

G A N G A

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Attempt for Water Conservation in Abu Road block, Rajasthan

After the issue of the last NEWS LETTER no. 39 in October, 2012— there has been a long gap for its next issue. I deeply apologise for this before the honourable members. The reason behind is nothing but pre-occupation in two very important projects - one in Govt. sector, and other a project under Rajiv Awas Yojana programme. Whatsoever, out of all these, we are not lacking in attempting to achieve the

principal vision of IRBMS i.e. mission of water conservation, which is a great venture in the present day world. Our team members visited a drought prone area in Sirohii district in Rajasthan during May last, and after a comprehensive study in a small sector in Abu road block, could suggest some water harvesting structures for beneficial purposes in the rural sector.



Integrated River Basin Management Society

Ganga – the Eternal River

(Part 37)

GANGA DELTA

Bengal contains the largest deltaic landform in the world with swamps, meandering streams, their braided channels, cut-off loops and all other genetic topographic features, which are commonly associated with delta. The origin of this great delta cannot be explained by the single infilling of a shallow continental shelf with the sediments brought down by the Ganga and / or the Brahmaputra river system.

Three stages of evolution of the modern Bengal delta has been visualized on the basis of existing literature:

1. During the first stage of evolution- when the sea level was lowered, rivers in order to reach the sea, eroded deep valleys into the then exposed shelf and deposited sediments at its edge.
2. The second stage of evolution commenced with the sea level rising gradually and more or less stabilized to its present level. During this stage, deep valleys of the first stage turned into drowned valleys. Presence of cut and fill channels in the shelf have also been reported. Rise in sea level resulted in estuarine type of coast line.
3. During the third stage of evolution, a regressive situation was initiated with

progradation of delta, which first commenced in the north- western part of Bengal delta. The Brahmaputra river seems to have started its contribution in delta building activities much later with the eastward migration of the Ganga. The site of delta progradation gradually shifted towards east. In the abandoned deltaic plain, there was little supply of fluvial sediments. This resulted in the development of chute cut- off, old point bars, and marshes in place of continuous channels. The lower deltaic plain is continuously revoked by tides resulting in the development of complex network of tidal channels with thick cover of mangrove on intertidal flats. Since there is very little or no fluvial flow in these tidal channels, sediments involved in the tidal deposition are obviously eroded from the coast, resulting in coastal retreat. Thus a transgressive stage is observed in the abandoned deltaic plain, whereas to the north of the Padma and Hugli river, active progradation, regressive stage is present.



Geomorphology of the Ganga delta

Geomorphologically, the Bengal delta can be divided into four geomorphic units viz. Palaeo delta, Sub-aerial delta, Transitional delta, and Marine delta.

Palaeo delta; occupies the western and northernmost part of the main delta body to the west of Hugli river, north of the Ganga, and east of the Brahmaputra rivers. To the west, it is bounded by the pre- Cambrian rocks . The delta lobe of Damodar river and the indented palaeoshore lines and funnel-shaped palaeochannels indicate dominance of tidal processes during the formation of palaeo delta.

Sub-aerial delta : This unit is restricted between Ganga and Brahmaputra rivers , to the north and east ,and Hugli river to the west. It consists of two geomorphic sub-units viz.

1. The upper Flood plain: which is the fluvial flood plain where the river has high sinuosity other than the main channel which is braided. Point bars, meander scars, ox-bow lakes etc. are the main landform units here.
2. The lower Flood plain: which is the zone of interaction of between the fluvial and tidal processes. It shows important landform units viz. tidal channels of degraded nature.

Transitional Delta: This unit is an intermediate zone between the fluvial and marine processes dominated by tidal activities . It is connected to the sea through a network of tidal channels and creeks. The tidal channels migrate freely in the tidal flats, and capturing of one channel by another is a common feature here. Estuaries are common features in this zone.

Marine Delta: As regards this morphological unit, bathymetric charts of naval hydrological surveys are used for interpretation of submarine part up to 250 km.

Shoreline of West Bengal: A narrow stretch of about 60km. long shore extends from Hugli river estuary to the Northeast of Subarnarekha river. Digha Tourist Resort is located on this stretch. This part of the coastal plain is generally a non- accretion area except near the estuaries of Subarnarekha. Subsurface exploration around Digha coast encountered mainly three formations, viz.

1. Upper formation—being 55 m. thick is made up of plastic clay, grading to medium- grained well- sorted sands.
2. Middle formation—consisting of 14 m. thick pebbly to poorly- sorted sand with lateritic concretions.



3. Lower formation—consisting of a 70m. thick well- sorted sand, alternating with clay beds. Earlier workers have suggested a feeble southwesterly littoral drift. It seems likely that there is a southwest to northeast current flow in the winter and summer ,and a reverse current flow in the monsoon period . The regional picture of erosion- accretion pattern indicates that the shoreline, east of Digha is relatively stable, while that to the west has been pushed northward. The overall stretch of the shoreline around Digha is suffering erosion at present.

PENINSULAR MASS OF SOUTH WEST BENGAL : (GANGA DELTA)

The Chhotanagpur Gneissic Complex, the main constituent rock mass of Peninsular India, extends from Madhya Pradesh in the west through Orissa and Bihar up to parts of the districts of Puruliya, Bankura, Birbhum, and Medinipur of West Bengal in the east and forms an integral important segment of the Pre-Cambrian Continental Shield of Eastern India.

1. **Chhotanagpur Gneissic Complex** – includes granites of various composition and structure . It covers the largest part of the Peninsular shield area of West Bengal .In respect of the mineralogical

assemblages , a two- fold sub-division has been attempted in the Chhotanagpur Gneissic Complex mass of West Bengal

- a) Supracrustals represented by parametamorphosed rocks with metamorphosed basic intrusive and
b). plutonic rocks represented by granites, acidic gneisses and migmatites of charnockitic affinity.

2. Singbhum Group of Rocks and Dalma Volcanics

--Singbhum Group of Rocks is represented by low- grade Phyllite, Quartzite, Amphibolite, Calc-silicate rocks, Mica schist etc. Further, in parts of Puruliya and Medinipur districts, Dalma volcanics are exposed. Occurrences of acid volcanic rocks are reported between Dalma volcanic belt and Chhotanagpur Gneissic Complex in East Singbhum and Puruliya districts of Bihar and West Bengal. The north Singbhum mobile belt, comprising Singbhum Group and Dalma Volcanics was developed in Proterozoic times.

3. Gondwana Supergroup : forms the representatives of subsequent sedimentation that continued throughout the Palaeozoic and Mesozoic periods. The rocks contain a boulder bed at the base which is thought to be of Glacial origin. The major occurrence is found in the Raniganj Coal Field, located



between the Damodar and the Ajoy rivers and covers parts of the districts of Puruliya, Bardhaman, Birbhum and Bankura.

4. Tertiary Rocks : represented by pebbly grit, ferruginous sandstone, Red shale etc. , which are reported from several places in Peninsular West Bengal.

5. Quaternary Formations : The Quaternary terrain of Peninsular West Bengal can be divided into the following domains :

i) Base of the Quaternary (LATERITES): occupy a major part of the hard rock area of the peninsular terrain of Bankura, Bardhaman, Birbhum, parts of Murshidabad, southwest corner of Medinipur, and parts of Puruliya district. The Laterites are variegated, hard, and formed mostly due to sub- aerial weathering of exposed parent rocks, showing considerable thickness, ranging from 6 to 15 m.

ii) Older Alluvium : represents the oldest continental Quaternary deposits ,and is the oldest terrace in the area. These are valley – fill deposits, and is characterized by Greenish- grey to khaki- yellow coloured hard clay and silt, occasionally impregnated with

calcareous concretions and iron nodules, indicating attainment of oxidation.

iii) Older Flood Plain Deposits : are fluvial deposits , representing the youngest terrace in the area and occupy the main alluvial and deltaic terrain . The sediments are constituted of alternating layers of brownish silt , and very fine white sands etc.

iv) Recent Flood Plain Deposits : are products of the Present – Day river system , deposited in Recent times , and consist of coarse- grained to fine- grained very poorly – sorted loose, micaceous sands and clays.

RIVERS OF BIHAR & JHARKHAND

North Koel River

The North Koel river rises on the Ranchi plateau and enters Palamou district below Netarhat, near Rud. After flowing nearly due west for about 30 km. , it turns north at an almost complete right angle through a gorge at Kutku, and flows through the centre of the district till it falls into the river Son , a few kilometers north-west of Haidarnagar. From its source to its junction with the Son, its length is about 260 km., and since it drains a catchment area of at least 9100 sq. km. , it naturally contributes a large supply of water to the Son during the rains; at other times, the stream is not deep enough to



enable Cargo Boats of even small dimensions to make their way upto Daltonganj. Mention may be made of the metamorphic rocks, encountered in the area which form the watershed between the North Koel and the Damodar rivers to the west of the Chandwa- Balumath road.

The principal tributaries of the river are the Auranga, and the Amanat rivers, both of which join it from the east, the former at Kechki, 16 km. south, and the latter 8 km. north of Daltonganj . Another tributary is the Burhawhich joins the North Koel above Kutku at Bagechampa.

The North Koel Project is being implemented at Mandal near Kutku. The project has a 64.82 m. high dam from which water will be released for picking up by the Mahammadganj barrage and Indrapuri barrage. Hydroelectric power generation would be 2x12 MW. The project would flood 15 villages of which 5 are within the Palamou Tiger Reserve.

Important towns along the river side are Muhammadganj, Haidarnagar, Tilokhar, Husainabad, Akbarpur, Rena, Banjari, Majhiaon kalan, Bardiha, Tumba, Nabinagar, Adhaura, Tilothu, etc.

North Karo River

The river originates on the Ranchi plateau. It forms a 17 m. high scarp falls ,Pherua-

ghaugh, at the southern margin of Ranchi plateau. It drains the Gumla, Ranchi, and west Singbhum districts. It joins the South Koel near Serugda. The meandering valley of the Karo river , downstream for Pheruaghaugh falls is a typical example of an incised meander.

Koel-Karo project: The Koel- Karo project is located in the Ranchi and West Singbhum districts . The 710 MW power project involves the construction of two earth dams – one, 44 m. high across the South Koel river near Basia,; and the other, 55 m. high across the North Karo river, near Lohajima.

The two dams will be linked by a trns- basin channel, with six units of 115 MW each in the underground powerhouse at Lumpu-n gkhel and one unit of 20 MWat Raitoli. About 120 villages are to be affected , displacing over one lakh people. 22000 ha land are to be submerged. Of the total land acquisition, 12000 ha are reported to be agricultural land, while 10,000 ha comprise of forests. Dispute arose over the compensation package for the displaced people, and protests started in 1974, and have been continuing since then.

South Karo river :-- The river flows through Sundergarh and Keonjhor districts of Orissa, and West Singbhum district of Bihar. It runs along Industrial and Iron ore Mining areas and Saranda forest area , before joining the



South Koel river in Goilkera block of West Singbhum district . The river water gets polluted due to industrial waters. Important cities are: Chakradharpur, Rania, Barbil etc.

Karmanasa River

The name of the river Means “Destroyer of religious Merit “.There are several legends about it. According to one legend, the sage Visvamisra through Tapasya, acquired the power to create a whole new Universe. When he set out to create a new universe, it aroused anger in Lord Indra. However, he continued and after creating a copy of our universe, he started creating people, the first being TRISANKU, whom he decided to send up to rule His new universe. Lord Indra stopped his progress. That is how Trisanku ended up suspending head down in mid air. The River Karmanasa was originated out of Saliva dripping from mouth of Trisanku.

Course : The river Karmanasa originates at a height of 360 m. on the northern side of Kaimur range near Sarodag in Kaimur district of Bihar. It flows in a Northwest direction through the plains of Mirzapur ; then forms the boundary between Uttar Pradesh and Bihar, and finally joins the Ganga near Chausa. The length of the river is 192 km. out of which 116 km. lies in UP and rest 76 km. forms the boundary between UP and Bihar. Total drainage area of the

river along with its tributaries is 11709 sq. km.

Tributaries : The tributaries of the Karmanasa river are the Durgavati, the Chandraprabha, the Karunuti, the Nadi, and the Khajuri etc.

Waterfalls : The river reaches the plains by a succession of leaps , including two falls, known as the Devdari falls, and the Chhanpathar falls- which from their height and beauty are deserving special attraction. Chhanpathar falls is 30m.high. Devdari falls at an edge of the Rohtas plateau along the course of the Karmanasa river is 58 m. high. However, Chandauli district Administration considers Devdari falls as being on the Chandraprabha river.

Dams and bridges : There are two dams across the river – the Latif- Shah bund and the Nuagarh dam. There is also a dam across the river Chandraprabha.

The Grand Trunk road passes over a long bridge on the river.

Archaeology : Uttarpradesh State Archaeology Department after excavations, has unearthed Iron artifacts dated between 1200—1300 B.C. at Raja Nal KA TILA site in Karmanasa river valley of north Sonebhadra. It throws new light on the history of Iron- making in India.

History : At one time, the river formed yhe boundary between the Ancient Aryan



colonies of the North , and the still unsubdued aboriginal Tribes of the East. The Karmanasa was the eastern boundary of the Awadh. It also possibly was the western boundary of the Sena Dynasty. At the battle of Chausa, situated on the banks of the river Karmanasa on June 26, 1539, Sher Shah defeated the Mughal Emperor Humayun and assumed the Royal Title of Farid al –Din Sher Shah Suri.

Bagmati River

The Bagmati river is a river of Nepal. It flows through the Kathmandu valley, and is the river , separating Kathmandu from Lalitpur. It is considered a holy river , both by Hindus and Buddhists. A number of Hindu temples are located on the banks of the river. The importance of the river also lies in the fact that Hindus are cremated on the banks of the river, while Kirants (Buddhists) are buried in the hills by its sides.

History : The Bagmati river is considered as the source of Nepalese Civilization ,and Urbanisation. The river has been mentioned as Vaggumuda in Vinaya Pitaka and Nandabagga. The river has also been mentioned as Bahumati in Battha Suttanta of Majjhima Nikaya. An inscription dated 477 AD describes the river as Bagvati

Parpradeshe , and subsequently in Gopalraj Vanshavali.

Courses : The Bagmati originates where three Headwater streams converge at Baghdwar , above the southern edge of the Shivpuri Hills, about 15 km. north- east of Kathmandu. Here the river is wide, and swift with a high load of suspended sediments, giving the river water a grey appearance. The river flows southwest about 10 km. through terraced rice- fields in Kathmandu valley. Resistant rock strata interrupt the flow in places , including at Pashupatinath Temple. Beyond the temple, the river flows south until joined by the larger west- flowing Monahara river; then turns west itself. After entering Kathmandu's urban area, a number of tributaries enter relatively unpolluted Dhobikhola, and sewage- laden Tukucha khola. Then the river bends south, and the Vishnumati river enters from the right at Teku Dovan. The Vishnumati river also rises in the Shivpuri Hills, some 6 km. west of the Bagmati source. It flows south, past Nagarjun Hills and Forest Reserve, Swayambhu Stupa, and Durbar Squire in Kathmandu. As it passes the centre of Kathmandu, this tributary.



Sankh River

The Sankh river flows across Jharkhand, Chattisgarh, and Orissa states in India. The river flows for a distance of about 240 km. before it meets the Koel river in Orissa.

The river starts 1000m. above sea level in Lupungpat village in Gumla district in Jharkhand and flows 67.5 km. in the state before entering Chattisgarh. It runs a distance of about 50km. in Chattisgarh, and enters Jharkhand again to flow for another 78 km. The river finally enters Orissa and travels a distance of about 45 km. before merging with the Koel river. The south Koel enters Orissa and joins with the Sankh river at Vedavyas near Rourkela from where it is called the Brahmani river. The 60 m. high Sadni falls on the Sankh river at the edge of the Ranchi plateau is an example of scarp falls or knic-line falls.

Koina River :-

The Koina River flows through West Singhbhum in the state of Jharkhand. The river originates near Bhangram in Orissa, and flows for about 85 km. before it joins the South Koel river. It flows through Saranda Forest. The river has one specialty, which is the river contains plenty of water in the height of the hot season, even when there is no rains for many months.

Mohana River

The river, also called Mohani river, flows through the Hazaribagh, Chatra, and Gaya districts in Bihar and Jharkhand. The river originates on Korambe Pahar on the Hazaribagh plateau near Bendi village, 19.3 km. from Hazaribagh. It drains the upper part of the plateau. The western portion of the plateau constitutes a broad watershed between the Damodar river, draining on the south, and the Lilajon (also called Niranjana), and Mohana river on the north. The Mohana then runs north past Itkhori, and descends into the Gaya plain, and crosses the Grand Trunkroad/ NH- 2 at the foot of the Denua pass. Near Itkhori, it intersects the Chatra- Chauparan road with its wide and sandy channel. 3.2 km. below Bodh Gaya, it unites with the Lilajan river to form the Falgu. When it goes past the Barabar Hills, it again takes the name of Mohana, and divides into two branches.

Waterfalls : In the long range of hills, south of the border of Gaya district, well inside Chatra district, there are two waterfalls on the river Mohana. The first at Tamasin is at the head of deep valley where the river plunges abruptly down a high steep face of black rock into a steady pool below, and then dashes down a gloomy gorge of strongly contorted rock; the other falls at Hariakhel presents a scene of more placid



beauty, as here the river, issuing through a picturesque glen, glides down the sloping side of the red rocks into a still large pond, surrounded by high wooden banks. Tamasin is 26 km. from Chatra town.

N.B.

Due to space scarcity, the details under “News” heading could not be placed in this issue.

*Editor- Sujit Choudhury, Published by
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