

GEO-ENVIRONMENTAL PROBLEMS OF FLOOD BY BHAGIRATHI RIVER

A CASE STUDY OF

AGRADWEEP OF BARDHAWAN DISTRICT IN GANGETIC DELTA

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ABSTRACT:

Many states in our country are flood prone due to heavy rain or otherwise. The flood causes loss to human life and wide spread damage to property. Unimaginable damage to agriculture takes place affecting the States planning and upset the financial budgeting there by slowing down the whole economy of the country. The term "flood" is a general or temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters or from the unusual and rapid accumulation or runoff of surface waters from any source. Heavy down pore in the form of rain, brings down more water than can be disposed by combined factors natural and manmade systems causes flooding. The rivers overflow embankments may be breached. Generally rains following storm and hurricane are heavy and bring unmanageable amount of water causing flash floods. The frequency or probability of a flood usually is described by assigning a recurrence interval to the flood at each gauging station. This is accomplished by statistically evaluating long-term annual peak stream flows at a station.

SIGNIFICANCE OF THE STUDY:

Any research gives us a light of new vision. The significance of that research work will help us what are main causes and affect of flood in Agradweep by Bhagirathi River and what is the process of flood risk reduction management. Local government as well as govt. of India can take necessary step to reduce mitigate, and management of flood in Agradweep. Although flood is a natural hazard, but by which of interference by man increase the flood vulnerability that should control by the proper govt. policy as well as people awareness.

BACKGROUND OF THE STUDY:

Agradweep is an ancient land in Katwa Sub-division. Ptolemy mentioned it as Apnagar or Aagaha, Will Ford called it as Aghodeep and according to Renel, it was Aghadweep. To reach there, one has to get down in Agradweep railway station, which is in Bandel – Katwa railway line and then travel about 2.5 km by boat or rickshaw to reach the Agradeep village, which is situated on the banks of the river Bhagirathi. Due to frequent changes in the way of river Bhagirathi, Agradeep in the past remained sometimes on the east banks and sometimes on the West Banks.

Agradweep with its varied tectonic elements and riverine features, is a traditional zone between the Jharkhand plateau which constitutes a proportion of peninsular shield in the west and Ganga-Brahmaputra alluvial plain in the north and east. In general Jharkhand plateau consists of the meta sedimentary rocks of a Precambrian age.

The river system in Agradweep includes Bhagirathi- Hooghly in the east, Ajoy and its tributaries in the north and the Dwarakeswar, Damodar and its branches in the south-west. Besides, there are innumerable khals old river beds all over the area.

The soil of the investigation area is of reddish colour, medium to coarse texture, acidic in reaction, low in nitrogen, calcium, phosphate and other plant nutrients. Water holding capacity of this soil increases with depth as well as with the increase of clay portions. Towards the east alluvial soils attain enormous thickness in the low level plains to the east. This alluvial soil is formed of alluvium brought down by the Ajoy, Bhagirathi and numerous other rivers. These soils are sandy, well drained and slightly acidic in nature.

The study area experiences a climate which is CWg3 and AW1 types, where 'C' stands for 'warm temperate climates with mild winter', 'W' for 'dry winter not compensated for by the total rain in the rest of the year', 'g3' for 'eastern Ganges type of temperature trend' and 'AW1' for 'tropical savanna climates'.

Average temperature in hot season is 30 degree while in the winter season is 20 degree Celsius and average rainfall is 150 Millimeters. The cold season starts from about the middle of November and continues till the end of February, March to May is dry summer intervened by tropical cyclone and storms. June to September is wet summer while October and November is autumn.

LOCATION MAP

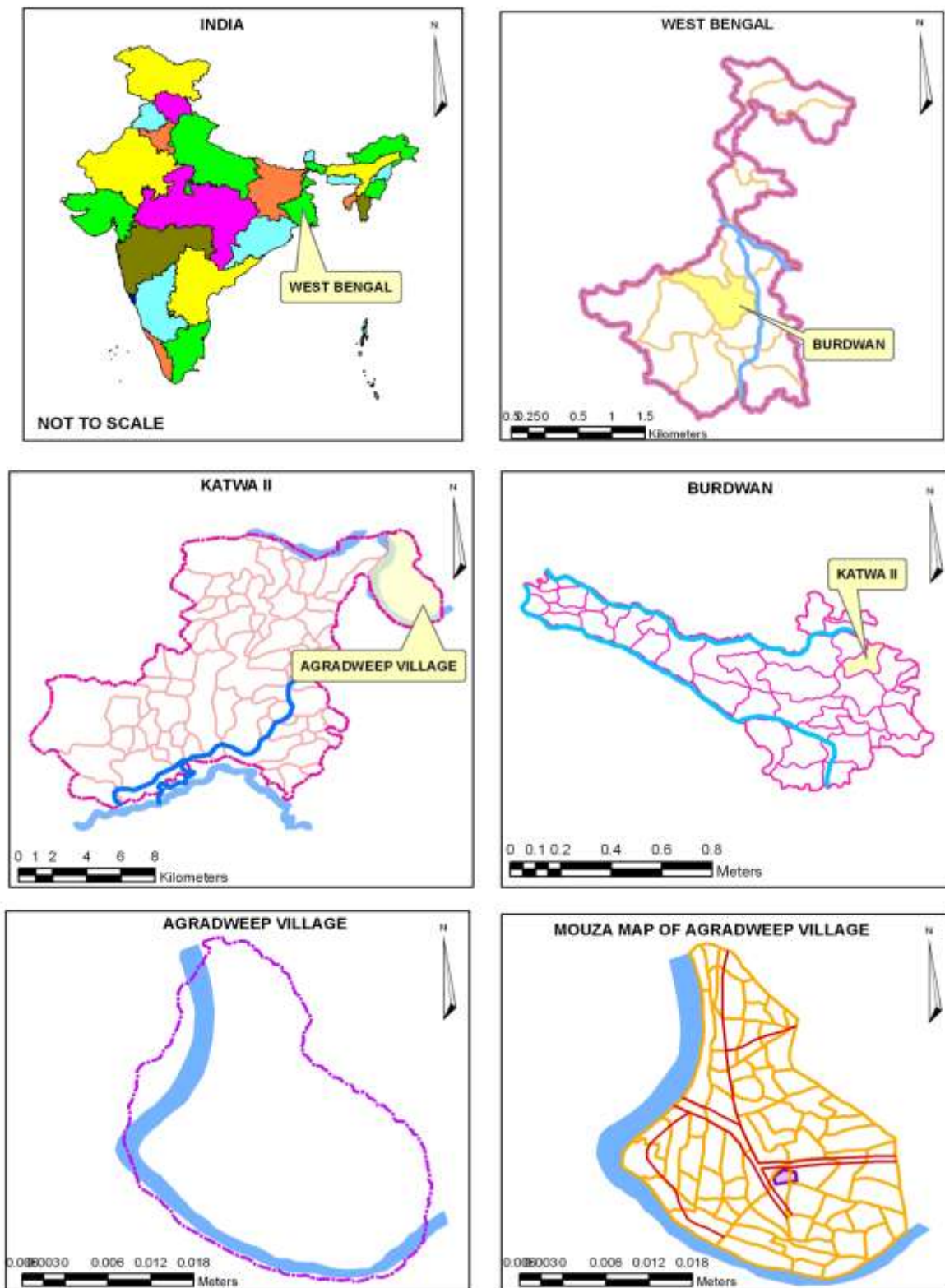


Fig-1: Location map of study area

OBJECTIVES OF THE STUDY:

The Objectives of the investigation has been carried to --

1. To understand basic problems of flood in my study area.
2. To identify with focal effects of flood in the investigated area.
3. To value the role of disaster management of Government and NGOs during the flood and post flood reconstruction.
4. To find out the main geo-environmental problems flood affection

METHODOLOGY OF THE STUDY:

The primary data collected from the respective authority like panchayet, club and person of the villages. Though my study is based mainly on primary data but I also collected secondary data from mahakuma library, Katwa information centre, NATMO, Gazetteer, different books etc. just to get a general idea about the background of the study area.

The methodologies followed in the present report may be divided into three parts –

Pre-field methods This stage includes - i) collection of districts map ii) collection of secondary information from district handbook, cesus report, information from B.D.O office, Panchayets ,reports,others books and journals etc. iii) preparation of questionnaire statistical schedule for collection of primary data which are closely related with the research work.

Field methods By questionnaire schedule primary data will be collected from the study area. Observation schedule also help to collect the information.include collection of primary data from aged person in different G.P. and collection of present condition of Agradweep by photograph in different reliable place of Bhagirathi river.

Post field methods Collected data will be classified in a master table and various cartographic and statistical techniques will be made in support of the theoretical discussion and preparation the final report.

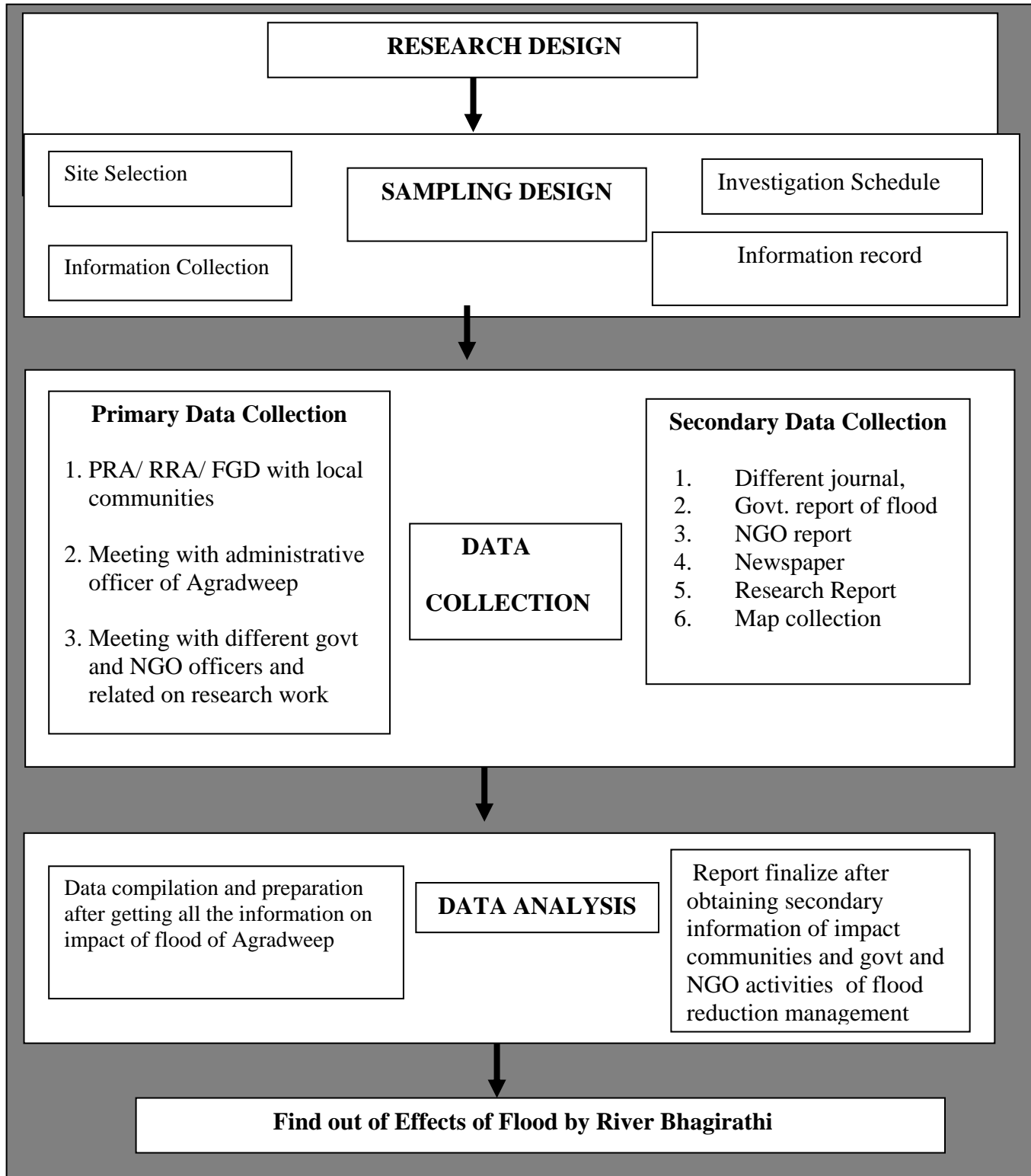


Fig-2: Lay our of the methodology of Present study

RESULTS:

Geo-Environmental Problems Related To Flood:

A. Physical Problems:

Some specific problems which are physically due to flood in the floodplain. Among the problems the most important problems are:

Destruction of natural levee:

In case of Bhagirathi River, the destruction of natural levee has been taken place during the all large scale of the same lengths at almost at all locations. It is due to the stagnation of huge water relatively in the lower catchments of the district.

Depression of land:

Existence of a weaker zone in the subsurface part does not carry heavy water load during flood. Thus, it is responsible for creating depression in the outer surface e.g. there is a big depression existed during 2000 and 2004 flood at Agradweep in Bardwan.

Shifting of river course:

The eastward migration of Ganges near Panchanandapur [situated at Malda District, just before the Murshidabad District entrance in the northern side of Farrakka] reduces the distance between two rivers Pagla which can take a vital role to make Farrakka Barrage useless. It was estimated that the distance between two rivers along a fixed line was 8.53kms in 1923, 2.05kms in 1966, and 0.95km in 1975. It reduced to 300m in 1998, In the month of August 2001, the encroaching Ganga swallowed the narrow interfluves between two rivers. So if those rivers are joined together in future then the water will flow through Pagla and the present Ganga tract will remain abandoned. Thus Farakka barrage will be useless.

The migration river course, mainly occurred during flood, can the district or state administrative boundary and making a big barrage useless because of its destructive nature. Such shifting nature is found in almost all the rivers of the study-area but among them the Bhagirathi river is dominating .

River Channel widening:

River channel widening is a perpetual processes in the study-area. It is mainly due to lateral erosion. It is noted that Groves of the flood plain's in the study-area which were development on the river banks now their locations are existing within the channel beds. Sometimes 30m-100m from the present bank which have submerged. The process of River channel widening repeats in the study-area and responsible for more destruction in the existing floodplains.

Surface Channel Dcour:

During floods, over bank flow is often concentrated in braid-like threads on the flood plain surface. These channels can erode the surface to depth of 30cm and do not necessarily aggraded during the waning stages of the flow. The confined back channels are more effective agents of both lateral and vertical erosion, the lateral extension of back channel by erosion of the scarp of the adjacent, higher flood plain is commonly observed.

Flood plain stripping:

Stripping of floodplains is a process that removes alluvium from floodplains surfaces. In the study area the mechanism operates at a verity of seals. For example, a strip of flood plain alluvium approximately 40cm in depth and 3m in width near Agradweep was removed from the flood plain surface along it's 300m length. More commonly, flood plains are stripped to 2m depth in width of 30-40m distance up to 500m mainly in the relatively upstream areas. If stripping occurred repeatedly in the same place during different flood than it results rills and gullies which ultimately appears as water logging area. Detachment of settlements during the flood and water logging is also one of the important in the study-area.

B. Socio-Economic Problems:

Poverty and Migration:

About 1.27% of India rural poor live in Bardwan district West Bengal State. About 3 million people or 36% of the district's population are below the poverty line. Agricultural deficiency, unemployment and child labour, child marriage and trafficking factors are mainly responsible for poverty and migration in the study-area.

Agricultural deficiency:

Although the agricultural land of the study-area is very much fertile but the agriculture productivity is low. It is due to the flood on the agricultural land. In winter, it gives maximum Production but in Rainy season flood washes almost 70% of the total area consequently low production. The River in the this area during the flood time is responsible for subsidence and slumping along the banks that also results loss of land poor farmers. The river bank erosion and shifting of river courses in the study-area also affect the residents of the villages. Villagers move to upland areas along the river banks during the extreme condition of flood. The loss of land of villagers directly affects the sustainability in the study-area. It increases poverty as well as insists the rural population to migrate for obtaining employment at other places.

Unemployment:

The total no of applications on live register of employment exchange is 310425 within which only 847 person are placed. According to the survey report of district rural development authority 1997 and census report 2011, it is noted that about 65.86% population of the study-area are unemployed. It is also noted that out of 65.86% about 92% populations belong to female category.

Child Labour, Child Marriage and Trafficking:

It is noted that teenagers of the study-area boys and girls have been working at different places such as domestic maids, as helper at various shops particularly tea shops as well as for hopes keeping. Early marriage is also well adopted social system in the study-area. All factors are responsible for a high percentage of dropouts from the schools of the teenagers in the study-area.

Sexual Exploitations:

Calcutta sex worker Carolyn Sleightholme and Indrani Singha (1996) have explained in their book “Guilty without Trial” as – in the Sanlaap Survey it is found that 70% of the sex workers in kolkata are from West Bengal. Of these almost 13% are from Bardwan district. It is evident from the above date that the rate of sex workers are high in the Bardwan district.

Thus it is concluded the malnutrition, early marriage, dowry system, school dropouts, poverty and unemployment are the indirect effects of flood, which are also the main causes behind the sexual exploitation in the district.

Education:

According to 2001 census about 68.28% of the total populations are literate which increased up to 84.35% in 2011 census. It is noted that the school building have been submerged under the water during the flood period. Sometimes the school building becomes shelter of the poor people in the study-area during and after the flood for certain period. After flood the study-area get engaged in re-construction of settlements and work for raising funds for solving the economic problems of the rural flood affected population. Ultimately it also increases the number of dropouts from schools.

Health:

The district comprises 70 primary health centers and 34 family welfare centers. The primary health centers are sometime submerged under flood water and consequently the apparatus, medicines and other necessary goods are destroyed. Thus these health centers having very lesser apparatus and medicines which are portable. Very few doctors and nurses are sent for their duties in those area and beds are also not more than 10. On the other hand due to flood, damped weather continues for long time. The suffer comes to the PHC for treatment a lot becomes upset by not get is medicines. Due to more bushes and rat-holes, snake bites cases are more but they do

not get proper medicine in proper time and dies. Ground water contains a dangerous level of arsenic which also creates “black foot diseases”

Destruction of Settlement:

The dense rural settlements are along the riverside which are highly affected by flood. The townships or place like Katwa, Daihat, Agradweep are also located flood prone zone. Almost 60% of the total households are affected by highly elevated flood whereas about 30% of it, are affected almost in every year. Sometimes, the house buildings are totally damaged and the dwellers are bound to be shifted. They sometimes take shelter in school building or in flood centers.

Loss of Live-Stock:

In flood period most of the domestic animals are unsecured because:

- a) They can be carried away with flood water and when they are unable to swim or get collision with obstruction and then died.
- b) Sometimes they are submerged by clay-made walls of the houses when these are broken down.
- c) These are affected by various diseases during flood due to bites of harmful insects or different harmful virus and bacteria.
- d) The relief and medical team cannot be sent to the flood affected area in proper time due to damaged transport problems. When it reaches to the area, becomes useless and problem remains unchanged.

Industry:

Only one agro-based large scale industries is established in the study-area i.e sugarcane industry at Agradweep. The small scale industries are-silk, ivory carving small scaled textile industry[almost homely made], metal work, clay model preparation bidi industry[home-made siggerate]etc. the other industries are existed in Bardwan are oil mills, rice mills etc, which are also affected by flood. The productivity decreases during flood due to lack of raw materials or labours that comes from the other villages and communicational drawback. Sometimes rivers are polluted with oils and becomes thick water. This provides great economic loss in these small industries.

Transport:

Means of transportation in Bardwan District are railway, roadway, waterway etc. amongst which waterway is the cheapest mode of communication and easily available during flood. Sometimes the boatman and fisherman pray for flood because of their high income in flood period.

ROUTE MAP AND EFFECTS OF RIVER BHAGIRATHI

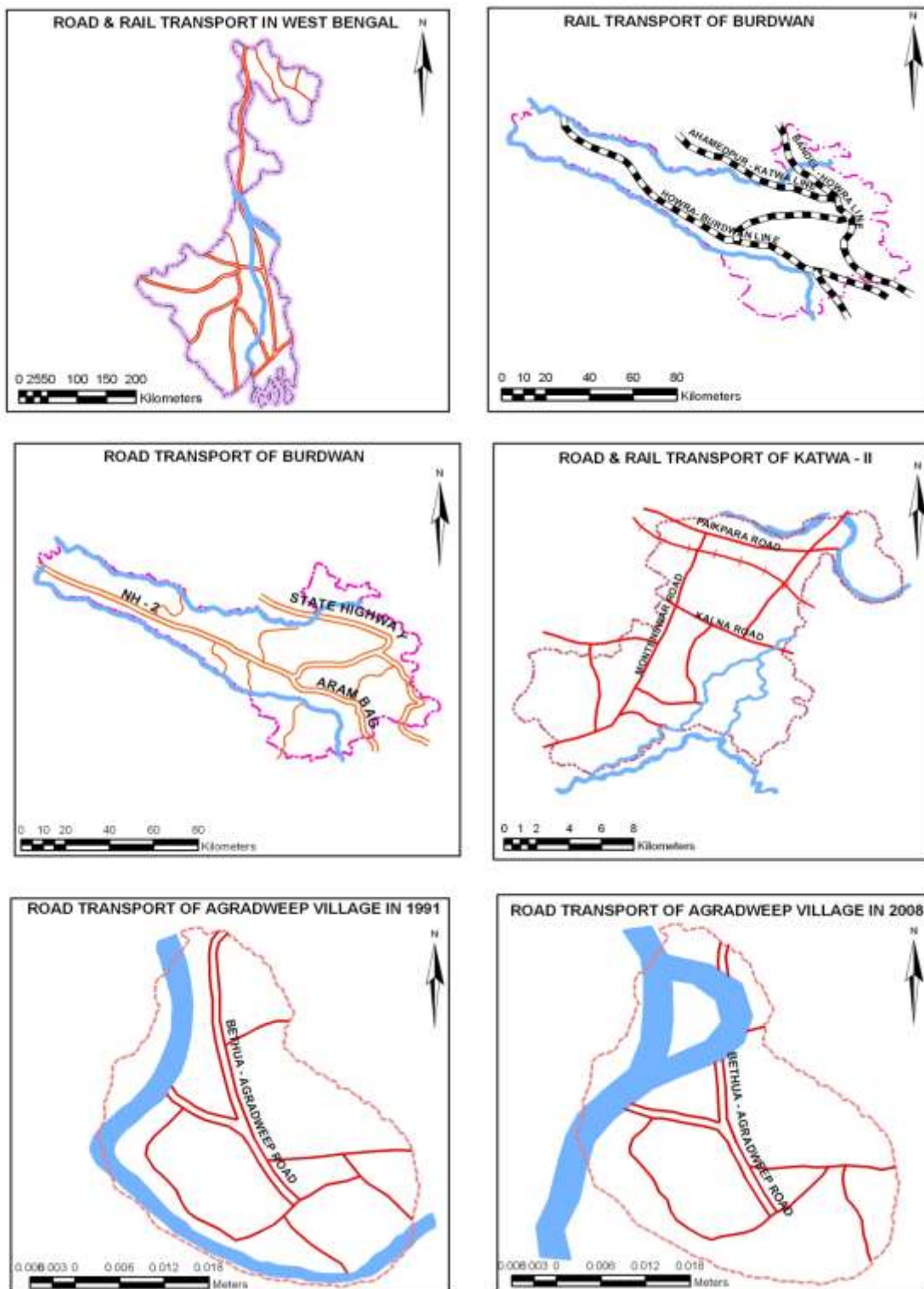


Fig-3: Route map and Effect of Bhagirathi

CONCLUSION:

Irrigation and Waterways Department (I& WD) Govt. of West Bengal has already taken up disiltation works in some major reaches of the river. However. Managing flood in any tropical and developing country is difficult for any single agency/organization. Flood has a multidisciplinary dimension where society plays a vital role. With limitation in prediction of rainfall, flood forecasting also cannot be very accurate. If we can involve local people and use their knowledge for devising a disaster management plan where all available scientific data are also taken as input then surely we can over come some of the indeterminate factors of disaster management.

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