

Geographic Specialty and Resource Potentiality of South Western West Bengal

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Abstract: The geographic environment of any locality is determined mainly by natural component of environment like geology, topography, climate, soil, forest etc. The human mosaic is developed through time on the basis of condition determined by the environment, though advanced societies developed in science and technology have now made it possible to modify environment without consideration to natural limiting factors. The situation in the selected study area is a pure example of an area with low share of development and largely limited by in situ resource availability greatly controlled by natural geographic element of environment.

This study attempts to depict the natural geographic environment of the area in association with their resource potentialities of South Western West Bengal.

Keywords: **Geographic Specialty, Resource Potentiality, South Western West Bengal.**

INTRODUCTION

The combination of physical and cultural dimensions is identified as geographic characteristics of any area. Physical characteristics in geographic discipline refer to the physical aspects of the area excluding any kind of human interventions. The most common physical components include geology, topography, hydrology, climate, vegetation etc. The cultural or human characteristics are observed in demography or population, economic and social activities of any area. The occurrences of natural resources are determined by physical geographic features of any territory of the world. The study area include the natural resource enriched but comparatively less developed four Districts of Bankura, Puruliya, Jhargram and Paschim Medinipur commonly called as South Western West Bengal.

OBJECTIVES

The first objective is to analyze the condition of available resources determined by natural element like geology, topography, climate, soil etc and the other objective relates with resource potentiality and dependent livelihood in the area.

METHODOLOGY

The study has been initiated with extensive literature review and field visits as tool of empiric methodological aspect. The examination of geological maps prepare by Geological Survey of India, topographic maps prepared by Survey of India and soil maps collected from National Bureau of Soil Survey and Land Use Planning have been consulted as foundation of this work. Thematic maps have been prepared using ArcGIS 10.3 software based upon administrative map of census 1961. The statistical technique have used for water and climatic resources beside descriptive methodology for rest of the work.

RESULTS AND DISCUSSIONS

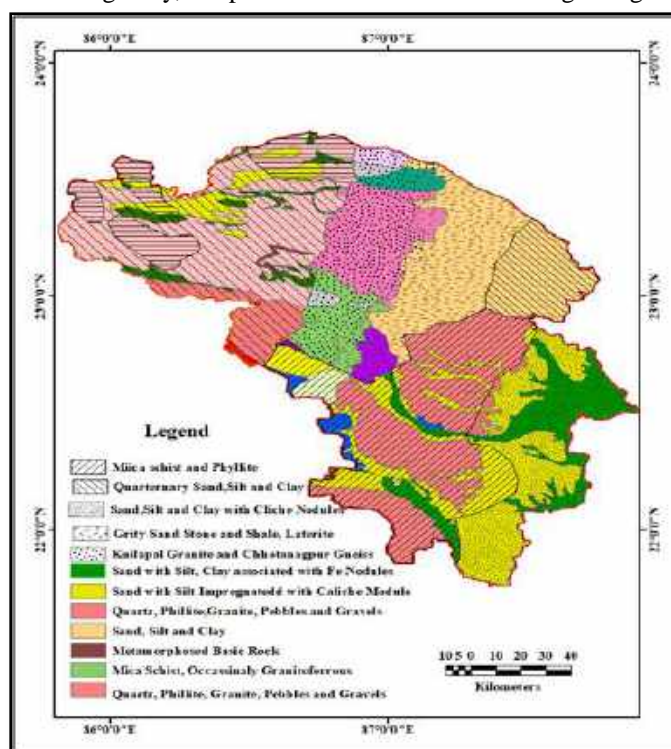
This section is very crucial and covers brief outlook of all the natural geographic element of the study area and resource endowments based upon this geographic speciality.

Geological Resources

The main geological formations of the area include Pre Cambrian rocks and Gondwana sediments of Puruliya, Laterite and Alluvium formation of Bankura and Laterite formation of Paschim Medinipur District (Gaz. Pur. 1985). The major part of Puruliya district belongs to Pre Cambrian except the Blocks of Neturia and Santuri along the flanks of Damodar with Gondwana formation. The eastern part of Bankura district falls under alluvium formation and western part including CD Blocks of Saltora, Mejia, Barjora, Khatra, Ranibandh, Taldangra, Sarenga and Hirbandh is covered with Laterite formation. Bankura also slopes down gradually from west to east. The District of Paschim Medinipur is more or less entirely lateritic.

The Geology of the Study Area (Source: GSI, 1999)

Kuilapal granite intrusion is visible in Binpur II Block along the border of Bankura and Paschim Medinipur districts. Geologically, Binpur II Block is most diverse regarding rock formation. Phylite and Mica-

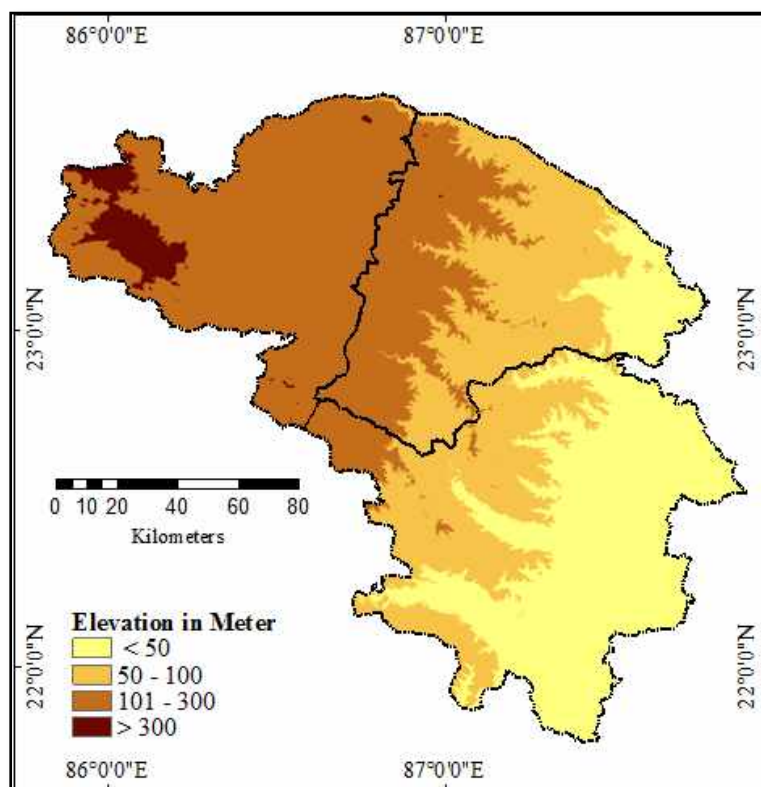


schist are spread over the largest area of Binpur II. In the eastern part of the Block, some alluvium is found along the banks of Kangsabati, interspersed with fragments of quartz, phylite, granite pebbles and gravels occasionally laterite and greenish grey clay, impregnated with caliche nodules. In the north-west near Silda, outcrops of micaceous schist are found (O'Malley, 1911).

Topographical Resources

The topography of an area is a major determinant of utilization of resource. It determines evenness, gradient, run off, infiltration, etc and thus controls productivity of the land. The Rahr Bengal has three main topographic features: **western plateau and hilly area**, next to plateau **a mixed zone of transition from plateau to plain** and **an alluvial plain area on the extreme right**. The area may be delimited in four contours of 50,100,300 and 500 meters. Digital elevation model (DEM) has been prepared from ASTER data set to represent the topographic expression of the area. The highest altitude of the area is 726 meters in Baghmundi

hill area and as derived from ASTER data set. Elevation of the study area steadily decreases from north-west to the south-east. The area has been classified into four



The Surface Topography of the Study Area

topographic units: **the sporadically eroded high altitude hills, hilly areas, plateau area and eroded plains** which have been shown in the diagram.

The first zone covers the hills of Ajodhya, Panchet and Bundwan. The second zone of hilly area forms almost 1/3rd of the study area covering the total Puruliya and western part of Bankura and Paschim Medinipur Districts. The third zone of plateau area covers the total Rahr Bengal from Nayagram to Barjora through Jhargram, Garhbeta, Raipur, Taldangra, Bishnupur and Patrasayer Blocks. The fourth geographical zone of eroded plain is situated along the eastern border of the study area with Indas Block and surrounding areas in Bankura and major portion in Paschim Medinipur District along Damodar, Rupnarayan and Kansai rivers.

Hydrological Resources

The hydrology of the study area encompasses movement, distribution, water cycle and management of water resources. The movement of run-off water of the region is controlled by physiographic characteristics of very steep slope, with hills on the western part and alluvial tract at the eastern part. Thus, the usual pattern of water flow is from west to east and western part covering Puruliya and western Bankura faces comparatively steady water crisis. The mean annual rainfall of the area is around 154 cm, 151 cm and 166 cm in Bankura, Puruliya and Paschim Medinipur respectively (Rudra *et al.* 2010). The storage capacity of water resources in the study area has been given. The data presented at table shows that Paschim Medinipur has highest potential in terms of total internal water resources. Total sources in the table include water coming through discharge of rivers or other run off from other states. The Bankura District has highest potential of water resources in terms

of total sources (rainfall plus run off from upper catchment)

District level Storage Capacity of Water Resources (Volume in Km³)

District	Rainfall	Surface water	Ground water	Total internal Source	Total source
Bankura	10.65	5.43	2.16	7.39	31.78
Puruliya	9.43	5.82	0.83	6.57	24.17
Paschim Medinipur	15.41	7.99	3.75	11.38	22.88
Total	35.49	19.24	6.74	25.34	78.83

Source: WBPCB, 2009; CGWB, 2011; Rudra, 2012

The distribution and presence of water sources of this area may be described with the following heads:

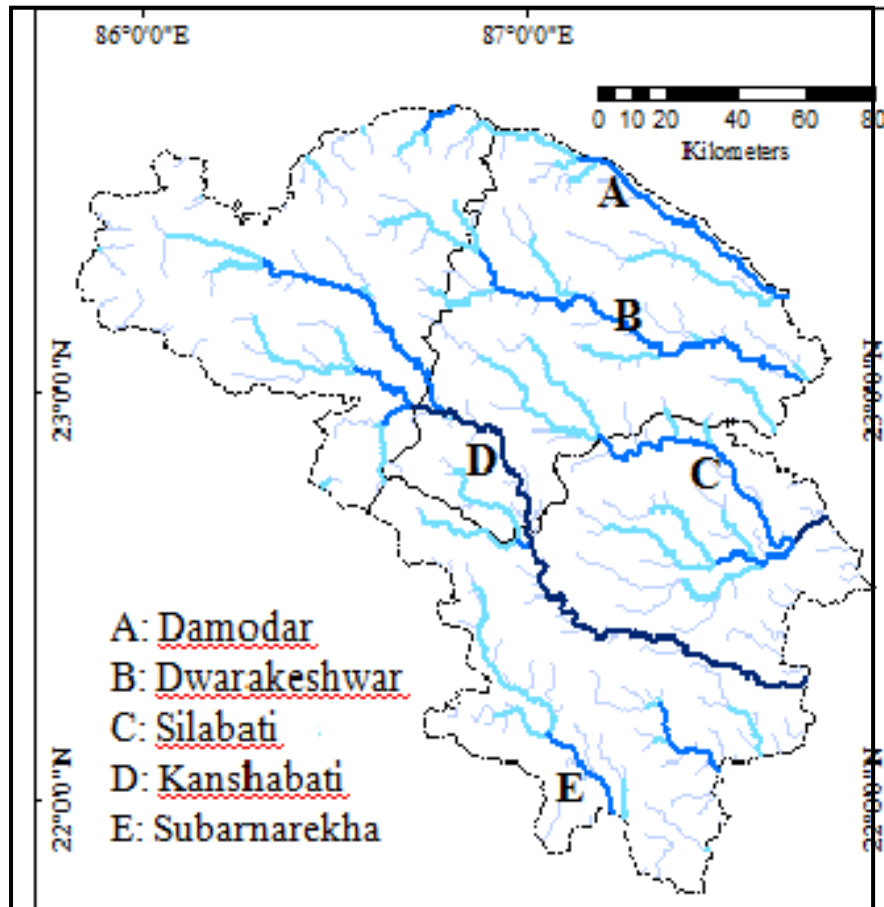
a. Surface Water

The main hydrological features are rivers and tributaries, lakes and tanks, *jhoras* (springs) etc. The watersheds of the rivers of the study area includes Damodar, Dwarakeswar, Kangsabati, Subarnarekha, Silabati, Gobai, Kansai, Kumari, Nangasai, Gandheswari, Rupnarayan etc . There are numerous large, medium and small dams which are lifeline not only of the area but various downstream areas e.g. Ajodhya dam in Puruliya.

b. Sub-Surface Water

The condition of sub-surface water in the study area is very alarming because of the impervious crystalline base in the study area. The depth of water table ranges from 3 meters to 15 meters from the surface during summer. The areas at the banks of major rivers of the study area are satisfactory in terms of ground water. On the contrary, tribal habitations at the western margin suffer from inadequacy of large aquifers and drying up of many tube wells, dug wells and even river beds in summer every year (Gaz. Pur., 1985).

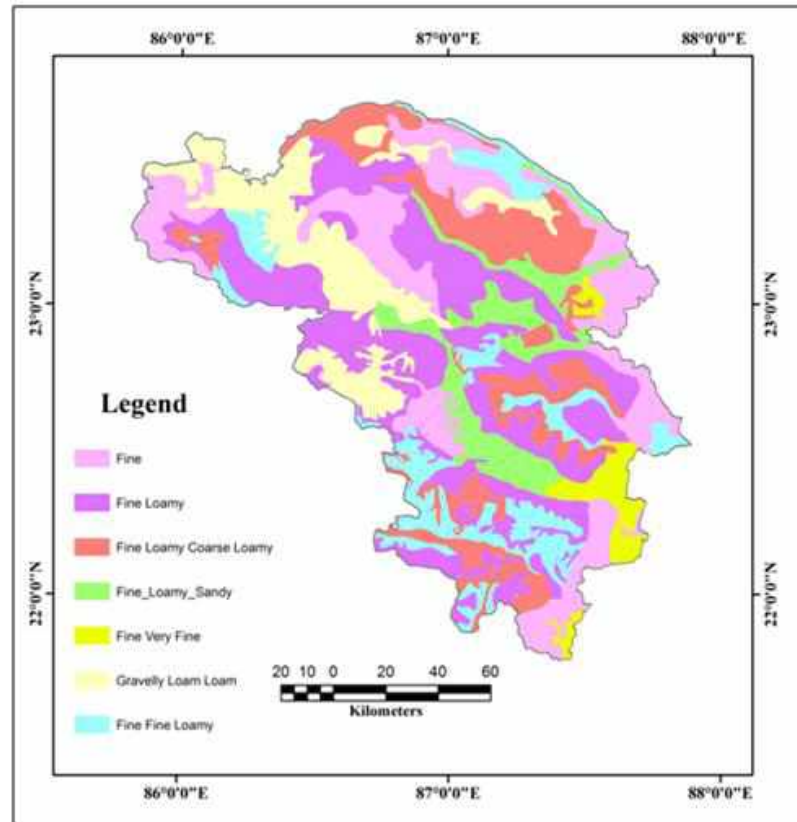
Folding, faulting and fracturing are defined as lineament in hydrogeology. The geological factor, lineaments is very significant in controlling storage and movement of ground water in hard rock areas. The lineament density of >0.3 indicates better movement of groundwater, but most of the areas of Puruliya in the study area belong to low lineament density zone i.e., value <0.15 (Das *et al.* 2018).



The Surface Hydrology of the Study Area

Soil Resources

The soils of Puruliya District have been classified as Gneissic soil, Gondwana soil and sedimentary soil in District Gazetteer of Puruliya, 1985. In Bankura, it is loamy in north Sonamukhi, Indas and Kotulpur, elsewhere lateritic soils are found. In Paschim Medinipur, soils are alluvial and in Jhargram it is lateritic. The soil characteristics have been examined with soil maps prepared by the NBSS & LUP, Kolkata, in 2009. The dominant soil type found in the area is loamy varieties stretching from very fine grain to coarse grain. Gravels and sands are found in few isolated patches as well as along the river courses of Damodar, Kansai and Dwarakeshwar rivers flowing through the study area (NBSSLUP, 1992). The study area falls under red and laterite zone of National Agricultural Research Project classification, 2012; Government of India. The soil map given below illustrates that water stressed areas are in the western part of the study area, while the eastern plain area have no such major problems of water stress. Thus, Blocks of eastern plain area are in better position in terms of agricultural crop yield, western plateau areas of tribal settlements suffer from uncertainties in agriculture and comparatively lower crop yield.



Source: NBSS &LUP, Kolkata, 2009

Soil of the Study Area

Climatic Resources

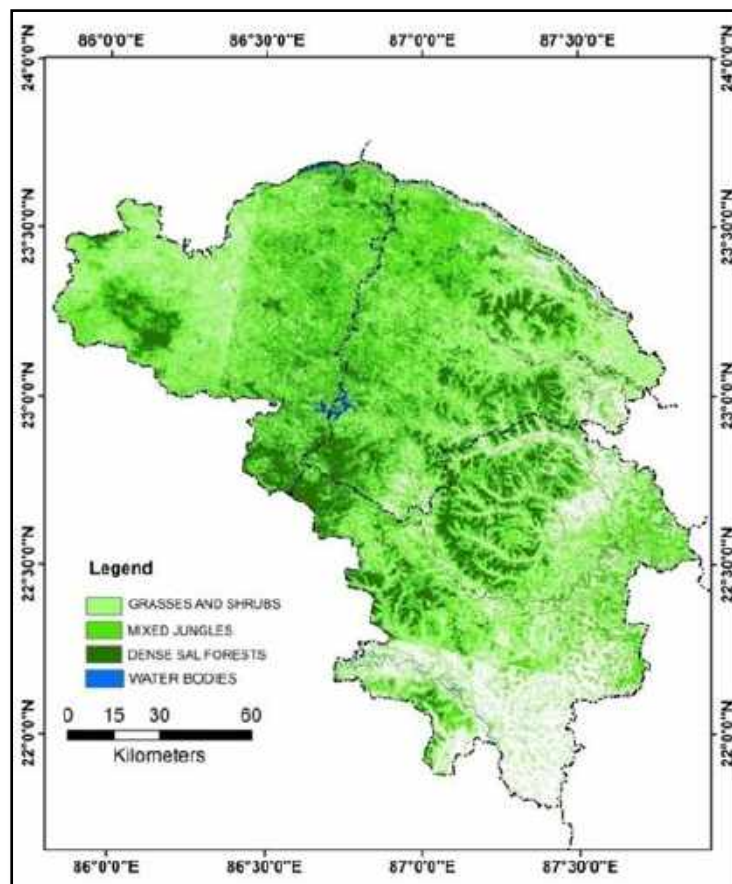
The climate of the area under review is characterized by hot summer with seasonal south west monsoon rainfall. Climatic data have been studied for more than hundred years from 1901 to 2011. The average annual temperature of the study area is around 24°C to 26°C, and mean annual rainfall is 1300 to 1450 mm (Gaz. Pur., 1985; Gaz. Bank, 1995; O'Malley, 1911). The marked four seasons are **cold season** from December to February, **hot season** from March to May, **monsoon season** from June to September and **post monsoon season** of October and November. The climatic type of the whole study area is dry and wet sub-humid tropical type of climate within the regime of south-west monsoon which is under 'Aw' type of climate as per Köppen (Spate and Learmonth, 1954).

Forest Resources

Throughout the area, three types of vegetation landscapes (Gaz. Pur., 1985) may be identified. **Firstly**, there are the patches of land under cultivation on the better watered plains. **Secondly**, there are widely spaced savanna like low trees, shrubs and tufts of various annual grasses on more undulating surfaces. This open forest-cum-grassland association looks like a wild park due to attack and destruction by soil erosion and badlands. Growing singly or in groups in specifically favourable areas, they do not form any continuous cover. The important plant species in this wild park are *ash sheora*, *bel*, *chalta*, *sajina*, *bhat*, *chikum*, *sheora* and *dumur*. Some other varieties of figs, most notably *pipal* or *ashwatha* and *bot* with *simul*, *aam*, *kul*, *siakul*, *amra*, *jiyal*, *nim*, *palas*, *sirish*, *sotsal*, *tentul*, *sidha*, *kadam.*, *karam*,

Natural Vegetation of the Study Area (Source: LANDSAT OL TIRS, December, 2014)

mahua, *kendu*, *lodh*, *kanthal* etc. make up the arborescent part of these thickets. *Bans*, *khejur* and *tal* also occur in large numbers. A number of creepers, hedges and stunted shrubs grow in these tracts and in *khowais* or



khullas, most important to mention are the naturalized exotic *varenda*, *ban okra*, the hog-gum and soft silk cotton producing *golgol*, various species of fiber yielding shrubs, colic pain killing *maronphal*, their culinary oil producing climber *raerui*, *safed bhangra*, *alkushi*, *bichuti*, *dhutura* are important to mention. Several bushy species are *babla*, dye yielding *mehendi*, *dhatki*, the fragrant *sitik*, *akanda* the inner bark of which produces a strong fiber used for bow strings, the silky hair covering the seeds for stuffing pillows and the root as a dye and similar trees are present. The upper canopy of these forests, the **third** one, is closed, though uneven, due to a combination of different species. The trees sometimes reach a height of about 20 metres, a height half of the original moist deciduous forests of the past (Gaz. Pur., 1985).

The present coverage of forest in the study area has been represented in Map no. 3.5 with LANDSAT OLI data of December, 2014. The area is seen with few patches of dense of forest in southern Puruliya, Bankura

and western Paschim Medinipur. Deforested area or sparsely vegetative areas are found in rest of the study area.

Faunal Resources

The faunal composition of any area bears vital role for existence of food chain in ecosystem. The forests had been once full with many herbivores and carnivores as per Coupland (Coupland, 1911). They are eliminated at present due to cultivation and clearing of forests (Gaz. Pur., 1985). Still, the niche of forest and local micro climate provides favourable habitat for few large and many small animals. Presently available common mammals are *ban-biral*, *khek-sial*, *bhondor*, *bham*, *buno-suar*, *munjtjac*, *khargosh*, *hanuman* and *bon-ru*; common birds are *titir*, *mayur*, *ban-murgi*, *raj-hans*, *balihans*, *bok*, *kokil*, *dhanesh*, *charai*, *babui*; common reptiles are *takshak*, *girgiti*, *gosap*, *keute*, *chandrabora*, *dhamna* etc (ibid.).

Standing Water Sources at Dhaska



Hill Forest Complex, Balarampur



Conclusion

Thus, the study area exhibits distinct mineral richness, plateau based, sub tropical climatic, lateritic soil based and presence of wet deciduous as well as shrubs and bushes. The geographic specialty of the area has endowed it with huge geological and floral resources in plateau areas and optimum soil resources in plateau fringe and eastern plain areas of Bankura and Paschim Medinipur. The resources are not yet fully developed. The application of sophisticated scientific technologies may enhance the resource development to much larger quantum. The harnessing of developed resources must be utilized with priority for the local people and the area. Transportation of those developed resources to distant places may be considered after fulfilling of the local demand.

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