



MAJOR OLD RIVER BASINS IN THE BAGRI TRACT IN THE DISTRICT OF MURSHIDABAD, WEST BENGAL

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Abstract

Murshidabad Plain is part of the moribund delta. The position of the Bagri tract is within the quadrilateral, bounded by Bhagirathi, and Padma, and partly by Mahananda. In this study region of the river Bhagirathi, flowing from north to south dividing the district into two topographical divisions showing contrasting physical characteristics. The major old river basins in the Bagri tract are described in this paper. The simulated satellite images in MS form and DEM form demarcate the nature of river actions by their dynamic equilibrium. The main features of satellite images are contour, slope, watershed, flow direction etc.

Keywords: Moribund delta, Bagri tract, Quadrilateral, Topographical divisions, Flow direction, Watershed.

Introduction

Bagri is the study area, and it is a flat rolling plain on the eastern side. The Blocks Farakka, Samsanganj, Suti-I and Suti-II, Raghunathganj-I, Nabagram, Khargram, Bhrdwan, Kandi, Berhampore and Beldanga fell in the Western part. While the other Blocks are on the side of the eastern part are the major blocks in the Bagri tract are Samsanganj, Suti-II, Raghunathganj-II, Lalgola, Bhagwangola-I and II, Raninagar-I and II, Murshidabad, Jiaganj, Berhampore, Domkal, Jalangi, Large part located --Farakka, Suti-I, Beldanga-I and a Small part of Raghunathganj-I and Hariharpara. As the eastern part is a flat plain the height varies between 12.5 meters to 24 meters. The average slope is towards the east and southeast.

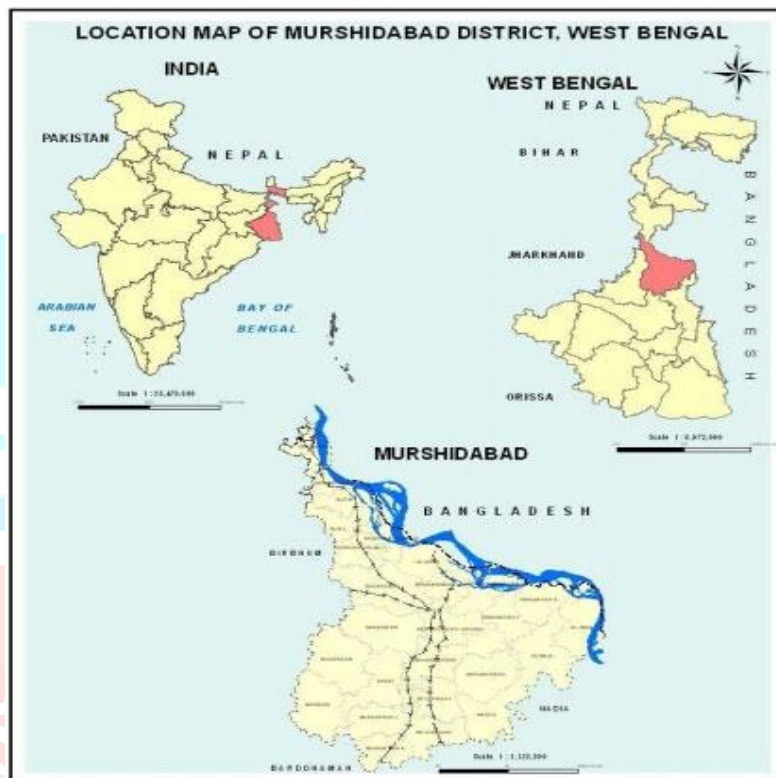
Significance

Murshidabad is the central district. Berhampur is the district headquarter. The flux of refugees increases the population overnight. Murshidabad is not out of the effect. In the Berhampore, the migrated people rapidly proceeded to agricultural activity for survival. As the rural development is inadequate in the village areas, the people gradually concentrated in district headquarters for various services like education, health, legal assistance, etc. Over time to feed people, primary activities gradually reduced.

Projects of DVC, & other river projects controlled the flooding, water for agriculture was reduced. To the geology, soil conditions are not friendly with soil & climatic condition for all types of farming, & agriculture started suffering from water. In practical situations, the canals are dry in summer, & axes of flooding during rain.

Location of the study area

Murshidabad district of Rarh tract located at projected at west at Jharkhand, the Padi plain of Chotonagpur attached along with West Bengal. At North $24^{\circ}50'36''$ (N) $87^{\circ}53'54''$ (E) At West $24^{\circ}01'34''$ (N), $87^{\circ}51'51''$ (E) At South $24^{\circ}01'24''$ (N) $88^{\circ}00'24''$ (E) At East $24^{\circ}17'54''$ (N) $88^{\circ}13'18''$ (E).



Objectives

The main objectives of the study area are given below-

- To evaluate the location of old river basins (bills) and their courses,
- To extend the physiography of Bagri tract,
- To explain the shortfall of groundwater in the Bagri tract,
- To conserve the ground water in Murshidabad district,
- To assess the watershed and flow direction of Bagri tract.

Major rivers and their courses

The major rivers and the course are given below for a better understanding of the influence flow active rivers in the Bagri tract

Table 1. River locations in Blocks

Name of the Rivers	Name of the Blocks
The Ganga and Bhagirathi	Farakka, Suti-I, Raghunathganj-I and II, Murshidabad-Jiaganj, Berhampore, Beldanag-I and II, Sagardighi
Padma	Suti-II, Raghunathganj-II, Lalgola, Bhagwangola-I and II, Raninagar-I and II, Samserganj, Suti-I
Bhairab	Raninagar-I and II, Murshidabad-Jiaganj, Berhampore, Hariharpara, Nowda
Jalangi	Jalangi, Domkal, Nowda

River Bhagirathi has been bifurcated into a triangle shape according to the Murshidabad. The physical reason for the depletion of the Bagri tract. The old course of the Ganga River was the present Bhagirathi channel. In geological ages, the old Ganga/Bhagirathi channel many times, changed its courses.

Bagri lies among the Ganga, Bhagirathi, and Jalangi river basins. In geological history, the Bagri tract was constituted by Mahananda River alluvium. Which are now the marked channel ridges. Shifting of Ganga, Bhagirathi, and Jalangi occurred many times. The old alluvium carried by Mahananda/Jalangi River build the foundation of the Bagri tract of Murshidabad. At present condition; human activity seriously affected the zone of the shortfall of groundwater. I tried to give views on the problems related to the terrain character, by the satellite images.

Rising, and increasingly widespread incidence and levels of pollution, surface and groundwater sources in different locations of Murshidabad is a matter of grave public concern. Pollution in the Ganga attracted nationwide attention. But the problem is more widespread. Videthe report of NEERI (National Environmental Engineering Research Institute), a major percentage of available water in India is polluted. The types of water pollution are uniformly gloomy. Even our large perennial rivers like the Ganga are today heavily polluted.

In the Bagri tract of Murshidabad, all the Bills are polluted by the rapid growth of urbanization, and the increase in population is the main reason. Groundwater pollution, which is more dangerous because it's more difficult to reverse, is also turned into a major problem. Its seriousness is illustrated by the presence of arsenic poisoning in Bengal. The Bagri tract of Murshidabad. Moreover, growing salinity problems are affected by high levels of pesticide residues in groundwater in several areas and bills of the district. The scientists from Jadavpur University estimate that 38 million inhabitants in eight districts of

West Bengal are exposed to health risks from the high arsenic content of groundwater. The National Water policies (Ministry of Water Resources, 1987) declared Industry development and activities including agricultural, industrial, and urban constructions should be planned with due regard to the constraints imposed by the configuration of water availability.....but all in the paper, no effective measure yet implemented. All the department, political sectors, NGOs are concentrated in papers publications and meetings. In the district of Murshidabad mainly in the Bagri tract, water pollution is a very common feature. Administrations are not active.

Rainfall rate in pre and post monsoon

In the government report of the Water Investigation and Development Department, Berhampore, the data from 1993 to 2003 of Bagri tract block-wise as follows:-

Table 2. Rainfall rate in pre & post-monsoon

Name of the Block	Per monsoon in meter	Post monsoon in meter
Lalgola	4.37	1.94
Bhagwangola-I	3.65	2.02
Bhagwangola-II	5.86	2.26
Raninagar-I	5.97	2.98
Raninagar-II	4.49	2.18
Murshidabad-Jiaganj	4.45	2.54
Beldanga-I	4.11	1.61
Beldanga-II	5.25	2.48
Noida	5.95	2.90
Hariharpara	5.22	2.32
Berhampore	4.69	1.97
Domkal	4.84	2.29
Jalangi	5.61	2.73

Source: Water Investigation and Development Department

Physiography

Murshidabad district is essentially a flood plain. The Bagri tract is formed by Ganga/Padma and Bhagirathi. The basic formation of the floodplain was formed by the Mahananda River.

Pleistocene Sediment forms the Barh tract of the district. Bagri tract is formed by Quaternary sediments deposits in the wide deltaic flood plain found mainly in Block Samsrganj, Suti-II, Raghunathganj-II, Lalgola, Bhagwangola-I and II, Raninagar-I and II, Murshidabad-Jiaganj, Berhampore, Domkal, Jalangi, Major part of Farakka, Suti-I, Burdwan, Beldanga-I, and a small part of Raghunathganj-I, Sagardighi, Natungram, Kandi, Khargram, Bharatpur-I and II, Hariharpara. It happens the tectonic movements, and shifting of Bhagirathi and/or Ganga. Recent alluvial deposits consisting of clay, silt, and sand are located in the riverine alluvial plain of Noida, the major part of Hariharpara, Beldanga-I, & II, Blocks geologically eastern part of the Bagri tract is more favorable for agriculture than

the Rarh tract. All the minor and major bills and old river channels are passing through urban places and big villages and towns are so filled with pollutants that they seem to be no better than gutters. Even the major river Bhagirathi flowing past big towns has begun to resemble a Waste-drainage system, characterized by heavy loads of organic waste, micro-organisms, and toxic chemicals released by neighboring industrial effluents that level 73-4mg/l. Toxic elements released by automobile service stations, hospital wastes, and whatnot are present. Thus dissolved oxygen content in river water has gone down much above the critical level. Toxic elements like lead, Zinc, Chromium, Copper, Cadmium, etc. have been entered into the framework of clays of riverbed and bill sediments.

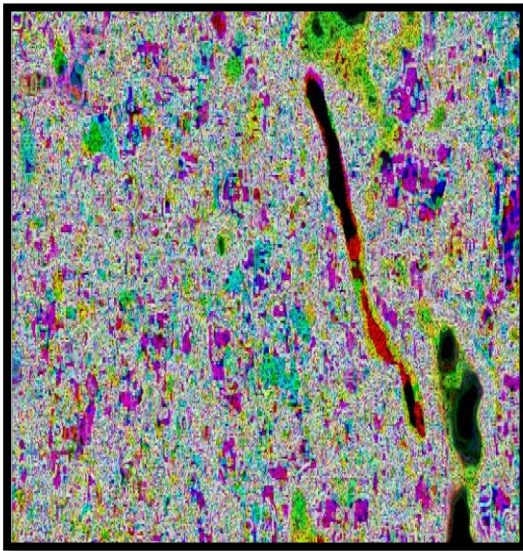
These toxic elements, in trace amounts, have found very common their way into the food chains of animals and human-who consume the polluted water and grasses that grow on the floodplains of polluted rivers and bills in the Bagri tract of Murshidabad. During per rain floodwaters carry days that have absorbed toxic elements from urban areas and industrial effluents and spread this onto the plains supporting folder grasses. For this reason, surface water and river water and overflow of bills are becoming less and less consumable to the phenomenal increase in pollution everywhere in the district and beyond.

All present attempts to reduce pollution have met with disastrous failure. In a short spell of the field, the study is Bagri tract's remarkable pollution threats are evident. For the shortfall of awareness, many bills become dry or lose the water holding capacity due to unplanned agricultural activity. Moreover, the lifting of groundwater for irrigation made the situation graver. The construction of roads, and railway lines are the worst impact. No risk characterization and assessment of risk was ever done in the district. The pH status of bills in the Bagri tract is under threat. Also lost the percolation ability for the various forms of pollution and unplanned urban growth. No administration measures were ever taken to solve the problems. The administration, and also people not aware of acid deposition has caused some surface water of the district to acidity. Fish and other agnatic life are affected for this reason. Thus the vegetation is also affected in places of the Bagri tract. Chaltia-related problem-The location of Chaltia bill bow is within Berhampore town. It is the old course of the Bhagirathi River. At present, its link with Bhagirathi in the rainy season is blocked due to unauthorized settlements. In most cases, local political interest in the vote is related. Due to the stagnation of flow per rainy season, 80% of the bill is now covered by water hyacinth. Moreover disposal of domestic waste around the bill both solid and liquid made the situation grave with the water pH 7.9 at a temperature of 26.67C.

Major old river basin (bill) in the Bagri tract

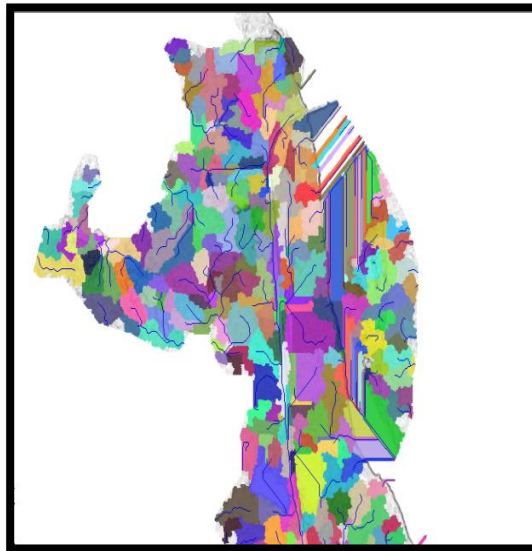
Vandardaha Bill- Water is the common pool resource like the vandardaha bill. There is the old course of river Mahananda. In many locations, its depth is more than 100 meters or even more. These river channels did not have many oxbow lakes. From the British era, this old change of Mahananda was considered as a disposal channel of Berhampore town. Gradually the increased urbanization around this bill made the situation critical. Water pH 7.8.

Fig 1.Vandardaha Bill
Low pass filter 33/33



Scale 1:1000,000 R -2 ,G -2 ,B-3

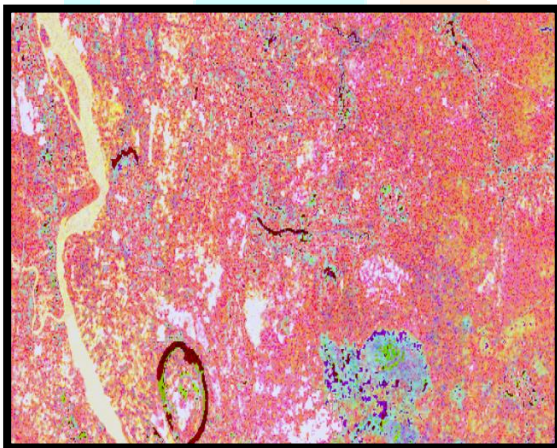
Fig. – 2: Watershade of Ahiran



Sale1: 125,000 Watershade

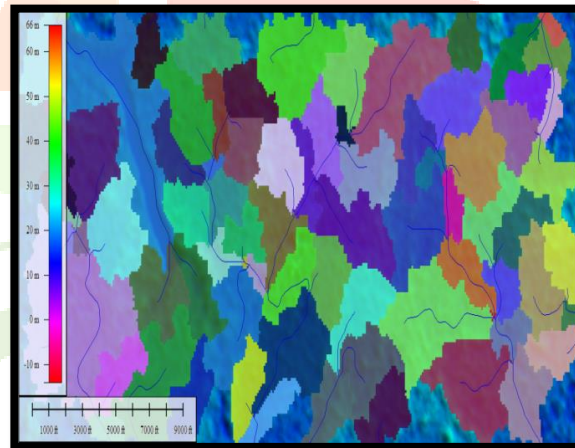
Bhola Bill- May be considered a missing link to the Bhairab River. It is straight. a small segment of the old channel of the Bhairab River. Now it is used by the village people for fermenting Sweetwater fish.

Fig 3.Bhola Bill, Water shade



Scale 1:125,000

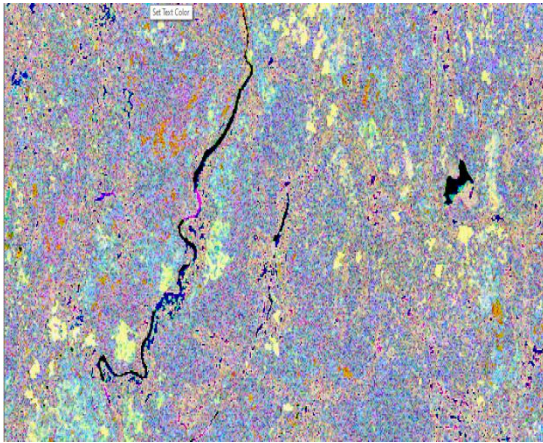
Fig 4. Watershed



Sale 1:95,330 R-2 G-3 B-4

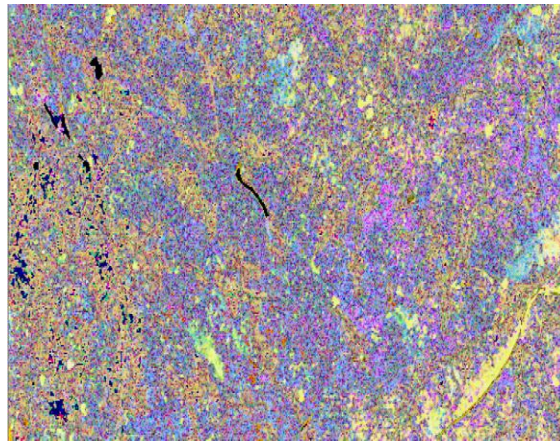
Khora Bill- Lost flow pollution concentration lost its flow even in per rainy season. The agricultural activity and disposal of urban waste destroyed the ecosystem and biodiversity. The pH rate is 8.0. Full of water hyacinth. The bottom is pocked by thick mud casing presenting against percolation. People use tube well water for domestic needs. But the quality of groundwater is not as safe as per government reports. this bill is an extended part of the Vandardaha Bill.

Fig 5.Khora Bill



Scale 1:143,000 R-1 G-2 B-3

Fig 6.Goribag Bill



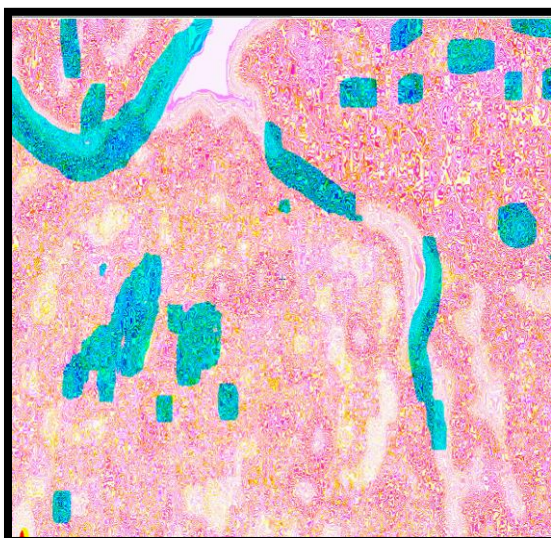
Scale 1:35,700 R-2 G-3 B-4

Goribag Bill- This is another extension of Vandardaha Bill water pH- 6.8. As urbanization has not developed, the water is available but now a stagnant pull. As the local panchayet cleans the water hygienically the situation here is to the same extent good.

Nohar Bill- Almost dry, in imagery the contour intervals are shown as 3 mts. Slope 33/33 in low parts flipper. The discontinuity of links from Ganga is evident. duringthe rainy season, their bill carries water and joins the missing links. In the British period, they build the bridge for an axis to Jessor via Akhriganj. The water pH is 8.8. It is the highest polluted Bill of Bagri tract, Moreover, the increasein urbanization, and the thick density of the population, made the situation more grave.

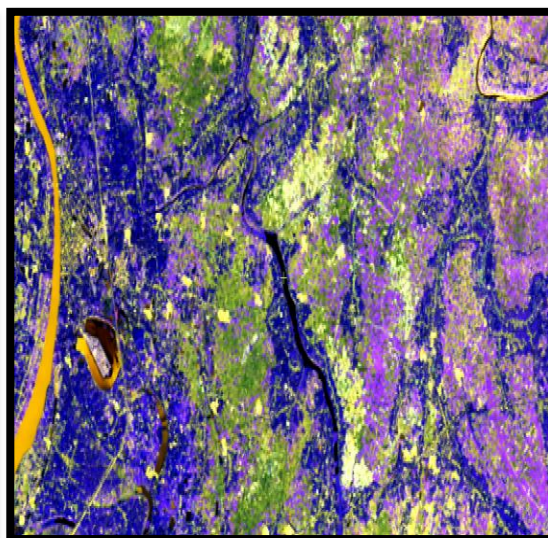
Balirghat Bill- In the segment of Vandardaha bill here the water pH is 7.9. The deepest Bill. Balirghat, depth is the highest nearly 200 mts. or more. Full of thick alluvium. The foundation river of the Bagri region. The settlements along with this long Bill in Bagri tract. Here we find a clear indication that this large bill was not used for urban or village water supply as the pollution rate is very high. The source of pollutants is agricultural activitythroughout the year. Organic materials, including plant debris and animal, remand made the situation more grave.

Fig 7.Nohar Bill



Scale 1:21,4500 R-2 G-3 B-4

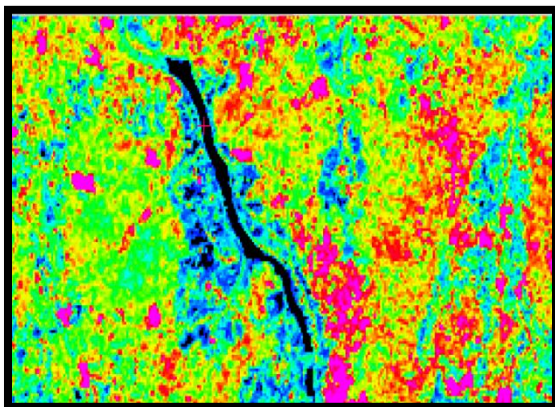
Fig 8.Balirghat Bill



Scale 1;150,000 R-2 G-2 B-4

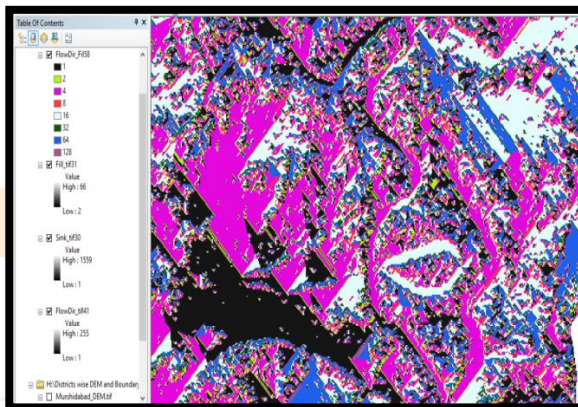
Daulatabad Bill- Water pH 8.1. It is a bifurcation of the Vandardaha Bill. For agricultural activity. Brickfields and villages waste. The bill is almost ended to the north moreover fishery also polluted the water. The rapid use of water for agriculture. The pumpset owners also lift the water for irrigation. Thus it has reached an alarming level. Moreover, involve most of the political power using a fair share of fresh rural water supply. The water is almost absent at the northern section of the channel. Villages developed on the availability of the water of the river. Gradually population increased and agricultural activity increased around the Bhola Bill. On this site, agricultural activity and the development of fishery destroyed the ecology of the locality. The water pH is 8.5. Still, people using the water from the Bill

Fig 9. Daulatabad Bill



Scale 1:40,000 R-2 G-2 B-4 PseudoColor

Fig 10. Flow Direction of Gumani Bill

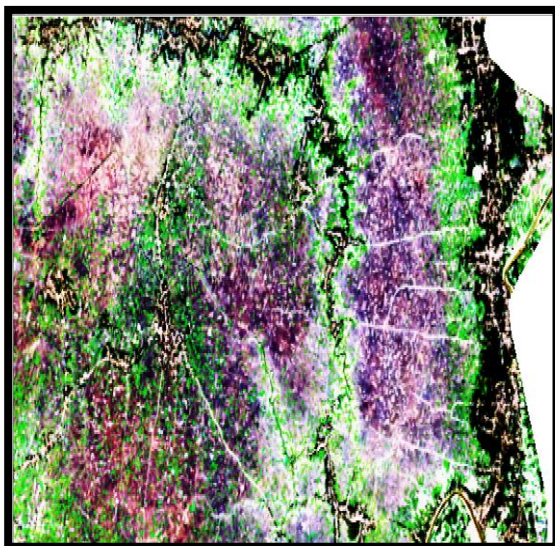


Scale 1:62,500

Gumani Bill- Water pH 7.9 is almost dry in summer. For the construction of the road. The flow direction is blocked. The rainy season has little flow from the Bhairab River. A flood happens when the rainwater is blocked by road and urban construction. An area is a place of intensive agricultural activity. The reason is that soil erosion rapidly increases during rain. Pumping out of groundwater for domestic and agriculture creates a cone of depression around the wall. The reasons people do not have water from tube wells during summer.

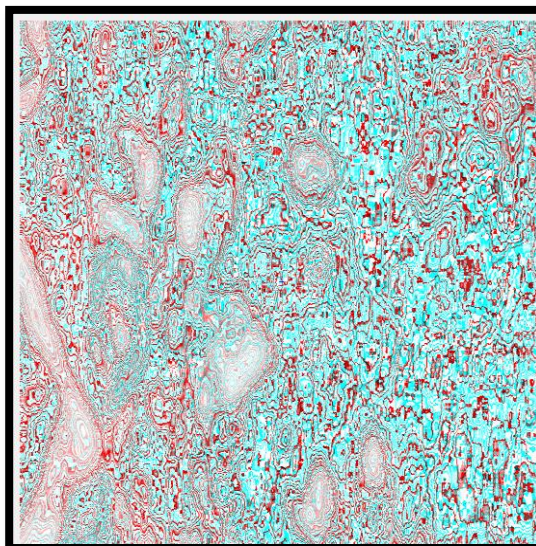
Bor Bill- The old channel of the Bhairab River. During the dry season, people use the big bill for agriculture. In monsoon, it turns into a big bill. The course change of Bhairab and also the metallic roads without adequate culverts restrict the natural runoff in this location. Water pH 7.6 application of toxic chemicals for the increase of yield rate. The water table rises above the sea level from 15 to 30 Mts.

Fig 11. Bor Bill



Scale 1:14,25000 R-2 G- B-4

Fig 12. water depth of Nisithpur Bill



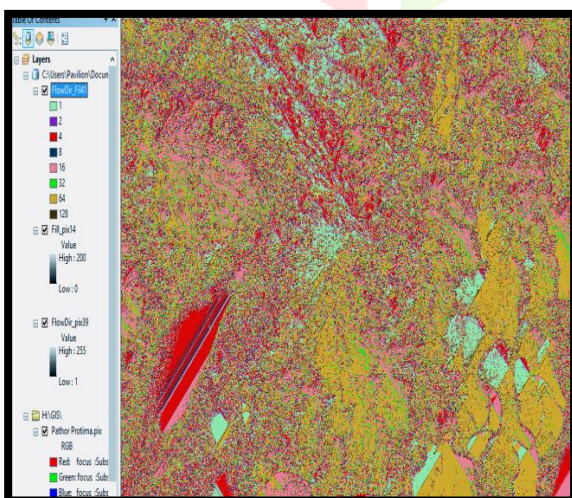
Scale 1:10,8500 R-3 G-4 B-4

Nishitpur Bill- Water pH 8.5. is also a vast floodplain. This is also a distributary of the Bhairab River's old flow channel. Water pH 8.5. Contour intervals 3 mts. analyzed by low pass 33/33. The indication of the dry flood plain. The agricultural activity, increase in population, related urbanization, and also road construction blocked the natural flow of the Nishitpur bill. The capacity of an aquifer for holding water depends on the porosity of the soil. The structural discontinuities like fissures, fractures, joints, and faults in the rock may be the reason as the Bagri tract is situated at the southeast Excess bring zone. Moreover, the type of soil allows the passage of water. The area is a day-rich soil the flow of groundwater will be less. Moreover, the variation of slope creates many critical probates.

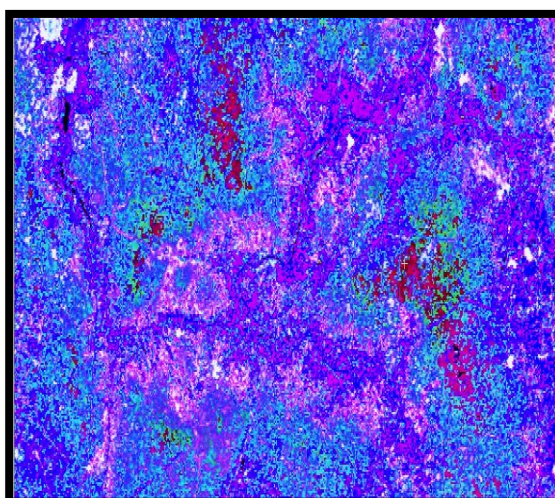
Shilmari Bill- Also an almost dry bill. Due to urbanization, construction of roads, and unauthorized constructions for settlement disposal of urban wastes. The bill turns almost dry. As its location is close to the highway, Railway lin. The normal runoff is disturbed by various human activities. Only scattered depressions are available. The natural flow direction has been interrupted due to other reasons.

Fig 13. Shilmari Bill water depth

Fig. 14 Dumnidaha Bill



Scale: 1:80,000 R-2 G-3 B-3 Flow direction



Scale 1:54,240 R-1 G-3 B-4

Dumnidaha Bill- This portion is the southern part of the Vandardaha Bill. The water pH is 5.00. As action by the panchayet cleared the location of all types of injuring hydrophytes. The bill is surrounded by a thick population but the people are aware of the environmental issues. For the outflow of wastewater

from urban places, they are partly successful. The problems are created by the topography and water shade. Many of the seasonal links pollute the Vandardaha bill all through the main channel. But the shortfall of groundwater is common around the bill. As the soil conditions are composed of thick clay the percolation rate is poor.

The Bagri tract of Murshidabad is a Moribund alluvial plain of Ganga, Bhagirathi, Bhairab, Jalangi, and Mahananda river. The simulated satellite images in MS form and DEM form demark the nature of river actions by their dynamic equilibrium. The main features of satellite images are Contour, Slope, Water Shade, Flow direction, Simulated Water logging designs, Vector data analysis, Rustier data analysis, Edge detection, Ridge making etc, Location, Mapping scale with protection, Agricultural activity, Correct location etc. It is possible by the major four RS-GIS software- 1) Geomatica, 2) ERDAS, 3) Arc Gis, and 4) Global Mapper. With the help of secondary data and with the help of current imaginaries like LISS II, III, and Land sat Images in 1:30,000 scale used for analysis; many types of filters are applied for critical analysis of landforms, terrain, and water bodies. Also, stream order, sink, and fill images are methodically processed by various software to design a final shape. Latitude & Longitude, buffer, drainage density, flow directions, Identification of plants and rivers, ponds by metamorphism. RGB bands are used for the classification of raster data. For vector data analysis by 3D image processor use from DEM data analysis, where basic images and SRTM-30. It is the common international standard used for critical applications. The total framework of cartography done by WGS 84 and UTM projection and file format are Tiff and pcidx used for image processing.

Conclusion

In 3rd world countries, the outcome of human activities in cities and villages is likely to be the same as solid waste disposal. Moreover, the agricultural activities increased to food for the people, thus the lifting of groundwater in the Bagri tract is a common feature. Without any proper analysis, they choose to change the land slope for vested interest. Construction of roads and railway links block the natural runoff in the terrain. Organic and inorganic waste create a nuisance in rainy seasons. The administration does nothing for those. For the settlement landfill and blocking the natural flow of runoff is very common in India, Moreover, to protect against bank erosion, collection of soil from river beds is a very popular method in India, What the hell engineers are doing to protect it?

Moreover, no plan has yet to be taken in the Bagri tract to remove heavy metal ions from diluted wastewater from a stream. Use of various chemical fertilizers. Pesticides etc. made the groundwater polluted. The villages are now expanded due to the increased population. Modern lifestyle is attracted the village people. But they are ignorant of all awareness and educated for the benefit of future generations.

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