generally a non-perennial river by nature. It originated from Ghoramara hill (Jhalda - 23°32′30″N and 85°56′30″E) the Eastern Chotanagpur plateau, flows towards east through the Districts of Puruliya, Bankura, and undivided Midnapore. Kangsabati meets with Rupnarayan River near Ghatal (Bandar). The combined flow of Rupnarayan and Kangsabati is known Keleghai.



Objectives of the Study: The main objective of the study is to make a brief introduction of Kangsabati River. The paper covers the physical aspects of the river basin as well as the socio economy of the river basin. Also we focused on the pollution and its impact on human and biodiversity.

Research Methodology: This study is purely based on secondary data. Secondary data collected



from different publication as, research paper, journal, web sites and Govt. Publication. Also we used LISS – III satellite data to produce land use land cover map of river dam site. GIS environment has been use to produce various maps for this research article.

River Course: The non perennial Kangsabati has been divided into three major courses. Youth or upstream extended Jhalda to Sarenga, Middle course or mature stage extend up to Sarenga to Mohonpur. And the lower course or lower stream

extant Mohonpur to Ghatal (Bandar). The dendritic drainage pattern river basin covers 9658 sq. Km. With the total main stream length of 465.23 km. (289.08 mi).

River	Tributaries	Districts Covers (Location)
Kangsabati	Primary	Secondary
	Purulia, Bankura, Paschim Medinipur	
	Saharjore, Bandhu, Patloi	
	Purulia	
	Kumari	Hanumata, Kerro, Jore, Charan
	Purulia	
Jam		Paschim Medinipur, Bankura, Purulia
	Tatko	Purba Singbhum (JHARKHAND)
Bhairabbanki	Jhinuk	Paschim Medinipur, Bankura
	Tarapheni	Paschim Medinipur (Now Jhargram Dist.)

Table – Showing the Kangsabati River and Its Tributaries

Source -Annual Flood Report For The Year 2017- Govt. Of W.B, Irrigation and Water Way Dept.

Climatic Condition: The climate of the river basin is generally semi-humid in nature. The Southwest Monsoon has the highest rainfall in June, July and August, average rainfall 150-175 cm. The highest temperature is found in April-May, the first period of summer, varied 40-42°C. the lowest temperature is found in December and January months, mean temperature varied 8-12 °c. Deficiency of subsurface water availability is peek in the months of March, April and May. Bankura and Purulia districts are considered as drought prone areas in the state of West Bengal. Droughts are mostly caused by some geological and river hydrological factors.

Geology and Morphology of Kangsabati River Basin:

Geologically the river basin area is constituted by many geological units. That region brought up through a long evolution from oldest Archaeans (Pre-Chmbrian) to Tertiary- Quaternary formation (Mukhopadhyay.1992). The river basin area mainly formed with Granite, Gneiss and mica schist. Upstream and middle stream mainly consist with igneous Granite and metamorphic Gneiss. Downstream mainly formed with alluvial deposition and fractured aquifer in upper basin granite gneiss.

Kangsabati river basin is mainly elongated in nature. Absolute and relative relief of kangsabati

river basin is 659 and 657 m correspondingly. The Dissection value of Kangasabati River basin is 0.9 (Avijit Mahala At. Al -2019). It refers that the river basin in the maximum denudation stage in geomorphic evolution.

Biodiversity: Scientists estimated near about 1655 fish species in Kangasabati River. According to the record fish specimens were distributed in 19 genera, 10 families and 5 orders. So we said that the river has richness in aquatic biodiversity. The species diversity is shown bellow –

Order	Family	Scientific name	Local Name
Beloniformes	Belonidae	Xenentodon cancila	Kakia
Cypriniformes	Cyprinidae	Amblypharyngodon	Mourola
		Catla catla	Catla
		Cirrhinus mrigala	Mrigal
		Danio devario	Techokha
		Danio rerio	Techokha
		Esomus danricus	Darkina
		Labeo calbasu	Kalbose
		Labeo bata	Bata
		Labeo rohita	Rui
		Osteobrama cotio cotio	Keti
		Puntius ticto	Punti
		Puntius sophore	Punti
		Puntius conchonus	Punti
		Salmophasia bacaila	Chel
			Cobitidae
Osteoglossiformes	Notopteridae	Notopterus chitala	Chital
Perciformes	Ambassidae	Chanda ranga	Chanda
		Chanda nama	Chanda
	Channidae	Channa punctata	Lata
	Gobiidae	Glossogobius giuris	Bele
	Osphronemidae	Colisa fasciata	Khalisa
Colisa lala		Khalisa	
Siluriformes	Bagridae	Mystus tengara	Tangra
	Sisoridae	Bagarius bagarius	Bhaghaor

Table: Distribution of Fish Diversity in Kangasabati River

(Source - Studies on fish diversity concerning Hydro-ecology of Kangasabati River in Purulia district, West Bengal, India- Manab Kumar Saha)

Socio- Economy of River Basin: In religious perception the major population of that river basin area is Hindu, Muslim, Christian, and Sikh. Out of which the Hindu and Muslims are the main dominated religion. River basin is the inheritance of some tribe as Santal, Lodha. The major population belong to “KURMI” sub-cast.

- **Economy:** The main economy of the river basin area is agriculture. The agricultural system is classified into major two types. One is Rabi and the second one is kharif. Paddy produced as Kharif Production and the Oil Seeds as Mustered oil seeds, Potato and various vegetables are produce as rabi production. After the development of Kangasabati River Project when the irrigational

system developed the intensive subsistence system changed into Commercial Intensive system.

The river Kangasabati helps to develops Kharagpur Industrial belt (Vidyasagar Industrial Park). The major industries are Iron and steel (TATA Metallic, Reshmi Metallic), telecom, engineering (TATA Hitachi) and food processing (Nestle, Dabur India Limited) etc.

Gathering economic activity conducted by the tribal groups. They gather wood, leaves (Kendu and Sal) from the desoudius forest. Belpahari block is famous for the production of Kendu leaves.

River Projects on Kangasabati River Basin: Bankura, Paschim Midnapore district is a drought prone region of West Bengal. Scarcity of sub surface water availability increases in dry season

(March April May). Govt. of India was taken a project to solve this problem in the year 1956-57. The dam site located at Mukutmanipur, District Bankura on the rivers Kangsabati and Kumari about 3.2 km. upstream of their confluence. It is mainly Earthen Gravity dam by nature with the length of 11.27 km (7miles) including Dyke and Hillock. Total Storage (DS & LS) of water is 103614.16 ha. m (8,40,000 ac. ft.) The submerged area for the cause of dam construction is 13668 ha. From the river dam 804.5 km main and branch canal and 2413.5 km distributaries and minor canal

established to irrigate 340752 ha (Kharif) and 60704 ha (Rabi) agricultural land. Districts of Bankura, Midnapore and Hooghly are directly facilitated through this Project.

Prior to this project, an anicut dam (Coordination of 22.400894 N, 87.344261 E) is develop on Kangsabati River near Midnapore Town in the year 1784. It was re built on the year August 2008, the dam provided distil water to 3,500 square kilometres (1,400 sq mi) agricultural land, local industrial zone Kharagpur Industrial belt and the Kharagpur, Midnapore Municipality.

Crop Name	Pre-irrigation Stage (%)	During Irrigation Period (%)
Paddy	95	37
Oil Seeds	2	2
Pulses	2	2
Wheat	1	10
Potato	0	2
Vegetables	0	5
Ground nut	0	42

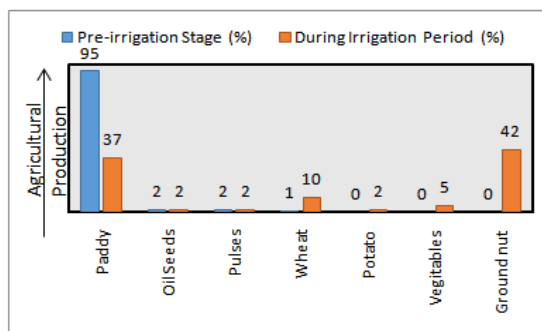


Fig – Agricultural Production in Pre and During Irrigation Phase

Flood Vulnerability: Average rainfall of the basin area is 1567 millimeter. The maximum rainfall occurs (75%) during the monsoon session, from May to September. Heavy rainfall in Chotonagpur plateau results in large inflow into the reservoirs of Mukutmanipur. The reservoir has failed to control the inputs (Water) and discharge into the rivers in the later part of the rainy season to control the heavy flows. The heavy discharge within a short span of time with onrush of water through the

rivers causes flood in vast areas. As the result it is very heavy loss of agricultural production, cattle, and destruction of houses is very common in lower and middle zone of the basin. Panskura, Debra region frequently face up the flood condition.

Kishor Dandapat, Gopal K. Panda ware estimated on their research paper (2018) that last 65 years (1950-2015) 31 time high magnitude floods occurs in Kangsabati Basin. It means the frequency of 1 flood occurs each 2.13 years.

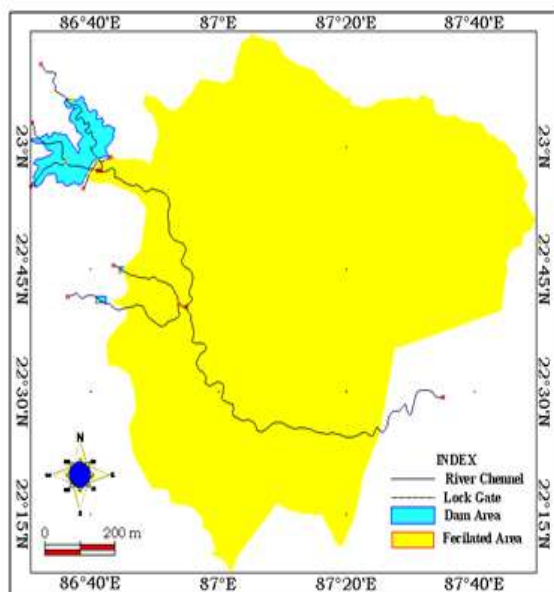


Fig: River Dam Facilitated Area

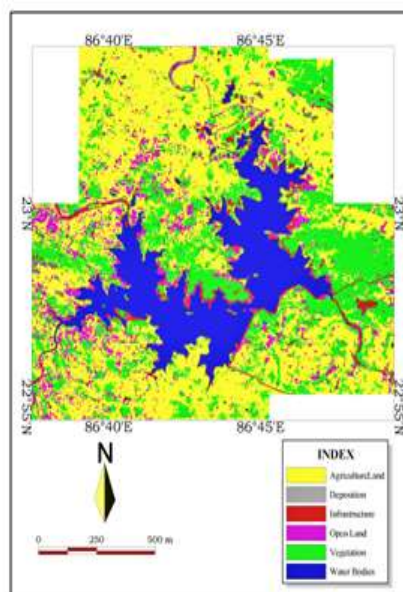


Fig - Land Use and Land Cover Character of Mukutmanipur Dam Surroundings

Pollution: Kangsabati River has been polluted from point and non point source both. Uses of chemical fertilizer and pesticides in agricultural field are the sources of non point pollution. The industrial and urban disposals are the sources of point source pollution.

A.Bera, M.Bhattacharya, B.C.Patra, and U.K. Sar estimated the Chloride presence in river water in summer season (March–June), Rainy season (July–October), winter season (November– February), 132.91–305.3 127.4–160.93 110.9–160.40(mg/L) correspondingly, the high concentration of chloride value of river water is stressful for fish culture. The high concentration of chloride in the Kangsabati River may be cause by agricultural and sewage run-off during rain session from the surrounding area of the river basin and higher evaporation rate. The high concentration of chloride in Kangsabati river water is an indicator of eutrophy.

Research Scholar of IIT Kharagpur Tandra Mohanta and Sudha Goel find out 8 heavy metals on their research in the water of Kangsabati. Presence of those metals is harmful for public health and safety. They also find out the presence of Phosphates in the water of Kangsabati. It leads maximum (25.067 mg/L-36.214 mg/L) in river water, where 5-7 times greater than the recommended permissible limit. According them probably, the use of chemical fertilizer in agricultural land is the main cause of Phosphates pollution.

Conclusion: We found that the Kangsabati River Ecosystem is in risk, ecosystem has been threatened by human activities. River water has been polluted by the causes of mixing agricultural pesticides, chemical fertilizer, industrial and urban sewages. Construction of river dam (Mukutmanipur Barrage) has also a negative impact on river hydrology and ecology. On our study we find out the vulnerability of Kangsabati River. From our study we can recommend that –

1. Source of pollutant must be identified and takes some mitigation process to control the river pollution.
2. A cumulative and continuous study needed to observe the ecological impact of Kangsabati River project (Mukutmanipur Dam, Anicut dam (Midnapore).
3. Need a sustainable land use model to prevent pollution.
4. Hydrologists, Ecologists, Geographers should be focus on the small rivers to rejuvenate the environment.

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