Chapter — III

Resources, Their Availability, Constraints and Utilization

3.0. Introduction

The Sundarban is one of the productive and unique ecosystems of the world. The Sundarban has been considered to be a bio-geographic region and one of the Biosphere Reserves of the world. The inhabitants are exploiting the forests, aquatic and agro resources of Sundarban, which being an endangered zone, is going through the process of long term conservation and proper use of its resources for sustainable development.

3.1. The Iron Triangle

The iron triangle governs the resource use patterns in India. Large state sponsored subsidies have created an iron triangle of components of Indian society benefiting from, administering and deciding upon state patronage. Constituents of the iron triangle — the bureaucrats, landlords and fish traders in Sundarban has lead the country into a pattern of exhaustive resource use at the expense of the environment and a majority of the people. (Fig.9)

3.1.1. Poverty and Ecological Refugees

The relentless transformation of the natural world into the world of artifacts brought out vividly for the mankind by the satellite has more asymmetric implications for the different constituents of the Indian society. There are many, who earn barely enough to fill bellies, there is little left over to acquire the new goods on the market, be they soaps or blenders, mopeds or TV sets. Thus the bulk of the poor, or even the not so affluent, must scratch the earth and hope for rains in order to grow their own food. They must gather wood or dung to cook it, must build their own hut with bamboo or sticks or sorghum dabbed with mud and must try to keep out mosquitoes by engulfing them with smoke from the cooking hearth.
Such people depend on the natural environment of their own locality to meet most of their material need. About four-fifth of India’s rural people, over half of the total population belong to this category, who are entirely dependent and thus known as ecosystem people. (Gadgil, 1992)

As the natural world recedes, shrinkage takes place in the capacities of local ecosystems to support these people. As forests vanished, millions of tribals and peasants were displaced. These people fled as they had no other alternative. Often they were evicted in the name of planned development of an area. These people constitute the group of ecological refugees.

There is a third category of people who are not the producers, but they are capable of siphoning the natural resources through market mechanisms. They are recognized as the biosphere people.

More than fifty years of planned development has created an India in which islands of prosperity peep out of a sea of poverty. The ecological refugees are hangers at the edges of prosperity, like mud skippers hopping around on the muddy beaches, fringing mangrove island. The tide swallows them from time to time, they manage to clamber back on to the mud, but can never make it to dry land.

3.1.2. Alliance to the Iron Triangle

The omnivores have built up an alliance akin to an iron triangle—an alliance of those favored by the state (industrialists, rich farmers and city dwellers), those who decide the size and scale of these favors (politicians) and those who implement their delivery (bureaucrats and technocrats). The creation of Salt Lake city towards the east of Kolkata is an example of the above statement. This was once a salt marsh in the northward stretch of mangrove swamps of the Sundarban.
IRON TRIANGLE

INDUSTRY

LARGE HOLDERS OF IRRIGATED LANDS

AT THE COST OF

SUBSISTENCE SECTOR
RURAL LANDLESS
SMALL HOLDERS
RURAL ARTISANS
HERDERS
FISHER FOLK
TRIBALS
URBAN SLUM DWELLERS

RESOURCE CAPITAL
QUALITY OF ENVIRONMENT

STRONGLY LINKED TO INDUSTRIAL COUNTRIES

BENEFICIARIES

URBAN POPULATION

ADMINISTRATORS

DECISION MAKERS

POLITICIANS
Some Benefits and Uses of Forests

Subsistence needs
- Fuelwood
- Charcoal
- Building materials
- Fodder
- Fruit
- Nuts
- Honey
- Medicines
- Dyes

Environmental uses
- Prevention of soil erosion
- Watershed protection
- Soil fertility
- Shade
- Shelter from wind
- Prevention of floods, landslides
- Water retention

Industrial uses
- Poles
- Plywood
- Veneers
- Paper and boards
- Gums and resins
- Oils
- Exports

Genetic storehouse
- Strains for crops
- Medicines
- Industrial chemicals

Fig. No.10
3.1.2.1. Prime Beneficiaries of Iron Triangle

The prime beneficiaries of this system of state-sponsored resource capture are those in organized industry and service sector along with large land owners in areas of intensive agriculture. The resource captured by omnivores is at the cost of the other five-sixth of the population: the landless laborers, small peasants, rural artisans, herders, country boat fisherfolk, spawn collectors of ‘bagda’, nomads and tribals.

Large state sponsored subsidies have created an iron triangle in Sundarban as in other Indian societies well. Constituents of this iron triangle are forcing the country into a pattern of exhaustive resource use at the expense of the environment and a majority of the people. (Gadgil, Guha 1995)

3.2. Types of Natural Resources

The natural hazards, swampy forest land, ferocious carnivores and poisonous snakes could not diminish the quest of the people for exploring this area and establishing settlements by clearing the forest.

The natural resources of the Sundarban mainly include forest, land and water resources. The importance of this vast mangrove track was not realized earlier due to which unplanned large scale reclamation took place.

3.2.1. Forest Resources

In rural areas, soil erosion, flooding, ground water depletion, and silting as a result of deforestation can directly influence agricultural productivity, thereby affecting household food supply, health and nutrition. Also deforestation processes are associated with numerous other socio-economic impacts on employment, incomes and social relations. In developing countries, forests serve as ‘food banks’ for the poor. Various types of fruits, nuts, leaves,
roots and shoots are collected by poor people (Fig. 10). Forests harbour many types of animals, birds and insects, which can be hunted and consumed. The rural people living around forest areas depend on a large variety of forest products for subsistence, especially for those population groups in rural areas of the developing countries. Sundarban is a storehouse of immense variety of forest resources. (Fig. 11)

Besides supplying timber, forests offer several non-timber forest products (NTFPs), including plants or plant parts, fuel-wood and wood for handicrafts. In the tropics and sub tropics NTFPs are particularly important to the rural population because they provide foodstuffs, drugs, tools, fibers, biocides, construction materials and other types of useful materials. The farming of some commercially valuable NTFPs are profitable enough. It is generally overlooked that the importance of timber products is often exceeded by NTFPs which include leaves, fruits, bark, animals and other forest habitat products. Indeed, NTFPs best illustrate the great diversity of tropical forest because their heterogeneity reflects the diversity of forest species. (Fig. 12)

It is found that deforestation along with forest degradation has a profound impact upon the environment of a region. The natural functions and human pressures of population ought to attain a perfect balance as explained in the figure 13.

The mangroves are rich storehouse of timber wood for charcoal, woodchips, fuelwood fodder and other forest products as honey and wax. Mangroves are typical tropical tidal forest of the creek infested deltaic islands of South 24 Parganas.

Historically, forests have meant different things to different people. Loggers have regarded them as reserves of low cost timber easily reached on government-built roads. Environmentalists have wished them to be nature reserves, minimally touched by human hands. In the past many of the debates on various respects of forests have tended to focus on
the forest sector and on direct causes of deforestation and forest degradation rather than on the cross-sectoral aspects or connectivity of forests and the human societies. (Kumar, 2002)

3.2.1.1. Timber

About twenty-five to thirty principal kinds of both soft and hard wood timber can be found in the Sundarban. The timber of Amur (Amoora cucullata), Bain (Avicennia tomentosa), Garan (Ceriops Roxburghianus), Geoa (Excoccaria Agallocha), Hental (Phoenix paludosa), Kankra (Bruguiera gymnorrhiza), Khalsi (Aegiceras corniculata), Gnewa (Excoecaria agallocha), Dhundal (Xylocarpus granatum) fetches huge returns.

3.2.1.1.1. Utilization of Timber

Timber is used for beam, rafter and also for post. Sundari is used for transmission pole, telegraph wire or electricity lines, boat building and house posts. The ‘Gnewa’ is mainly used for making packing boxes and match sticks. ‘Keora’ and ‘Passur’ is used for making doors and other wooden furniture. (Vide Appen. A for scientific names)

3.2.1.2. Honey

Honey collected from ‘Khalsi’ (Aegiceras majis) and ‘Singur’ (Cynometra ramiflora) is considered to be the best in quality. The ideal site for formation of hive is Hental-Gnewa combination forest. Honey and bees wax, both are collected from the forest on a remunerative basis.

3.2.1.3. Flora and Fauna

The flora and fauna combination of the mangrove forest, so unique in its characteristics, is also a major resource of this region attracting tourists throughout the world.
Under natural ecological conditions when a new island appears in a creek or coastal sea the first vegetation that automatically grows here is Dhani grass followed later by Barun grass. The mangrove plant that appears next varies from one place to another. The zonewise distribution of mangrove flora is given in the table no 3.1.

**Table No. 3.1 Floral Resources of Sundarban**

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Segment/Plant Species</th>
<th>Wood Type</th>
<th>Used for</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Western Segment:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Gengwa (Excoecaria Agallocha)</td>
<td>Soft</td>
<td>Local furniture.</td>
</tr>
<tr>
<td></td>
<td>4. Bon-jam (Clerodendron Inerme)</td>
<td>Soft</td>
<td>Post, local furniture.</td>
</tr>
<tr>
<td></td>
<td>5. Kankrha (Bruguieula gymnorrhiza)</td>
<td>Splinterly</td>
<td>Firewood.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Central Segment:</strong></td>
<td>Medium Firewood Hard Splinterly Fibrous, thorny Grass</td>
<td>Firewood, medicinal, fruit sil. Innerwood for charm beads. Jute oil, bobbin oil. Firewood. Fragrant flower, medicinal. Deer fodder, boatmen's emergency food (wild rice)</td>
</tr>
<tr>
<td></td>
<td>9. Dimal (Salacia Prinoides)</td>
<td>Hard</td>
<td>Firewood.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Eastern Segment (Tiger Project Area):</strong></td>
<td>Fibrous, wild mini date palm. Props, sticks Firewood, big fruits (large triple seeds) Hard Firewood. No wood. Hard boat making</td>
<td>Pole Fuel Thick base for backing boxes. Coconut like long leaves for thatching. Oar, post, pole etc.</td>
</tr>
<tr>
<td></td>
<td>15. Hental (Phoenix Paludosa)</td>
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<td></td>
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<tr>
<td></td>
<td>16. Bhara (Rhizophora Mucronata)</td>
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<td></td>
<td>17. Dohondal (Corapa Abonata)</td>
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<td></td>
<td>18. Pasur (Carapa Obonata)</td>
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<td></td>
<td>19. Golpata (Nipa Fruticosa)</td>
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</tr>
<tr>
<td></td>
<td>20. Sundari (Heritiera Littoralis)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOURCE:** Mukherjee (2002)
DIVERSITY OF PRODUCTS AND SERVICES AROUND TROPICAL FORESTS

After FAO, 1993
3.2.1.4. Other Forest Resources

The other products, found in the mangrove forest of Sundarban include canes, reeds, thatching leaves, honey and shell-lime. The reeds are used for making mats. These mats were woven in huge number earlier. The basket and mat weavers reside just beyond the limit of Sundarban. Besides a unique long leaf is also found specially for thatching huts.

3.2.1.5. Problems Regarding Extraction of Forest Resources

There are some major problems, which have short and long term socio-economic and as well as environmental effect upon the villagers who extract forest resources.

The honey collector (Mouly) and the woodcutter (Bouley) often face inherent danger and unknown hazard from the ferocious animals and reptiles. Most of the people enter the forest without any modern arms and ammunitions. They depend on sticks and musk for self-defence. Deep mangrove forest is often impenetrable because of sticky mud and dense undergrowth. Fishermen’s trawlers are often attacked by pirates. (Chakroborty, 2000)

The felling of target trees by unauthorized greedy intruders who have exploited the forest to the maximum has caused serious concern because that has indirectly led to the loss of species diversity. (Raha, 2002)

3.2.1.6. Preservation of Biodiversity and Exploitation of Forest Resources

Biodiversity is a function of both time (evolution) and space (bio-geographic distribution). In Sundarban much emphasis has been given to the sustainable exploitation of forest resource by the forest department of the State Government.
3.2.1.6.1. Curb on Unplanned Exploitation

Over the years, gradually it was felt that there is a necessity to protect the Sundarban from unplanned exploitation. The forest belt is essential for maintaining optimum eco-climate and socio-economic conditions of the entire area.

3.2.1.6.2. Very Few Options

Local people enter the forest because they do not have adequate job opportunities. They are left with very few options other than wood collection. The village adjoining Bakkhali Reserve Forest is not suitable for agriculture. However, it is found that though the Government tries to restrict the unplanned exploitation but still, the villagers enter the forest without legal permit mainly in search of fuel wood, timber and games. (Naskar, 2000)

3.2.2. Social Forestry

The social forestry programme was a joint effort of the forest department and the Sundarban Development Board. Plants of rapid growing variety was mainly chosen. These include the exotic species of ‘Kubabul’ (Lucancena veneccephala) brought from Phillipines plantation of Casurina (equiletifolia) and Acacia. Casurina plantation mainly near the coastal margin is found which has brought miraculous result.

3.2.2.1. Problems Regarding Implementation of Social Forestry Programme

The social forestry programme mainly aims at integrating the human along with the flora. In this attempt the conscious effort is made for protection, conservation and afforestation.

3.2.2.1.1. Premature Slashing of Trees

The main problem of Social Forestry Programme is that the villagers do not give time for a tree to grow up. On either side of the road planted trees are cut off much earlier. At Gosaba
DIVERSITY OF NON-TIMBER FOREST PRODUCTS

Diversity of Products and Services

- **Tree products**
  - Timber, sawwood, plywood, pulpwood
  - Leaves, flowers, fruits, bark, gums, resins, essential oils, roots, firewood

- **Habitat products**
  - Plant products from shrubs, grasses, palms, canes, lianes
  - Mushrooms and microbes
  - Animals (wildlife, birds, reptiles, insects) and animal products (honey, wax, nests, eggs, skins, bone, horn)

- **Forest services**
  - Environmental, cultural, religious, tourism, recreation

**Fig. 12**
block, most of the trees planted under the social forestry programme have been cut off by the local people much ahead of their attaining the stage of maturity.

3.2.2.1.2. Care for Indigenous Species

Poor people of the scheduled caste and scheduled tribe communities are in favour of indigenous species combination under the Social Forestry Programme in preference to the exotic species combination. They like to gather seeds, leaves, flowers, fruits, medicinal plants, honey and apart from small twigs for fuel and hard wooden logs for building materials. Eucalyptus being an exotic species is mainly industrial raw materials. Ecosystem people can achieve nothing from such species having low undergrowth and lesser branching.

3.2.2.1.3. Agroforestry

This is defined as the set of land-use practices, which involve the deliberate combination of woody perennials and herbaceous crops and/or animals on the same land management unit, in some form of spatial arrangement or temporal sequence, such that there are significant ecological and economic interactions between woody and non-woody components.

The agroforestry approach combines the study of woody perennials, herbaceous plants, livestock and people, and their interactions with one another. It involves both an ecological and an economic interaction between the tree and non-tree components. Some other specialized agroforestry systems include apiculture with trees, aquaculture in mangrove areas and multipurpose tree lots.

3.2.3. Human Encroachment and Reclamation

Human encroachment and reclamation started way back in 1770 initiated mainly by Clande Russell, the Collector General of the Sundarban forest areas of 24 Parganas. (Mukherjee
Impact of Human Pressure on Natural Functions of Forests

Human Pressures

- Fodder
- Fuelwood
- Urbanization
- Timber
- Grazing
- Lopping
- Fruits, seeds

Natural Functions

- Forest
- Interception
- Soil protection
- Food for wildlife
- Regeneration
- Hydrology
- Habitat structuring
- Microclimate
- Biological diversity

Fig. 13
RECEDING NORTHERN LIMIT OF SUNDARBAN FOREST

REFERENCES
1770 - 1781
1781 - 1873
1873 - 1939
1945 - 1951
1951 - 1971
1999


Fig - 14
2002) The whole area was divided into several Lots and sold at a high price. These Lotdars were responsible for mass scale deforestation of the northern part of Sundarban (Fig. 14). But the scenario has changed and the Government is more responsible now in preserving forest resources. However, the forest with its vulnerable biotic condition is not considered to be safe by mere legislation and declaration of protected and reserve forest. The ever-growing poor needy population of the neighbourhood area as well as greedy poachers lead to the encroachment upon the enacted reserve area. Lucrative cost of timber and other forest resources is a temptation for these people. Local ecosystem people has limited job opportunity or limited scope of job diversification. They suffer from low or capital income and indebtedness. It is very difficult to control these people and tame the poachers. Even today the law-enforcing agency is not able to check the infiltration and encroachment.

3.2.4. Sustainable Development

The functioning of the forest production system amidst the alternative subsystems like agriculture is of vital importance from environmental point of view as well as for understanding the sustainability of the process of rural development. (Naskar, 2000)

The sustainable development of the total mangrove ecosystem is required in Sundarban. Human interference since the 18th century has been mainly of a destructive nature due to which much of the resource base has been lost. Optimization of the resources of a highly productive ecosystem or life sustaining silvi-agri-aquacultural complex is possible with the application of scientific knowledge coupled with socio-economic considerations.

3.3. Water Resources

The water resource of Sundarban can be divided according to the multifarious uses it is put to, mainly fishing, transportation, elaborate tourism promotion and also drinking water.
3.3.1. Fishing

Fish abound in nearly all the rivers and creeks of Sundarban. There are different varieties of edible fishes found here. Sundarban is a rich abode of several types of fishes, which survive in this unique ecological niche.

Several rivers, rivulets and creeks of Sundarban have tidal saline water, but along with it there is continuous flushing of sweet water, which sets up a unique environment for the fishes to survive. Way back in 1859 the Government of India introduced tax on fishing on all navigable water. This was abolished in the year 1868 (Mandal, et al. 1989). Thus the fishing right in Sundarban remained free.

3.3.1.1. Fishery and Livelihood

A major population in Sundarban is dependent on fishery for their livelihood. The economic condition of these people is precarious. However, the water resource has great potentiality for fishery. Demand of fishes from Calcutta and its suburbs has been of greater advantage to exploitation of fishery. Exporting prawns has recently been an advantage for quick returns.

3.3.1.2. Present Trend

It is observed that presently, there has been a trend towards collection of single species of bagda shrimp. They are as valuable as gold, because each tiny spawn would mean some extra earning, in an area where the scope of alternative employment is limited (Kanjilal, 2000). Thus the collection of spawns is more profitable than other varied species of fishes. This gradually has led to the loss of biodiversity due to emphasis on culture of single species. (Chosh, 1998)

3.3.2. Drinking Water Crisis

Problems regarding collection and distribution of potable water are of major concern to the people of Sundarban. The crisis is mainly due to the limited pockets of sources where sweet
water is available. People have to travel long distances to collect sweet water fit for the purpose of drinking.

3.3.3. Transport

Water route provide cheapest transport system within the rivers and creeks of Sundarban connecting the remote areas including the islands. People are mainly dependent on launches in the rivers and mechanized boats and local country boats in the narrow creeks. Over crowded boats and boats loaded with goods are common sights in the region.

3.3.4. Tourism

The Sundarban region has immense potential of water centric tourism through the provisions of sanctuary for the water loving birds, Crocodile Project, Ridley Turtle Project etc. Government of West Bengal has already floated two luxury streamers for the tourists with arrangement for food and lodging.

3.4. Land Resources

The entire Sundarban consist of a vast plain, gently sloping seaward. The deltaic alluvium of this land is most suitable for agriculture. Cultivation includes mainly paddy, however, presently other crops have also been introduced.

In northern portion of Sundarban much of the agricultural fields have been converted into 'bheris' for fish cum paddy cultivation. In the eastern portion impetus to poultry farming is observed. Cutting of forests and reclamation has led to the establishment of settlements.

3.4.1. Constraints of Land Utilization

There are several problems regarding the utilization of land in the Sundarban:
- Problem of improper drainage through the clayey soil of Sundarban to which land has a tendency to get water logged.

- Problem of embanking cultivated fields so as to prevent the salt-water to get into them. The embankments are too low to be of much use.

- Salinity of soil is often enhanced following strong tidal surge either in new moon or in full moon days. Breach in the embankment leads to disaster.

- Greater part of the agricultural field is cultivated by seasonal workers, who come from Medinipur and even from Bangladesh. They return home after sowing and transplanting rice. In a labour intensive production system, for any other field oriented activity especially immediately after any natural hazards like cyclone or flood, the cultivators feel distressed enough.

- Most of the farmers follow conventional method of agriculture. Consequently productivity of the crops is rather low. Small land holding size (about one and half acres on an average) of the agricultural farms are not profitable. Most of the people practicing land oriented production system are either landless labourers or marginal farmers. It is impossible for them to switchover from subsistence farming to commercial grain farming.

- Illiteracy, ignorance and lack of awareness are also reflected in mismanagement of the land. Many of them fail to understand the significance of proper dose of the agro chemicals.

- Experiment with sugar beet and cotton has failed in Sundarban. Beet was never popular among the farmers because of low demand in the domestic market. In absence of food processing units, industrial demand for such raw
materials was never created. Cotton is a glaring of crop failure. It was affected by diseases and pest attack presumably because of excessive moisture in the soil. Overcast sky inflicted blight on them.

- Non introduction of salt resisting variety of crops may be cited as a major reason of low productivity.

- A kind of conflict often emerges between the farmers and the fishermen. This often leaves to conversion of crop farms into fishing ponds (*bheri*). Social tension and rural politics roles round this conversion and reconversion of land. Long term affect of either on soil fertility or on the peaceful rural life is devastating.

- Migration takes place in Sundarban ceaselessly. Migrants settle in vested land and on the newly developed islands. In case of submergence of any low lying island they move to other safer places. These people have a tendency for deforestation and misutilization of land and other natural resources.

### 3.5. Observation

Nature has endowed the Sundarban region with vast natural resources. It occupies a special position amongst the forests of the world. The rapid depletion of forest due to the greed of mankind has kept very little hope for the future generation — because very few realize the need for preservation and conservation of this precious mangrove reserve. Over exploitation of the natural resources, large-scale conversion of natural habitat and unwise land use have led to the wastage of the productive areas. The earth, however, has an extraordinary capacity for restoration and regeneration.
3.6. Human Resource

For a long period, in the history of economic geography, human being was considered to be the consumer who will utilize the natural resource base and convert the potential into realized actual. Better the scientific knowledge and technical skill of a diligent optimum population of a country, greater would be the achievement of the society. Without intellect and labour it is impossible to utilize the natural resources and to produce or manufacture something through the process of resource conversion. Man is capable to rule the world, not only because he occupies to most position in the food chain, but also because of his ability to domesticate both plant and animal, to manufacture industrial product, to generate power and to mitigate hazards. He has opened new vistas of possibilities within the given frame determined by the nature. Thus in modern Economic Geography, healthy and intelligent human beings are also considered as resources.

3.6.1. Demographic Transition and Population Growth

Now the question is, how rich is the endowment of human resources in Sundarban region? Considering the fertility and mortality rates it is evident that like other places of West Bengal it is passing through the second or expanding phase of demographic transition characterized by high fertility rate and declining mortality rate. Obviously, natural growth rate is high, coupled with this accelerated rate of migration has lead to a kind of population explosion, thus pushing the forest south ward and obliterating the ideal man-land ratio.

In fact, growth rate of population in this deltaic part of West Bengal in the last century was always positive bearing the second decade of the last century when the region, along with the rest of West Bengal, suffered from the dreaded epidemic and famine. Otherwise, in all the decades growth rate was ranging between 8 to 34. Thanks to the indulgence given by the colonial rulers to migrate in this littoral track at the cost of forest. Immediately after the
DECADAL GROWTH OF POPULATION

Source: Census of India 2001 (Provisional)
partition of Bengal the region experienced sudden influx of refugees, which though slowed down within a decade, yet a steady flow of immigration continued for several decades thus pushing up the growth rate (Fig. 15). Even in the last decade growth rate was more than 15%.

3.6.2. Spatial Distribution and Density of Population, 2001

The Sundarban region shows a remarkable contrast in the spatial distribution of population. The different geo-ecological regions exhibit different human numbers attributed to the contrasting physical characteristics and ever-changing historical factors (Banerjee, 1998). From the figures of census 2001, it is clearly discernable that two-third of the total population of Sundarban region lives in the upper part having better infrastructure facilities. The lower part, on the contrary, with lesser accessibility supports the rest one-third.

In the year 2001, population density was highest, 1,738 per square kilometer, in Jaynagar I block having the solitary urban center of the entire region. Lowest density, 368 per square kilometer has been recorded in the isolated island of Sagar, situated in the south-western corner of the region touching the Bay of Bengal. (Fig. 16)

It is also evident that nowhere in Sundarban, with the exception of Jaynagar I block, density is more than 1200 per square kilometer. However, Haroa and Hasnabad blocks in Basirhat sub-divisions, Canning I and Jaynagar II blocks in Alipur Sadar sub-division, and Mathurapur I block in Diamond Harbour sub-division have exceeded the limit of one thousand per square kilometer. In rest of the areas, the density ranges between 615 and 974. In fact, the areas enjoying the facility of railway line have recorded high density of population. Conversely, the areas connected by other means of transport and suffering from several hazards, have recorded lower density of population. The areas studded with wetland and dependent on unmetalled road or water transport have recorded lower density. The landforms and creeks actually have posed as natural barrier to human habitation. Now, vital question emerges that
POPULATION DENSITY (2001)

REFERENCES
1401 – 1800
1001 – 1400
601 – 1000
201 – 600
Uninhabited Area


Fig - 16
this is a spatial pattern of density within the Sundarban region. Can the land of Sundarban, suffering from its inherent problem of salinity and other hazards support such a density of population?

3.6.3. Composition of Population

Since the block level data for composition of population in 2001 has not yet been published, the year 1991 has to be taken as the subject matter of consideration. Such a discussion on composition is important since it can be viewed as an active factor that determines or conditions population growth. For the present purpose, population composition can be subdivided into demographic and socio-economic contexts.

3.6.3.1. Demographic Composition

Age-sex structure and sex ratio are the two basic tools for analysis of the composition of population.

a. **Age-Sex Structure:** Like any third world country the age-sex structure of population has a pyramidal shape with wide base and narrow apex. This reveals that child mortality rate is high and life expectancy of the people is not very high. Erosion from the potential labour force, in all the age group between 16 to 60 has also been noticed.

b. **Sex Ratio:** The sex ratios of the different blocks of Sundarban reveals that the margin between the share of male and female population is lesser than that of West Bengal. While in 1991, the sex ratio for the State was only 917, it ranges between 932 (Mathurapur) and 963 (Canning) in Sundarban region, which is of course a healthy sign. Bose, (1991) and Premi, (1991) suggested that a steady rise in age of marriage is responsible for such higher ratio, where struggle for existence is tough enough. Gradual replacement of rural midwifery by modern medical facilities has lowered the
maternal mortality rate. In 2001, the sex ratio of West Bengal has been enhanced to 934 and it is expected that the blocks of Sundarban (for which data is still not available) will maintain their position.

### 3.6.3.2. Socio-Economic Composition

This is reflected by work participation rate, occupational structure, literacy rate and rural urban population composition.

a. **Work Participation Rate:** More than half of the people in Sundarban region were non-workers in 1991, while nearly 1% people were marginal workers (having job for not more than 181 days in a year). Other people were main workers. It is evident from the available data that dependency ratio is too high for the region. Young people are haunted by the problem of unemployment. Work participation rate among the women is low because of social taboo and conservative attitude of the rural people (Fig. 17a).

b. **Occupational Structure:** Most of the people in Sundarban region are engaged in agriculture, whether as cultivator or as landless agricultural labourer. Some people are engaged in livestock raring, forestry and fishing. Share of the workers engaged in manufacturing units and trade/commerce/transport are not very high. In fact such an occupational pattern reflects the land oriented production system and over dependence on the natural resources. (Fig. 17b)

c. **Literacy Rate:** Sundarban is an area where literacy rate is lower than the State average. While literacy rate for West Bengal was 57.70 percent in 1991, the same for backward districts of Sundarban region was ranging between 31.52 percent (Basanti) and 50.96 percent (Namkhana). Wide gap exists between male and female literacy. Though gross enrolment in the primary schools is rather high, incidence of drop out
WORK PARTICIPATION IN SUNDARBAN [1991]

INDEX
- Main worker
- Marginal worker
- Non worker

CATEGORIES OF MAIN WORKERS IN SUNDARBAN [1991]

INDEX
- Cultivators
- Agricultural labours
- Forestry & Fishing etc.
- Manufacturing, Servicing etc.
- Construction, Trade & Transport
- Other services

Fig. 17.a

--- 500,000 people

Fig. 17.b
also is very high. Poverty, accessibility and lack of educational opportunity are other factors responsible for such a state. Literacy campaign is very weak in this area.

d. **Rural-Urban Composition**: Sundarban has a solitary urban center in Jaynagar I block. Name of the center is Jaynagar-Majilpur, which is mainly a distribution and marketing center of the agricultural products. Obviously the urban population is negligible in the region, which is devoid of any major industry or administrative center.

3.7. Conclusion

It is interesting to note that none of the three sub-divisional offices (Alipur Sadar, Diamond Harbour and Basirhat) within whose jurisdiction this region belongs, are located here. It signifies how little importance is attached to this region by the powers that be. Illiterate rural people who live from hand to mouth are engaged in struggle for existence here. Most of these people are unemployable in organized sector because of their low level of education and skill. Naturally one may apprehend whether these people can be designated as ‘human resource’!

For the success of any developmental plan in Sundarban, adequate emphasis requires to be given on adult literacy, reduction in the gap between male and female literacy and control on school drop out. Creation of viable job opportunities for the people living below the poverty line is also a challenging task.

**Reference**


