



WEST BENGAL STATE UNIVERSITY

BERUNANPUKURIA, MALIKAPUR, BARASAT
24 PARGANAS (NORTH), KOLKATA-700 126

ADMIT CARD

CBCS, SEM-V EXAMINATION, 2020-21

Regular Candidate



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COURSE : B.SC. (HONOURS) IN GEOGRAPHY

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2.	16/03/2021	2ND	Th + Pr	CC12	GEOACOR12T - GEOGRAPHY
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4.	18/03/2021	2ND	Theory	DSE2	GEOADSE02T - GEOGRAPHY

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WEST BENGAL STATE UNIVERSITY

REGISTRATION NO. - 1321821400064

ROLL - 5202132

NUMBER - 19968

SEMESTER - 05

PAPER - GEOACOR11P (Fieldwork and
Research methodology)

TOPIC :

**SOCIO-ECONOMIC STUDY REPORT
ON UTTAR BAGI MOUZA, SOUTH 24
PARGANAS, 2020**

This is to certify that Ms Ritu Shee, 5th semester Honours Student of Geography, Ramakrishna Sarada Mission Vivekananda Vidyabhavan, Dumdum, Kolkata (West Bengal State University Registration No1321821400064.....and Roll No-520213219968), has completed her field report entitled Socio-economic study report on Uttar Bagi Mouza, South 24 Parganas under the guidance of the Teachers of the Department of Geography, Ramakrishna Sarada Mission Vivekananda Vidyabhavan.

11.04.202
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Soma Mukhopadhyay

DEPARTMENT OF GEOGRAPHY
RKSMVV

ACKNOWLEDGEMENT

I convey my deep sense of gratitude to our Principal Mataji - Praurajika Vedarupaprana for providing me with all the facilities that was required regarding the entire field report. I am also thankful to Prof. Anurita Pramanik, HOD of Geography department, Prof. Soma Mukherjee, Prof. Nibedita Deb, Prof. Kanika Das for their overall supervision, endless guidance and support without which it would not have been possible to complete the fieldwork project report perfectly.

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LOCATION AND SITUATION

Uttar Bagi is a land locked mouza with a total geographical area of 749543 sq. m and is situated on the north eastern part of the Bishnupur 1-block of South 24 Parganas District, West Bengal. The mouza lies between $22^{\circ}24'25''$ N to $22^{\circ}24'48''$ N latitude and $88^{\circ}16'56''$ E to $88^{\circ}17'19''$ E longitude.

ADMINISTRATIVE SETUP AND BOUNDARY

The J.L number of the mouza under study is 78. Dakshin Bagi mouza forms the northern boundary of the study area. The eastern boundary is marked by the Vasa mouza (J.L number-20). The south eastern boundary is marked by Uttar Gauripur mouza (J.L number-95). Aamgachi mouza (J.L number-93) is located in the western boundary of the area under study.

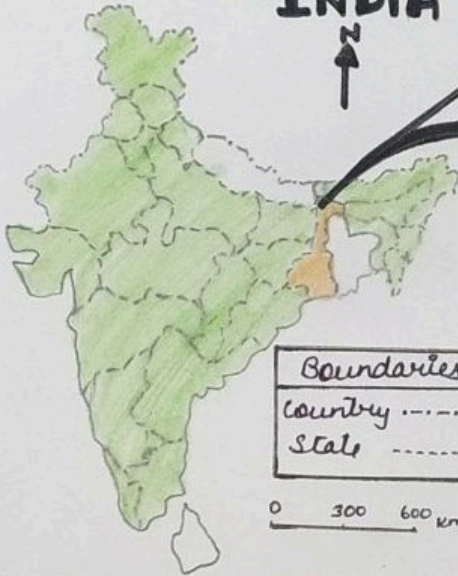
ACCESSIBILITY AND STRATEGIC LOCATION

Uttar Bagi mouza is well connected by roadway network. The national Highway (NH) 117, connecting Kolkata, the capital of the state with Bakkhali via Diamond Harbour is passed through the eastern part of the mouza. This road connects the study area with the major cities like Kolkata, Sonarpur, Bishnupur and Amtala, which provide ready markets for all the major product of the mouza.

LOCATION MAP



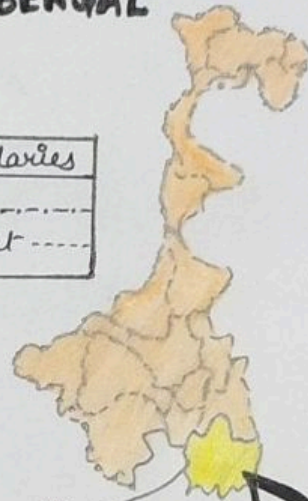
INDIA



WEST BENGAL

Boundaries
State -----
District -----

0 60 120 kms



DISTRICT SOUTH 24 PARGANAS

Boundaries
District -----
Subdivision -----

7 0 7 14 21 km



BISHNUPUR SUBDIVISION

Boundaries
Subdivision -----
Block -----

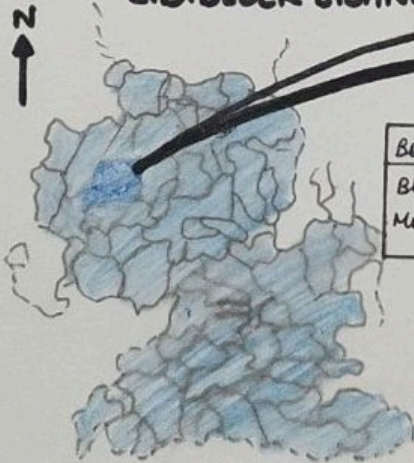
7 0 7 km



C.D. BLOCK BISHNUPUR

Boundaries
Block -----
Mouza -----

km 1 0 1 2 3 4 km



MOUZA UTTARBAZI

Boundaries
Mouza -----
Plots +H

0 150 300 MTS



PHYSIOGRAPHY

The study area is located in the south 24 Parganas of West Bengal. This area is considered to be a part of the deltaic plains. The general elevation of the district lies below 15 m above mean sea level. In the extreme western part of the district the elevation is above 15 m whereas in the eastern part it is only 6 m above mean sea level. The area falls within the Hooghly river basin where the gradient is less than 20 m.

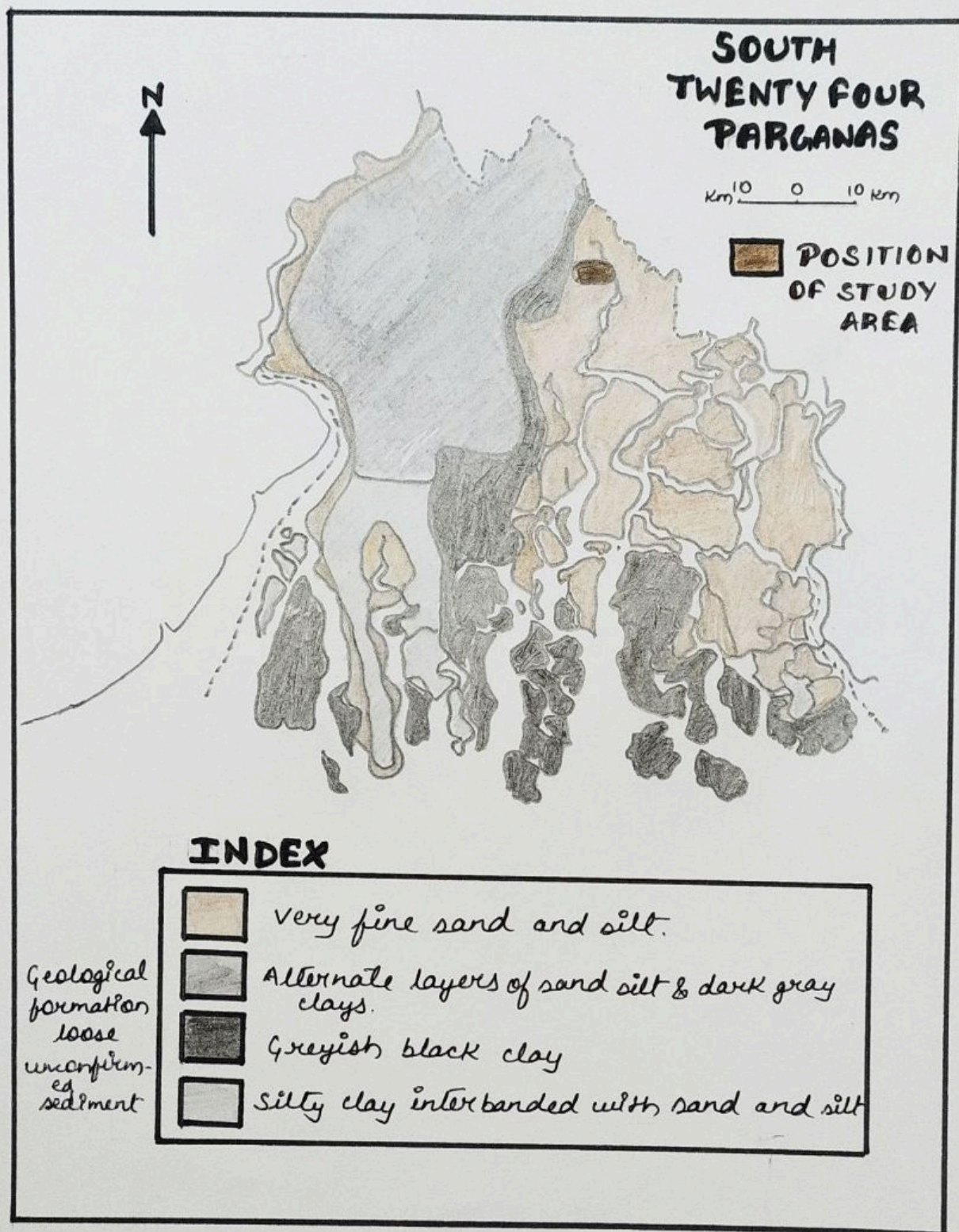
Here, the sediment is composed of new alluvium by auto compaction process, as the study area is located within Ganga river basin. The general slope of the study area is from west to east due to the existence of hinge zone below the thick alluvium. The general topography is marked by flat and slightly undulating plain.

GEOLOGY

The study area is located in the northern part of south 24 Parganas district. Micro level geological map of the study area is not available. Geological formation of the study area is, therefore extracted from the published reports and map of geological survey of India, Government of India.

The northern part of the district forms a part of alluvial tracts of lower Ganga basin. This alluvial formation forms a gentle southerly slope with some local elevations and depressions and with an average elevation of 9-10 m above mean sea level. Flat alluvial plain is dissected by numerous meandering rivers and streams like Hooghly, Udyadhar, etc. with dendritic

GEOLOGICAL SET UP



SOURCE : District of Resource MAP 24 Parganas (N & S)
Director General Geological Survey of India,
Kolkata.

pattern. Uttar Bagl mouza, our study area, is located within this geological formation.

A thick pile of semi consolidated loose quaternary sediments consisting of clay, silt and sand with occasional 'kankar' covering the northern part of the district. This is also common in our study area. This formation is geologically known as 'Panskura / Chinsura' formation. Sub surface borehole data reveal that below the depth of 250m the alternate sequence of sand, silt and clay occurs in various grades and colours.

Source - Geological survey of India.

WATER RESOURCES

- **GROUND WATER** - Ground water in the area occurs both as unconfined and confined aquifer conditions. Some observation on prominent natural levees of the area indicate that the open wells used mainly for domestic purposes, generally range in depth from 7m to 15m below ground level and the depth to water table in them range from 1m to 3m below ground level. The confined aquifer zones, in the area are overlain by a thick impermeable layer of clay. Because of this, recharging by rainwater to these aquifer is not possible.

The aquifer of the study area is characterized by primary inter granular porosity. The yielding capacity of the aquifer is 40 litres per second.

(Source) - Geological survey of India, district resource map.

● **SURFACE WATER RESOURCE** - There are no perennial or non perennial rivers in the study area. A canal (nearly 10m wide) passing through the eastern part of the mouza is the only drainage canal of the study area. It is now used as the drainage of excess water of the mouza and mainly covered by water hyacinth and bush.

Water bodies include the permanent ponds, Jheel. The area is dotted with atleast 28 ponds. Shallow water bodies are formed due to water logging particularly during the monsoon seasons and surface run-off of the surrounding region. Some of the areas gradually become marshy lands due to these factors.

The general run-off system corresponds with the slope of the land, particularly from west to East.

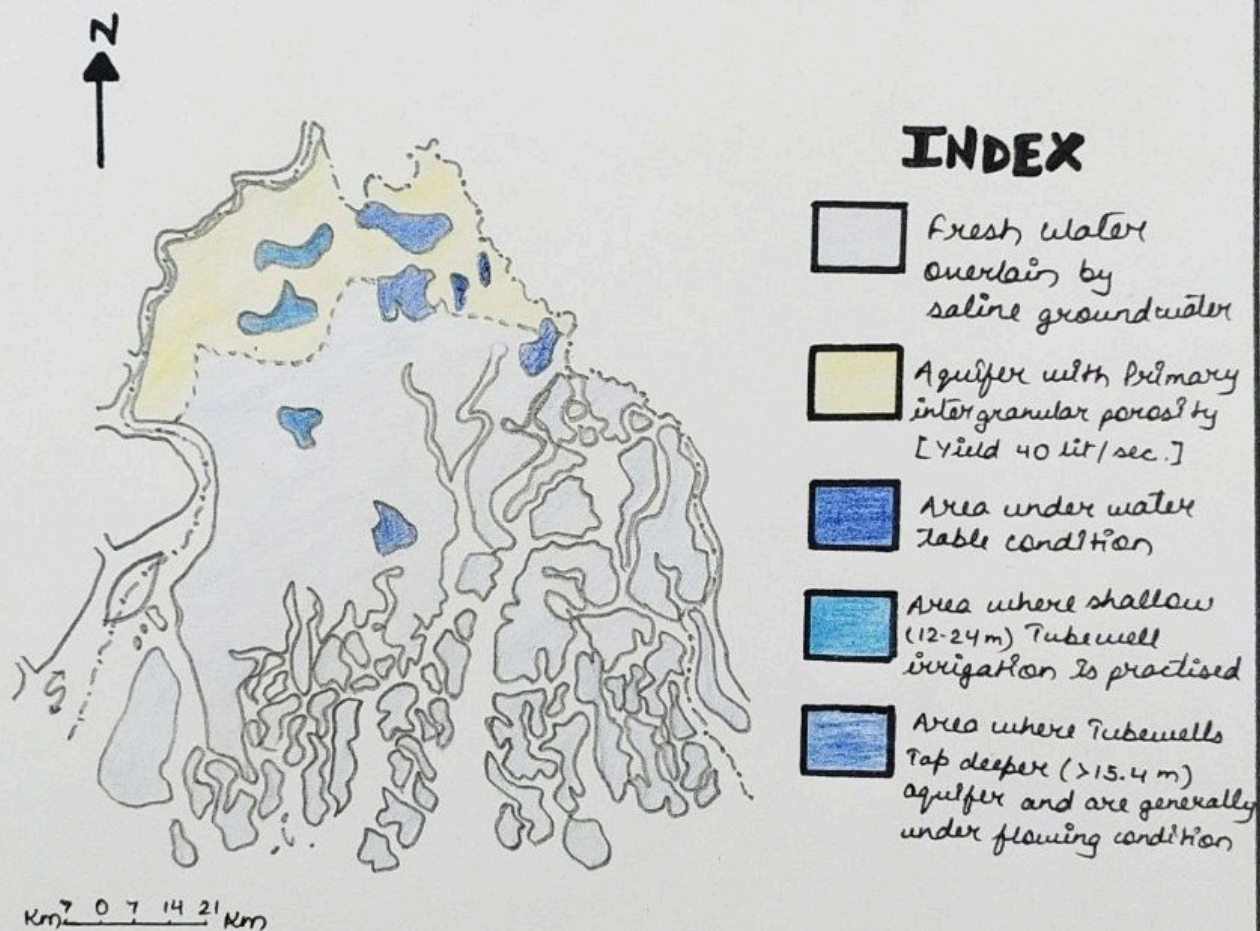
Surface run-off is common along the land around the ponds. In the eastern part of the mouza land is sloping towards the canal. Therefore run-off is common from west to east and from east to west.

Water logging is a major problem of the eastern part of this region, affecting agriculture. The main causes of water logging are poor natural drainage in the eastern part of the mouza, siltation of natural and man-made channels, development activities, such as construction of roads, and encroachment of slopping land by settlements.

(Source - Geological survey of India ; census data 2011 ; Research articles)

WATER RESOURCE OF THE STUDY AREA

DEPTH OF GROUND WATER



SOURCE : District Resource Map, GSI, Kolkata.

CLIMATE

The study area experiences a tropical monsoon climate. The altitude has a very low impact on the climatic condition of the mouza.

The year may be divided into four seasons. The cold season from december to february, the hot season from march to June, the monsoon season from July to September and the post monsoon month october and november. The cold season from december to february is very pleasant. January is the coldest month of the year with the minimum temperature of 12°C while may is the hottest month with maximum temperature of 40°C . An oppressive hot and humid summer followed by the monsoon between June and November and a moderate cold winter characterizes the general climate of the area. The annual average temperature of the study area is around 26.62°C .

Humidity is generally high specially in the monsoon and post monsoon months. Humidity varies widely between the monsoon months of July and August and the winter months of november and december.

Annual average rainfall is 40.84 cm. The study area falls under the category of medium rainfall (1200mm-1400mm). South-west monsoon causes maximum rain in the study area.

During the summer months, winds are generally light and low mainly from south and west. During the pre monsoon and monsoon months wind strengthen and flow from south westerly or westerly direction. In the post monsoon - months winds are light and variable.

During the winter months, northerly and north easterly winds are predominant.

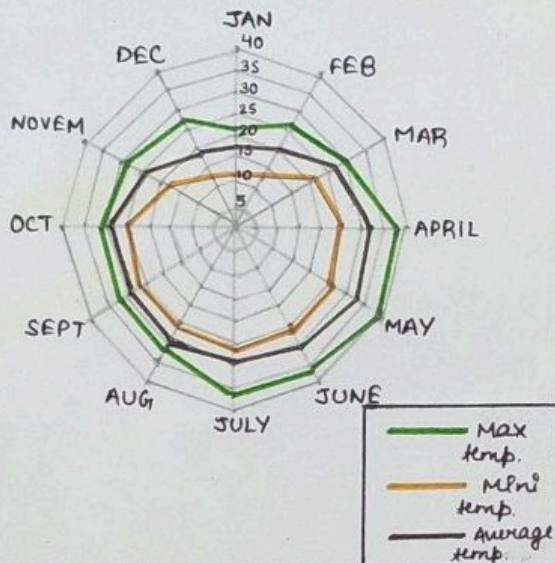
RELATION BETWEEN RAINFALL AND RAINY DAYS

A scatter diagram has been drawn to show the relationship between rainfall and mean no. of rainy days. The trend shows a positive relationship. The maximum concentration of rainfall occurs between June and September.

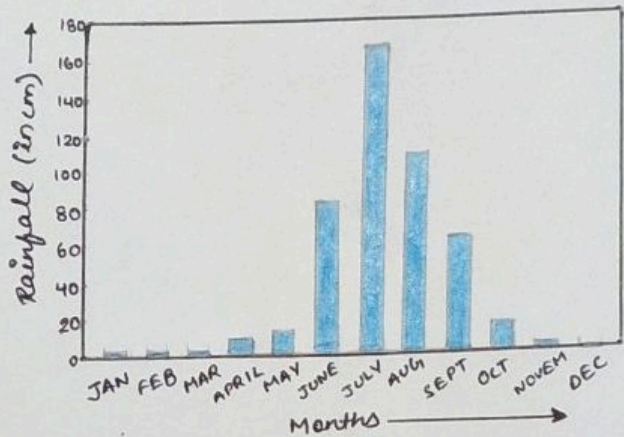
Reference : Meteorological department of India,
Kolkata regional office.

CLIMATIC PATTERN

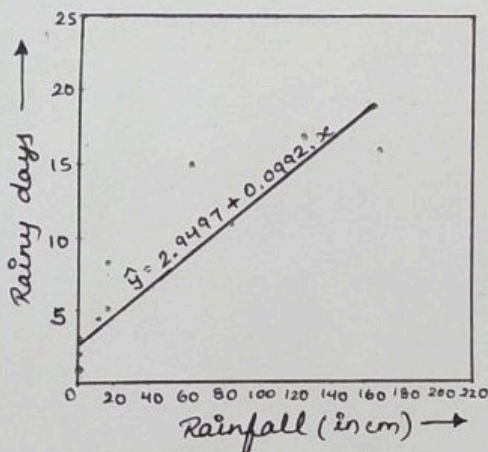
RADAR DIAGRAM SHOWING TEMPERATURE PATTERN



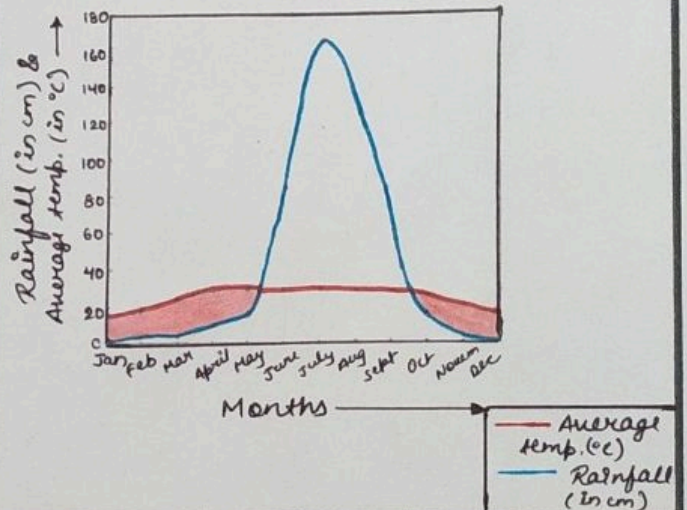
ANNUAL RAINFALL



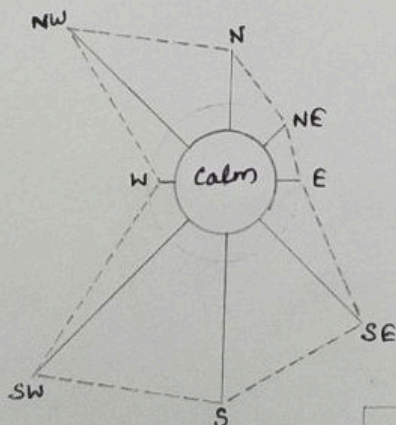
RELATION BETWEEN RAINFALL & RAINY DAYS



OMBROTHERMIC DIAGRAM

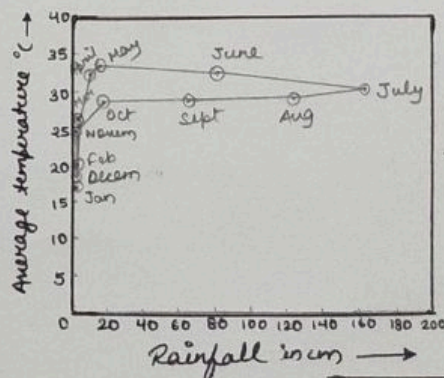


WIND ROSE



SCALE
1 cm = 7 %

HYTHERGRAPH



SCALE

Vertical - 0.5 = 5 °C temp
Horizontal - 0.5 = 20 cm rainfall

SOIL

The soil of the study area are pre-dominantly new alluvium. Physical properties of the soil particularly soil texture and chemical properties of the soil particularly soil pH, soil fertility (NPK) of the study area have determined by some journals report.

The alluvial soil of the mouza is classified into three subgroups, according to its textural character. They are clay, clay loam, and sandy loam.

Typical clay soil is found mostly in the east northern and north-western part of the mouza. This soil is suitable mainly for paddy and other minor crops. The soils are moderately acidic and moderate rich in humus and has high nitrogen content. In some pockets the soil is very sticky. The clay soils of the north-western part of the mouza are slightly acidic and suitable for rice and vegetable cultivation.

The clay loam soil type is found in the middle and southern part of the mouza. This soil is generally suitable for vegetable cultivation. So more vegetables are grown on this soil. The land remains fallow after the harvesting of vegetables. Major areas, covered by this soil have been occupied by the orchard and settlements. On the south western part of the mouza the soils are pre-dominantly sandy loam. The soils are unproductive due to poor nutrient reserve. The bare soils of the area are afforested with plantation trees to prevent soil erosion in this area.

SOIL EROSION - The potential loss of soil has the combined interaction of the

physical factors like climate, soil, topography and the intervention of human beings.

The factors responsible for soil erosion are :

- High rainfall in the region.
- low organic matter content and loamy texture of the soil.

Sheet erosion is common in the high land of the mouza due to surface run-off during the period of high rainfall. The northern part of the mouza is highly susceptible to soil erosion due to the rapid surface run-off towards canal.

NATURAL VEGETATION

The vegetation of the district has been shaped as much by human agencies despite physiographic, climate and edaphic conditions are suitable for the growth of different types of natural vegetation of the study area. Continued exploitation and mal-treatment of flora have destroyed the forest concentration of the study area and have replaced them at places by scrubs, grass, etc. Thus, agriculture, pasturing, growth of settlement have caused important changes in the structure and composition of plant communities.

Although scattered and isolated patches of trees are visible in some pockets. At present only 8.24 hectares (11% of the area) are covered by natural vegetation. Now natural vegetation are common in high ground fallow land and along the road side.

TYPES OF NATURAL VEGETATION -

Botanically the vegetation of the study area falls under the category of tropical moist, semi-evergreen and tropical moist deciduous type.

IMPORTANT SPECIES -

The vegetation of the Uttar Bagī mouza presents an assemblage of ecological types such as mesophytic, hydrophytic and semi-xerophytic. The characteristic species of road sides are generally mahogany, deodars,

Kanakchampa, Banyan, Asathua, chlm, nm etc. the vegetation in the waste lands mainly consists of akanda, wild mustered, sl - Kachu (local name) and some bushy species. Bare grounds are covered by short and tall grasses. In the water bodies and marshy land various type of hydrophytes occur such as water lillies, salook, sapla, lotus, Thangi, pata sapla, Tokapana, and Hegla. The main orchard trees are mango, jack-fruit, guava, Banana, sapne. Besides these coconut palms are common on the embankment of the ponds. The agricultural fields are dotted with some date palms, bamboo groves are also common on the western and north-western part of the study area. Sal is the major species here.

LAND USE

Land is the primary resource of people from which they mitigate their economic desire and space. The land use pattern of the study area is largely governed by the physical background and climatic conditions along with pedological conditions. In the study area, the man-land ratio is imbalanced due to population pressure.

For the purpose of analysis the land use pattern of the study area has been grouped into 10 principal categories, viz. agricultural land, orchard, water bodies, current fallow, road and settlement, etc. The study was conducted during early summer.

On the basis of data and information available so far, attempt has been made to study the present environmental status and land use pattern of Uttarbagi mouza. The statistics on land cover distribution of study area are collected from pit to plot survey.

It shows that out of 74.95 hectares of the geographical area, agriculture accounts for 57%. The area under natural vegetation covers only 12% including afforested areas.

CULTIVATED LAND - The study area is a part of deltaic Bengal. Agriculture is the main economic activity of this region. The cultivated

area cover 42.72 hectares, which is 57% of the total area. The gently sloping land on the northern and north eastern part of the mouza is suitable for agricultural operation.

NATURAL VEGETATION INCLUDING ORCHAD -

IN THE STUDY AREA MOUZA, area under natural vegetation accounts for 11% of the total area, covering 8.2 hectares. The mouza has the lowest proportion of area under natural vegetation. Orchard trees like mango, jackfruit, guava along with some coconut trees, banyan trees etc are common on the moderately high land around the settlement and the embankment of the water bodies particularly ponds.

FALLOW LAND -

Fallow land covers about 8% of the total area of the mouza. It is mainly common in the south western part of the mouza.

SETTLEMENT -

This built up area covers a good share of land use. Nearly 18% of the total area of the mouza is utilized for settlement purposes. Concentration of settlement is very high in the south-western part of the mouza.

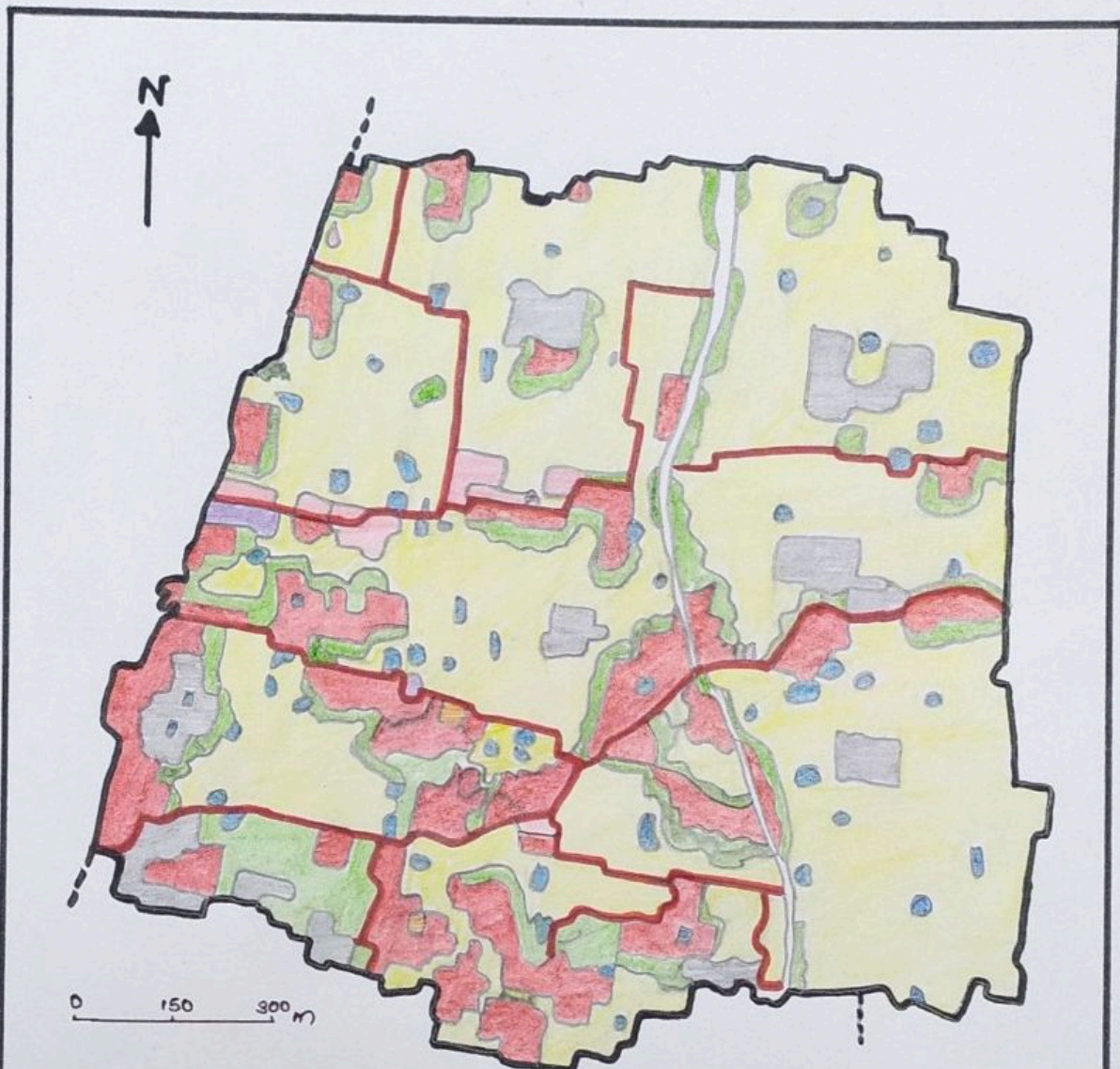
WATER BODIES -

Water bodies are another important land use component of the study area, covering 4.8% of the total area.

ROAD -

Compared to the other land use categories the proportion of road networks is moderately high in the study area. Only 1.2% of the total area falls under this category. There is three metalled road. One is running from north to south in the eastern part of the mouza and other two is passing through the central part of the study area from west to east.

LANDUSE MAP OF THE STUDY AREA



INDEX

	Cultivated land		Industry
	Orchard		Road
	Fallow land		School
	Water bodies		Panchayat office
	Settlement		Temple

SOURCE : Google earth, Census data

AGRICULTURAL PATTERN

Agriculture occupies a vital place in the economy of the Uttar Bagri mouza. It provides direct employment of around 27% of the total work force of the mouza. The total cultivable area of this mouza is 42.72 hectare. The agricultural pattern of the study area is highly controlled by topographical condition, soil and climate. The agriculture fields are located in low lands where clayey soil favors agricultural production. The agricultural operation of the mouza depends mainly on monsoon rainfall. Shallow tube well is the major mode of irrigation system of the study area. Due to this factor, multiple cropping systems are common. Rice is the dominant crop of the study area. About 75% of agricultural land is cultivated in the rainy season. Agricultural activity diminishes during summer due to inadequate water supply. Only about 20% of the agricultural land is cultivated during winter and summer.

CROP COMBINATION MAP

Crop combinations are based on the soil moisture and soil fertility. Multiple cropping systems are common in the eastern and south eastern part study area because the soil retain adequate moisture after monsoon. Moreover, there is irrigation facility served by shallow tube well. Two types of crop

combination are generally common. Rice pulses and mustered, common in the eastern and southern part of the mouza. Aman rice and vegetables are grown in some pocket of the central and northern part of the mouza due to moisture holding capacity of soil after harvesting of rice and irrigation facility provided by shallow tube wells.

RELATION BETWEEN AGRICULTURAL PATTERN AND CLIMATE

The agriculture of the study area mainly depends on climatic pattern. To interpret the relation between agriculture and climate, Ergograph has been drawn. The horizontal axis represents different months of a calendar year. The two vertical axis represents rainfall and temperature respectively. Rainfall graph and temperature curve has been drawn with the help of climatic data.

The graphs shows that growing and harvesting of rice cultivation corresponds with the monsoon climatic season. Again to harvesting period of Rabi crops like pulses, mustered and vegetables synchronizes with the winter season.

AGRICULTURAL PATTERN

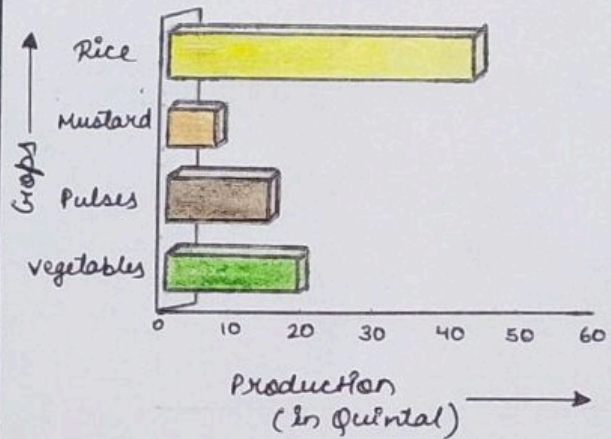
AREAS UNDER DIFFERENT CROPS



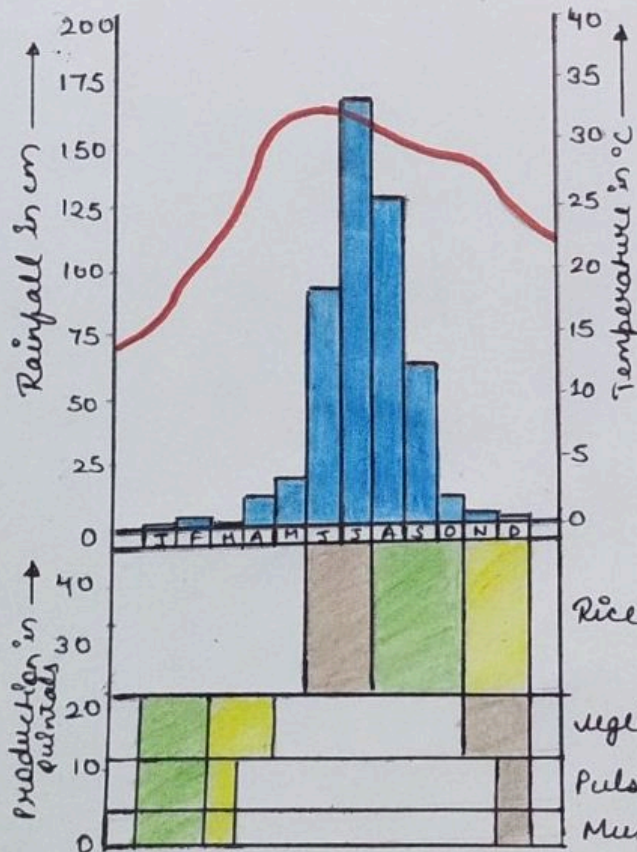
INDEX

- Vegetables
- Rice
- Pulses
- Mustard

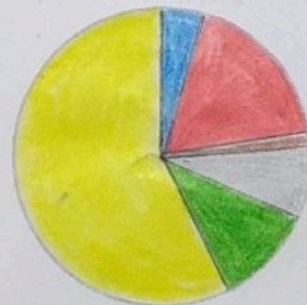
PRODUCTION OF DIFFERENT AGRICULTURAL CROPS



ERGOGGRAPH



PROPORTIONAL AREA OF DIFFERENT LANDUSE PATTERN



INDEX

- Water bodies
- Settlement
- Road
- Fallow land
- Cultivated land
- Orchard

INDEX

- Rainfall
- Temperature
- Sowing period
- Growing period
- Harvesting

SOURCE: Wikipedia, South 24 parganas

SOCIAL & CULTURAL STATUS

PROPORTION OF POPULATION BELOW AND ABOVE POVERTY LEVEL -

The poverty level dividing the population below and above the poverty line is based on the working population data collected from census book. The working class population is considered to be above poverty line and the non-working class population is considered to be below the poverty line.

Considerable proportion of the population in the study area is lying below the poverty line (almost 40%). The remaining around 60% population is lying above the poverty line. People below poverty level are mainly concentrated in the northern and eastern part of the mouza.

FAMILY SIZE -

Family size has been grouped into three classes ranging from 0-4, 4-8 and >8. It is observed that maximum number of houses have a family of 0 to 4 persons. Large families more than 8 persons are more predominant in northern and central part.

FAMILY STATUS - Single family unit is the principal characteristic feature of the southern portion of Uttar Bagri Mouza comprising 46.07% of the total household. On the other hand northern part shows a greater proportion of houses with joint families (23.14%).

LANGUAGES - The languages that are spoken here are Bangali, Hindi and Urdu. Bangali is the dominating linguistic group. Among 2532 population of the mouza, 1836 (72.51%) are Bangali speaking people and 23.26% Urdu and 4.23% Hindi speaking people in mouza.

SOCIAL AND CULTURAL LANDSCAPE

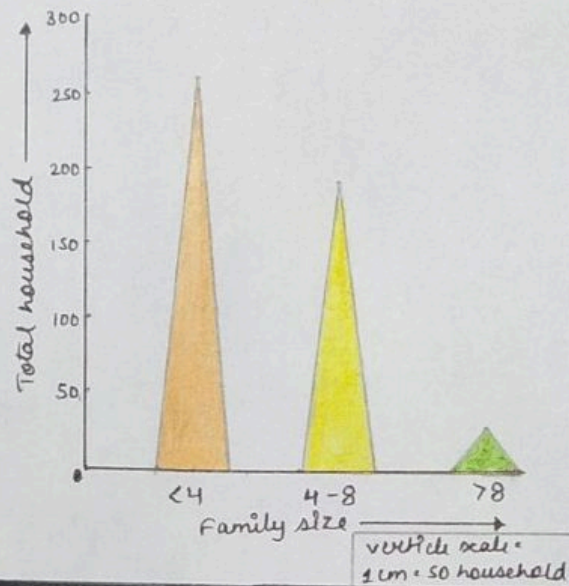
POVERTY LEVEL



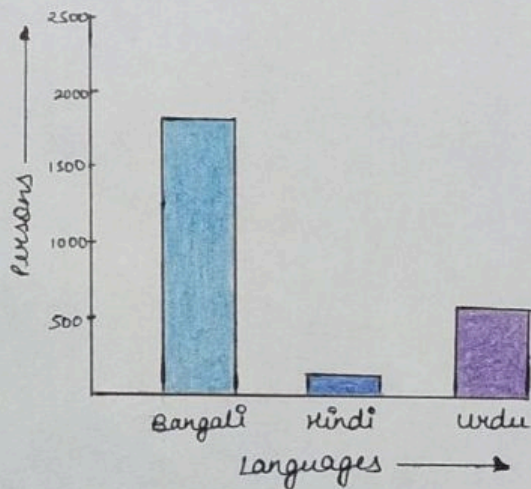
INDEX

■ - Above poverty ■ - Below poverty

FAMILY SIZE

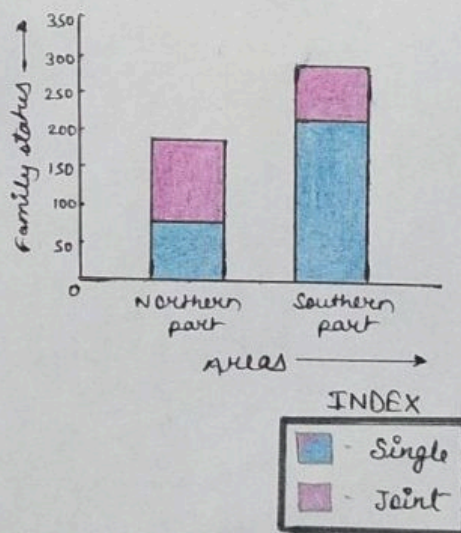


LANGUAGE PATTERN



vertical scale
 1 cm = 500 persons

FAMILY STATUS



SOURCE : Human development report, South 24 parganas -
 UNDP.

SETTLEMENT

In uttar bagi mouza the settlement has sprung up at two pockets particularly in the southern and northwestern part. In the southern part no of houses is 290 while in the northern part concentration of houses are comparatively low, it is only 194. The physical attributes like low marshy land, lack of communication are the restrictive forces for the distribution of settlement in the northern part of the study area. The settlement are mainly located on the moderately high ground of the plain land. The distribution of settlement is mainly controlled by the location of water bodies and communication network.

Since the land is gently sloping, the houses are closely knit with each other. Most of the settlements are linear in nature. Presence of metalled, unmetalled roads, cart tracks and foot paths are the controlling factor for settlement concentration.

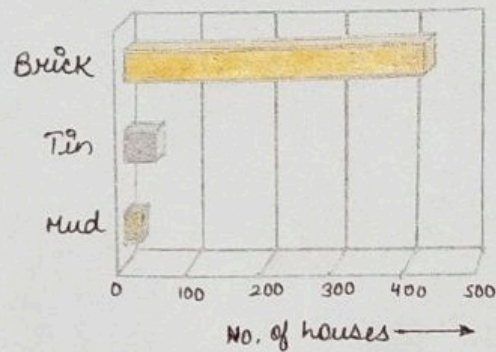
The village are quite unplanned and houses are generally built of mud walls and brick walls with timber or thatched roofs. Some of the high-class families in the southern part of the mouza dwell in pucca houses. In the northern and western part maximum houses have a concrete walls with tiles, asbestos and tin used as roof material. Few houses have muddy wall with straw roof. Some of the houses have cow sheds and rice storages called Marai. Some of the houses have separate kitchen.

SETTLEMENT PATTERN

DISTRIBUTION OF SETTLEMENT

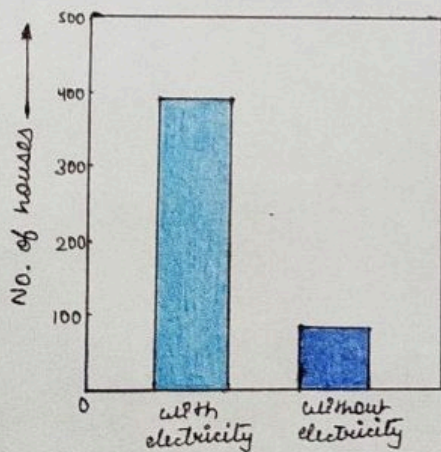


WALL MATERIALS



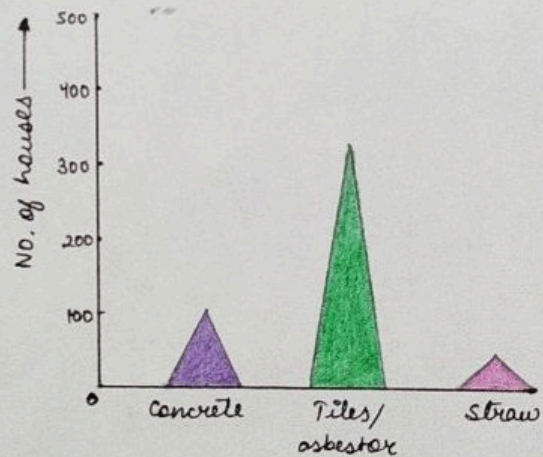
Horizontal scales =
1 cm = 100 houses

HOUSES WITH ELECTRIC CONNECTION



Vertical scale =
1 cm = 100 houses

ROOF MATERIALS



Vertical scale =
1 cm = 100 houses

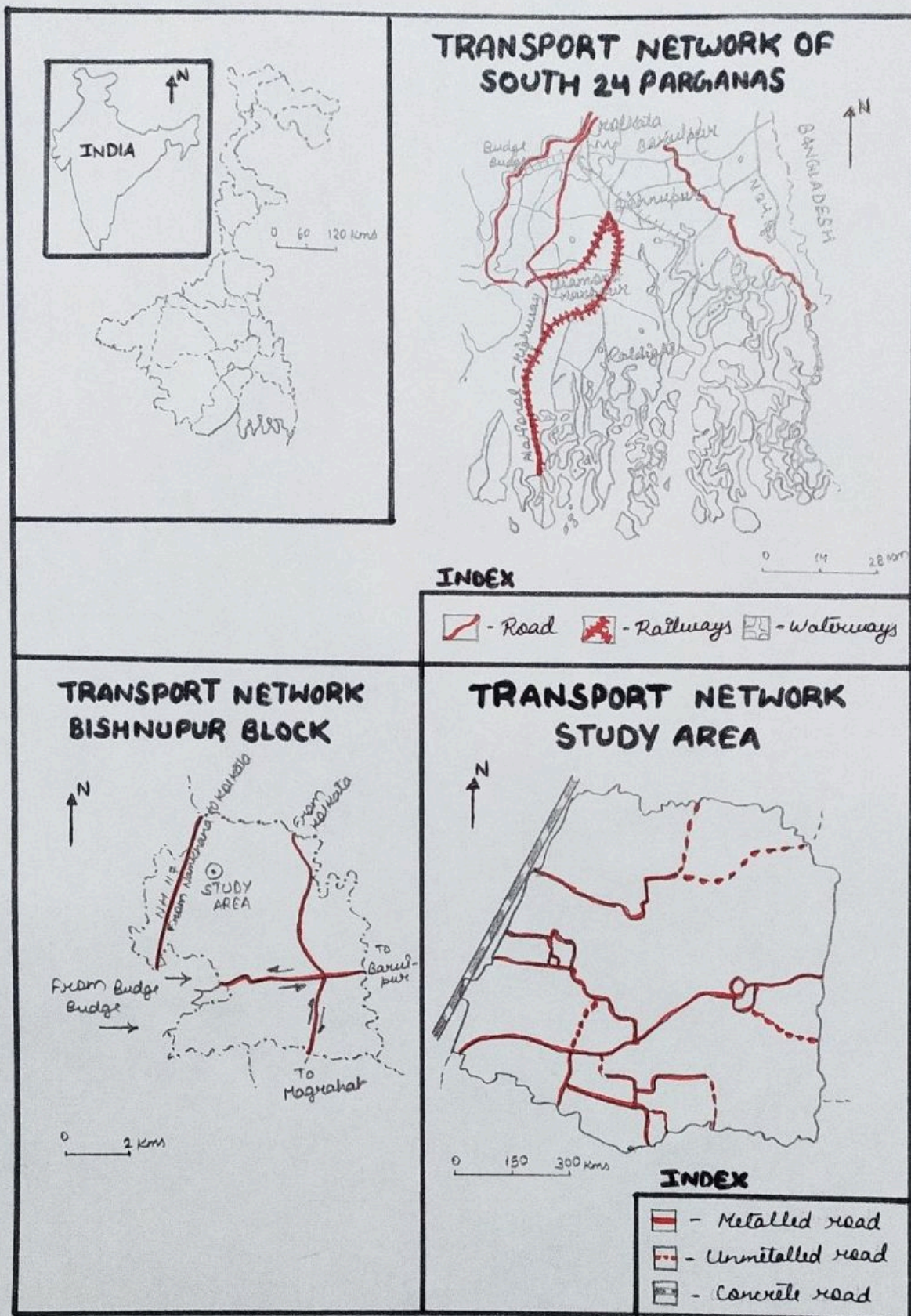
SOURCE : Content . Sciendo . com > journals > bog > Article - 933.

TRANSPORT AND COMMUNICATION

Extensive, efficient and economic means of transport and communication are considered as principal infrastructure of economic, social and cultural development. The study area is situated in the South 24 parganas district of West Bengal. Well developed to moderately developed transport network is the principal character of this region. Level land has no barriers in the development of modern means of transport and communication. The network is poorly developed in the interior village with Kaccha roads. Local panchayat also try to develop transport network of the study area.

Baruipura and Budgebudge are the nearest rail stations of the study area. These are nearly 12 Km and 10 Km away from the study area. The area is linked with Kolkata-Bakkhali road running through eastern part of the mauza. This route is of great importance for the movement of goods and passengers and is the regions communication backbone. It links the study area with modern transport network. The maximum numbers of Trucks, buses, motor vehicles, auto rickshaw play regularly between Kolkata and Kakdwip.

TRANSPORT NETWORK



SOURCE: Development of Basic Infrastructure, South 24 parganas

DEMOGRAPHIC SITUATION

The population of the study area is entirely rural. The total population of the mouza according to the census 2011 is 2532 of which 1297 are male and 1235 are female. Two sectors can be identified in the mouza i.e. the rural sector and the urbanised sector. The rural sector has a total population of 2026 and the rest 506 lives in the urbanised sector.

POPULATION GROWTH

The population of the Uttar Bagri mouza has been growing steadily from 982 in 1981 to 2532 in 2011. The population growth is positive. The study shows the population of the mouza grew at a lesser rate during census year 1981 to 1991. Since 1991 the population of the mouza has been growing steadily.

DISTRIBUTION OF POPULATION

Pattern of population distribution is used as the product of the interplay between the geographical and cultural phenomena. The distribution of population is far from even in the various parts of the mouza. Concentration of population is high in the south eastern part of the mouza. Due to proximity of national highway and prevalence of some industrial units, this people are generally urbanised. Distribution of population is dispersed in the central and

and eastern part of the mouza, where the settlements are rural in nature.

SEX RATIO

Age and sex are primary variables that are necessary to understand the character of population in an area. The sex ratio of the study area is almost balanced, it is 965 female per 1000 of male.

AGE-SEX STRUCTURE

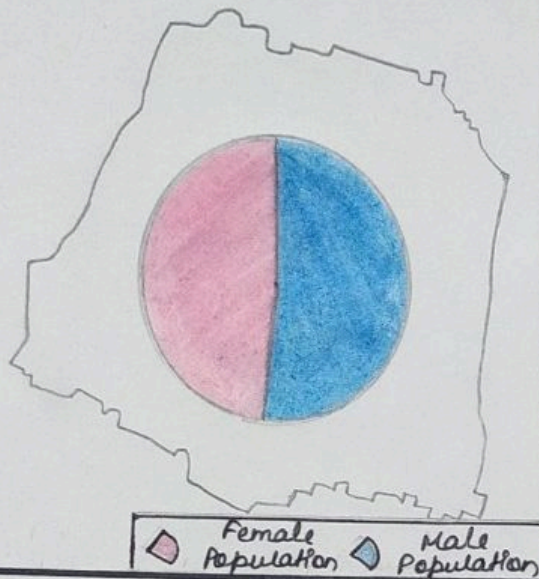
The age pyramid structure of Uttar Bagī mouza generally follows a traditional age sex diagram of India with slight deviations. It is observed that the no. of children in the age group 0-10 years is greater in the mouza. The age composition of the population of the mouza reveals that the no. of children far exceeds that of elderly persons. In both the villages population in the age groups 61-70 years is less compared to other age groups for higher life expectancy. Due to medical facilities owned by nearby primary health centers and hospitals, it means that birth is very high and death rates comparatively low.

SC, ST AND GENERAL POPULATION

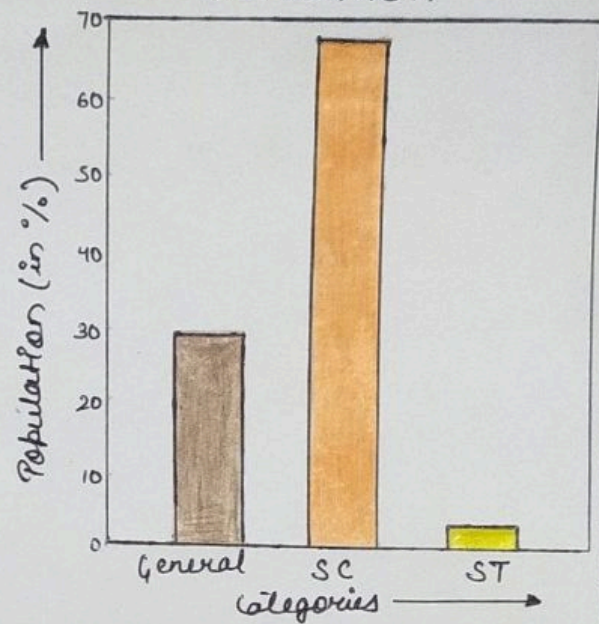
SC and ST contributes 67% and 3.05% of the total population respectively. General caste comprised 29.26% only. Therefore, the proportion of SC population is higher in the mouza.

DEMOGRAPHIC STATUS

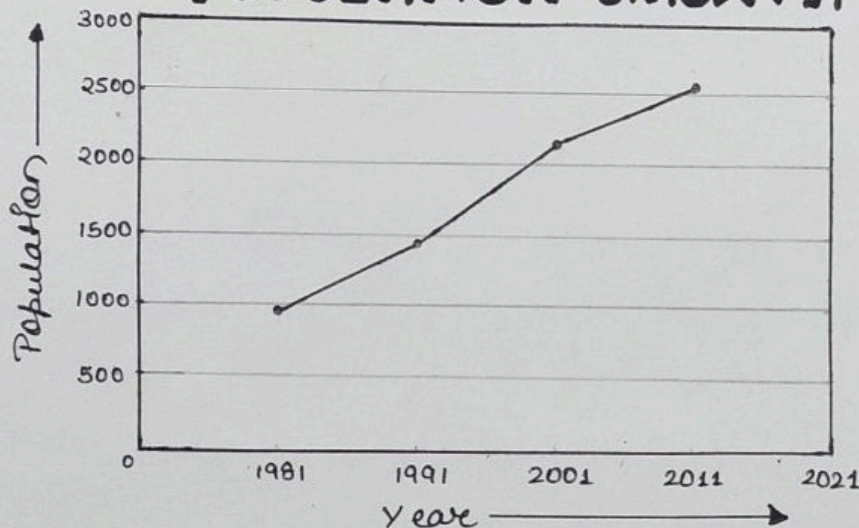
MALE AND FEMALE POPULATION



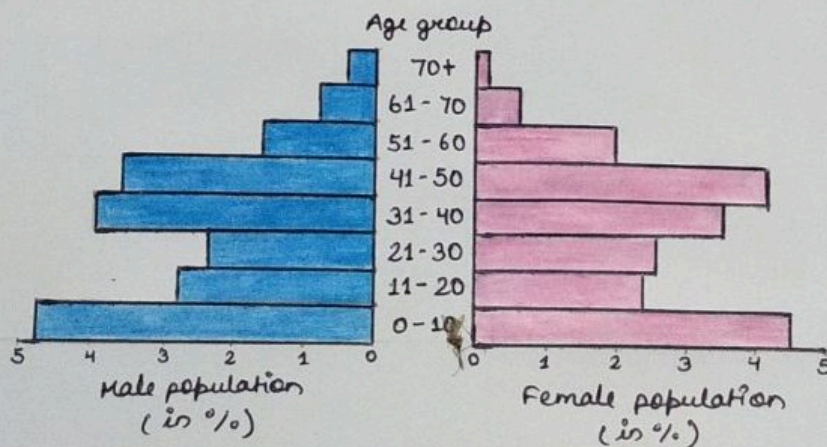
DIFFERENT CATEGORIES OF POPULATION



POPULATION GROWTH



AGE SEX STRUCTURE OF POPULATION



SOURCE: District census handbook, South 24 parganas, Directorate of census operation, Govt. of India.

LITERACY STATUS

Literacy is the most important parameter of measuring the human resource development of a region because it reflects the socio-economic and cultural set up of a nation, ethnic group or community.

EDUCATION STATUS

Nearly 15.42% of literates of the mouza have had their education till primary level. The scope of higher education is very low in the mouza. Although it is evident from the data that 78.28% literates of the study area take the advantage of the graduate level education due to close proximity of colleges in Amtala, Kolkata, Sonarpur and Barurpur. Post-graduate level of education is very poor. Only 2.51% literates of the general village have post-graduate degree.

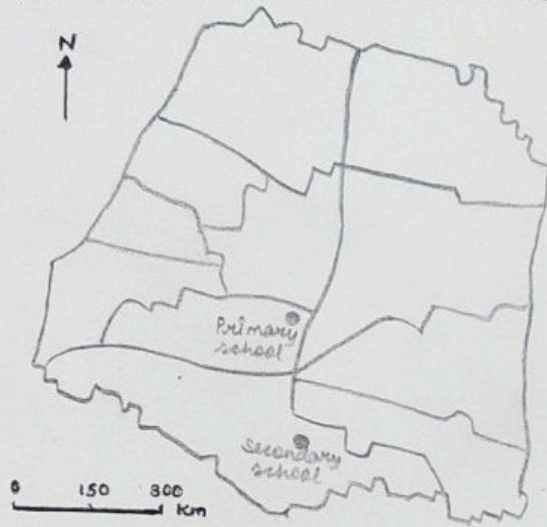
ECONOMIC PROFILE

Nearly 65% of the total population of the Uttar Bagī mouza belongs to the worker category. Spatial distribution of workforce in the study area is almost uniform. The number of workers is comparatively high. Overall work participation of female is lower than that of male. Out of the total 1648 workers of the mouza, 764 are male workers and the 120 are female workers. The population of the study area may be classified according to their major occupation in the following manner -

cultivators, Agricultural laborers, industrial workers, household industrial worker, trade and commerce, Transport, service, others.

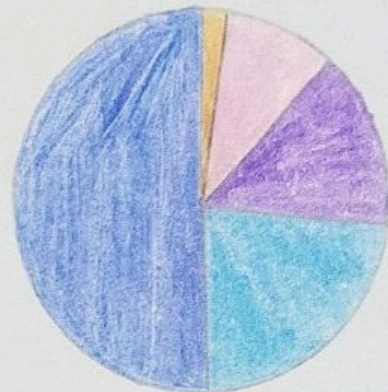
LITERACY STATUS

LOCATION OF SCHOOL



Source : Google Earth Pro

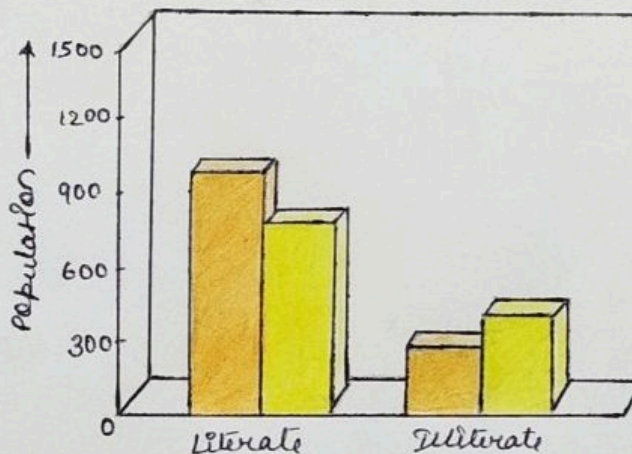
EDUCATION STATUS



INDEX

- University
- H. secondary
- Primary
- Secondary
- College

LITERACY STATUS - MALE AND FEMALE

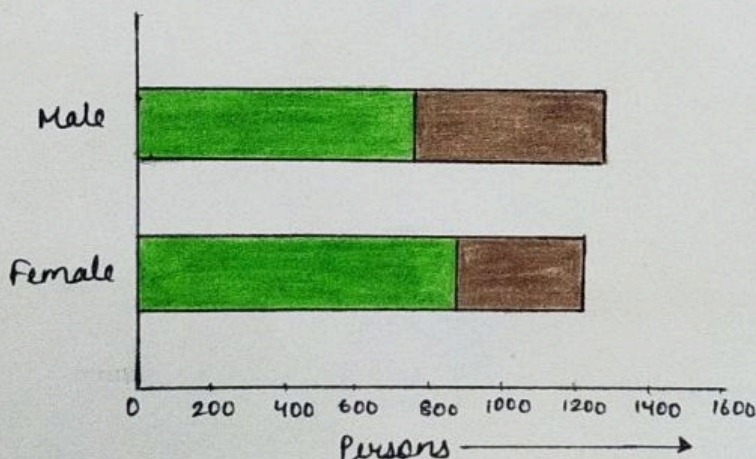


INDEX

- Male
- Female

Vertical scale =
1 cm = 300 population

ECONOMIC PROFILE



INDEX

- Workers
- Non workers

Horizontal scale
1 cm = 200 persons

AVERAGE MONTHLY INCOME

One of the crudest measures of the economic condition of the people is the per capita income. The monthly income has been classified into three classes :- Rs 7000/- to Rs 10,000, Rs 10,000/- to Rs 17,000/-, above Rs 17000/-, It shows pre-dominance of middle class income groups. Most of the people earn less than Rs 10,000/- per month. The village enjoys very little economic activity except agriculture.

ECONOMIC REGIONS

In order to understand the regional development of the area, the mouza is subdivided into 4 economic regions.

These are :-

- 1) Tourism region
- 2) Industrial region
- 3) Agricultural region
- 4) Household industrial region.

MARKET PATTERN

As the study area has a fairly large number of population, it has a well developed market. Different types of shops are found in the market especially commodities of daily needs. The major shops include - stationary, grocery, meat, fish, small eateries, tea-stalls, handicrafts, puja items and vegetables.

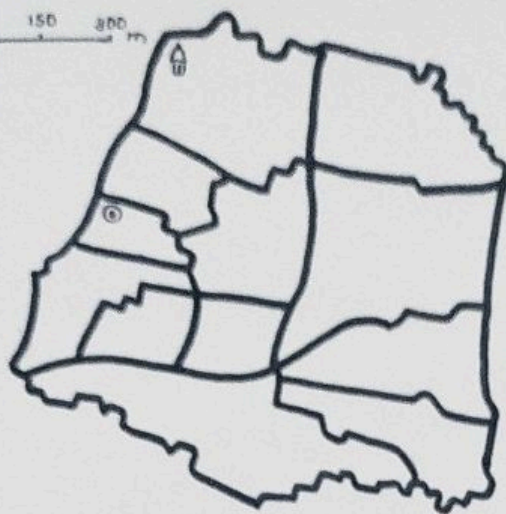
Most of the shop owners are local businessmen. Maximum number of businessmen is found to be the owners of the stationary shops followed by grocery and vegetables sellers.

TOURISM

Due to the presence of palm village amusement park cum resort, Uttar Bagī mauza attracts a large number of tourists especially during the winter months. This resort is hired by different organizations to arrange picnics, office parties, conference, social occasions and formal or informals get together. Another tourist attraction of this mauza is the beautiful marble-cut temple.

TOURISM

0 150 300 Km

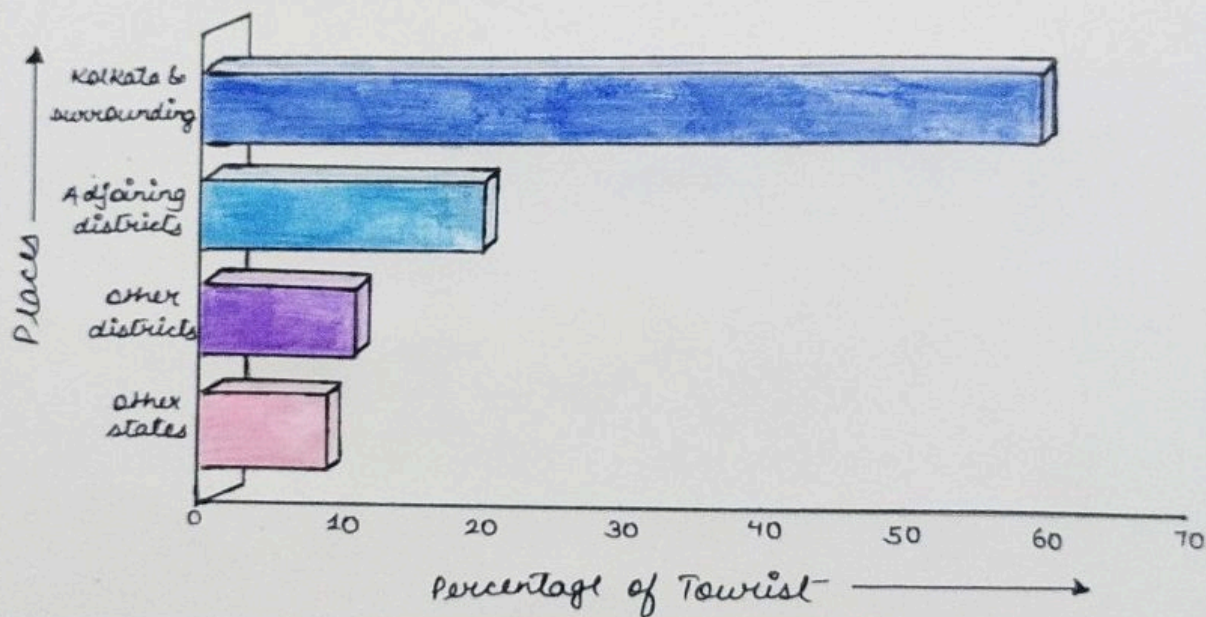


LOCATION OF TOURIST SPOT

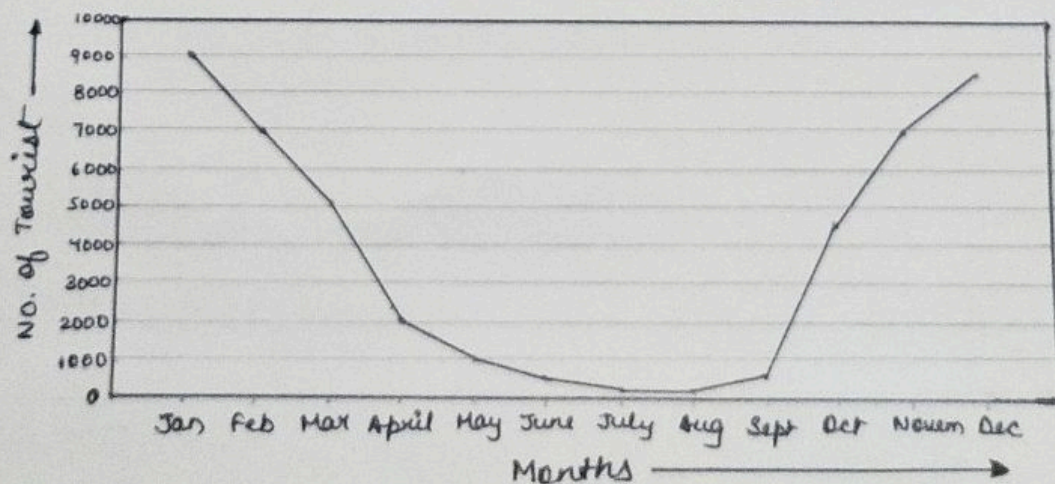
⊙ Palm village
Amusement park - cum -
Resort

⌄ Beautiful Temple
Formed of marble rock

INFLUX OF TOURIST



FLOW OF TOURIST



SOURCE - Research Article - tourism in coastal West Bengal of India (Supriya Mani Tawadkar and N.C. Jana)

INFRASTRUCTURE

The area is moderately developed as per as the infrastructural facilities are concerned.

- The area has well developed transportation and communication network. The NH-117 passes along this area. Beside, this area is also served by telephone connection and postal services.
- The health care facilities are satisfactory in the study area. There is a hospital within 250m of the mouza. Besides a local dispensary and medical shop also serves the purpose of medical facilities.
- Supply of drinking water is adequate, The mouza is served by numerous tube well which provide drinking water as well as irrigation water to the villagers. Besides mouza many ponds also supplies water for irrigation as well as domestic purposes especially during the monsoon season.
- There is one primary school within 250 mt of the study area and one higher secondary school within 500 mt of the study area.
- The types of energy utilized in the mouza are electricity, kerosene, L.P gas, wood. Electricity is mainly used for the purpose of lighting. Nearly 70% of the household of the mouza have electric connections. Some villagers use firewood still as the primary source of energy. The poor communities of the villagers also use wood for cooking purposes.
- Khoribari is the main market near the study area. However there are few grocery and repairing shops that are located along the main road connecting Khoribari with neighbouring villages. The people of the study area only collect their daily need from the local market and weekly markets.
- The mouza lacks in financial institutions. Only one bank is located at Khoribari within 500 mt of the study area. The people of the study area have to go to Joka for their financial needs.

PROBLEMS

The area under study suffers from different problems, which warrant serious consideration and a cautious and timely approach to their solution. The problems are mainly due of under development of both natural and human resources.

- There is limited scope for extension of agriculture due to water logged areas and encroachment of fertile lands by settlement. Agriculture is mostly depended upon irrigation facilities provided by ponds.
- The orchards of the region need better maintenance.
- The village metalled roads of the study area are badly damaged. These are in accessible during the rainy seasons.
- The human resources is qualitatively poor and its improvement is of vital significance for the general development.
- Operation of cottage and other village industries have become difficult due to lack of proper financial loan facilities.
- Scope of local employment is limited due to the few number of household industries.
- Unplanned growth of settlement creates different problems like water logging. Uneven development of communication system for the villagers. The village lanes are generally very narrow.
- There is only one primary and one secondary school. There is no college in the study area therefore, the students have to travel long distances to gain access higher education facilities.
- Supply of drinking water facility is very inadequate. Scarcity of drinking water is a serious problem of summer season.
- Traditional pattern of cultivation, lack of general awareness, non application of improved agricultural tools, manure, pesticides, gradual erosion of soil, infertile land, non application of HYV seeds, lack of irrigation facilities, small agriculture holdings etc. contribute to the overall low productivity of agricultural lands.
- The primary health care unit is not properly well equipped.
- Unhygienic ponds may spread serious diseases like malaria, cholera, etc.

SOME SUGGESTION TO IMPROVE THE PRESENT CONDITION OF THE MOUZA

- The present state of economy of the mouza is predominantly agrarian, that demands a priority for development. Irrigation facilities should be introduced for multiple cropping patterns.
- Stop deforestation.
- Roads, settlements should be constructed at appropriate sites.
- Population of the mouza is increasing. It is necessary to improve the existing agriculture and industrial as well as tourism infrastructure to absorb the excess pressure on agro based community.
- Majority of farmers in the mouza are orthodox and conservative. They do not give up the old method of cultivation, they should be trained about the advantage of using scientific agricultural method.
- The industrial side of the mouza is completely neglected. Setting up of household and cottage industries and forest based economy would strengthen the economic situation of the mouza.
- The establishment of improved health care centre within the mouza is urgently needed.
- Improvement of fish culture by scientific method will boost up the economy of the study area.

CONCLUSION

There is a unique correlation between the physical and cultural landscape in Uttarakhand. The lifestyle of the villagers and the economic sector of the mouza are always influenced by the elements of physical environment. The economic development is to some extent hampered due to lack of some infrastructural facilities.

Integrated development of the village can be achieved by careful planning and application of modern science and technology in various economic sectors. Sustainable use of natural resources may help the development of rural community of the area.

In spite of some drawbacks, the cultural landscape of the mouza is rapidly changing owing to its proximity to Joka town. The development of tourism of Uttarakhand gives impetus to its growth.

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11. Content. Sciendo. com < journals < bog < Article - P33.
12. Development of basic infrastructure, South 24 parganas.
13. Research Article - tourism in coastal West Bengal of India (Syfujjaman Tarabdar and N.C Jana)

APPENDIX

CLIMATIC DATA

Direction	No. of days
E	12
NE	13
SE	63
S	72
SW	88
W	8
NW	74
N	35

Year 2012	Maximum temperature in °C	Minimum temperature in °C	Average temperature in °C	Rainfall in cm	Mean number of rainy days
Jan	22.9	11.5	17.2	2	1
Feb	26.8	13.6	20.2	2.7	2
Mar	30.7	21.8	26.2	2.2	3
April	38.5	25.7	32.1	9.5	4
May	39.4	26.6	33	14.5	5
June	36.4	26.5	31.4	84.8	11
July	34.3	26.4	30.4	165.9	16
Aug	32.4	26.3	29.3	127.1	17
Sept	32.2	26.2	29.2	62.3	15
Oct	31.3	25.4	28.3	15.6	8
Nov	29.8	18.2	24	2.9	1
Dec	23.1	13.1	18.1	0.5	1

Source - Meteorological department, Govt. of India.

AGRICULTURAL PATTERN

- Production of different agricultural crops

Crop	Production (quintals)
Rice	43
Pulses	15
Mustard	8
Vegetables	20

- Areas under different crops

Crop	Area (In hectares)	%
Rice	24.02	75
Mustard	0.64	2
Vegetables	4.80	15
Pulses	2.56	8

Source - Wikipedia, South 24 parganas

SOCIAL AND CULTURAL LANDSCAPE

- Poverty level

Poverty level	Persons	%
Below	1008	40
Above	1524	60

- Family Size

Family Size	Total household
<4	261
4-8	195
>8	32

- Family Status

Total household	Areas	Family Status			
		Single	%	Joint	%
484	Northern part	82	17	112	23.14
	Southern part	223	46.07	67	13.48

- Languages

Bangali		Hindi		Urdu	
Persons	%	Persons	%	Persons	%
1836	72.51	107	4.23	589	23.26

Source - Human development report, south 24 parganas - UNDP

SETTLEMENT PATTERN

Total no. of household	
Southern part	290
Northern part	194

Wall material	No. of houses
Mud	24
Brick	414
Plaster	48

Roof materials	No. of houses
Concrete	107
Tiles/ asbestos	329
Straw	48

Electric connection	No. of houses
Houses with electricity	397
Houses without electricity	87

Source - Content, Sciencedo.com > journals > beg > Article - P33.

DEMOGRAPHIC STATUS

- Population growth

Year	Population
1981	982
1991	1429
2001	2176
2011	2532

• Male and female population

Location	Total population	Male population	%	Female population	%
Uttar Bagri Mouza	2532	1297	51.22	1235	48.77

• Age-sex structure of population

Uttar Bagri Mouza					
Age	Male population	%	Age	Female population	%
0-10	24	4.8	0-10	22	4.4
11-20	14	2.8	10-20	12	2.4
21-30	12	2.4	21-30	13	2.6
31-40	20	4.0	31-40	18	3.6
41-50	18	3.6	41-50	21	4.2
51-60	8	1.6	51-60	10	2.0
61-70	4	0.8	61-70	3	0.6
70+	2	0.4	70+	1	0.2

• General, SC & ST population

General population	%	SC population	%	ST population	%
741	29.26	1793	67.65	78	3.05

Source - District census handbook, south 24 parganas, Directorate of census operation, Govt. of India.

LITERACY STATUS

• Literacy pattern

Category	Total population	Literates	Illiterates
Male	1297	1001	296
Female	1235	824	411

• Education Status

Education level	Persons	%
Primary	282	9.77
Secondary	436	15.11
Higher secondary	691	23.94
College	1431	49.58
University	46	1.95

- Economic Profile

Name	Total population	Total workers		Male workers		Female workers	
		Persons	%	Persons	%	Persons	%
uttar Bagī	2532	1648	65.09	764	46.35	884	53.64

Source - District Census handbook, South 24 parganas, Directorate of census operation, govt. of India, 2011.

TOURISM

- Flow of tourist

Months	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Novem	Dec
Approximate no.	9500	7000	5000	2000	1000	500	200	200	600	4600	7000	8500
Percentage	20.61	15.18	10.85	4.34	2.17	1.08	0.43	0.43	1.30	9.98	15.18	18.44

- Influx of tourist

Places	Other States	Other Districts	Adjoining districts	Kolkata and surroundings
No. of tourist	3688	5532	9220	27660
%	8	12	20	60

Source - Research Article - tourism in coastal West Bengal of India (Syffuggaman Tarabdar and N. C Jana)

TOPIC:-

SUNDARBAN MANGROVE, POST AMPHAN : AN OVERVIEW



SUNDARBAN MANGROVE POST AMPHAN: AN OVERVIEW

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Paper - Fieldwork and Research Methodology

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ABSTRACT

This Literature review is trying to depict the horrifying situation due to the disaster (Super cyclone Amphan) on Sundarban Mangroves. The Sundarbans comprise a cluster of small low-lying islands in the Ganga-Brahmaputra-Meghna River Delta. It is the largest continuous mangrove forest in the world. Cyclone Amphan is the first super cyclone to form in the Bay of Bengal since 1999, and one of the fiercest to hit West Bengal in the last 100 years. As per the initial estimate, about 1200 sq km area in the Sundarbans suffered damage. Mangrove have the potential to adapt to sea level rise, catch runoff from soil erosion leading to accretion of coastal areas, and are of course impressive 'blue carbon' sinks. Mangroves, salt marshes, and sea grasses form much of the earth's blue carbon sinks and most importantly in the context of cyclones, act as a dampener. The cyclone wrought much less damage because of the delta's mangroves. A gendered approach to mangrove conservation is necessary in order to promote innovative, sustainable and equitable conservation. The literature review also suggests some strategies to manage or overcome from this disastrous incident through proper plans, policies and necessary steps.

Key Words : Mangrove ecosystem, biosphere reserve, Amphan, blue carbon sink, community based conservation.

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8. Fig 8 : Fluctuation in Salinity during pre and post Amphan period
9. Fig 9: Loss of Aquatic faunal
10. Fig 10: Loss of Species
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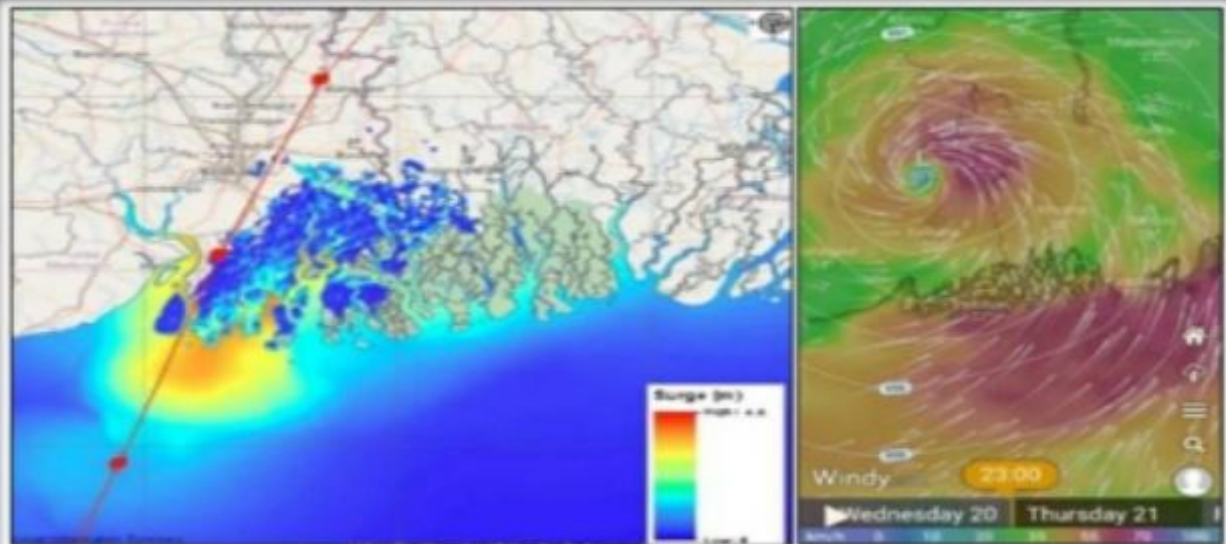
- Table 1: Showing wind speed of some cyclones
- Table 2: Nature of cyclone Amphan
- Table 3: Description of some cyclones in Bay of Bengal

INTRODUCTION

The Sundarbans comprise a cluster of small low-lying islands (less than five metres in height) in the Ganga-Brahmaputra-Meghna River delta. It is the largest continuous mangrove forest in the world. Cyclone Amphan hit on May 20 with heavy rains a massive storm surge and sustained winds of 170 kilometers (105 miles) per hour and gusts of up to 190 kph (118 mph). It passed directly through the Sundarbans, devastating it. About 28% of the Sundarbans has been damaged. Cyclones are regular occurrence in the region and contrary to the commonly held perception, the mangrove ecosystem is quite resilient to momentary disturbance. The South Bengal has been decimated by the cyclone Amphan during the night of 20-21 May in 2020. This was the strongest cyclone ever to strike the eastern state in the recent past, leaving behind a trail of destruction. At the time of landfall, the diameter of the eye was about 40 km while the front and rear side had a width of 120 kms each.

However, despite the cyclone not directly hitting the wall of the mangrove, the extended region comprising of spiral bands of the cyclone could have interacted with the shield to its right, thereby facing resistance. The map shows the air circulation in real time from modeled data at 11:25pm on May 20. It can be easily inferred that despite a largely favourable pressure gradient, the wind speed is visibly lower (Shown with a green shade) in the region immediately north of Sundarbans. Similarly, based on the map to the left, the force of the storm surge could have been partly

reduced by the expanse of mangroves in the Sunderbans. At present, this data can only be indicative and it would definitely require a detailed study to further substantiate this claim.



Maps showing the spatial distribution of storm surge of varying heights (left) and wind speed and pattern of movement during the cyclone (right). Source: INCOIS and windy.com

Fig 1 : Satellite image of Cyclone Amphan

The Sunderbans comprises hundreds of islands and a network of rivers, tributaries and creeks in the delta of the Ganga and the Brahmaputra at the mouth of the Bay of Bengal in India and Bangladesh. The Sunderbans is a UNESCO World heritage site and a critical wetland.



Fig 2: Sunderbans deltas

MAIN BODY / RESEARCH

Located on the southwestern part of the delta, the Indian Sundarban constitutes over 60% of the country's total mangrove forest area. The 10,000 square kilometer region stretches along the coast of Bangladesh (where 60 percent of the forest lies) and India. After cyclone Amphan, the Sundarbans have become completely unrecognizable.

- The Sundarban delta has 102 islands of which 54 are inhabited. Most famous for its population of tigers, the mangroves—dense thickets of small trees with exposed supporting roots—act as a buffer during storms, slowing down tidal waves and dissipating a storm's energy, said KJ Ramesh, India's former meteorological chief.

- It is also home to a large number of rare and globally threatened species, such as northern river dolphin, Irrawaddy dolphin, northern river terrapin, fishing cat. Two of the world's 12 species of Kingfisher and four horseshoe crab species are also found here. Recent studies claim that the Indian Sundarban is home to 2,626 faunal species and 90 percent of the country's mangrove varieties. It performs multiple ecological functions.

- The capacity of mangroves, sea grasses and salt marshes to sequester carbon dioxide from the atmosphere is becoming increasingly recognized at an international level. Of all the biological carbon, also termed as 'green carbon' captured in the world, over half (55%) is captured by mangroves, sea grasses, and salt marshes and other marine living organisms, known more specifically as 'blue carbon'.

- Mangroves are the plant communities occurring in inter-tidal zones along the coasts of tropical and subtropical countries. It protects coastal communities.

Study Area

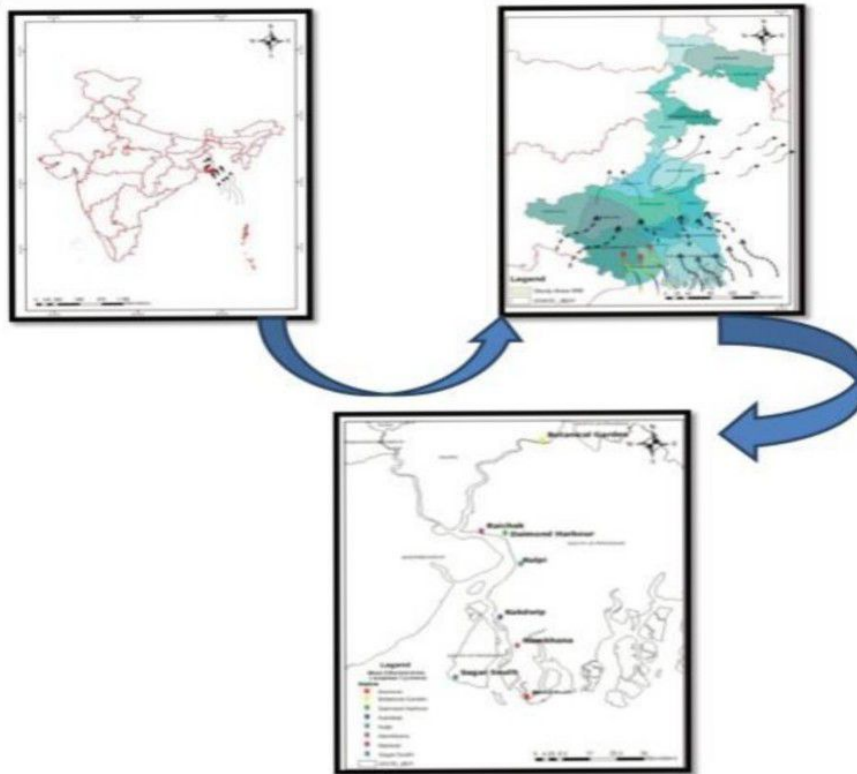


Figure 3.(a): Study Map representing the cyclone moving towards landfall; 3(b) Track of Cyclone through West Bengal ;3 (c) Sampling stations where parameters were measured.

Mangroves play a vital role in coastal ecosystems and food chains, by supporting communities of fish and shellfish. Mangroves are salt-tolerant trees and shrubs that help protect coastal areas from intense tropical storms, waves and erosion. By serving as a flood barrier, they can reduce the damage caused by storm such as cyclones. Damage and erosion to mangroves leave the coast increasingly exposed and therefore more vulnerable to storms. It is providing protection to coastal areas from tsunamis and cyclones. Each year about eight storms with sustained wind speeds greater than 63 km/hr form in the Bay of Bengal, with an average of two becoming tropical cyclones. Tropical cyclone Sidr in 2007 and Aila in 2009 caused extensive damage, prior Amphan.

IMPACTS

The powerful cyclone that struck India and Bangladesh on May 20, 2020 passed through the vast mangrove forests of the Sunderban delta. About 28% of the Sunderbans has been damaged. West Bengal's Chief Minister Mamata Banerjee said, 1200 sq km of the 4,263 sq km forests had been destroyed. The Indian Sunderbans, an area south of the Dampier-Hodges line, is spread over 9,630 sq km, of which the mangrove forests accounts for 4263 sq km.

ON TREES: Principle chief conservator of Forest Ravi Kanta

Singha said the damage was mostly in the Patherpratima and Kultali areas of South 24 Parganas. On trees turning yellow and red in the Sunderbans after the cyclone, he said, the phenomenon was mostly due to salinity. One resident said, he remembered the poem "On Killing a tree" to show the trees, they gave up to protect them.

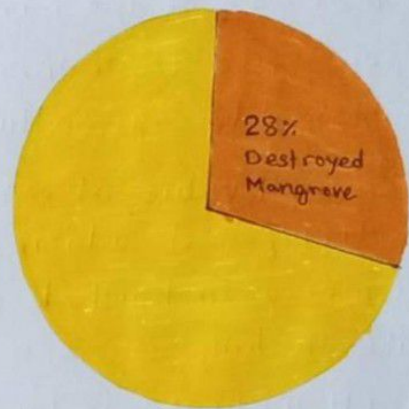


Fig 1: Pie diagram Showing the destroyed mangrove forest of West Bengal



Fig 5: Turning Mangrove Trees colour.

ON LAND: Four days after Amphan hit, the Sunderbans region of West Bengal is in shock. Most ominously, the intensity of the storm has meant salt water from the sea has backed up into farmland in the delta, rendering them useless for the next few years.

Nearly 17800 hectares of agricultural lands may have been damaged because of saline water from seas entering the farms. Apart from erosion, opening up of creeks might lead to overflow of saline water into village compelling all to think of salt tolerant varieties of rice (News, 18, 21.05.2020).

According to recent study carried out by DECMA (Delta Vulnerability and Climate change: Migration and Adaptation), in the aftermath of Aila between 2014 and 2018, it was found out that 64% of the migration from the Sunderbans regions happens due to economic distress resulting out of unstructured, unsustainable agricultural opportunities. (The wire, 26.05.2020).

The pH value also increased significantly in the study area due to (Figure 6) sudden intrusion of seawater in the estuarine system (e.g., in Raichak there is an increase in pH by 0.7%. While in Kulpi it is a 3.1% increase. However, in Sagar south, the pH increase is by 1%).

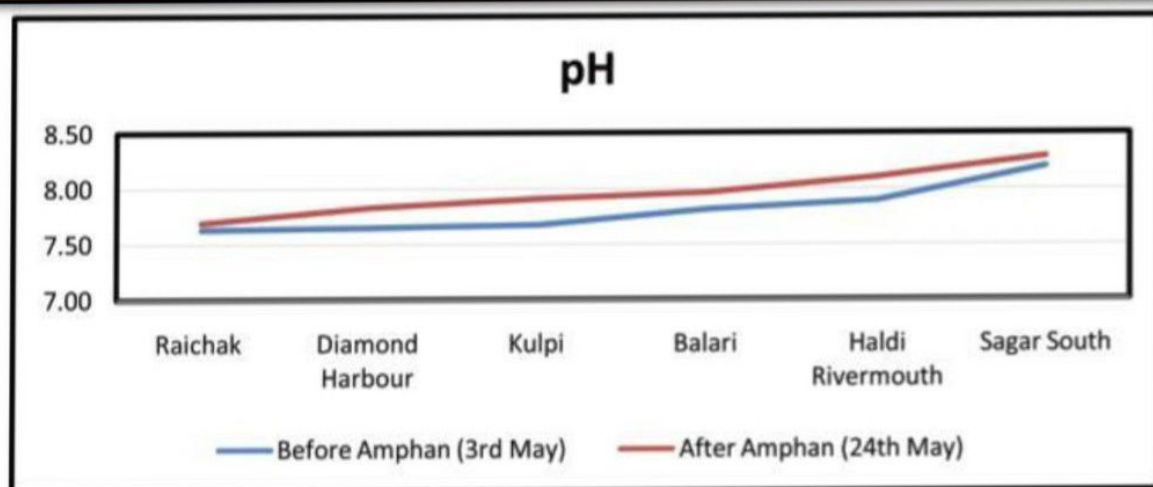


Figure 6. pH concentration shows significant difference during Pre and Post Amphan period.

• Sea Surface Temperature:- For Sea Surface Temperature, in (Figure 7), there has been an abnormal increase in surface water temperature due to increase solar heating and lack of precipitation. The significant gap between Pre-Amphan and Post-Amphan graph clearly indicates that Landfall of the cyclonic storm has reduced Sea Surface Temperature largely.

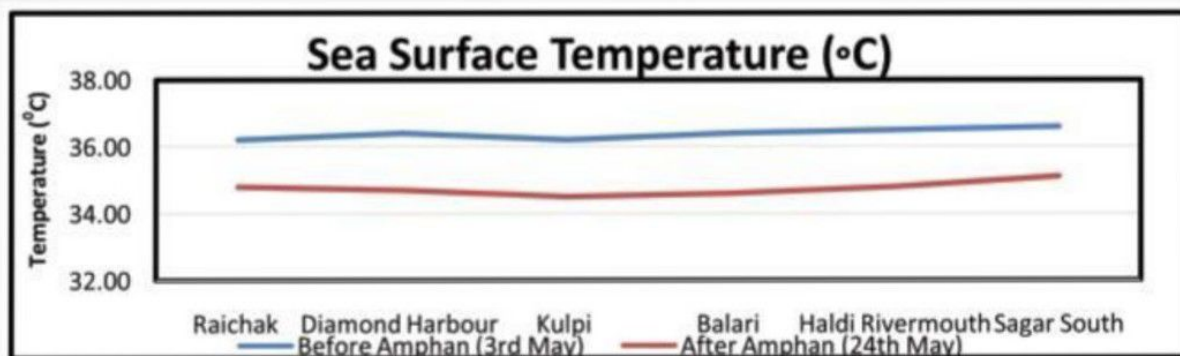


Figure 7. Sea Surface Temperature during Pre and Post Amphan period.

Salinity:- (Figure 8) shows fluctuation in salinity concentrations during Pre-Amphan and Post-Amphan periods. All the sampling stations show an increase in salinity post the cyclone. Increase in salinity can cause change in physico-chemical properties of aqueous medium as well as ambient medium. It greatly affects aquatic flora and fauna and alters freshwater biodiversity, harmful algal bloom as seen in case of alga, *Chattonella marina*. While salinity induces phytoplankton growth, high salinity chokes and kills the planktons.

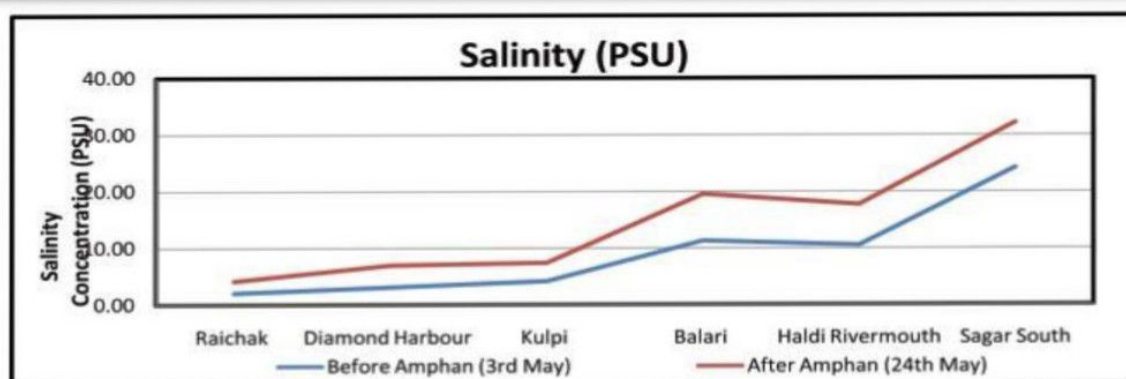


Figure 8. Fluctuations in salinity concentration observed in sampling stations during Pre and Post Amphan period.

On Biodiversity / Ecosystem:- Due to Amphan, the biodiversity of this region has been affected by the loss of trees and mangrove. According to the State Forest Department estimates, around 40 per cent of the mangroves were ravaged.



Fig 9: Loss of Aquatic Fauna

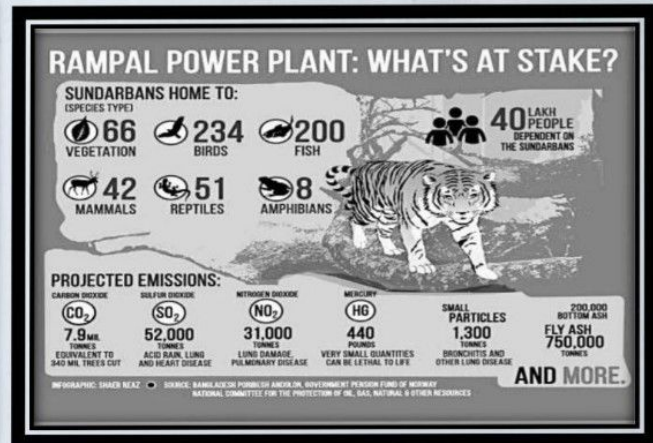


Fig 10: Loss of Species

On Embankments:- By the Supercyclonic Storm Amphan, over Bay of Bengal. The embankments that line the islands in Sunderbans were. The conditioned has worsened after cyclone. Amphan. Sunderbans has about 3,000 km of embankments, of which about 200 km are concrete embankments. At Ramganga in Patharpratima roughly about 2-2.5 km breached on the afternoon of 20th May.



Fig 11&12: Damage of Embankment

WIND SPEED OF SOME CYCLONES PASSED THROUGH SUNDARBAN (2000-2020)

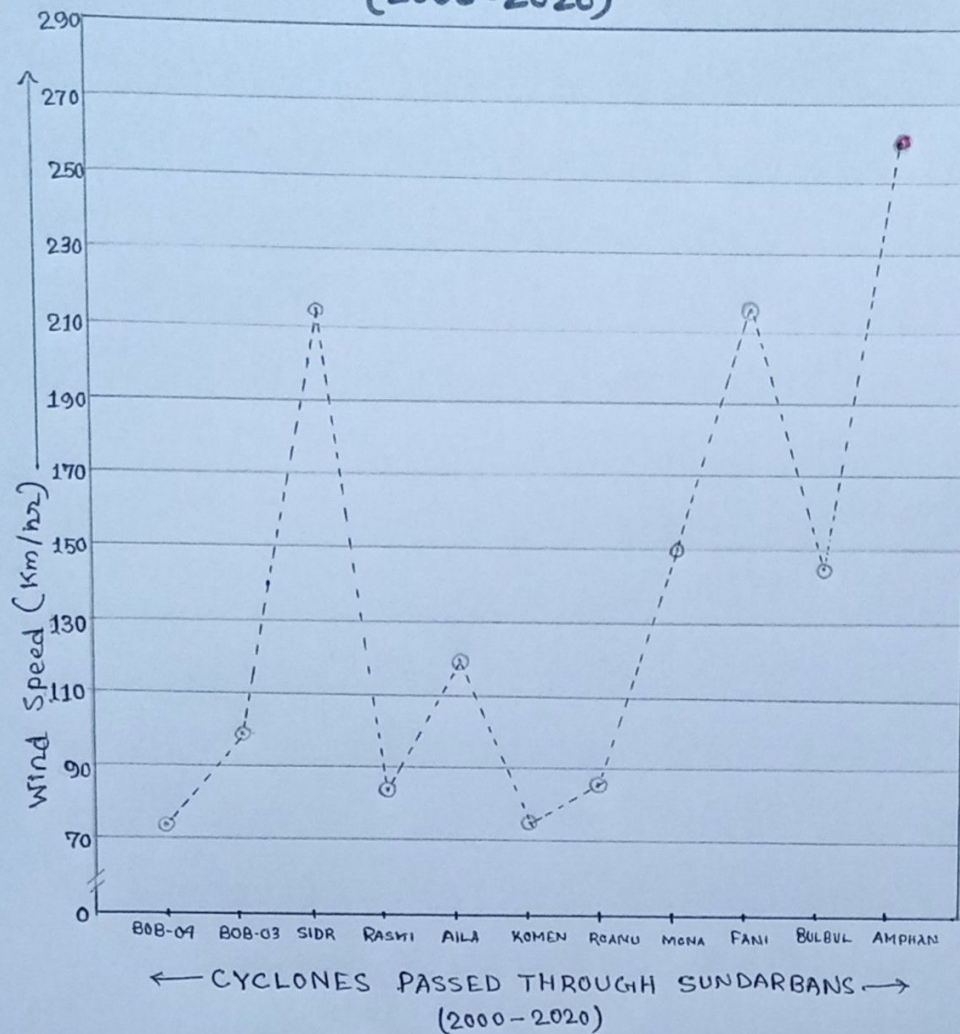


Fig: 13 Wind speed of some cyclones on Sundarban

NAME OF CYCLONE	YEAR	WIND SPEED (km/hr)	NAME OF CYCLONE	YEAR	WIND SPEED (km/hr)
BOB-04	2000	75	KOMEN	2015	75
BOB-03	2002	100	ROANU	2016	85
SIDR	2007	215	MONA	2017	150
RASMI	2008	85	FANI	2019	215
AILA	2009	120	BULBUL	2019	145
			AMPHAN	2020	260

Table 1: Showing wind speed of some cyclones.

• Mangroves not only reduce wind speed drastically but also break the waves during the storm surge triggered by the cyclones. The forest is also suffering from increased salinity due to rising sea levels and reduced freshwater supply.

Table 2: Nature of Cyclone Amphan

Date/Time(IST)	Position (Lat. °N/ long. °E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
16.05.20/1730	10.9/86.3	60-70 gusting to 80	Cyclonic Storm
16.05.20/2330	11.1/86.1	70-80 gusting to 90	Cyclonic Storm
17.05.20/0530	11.7/86.0	80-90 gusting to 100	Cyclonic Storm
17.05.20/1130	12.2/86.0	90-100 gusting to 110	Severe Cyclonic Storm
17.05.20/1730	12.8/86.0	105-115 gusting to 125	Severe Cyclonic Storm
18.05.20/0530	14.0/86.0	125-135 gusting to 150	Very Severe Cyclonic Storm
18.05.20/1730	15.1/86.1	145-155 gusting to 170	Very Severe Cyclonic Storm
19.05.20/0530	16.7/86.4	160-170 gusting to 190	Extremely Severe Cyclonic Storm
19.05.20/1730	18.3/86.8	160-170 gusting to 190	Extremely Severe Cyclonic Storm
20.05.20/0530	20.1/87.4	155-165 gusting to 180	Very Severe Cyclonic Storm
20.05.20/1730	22.2/88.0	135-145 gusting to 160	Very Severe Cyclonic Storm
21.05.20/0530	24.4/88.5	80-90 gusting to 100	Cyclonic Storm
21.05.20/1730	26.0/89.0	40-50 gusting to 100	Depression

Table 3: Description of some cyclones in Bay of Bengal

Year	Name	Lowest Pressure (mbar)	Winds (in km/h)	Storm surge height	Fatality	Damage
1970	Bhola Super Cyclone	966	185	6 to 7 m (20–25 ft)	300,000 to 500,000	\$86.4 million (1970 USD)
1991	Bangladesh Super cyclone	918	250	6 m (20 ft)	138,866	US\$1.7 billion (1991 USD)
1999	Odisha Super cyclone	912	276	5–6 m (16– 20 ft)	9887 to 12000	\$4.44 billion (1999 USD)
2007	Cyclone Sidr	944	215	3 m (9.8 ft)	3,447 to 15,000	\$2.31 billion (2007 USD)
2008	Cyclone Rashmi	996	85	2 m (6 feet)	28 to 100	NA
2009	Cyclone Aila	970	120	2-3 m	339	\$1 billion (2009 USD)
2015	Cyclone Komen	986	85	1 to 2 m (3.3 to 6.6 ft)	187 to 280	\$617.1 million (2015 USD)
2019	Cyclone Fani	932	215	2-3 m	89	\$8.1 billion (2019 USD)
2019	Cyclone Bulbul	980	145	1 to 2 m	41	\$3.37 billion (2019 USD)
2020	Amphan Super cyclone	925	260	5 - 6 m (20 ft)	118	\$13.35 billion (2020 USD)

SUGGESTIONS

- The Chief Minister said that the Forest Department should be prepared to plant 3-5 crore mangroves by July 14, World Forest Day. She has setup an ambitious target of planting 5 crore mangrove trees in the Sundarbans. She announced Rs. 1000 crore fund for restoration work.
- After every ~~every~~ cyclone, demands for concrete embankments are raised. Because it help ensure long-term sustainability of this.
- In order to raise awareness of the multiple benefits of mangrove ecosystem, there is a need to conduct more research and also focus more on expanding mangroves areas in participation with local communities and other key stakeholders.
- Forestry conservation and mangrove restoration work is particularly an important income source for women raising their social status.
- A gendered approach to mangrove conservation is necessary in order to promote innovative, sustainable and equitable conservation that integrating environment with society and economy, the underlying principle of Sustainable Resource Management (Pal and Sen 2017; Sen 2014a, 2018).



Fig 14: Plantation of Mangroves



Fig 15: Restoration of Mangroves

- The most substantial loss of the world's mangroves cover due to their conversion to other land uses, so we need to protect the mangroves area.
- Lastly, India and Bangladesh join hands to protect the Sundarbans from environmental degradation by the formation of an Indo-Bangladesh Sundarbans Ecosystem forum.

CONCLUSION

The Sundarbans is Bengal's first line of defence from the fierce storms that periodically arise in the Bay of Bengal. Amphan caused humongous damage and devastation along the coastal region specifically Sundarbans. Cyclone Amphan being associated with very high intensity winds, storm-water surges, tidal inundation, saline water invasion and flash flood caused irreversible damage to the biodiversity and livelihood generation activities. It also helps us to suggest recommendations for sustainable development of one of the fragile mangrove ecosystems in the planet earth. River and land sediment is trapped by the roots, which protects coastline areas and slows erosion. This filtering process also prevents harmful sediment reaching coral reefs and seagrass meadows. Coastal forests also help the fight against global warming by removing carbon dioxide from the atmosphere. They provide livelihoods. They encourage ecotourism. So, we need to protect mangrove forests not only helps preserve biodiversity, it also helps preserve a vital resource for local communities.

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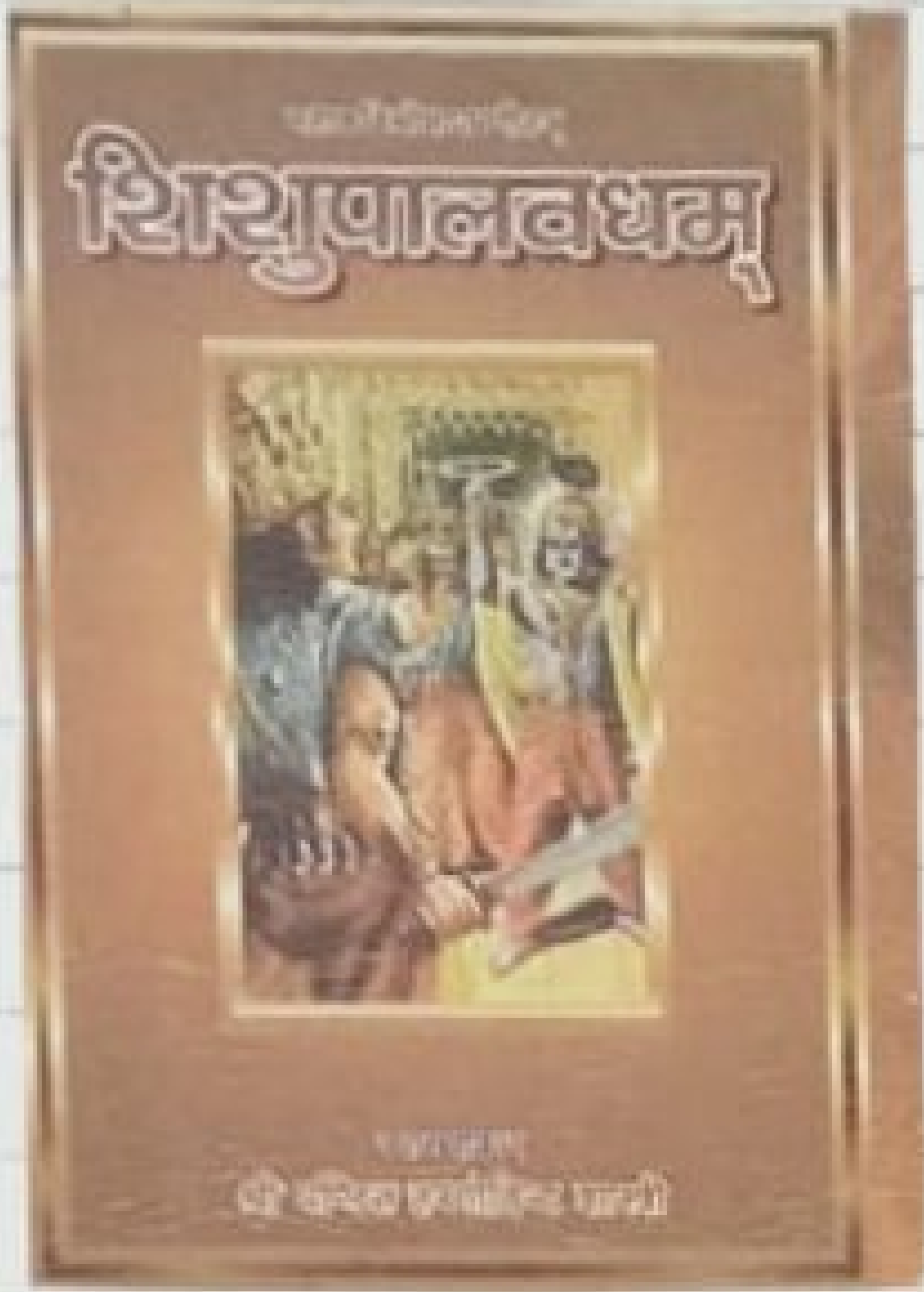
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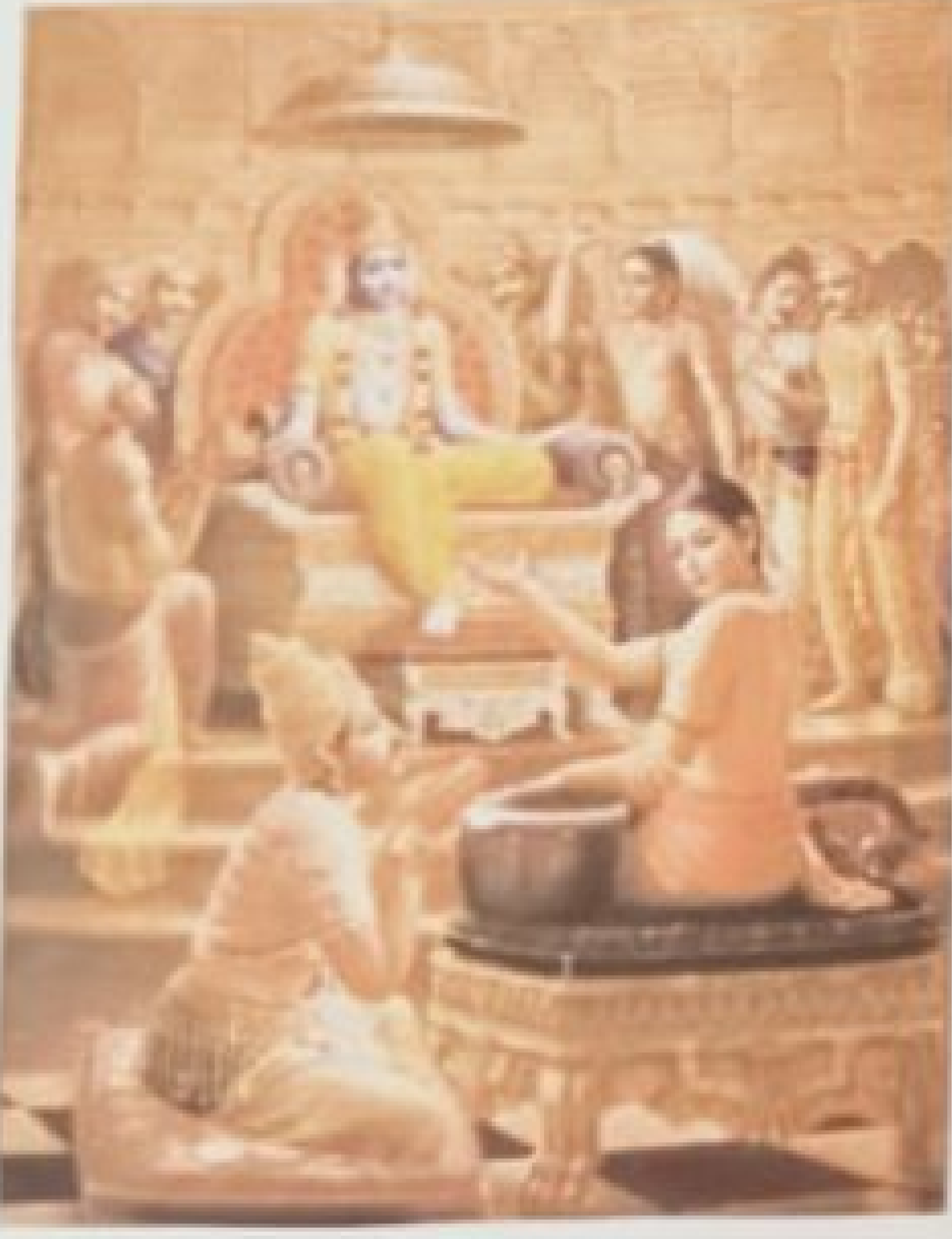
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न शक्तवान्, ज्योतिषुजः किम्! ततः क्रमेण मयूरस्य समीपं
गच्छति स्म किमपि शरीरेण सह, यथा यथा सः समीपं
समीपं गत्वा स्वस्य अङ्गानाम् अनुभूतिम् अनुभवति स्म तथा
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हिमालयवत् प्रादुर्भूतः । श्वेतचक्षुषी नारदः कृष्णमृगाचर्मपरिधानं
कृत्वा कटिभागे पिङ्गलवर्णीयमुखमेखला आच्छादितः आसीत् ।
तोष्मान् अवस्थायाम् सः वलरामस्य अनुकरणकर्तृत्वेन नीलवस्त्रधारी
सुवर्णसूत्रधारिणः आविर्भूतः । नारदः बाहुयुग्मे गरुडरौमवत्
दीर्घसुवर्णबेलसूत्रधारेणः निमोक्तं यज्ञोपवीतं धारयाति स्म । ततः
सः मानभूनस्य अन्ते विद्युत्गुणेन पारेतः भवतिशुभ्रः मोघ इव
अलङ्कृतः आसीत् । नारदः अस्य मृगाचर्मस्य दीप्तिमान् सूक्ष्मरी-
मव्यक्तं मर्त्यप्रज्ज्वलनरीरे धारयाति स्म । इन्द्रमान एवमेव तस्य नर्म-
परास्तरन्वासनाशोबिहलः कृत्वा इव भासते स्म । तस्य अङ्गुष्ठः
वीणातारयोः नित्यं अङ्गुलीनां गतिना किरांमेजीवणेन कलङ्क-
किन्तः आसीत् । मालास्य अङ्गभागः अपि तस्य प्रतिबिम्बे



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किरमिजी अभवत्, उद्येतः सः रफटिकमाणं धारयति इव
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तस्य महतीनाम्ना वीणायाम् वातरपन्दितायाः तन्नात् पृथक्
शब्दः, पृथक् श्रवणक्षेत्रं च उद्भूतम्, तस्य प्रभावेण ग्रामस्य
मूर्च्छा स्पष्टतया प्रकाशिता, महर्षिनारदं द्वारकम् अनुसृत्य
देवाः प्रणामं कृत्वा स्वर्गं प्रत्यागतवन्तः, नारदश्च श्रीहरि-
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