Introduction

Forests play an important role in controlling the environment and are considered to be one of the most important natural and renewable resources for industry as well. In West Bengal, the forest area constitutes about 11,879 sq.km, which is about 13.38% of the total area. Jalpaiguri district possesses the second highest position being next to Midnapore, under forest in West Bengal, which is about 15.55% of the total forest coverage of West Bengal. The forest coverage of Jalpaiguri district consists of the most valuable "Sal Plant" considerably. According to world standard, the forest-man ratio is one person per hectare; in India it stands at 8 persons per hectare, and in West Bengal it stands at 50 persons per hectare. Here the closed forests are extended in the Himalayan Tarai belt and mostly in the Dooars area in Jalpaiguri district. The actual forest area comes far short through the satellite imageries and the reduction of the area may be attributed to the fact that the small patches of forest areas in Southern districts are not reflected through satellite imageries. The coverage of tea gardens is also included as forest areas. The all India average forest cover is 23%. The position of West Bengal forest coverage appears to be more glaring when compared with the figure of 33% forest as adopted in the National Forest Policy. The per capita forest area of West Bengal is only 0.02 hectare against All India average of 0.12 hectare. Actually the Forest
cover of West Bengal occurs in the mountainous and Sub-Himalayan region of North Bengal in the catchment areas of the river Tista along with its tributaries - Jaldhaka, Torsa, Chel, Neora Nuddy, Lish, Ghish.

**Forest Denudation**

The forests in the northern part of West Bengal are confined to two districts, viz. Darjeeling and Jalpaiguri. The areas covered by forest in Darjeeling and Jalpaiguri district are 2,994 sq.km. and 2128 sq. km, respectively. These forests are directly managed by the forest department of which some parts are leased out to the West Bengal Forest Development Corporation Limited. These are the most valuable and productive forests of West Bengal. Annual timber production happens to be 1,25,000.0 m³. The forests in the foothills of Darjeeling and Jalpaiguri district abound a number of many valuable species like Sal, Teak, Gamar, Champ, Chikressi, Sissoo, Pakasaj, Panisej, etc. The handsome amount of revenue received from these forests has been steadily increasing over the years. From 1970-80 to 1980-85 the revenue receipts rose from ₹667.0 lakhs to ₹2300.0 lakhs (Fig.14). The recent problems of increasing vandalism and determined efforts to plunder these valuable forests can be attributed to the following factors:-

a) An alarming rise in the population of these two districts mainly because of influx of refugees and settlers from the neighbouring countries like Bangladesh, Nepal, Bhutan, Assam etc. Over the last thirty years or more, they encroach...
upon lands for their basic needs of raising crops, and to have fuel and fodder.

b) The existence of a large number of unemployed or under-employed people living around the fringe areas of the forests or adjoining rural and some urban areas. The situation has further worsened because of the unrealised aspirations of a large number of educated youths living in these areas.

c) The ever increasing price of timber and the ready marketability of these produce is the main attraction to a large number of unscrupulous financiers owning sawmills, plywood factories and veneering units to operate through the chain of unemployed educated youths in rural and urban areas and economically backward communities living in the fringe areas.

d) Over exploitation of forests for the requirement of industrial raw materials, railway sleepers, timber for normal use, military equipments and for arms and non-industrial uses.

e) Jalpaiguri district is bounded by the State of Assam, and foreign countries, like Bhutan and Bangladesh; the boundaries are quite long; and there are extensive interdispersed boundaries in between forest and a large number of tea gardens. These tea gardens have a significant number of unemployed labourers. These unemployed people become
Riverain Forest of Buxa

Forest Inspection Bungalow
involved in the illicit removable either to earn a living or to raise the levels of income of the families to which they belong.

(f) The Indian Forest Act 1927 is the causative factor for the organised criminals to avoid crimes by the gentle provisions under the IPC and to opt in favour of the crimes under the IFA, 1927. This vandalism is not confined to forest trees - indiscriminate killing of the denizens of these areas are also take place. Rhino - an endangered species has been a victim of the poachers in Jaldapara and Gorumara sanctuaries of Jalpaiguri. During the last three years 10 cases of such killing took place.

**Forest Species**

The forests by and large are coppiced- Sal forests which are worked under the simple coppice system of clear felling and coppice regeneration. Large scale plantations of quick growing variety species are undertaken in different five year plans. Eucalyptus, Ashmoni and Minjiri plants have been raised for the cover of the denuded and barren areas. The young sal coppice shoots and the plantations have immensely suffered because of the onslaught by hundred and thousand of intruders carrying away head-loads of coppice shoots or young saplings and pods from the plantations for the sake of their living.
### Table 23: Forest Area in West Bengal under Encroachment

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>Reserved forest</th>
<th>Other forest</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Darjeeling</td>
<td>11.13</td>
<td>1200.63</td>
<td>1211.76</td>
</tr>
<tr>
<td>2. Jalpaiguri</td>
<td>245.49</td>
<td>711.90</td>
<td>957.39</td>
</tr>
<tr>
<td>3. Cooch Behar</td>
<td>61.79</td>
<td>788.93</td>
<td>850.72</td>
</tr>
<tr>
<td>4. Murshidabad</td>
<td>-</td>
<td>32.00</td>
<td>32.00</td>
</tr>
<tr>
<td>5. Malda</td>
<td>20.00</td>
<td>-</td>
<td>20.00</td>
</tr>
<tr>
<td>6. West Dinajpur</td>
<td>-</td>
<td>41.16</td>
<td>41.16</td>
</tr>
<tr>
<td>7. Birbhum</td>
<td>16.00</td>
<td>0.68</td>
<td>16.68</td>
</tr>
<tr>
<td>8. Purulia</td>
<td>126.40</td>
<td>3541.60</td>
<td>3668.00</td>
</tr>
<tr>
<td>9. Midnapore</td>
<td>301.08</td>
<td>3480.20</td>
<td>3781.28</td>
</tr>
<tr>
<td>10. Bankura</td>
<td>-</td>
<td>3478.51</td>
<td>3478.51</td>
</tr>
<tr>
<td>11. Bardhaman</td>
<td>-</td>
<td>215.10</td>
<td>215.10</td>
</tr>
<tr>
<td>12. Hugly</td>
<td>2.15</td>
<td>-</td>
<td>2.15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>784.04</strong></td>
<td><strong>13490.71</strong></td>
<td><strong>14274.75</strong></td>
</tr>
</tbody>
</table>

### Forest Divisions of Jalpaiguri

There are 4 (four) Forest Divisions within the district. Actual Forest area of "Cooch Behar" district falls under the district. The Forest Divisions are as follows:

1) Jalpaiguri Forest division with an area of 388 sq.km.
2) Buxa encompassing an area of 734 sq.km.
3) Baikunthapur possessing an area of 276 sq.km. (Fig. 14.)
4) Cooch Behar having an area of 432 sq.km.

The forest of this district can be called Moist Tropical Forests. The best quality of Sal is found in Jalpaiguri forest division in India. The concentration of Sal forest in Jalpaiguri division is maximum about 90%, while Buxa divisions consists of 60-75% of Sal forest.
FOREST DIVISION OF JALPAIGURI

REFERENCE

- Scrub & Grass
- Arable
- Forest

BAIKUNTHAPUR DIVISION
JALPAIGURI DIVISION
COOCHBEHAR DIVISION
Rajabhat Khawa
Jaldapara
BUXA DIVISION

8 0 8 16 Miles

N
Classification of Forests

The forest of this region is classified into four types viz. (a) Riverain Forest (b) Plain forest (c) Hill forest (d) Savanna forest.

(a) Riverain Forest: This type of forest grows on freshly deposited sand and silt on river beds, thus mainly comprise of Khair, Sissoo, and various other species. Gradually this Riverain forest gets merged with the mixed and Sal Forests.

(b) Plain forest: The forest in the plains comprises of several distinct types such as scattered sal, wet mixed forests, dry mixed type etc. North Bengal Tropical Evergreen forests are situated close to the streams and moist pockets of these plains.

(c) Hill Forests occupy the hilly portion of the district. Hill area comprises only 2% of the total area of the district.

(d) Savannah forests are comprised of tall grass which are found in wide patches in Jaldapara and Garumara Sanctuary. Due to enforcement of Fire Protection Act, this Savannah forest now occupies a smaller area than before.

The total area under forest consists of 1847 sq.km. which is about 28.75% of the district as mentioned above. These forests are inhabited by 21,260 persons living within 77 forest villages; of the total forest population 91% is tribal and 9%
non-tribal. The average density of forest areas happens to be 11% per sq.km.

Table No. 24 Forest Population and Area of Jalpaiguri

<table>
<thead>
<tr>
<th>Divn. Area in Sq.km.</th>
<th>Forest Tribal Population</th>
<th>Non-Tribal Population</th>
<th>Forest Villages</th>
<th>School</th>
<th>Density per Sq.km.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bai-kuntha pur</td>
<td>1250</td>
<td>1250</td>
<td>-</td>
<td>4</td>
<td>4.53</td>
</tr>
<tr>
<td>2. Jal-palaguri</td>
<td>4231</td>
<td>3388</td>
<td>843</td>
<td>25</td>
<td>10.68</td>
</tr>
<tr>
<td>3. Buxa</td>
<td>9274</td>
<td>8532</td>
<td>742</td>
<td>30</td>
<td>12.48</td>
</tr>
<tr>
<td>4. Cooch Behar</td>
<td>6509</td>
<td>6268</td>
<td>241</td>
<td>18</td>
<td>15.07</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1847</strong></td>
<td><strong>19438</strong></td>
<td><strong>1826</strong></td>
<td><strong>77</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

Source: Forest statistics 1984 Govt. of West Bengal.

Apart from this, 15% of the total working force is engaged in forest based industries and other allied forest services.

Forest based industries

Considering the availability of the resources the existing and possible wood-based industries could be developed further.

Existing wood-based industries
1) Plywood (a) Tea chest plywood (b) Commercial plywood
2) Black Board
3) Veener and Splint (4) Tea Chest Battens
5) Saw wood Industries
6) Furniture 7) Railway Sleeper

Possible industries
1) Sal seed oil factory
2) Rope and Straw board factory
3) Oxalic Acid from saw dust etc.

Plywood

The plywood factory in Jalpaiguri is well organised having 12 registered units in operation, producing an estimated production of 19,000 cubic metres of which 38% is tea chest plywood and the balance 62% being commercial plywood. Moreover Saw Mills manufacturing plywood veneer feed the plywood factories. These plywood manufacturing units come within the fold of Small Scale Industries because of their capital investment structure. The employment of persons vary with the capital investments in the manufacturing units. Commercial manufacturing units having fixed capital investments to the extent of 30 lakhs generate employment of 75 persons and with an investment of less than 30 lakhs provide employment to an average of 40 persons. The scope and development in commercial manufacturing units are quite fair because it is an exportable item.

It may be mentioned here that the registered units are also producing tea chest plywood which feed the growing demand for packaging in the gardens located all over the district.
The average annual production of tea in West Bengal happens to be 144.6 million kgs. which requires about 34 lakhs tea chests for packing, (standard size, i.e. 46 cm x 46 cm x 60 cm of 4 mm thickness tea chest contains about 42.5 kg. tea). The estimated consumption of plywood is 44,000 cm for production of 34 lakhs tea chests.

Table No.25 Estimated requirement of Plywood in 2000 A.D.

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Domestic consumption (M.kg)</th>
<th>Export (M.kg)</th>
<th>Anticipated Estimated requirement of plywood of tea chest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990 AD</td>
<td>170</td>
<td>85</td>
<td>85</td>
<td>34</td>
</tr>
<tr>
<td>2000 AD</td>
<td>264</td>
<td>132</td>
<td>132</td>
<td>47</td>
</tr>
</tbody>
</table>

Source: Forest Survey of India.

Based on the Survey Report on tea chest plywood industry in West Bengal there are about 66 plywood factories operating within the state, out of which 12 are situated in Jalpaiguri District.

Supply of basic raw material, i.e. timber is made available through local contractors. The provision of Govt. supply of raw materials is limited to a few large factories. The North Bengal units get the supply of their requirements of timber from Bhutan, Nepal, Assam, Bihar and North Bengal itself. The plywood units in Calcutta mainly depend on the adjoining rural
areas and also from Bihar, Arunachal Pradesh, Assam and Andaman and Nicobar islands. As the supplies from other States have been drastically restricted, the plywood industry is in worst possible crisis at present.

The annual supply of tea chest plywood from the forests of West Bengal constitutes about 24% of the total requirement of tea chest industries in the State.

Table No.26 Division-wise outturn of Plywood in North Bengal

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Outturn of Plywood in cubic metres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1980-81</td>
</tr>
<tr>
<td>1. Kurseong</td>
<td>5317</td>
</tr>
<tr>
<td>2. Jalpaiguri</td>
<td>5724</td>
</tr>
<tr>
<td>3. Cooch Behar</td>
<td>1236</td>
</tr>
<tr>
<td>4. Boxa</td>
<td>5360</td>
</tr>
<tr>
<td>5. Baikunthapur</td>
<td>129</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>17766</strong></td>
</tr>
</tbody>
</table>


Forest Development Corporation

The Forest Development Corporation, West Bengal, has indulged in diversified activities within a span of 11 years of its existence. It has given special attention to the production of Khair which is grown in the adjacent areas of saw mills, situated in Madarihat of Jalpaiguri District. The Khair produced in this area is of high quality but price-wise cheaper.
The Alokydyog Plywood Industry under the Forest Development Corporation has started making profits and the different industries such as Saw Mills, Wood production, furniture factories established in Salt Lake area in Calcutta, Chemical treatment plant at Siliguri Citronella Oil extraction units in Jalpaiguri under the Control and management of West Bengal Forest Development Corporation, are making appreciable progress, and the sale proceeds of these products have touched more than 7 crores of rupees, which were 85 lakhs only during initial period. The Forest Corporation has all the credit to introduce "Seasoning Plant" operated by Solar Energy in North Bengal. This system does not require running expenses. The water contents in the logs are dried up with the help of Solar Energy which was previously done by Boilers using fuel. The introduction of Solar Energy has saved considerable amount of money on account of fuel. The Central Govt. is also giving financial assistance to the Corporation for setting up seasoning plant with the aid of Solar Energy. There are 3 units of seasoning plants, in North Bengal.

Alokydyog Vanaspati and Plywood Limited under the control of West Bengal Development Corporation with an installed capacity of 11.16 lakhs of standard sq. meters of plywood, so far produced 9,00,000 lakhs standard sq. mtr. of plywood, obtaining raw materials mainly from Jalpaiguri forest areas which constitute about 83%.
Table No. 27 The Tea Chest Plywood Timber Produced in Jalpaiguri

Allotted to Plywood factories of Jalpaiguri from Northern Circle, West Bengal.

During 1980-81 to 1984-85

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Premier Timber &amp; Ply-products</td>
<td>2200</td>
<td>2200</td>
<td>2400</td>
<td>2300</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td>2. Sevoke Plywood Industries</td>
<td>900</td>
<td>1100</td>
<td>1900</td>
<td>1700</td>
<td>2100</td>
<td>2100</td>
</tr>
<tr>
<td>3. North Bengal Plywood Indusries</td>
<td>800</td>
<td>900</td>
<td>1086</td>
<td>1100</td>
<td>1300</td>
<td>-</td>
</tr>
<tr>
<td>4. Calcutta Plywood Co.</td>
<td>800</td>
<td>1000</td>
<td>1205</td>
<td>1200</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Madarihat Veneer Industries</td>
<td>800</td>
<td>600</td>
<td>-</td>
<td>-</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td>6. Sorcar Enterprise</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>600</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td>7. A.K. Chatterjees &amp; Bros.</td>
<td>400</td>
<td>300</td>
<td>509</td>
<td>-</td>
<td>700</td>
<td>-</td>
</tr>
<tr>
<td>8. Dosmit Company</td>
<td>300</td>
<td>400</td>
<td>100</td>
<td>-</td>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>9. Sonar Bengal Ply, Mfg. Co.</td>
<td>-</td>
<td>-</td>
<td>7908</td>
<td>-</td>
<td>400</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Compiled from West Bengal Forest Statistics 1983.
The main problem of plywood industry is the procurement of raw materials which is plywood species timber. The timber is normally sold in auction. Necessary action should be taken by the forest department and forest development corporation to supply timber to the registered units of the region so that the entrepreneurs are attracted to open up such units. Regular supply of power is another factor to reckon with and should be considered by the district authorities.

Saw Mill

There are about 80 saw mills operating in the district. Due to proximity of the raw materials, the saw mills are concentrated in particular place. The capital structure of each saw mill has a fixed investment on an average, of Rs. 70,000/- with an employment of 15 heads. The by-product of these Mills is saw-dust which can be utilised as raw material to some other industries. Shortage in supply of raw materials further restricts the setting up of new mills. The department concerned is not able to supply and to feed the rated capacity of all the Mills within the district. Consequent upon the availability of wood, a good number of wooden furniture making units have been established and evenly distributed in the district. The fixed Capital investments vary from 10 to 15 thousand giving an average employment to 5 to 7 persons. The wood furniture factories are running in a very orthodox process. To develop these wood crafts and furniture units, more working capital is necessary. Local artisans are available in plenty.
Prospective Industries

Due to rapid industrialisation, the demand for packaging products is also growing fastly. The package materials used are mainly paper products like grey boards, card boards, polythene sheets and films, mill boards are considered superior as packing materials. The supply of packing materials could not keep pace with the growing demand of expanding market. Consequently, certain varieties of board are being imported from abroad even now. Existing manufacturing units, however, attempted to supply Mill Boards. These units mainly rely on waste papers, cotton etc. as basic raw materials, but the raw materials are not adequate to run these units. Alternatively, suitable raw materials are found out for manufacturing grey boards.

Straw Board

The district abounds in different varieties of straw and grass. Paddy straw amounts to thousands of quintals per year. Grass and other riverain weeds like, Nalkhagra, Sar, Kashiya, Hogla etc. can also be used as raw materials for grey boards. These natural resources are at present not put to any gainful utilisation.

Apart from raw materials available in plenty in Jalpaiguri District, the other factors to be reckoned with in this connection is the vast market potential existing in North East India comprising of North Bengal, Assam, Tripura,
Manipur, Nagaland etc. along with the neighbouring states of Nepal, Bhutan and Sikkim which have no such industry to cater to their needs of grey boards. The total demands of these areas have been estimated at around 3000 tonnes of grey board per year by local dealers. This huge demand is presently met from Calcutta and Southern India.

In the present context of the above mentioned market situation, one straw board manufacturing unit can be set up to cater to the needs of North East India partially. The prospective unit would require an investment of Rs. 7 lakhs in plant, machinery and equipment, with a capacity to manufacture 4 to 5 tonnes of grey boards per 3 shifts from paddy straw. It would need working capital of Rs. 70,000/- approximately per month. The employment potential of this unit will be 170 persons.

**Oxalic Acid from Saw Dust**

Oxalic acid is one of the important chemicals for Textile industries and for metal polishing. It is used for other purposes also. In our country oxalic acid is being prepared from Sugar by some big industries, but as the sugar is a costly material some other cheaper raw materials have been sought for the manufacture of this acid. The search has led to the development of a new process which uses saw dust as a raw material instead of costly sugar. The unique characteristics of the new process is the utilisation of saw dust which is available in plenty in the country. Moreover
saw dust is much more cheaper than sugar. Consequently, the price of oxalic acid will be lower. It can effectively meet the internal demand and as a cheaper commodity, it can possibly have an excellent foreign market. The approximate requirement of oxalic acid in India is estimated at 400 tonnes. As saw dust is regarded as the main input in this new process, it hardly needs any emphasis that Jalpaiguri will be one of the best locations for this industry, where saw dust is available in plenty. There are about 69 saw mills in the district which are evenly distributed. The largest concentration, of saw mills, about 13 in number is found in Lataguri alone. The total annual output of these saw mills are estimated approximately at 3600 tonnes. The prospective unit, for manufacturing oxalic acid will require only 188 tonnes of saw dust per year. The cost of the plant and machinery is estimated around 1.85 lakhs and the unit will have an employment potential of 10 persons and the ideal situation of the unit will be at Jalpaiguri town on the highway.

**Match Box Making**

The match sticks and the sheet of timber used in the manufacture of boxes are known as "Splints" and "Veneers" respectively are the important raw materials for the manufacture of "Safety Matches" - industries. The rich forests of Jalpaiguri produce a lot of soft wood which remains unutilised for any industrial purpose. They are presently consumed by two existing plywood units in the district.
Match boxes are widely used article in every household and have a steady demand in the market. This steady demand and the availability of "Splints" and "Veneers" in abundance should encourage the setting up of a few "Safety Match" manufacturing unit in the district. The unit may initially manufacture match boxes only and send them to Siliguri Match making factory for dipping. The production capacity of this unit may be kept at manufacturing 100 boxes per day and which will require an investment of Rs. 15,300/- as per plant and machinery and Rs. 3100/- as working capital per month. It will afford an employment opportunity to 8 persons.

Citronella Oil

Towards and of 1985, a citronella oil fractionation unit of the West Bengal Pharmaceutical and Phytochemical Development Corporation (WBPPDC) has been set up at Telepara in Jalpaiguri District. Citronella Oil which is the raw material for the unit is procured from the surrounding states, mainly Assam. Essence is being extracted from the oil at this unit for the purpose of export which is used in perfume. The capacity of the unit is 12 tonnes. This unit may be expanded in future to include production of ápecac and diaseoria. Economics of this crop can be explained below.

The cost for the creation of citronella grass its maintenance, distillation and depreciation of the plant including overhead expenses will be Rs. 30,000/-. The yield rate of citronella oil per hectare is around 450 to 470 kg. in 4(four)
Buxa Forest - Sal

Savannah Forest in Dooars.
years. The average selling rate is approximately Rs. 85 per kg. The income is estimated at Rs. 38,250 (450 x 85). The total profitability will work out to be Rs. 8250 in four years which shows a net gain of Rs. 2187/- per year per hectare. It will create employment capacity of 500 man days per hectare per year.

**Phytochemical Industry**

The West Bengal Pharmaceutical and Phytochemical Development Corporation (WBPPDC) plans to set up a large Phytochemical complex in North Bengal in collaboration with USSR. The West Bengal Government had discussed the project with the Soviets and the project report is being drawn up. North Bengal (Jalpaiguri) has good prospects for such a project as the medicinal herbs and plants are available in plenty in these areas. With the raw material available in and around Jalpaiguri forest area, the setting up of phytochemical Industry is really bright here which will give a boost for developing the under developed area with potential for employment.

**Sal Seed Oil**

Sal Oil seed of forest origin is one of the species found in West Bengal, in abundance. The production of Sal seeds depends largely on area and density of the crop and periodicity of seeding. The production of actual sal seeds fluctuate very much so it is difficult to predict as to when the good seed year occurs. It may be taken that good seed year occurs once in three years. There was no commercial demand of Sal seed prior to
1973. The actual collection of Sal seed dates back 1973 only. As regards productive areas under Sal seed in this state, it may be mentioned that about 1,33,400 hectares may be taken as productive areas divided into 42,000 hectares in Northern circle and 91,000 hectares in Western Circle. A sample survey was conducted in 1979 regarding the yield of sal seeds per hectare in this state and the following figures emerge:

- **Northern Circle** - 152 kilograms per hectare.
- **Western Circle** - 91 "  "  "

As such total potential yield of Sal seeds in this state may be taken as 11,176.8 tonnes. There is a significant gap between actual collection and potential collection because of the lack of infrastructural facilities for the collection of seeds. The collection of seeds are done through large sized multipurpose co-operative society. But the collection depends upon the individual capacities of LAMPS and as this organisation could not be set up at every place of collection, the actual collection fall short of the expected potential collection.

Sal seed oil has been earning foreign exchange regularly since 1974-75. This oil is used as a substitute for "Cocoa butter" as an extender of chocolate making. The oil content of Sal seed varies between 9 to 12%. Chocolate making industry is fast becoming popular in our country and it has the potential of further expansion. Previously this oil was imported from
Brazil and for which the country had to spend large amount of foreign exchange. But the situation has been reversed now. India earned ₹3.5 crores of foreign exchange during 1977-78 by exporting 27,28,365 kg. of oil and Japan was the major importer country.

If the potential collection as mentioned earlier, is properly tapped in North Bengal and the manufacturing units set up for the extraction of oil, it will not only meet the growing domestic demand but also have sufficient exportable surplus which will earn the country valuable foreign exchange. It will also generate employment opportunities for the rural people from collection stage to storage it will require substantial number of people to be employed.

Fuel Wood

This is a forest product and its immense importance in our country specially in rural areas can-not be ignored. The fuel wood which is the traditional renewable resource is widely used amongst all the non-commercial energy consumed in our country. The share of fuel wood consumption is 77.10% compared to 14.97% of agriculture wastes, 7.48% of dung cake and 0.45% of bio-gas.

In West Bengal fuelwood also dominates in the total energy consumption accounting 41.97% followed by 40.06% of soft cake and coal briquette, 8.15% of agricultural waste, 4.07% of dung cake, 3.63% of Kerosene for cooking, 1.87% of LPG and 0.25% of bio-gas.
Wood Balance Study

The World Bank has reported and recommended to carry out a wood balance study in West Bengal in 1982. World Bank felt the necessity to carry out a study in West Bengal and assisited.

"We recommend that a wood balance study be carried out to determine the consumption and availability of fuelwood and other forest based products...."

World Bank had again made enquiry in their report in 1983 and reasserted that - "In order to properly plan and implement the project it is essential that more accurate information is made available to establish present and future demand and supply of forest products...."

The following action about wood balance study thus taken up in the State of West Bengal, by the statistical cell of forest Directorate. The whole state was divided into Rural and Urban Sectors. Samples were drawn both from the rural (2%) and urban (5%) list of households in villages and urban blocks were obtained from the 1981 census. Information on supply of wood and wood products were obtained from forest divisions.

In Jalpaiguri district, the wood balance study has been conducted in the 15 rural areas located within 8 police stations viz. Jalpaiguri, Metiali, Maynaguri, Mal, Alipurduar, Dhupguri, Kalchini and Madarihat and also in the urban areas both municipal and non-municipal blocks (Fig 15.).
The outcome of the survey reveals that the consumption of wood fuel and other fuels of the district as stated below in the table.

Table No.28 Annual consumption of fuel in Jalpaiguri District.

<table>
<thead>
<tr>
<th>Sector and type of consumption</th>
<th>Fuel wood (0.000 U.M)</th>
<th>Agricultural and coal waste (0.000 kg)</th>
<th>Soft Coke Kerosene (0.000 kg)</th>
<th>LPG (m.t.)</th>
<th>No. of Gas consumed</th>
<th>Gas consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1159</td>
<td>204661</td>
<td>255348</td>
<td>1761</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>92</td>
<td>2422</td>
<td>41378</td>
<td>2761</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural per capita</td>
<td>0.57</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1251</td>
<td>207083</td>
<td>296726</td>
<td>4522</td>
<td>3912</td>
<td>302</td>
</tr>
<tr>
<td>Urban per capita</td>
<td>0.236</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District per capita</td>
<td>0.519</td>
<td>85.87</td>
<td>12307</td>
<td>1.87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Beside these Bio-gas plants are also in operation. The total number of Bio-gas plants are 225 with an annual production of gas of 4,13,910 cubic meter, consumption of wet cow-dung is 11,187 kgs.

Wildlife sanctuary and tourism

Wildlife sanctuary is an excellent base for tourism industry. The fauna is best seen in the wildlife sanctuaries of Jalpaiguri district. There are three wildlife sanctuaries situated within the district Jaldapara, Gorumara and Chapramari Wild Life sanctuary.
Jaldapara Wild Life Sanctuary

Jaldapara located in the Cooch Behar division of forest of Jalpaiguri district. The sanctuary is famous for its wild life Jaldapara was made for preserving the famous Indian one horned 'Rhino' which inhabited the Savannah forests. Among various other wild animals Elephant, Tiger, Leopard, Wild Boar, Chital, Gaur, Barking Deer, Spotted Deer, and Wamp Deer, Pig, Sloth Bear, Wild Cows and various kinds of reptiles, Birds and fishes are found in plenty. The total area encompasses 115.53 sq.km.

This sanctuary was declared a "Game sanctuary" in 1940 and the Jaldapara game sanctuary range was created in 1954 with headquarters at Jaldapara. Before 1961 this sanctuary was a part of Buxa Forest Division, the name was altered to Jaldapara wild life sanctuary during 1959.

The pressure of tourist is maximum in this sanctuary. There are two Tourist lodges, one is Madarihat Tourist Lodge and the other is Hollong Forest Lodge. Madarihat Tourist Lodge is located few steps apart from National highway 31 and it is 100 km away from Bagdogra airport. Hollong Forest Lodge is also situated within Jaldapara wild life sanctuary in Madarihat police station. About 5,000 visitors stayed in these two tourist bungalows during 1984.

Gorumara Wild Life Sanctuary

This sanctuary covers an area of 8.52 sq. km. It is situated near chalsa railway station, on the North-Eastern Frontier Railway. This sanctuary also abounds in
wild animals like Jaldapara. It was declared a wild life sanctuary in 1949. The area covered comprises of lower Tandoo, Upper Tandoo and Diana Forest ranges, (Fig.16).

Chapramari wild life sanctuary

This sanctuary covering an area of 9.60 sq.km. area having situated near Chalsa railway stations. It has got the same type of wild life species that are found in the other two sanctuaries. It was declared to a sanctuary in 1941. The area extended over part of Upper Tandoo Forest range.

The most impressive forests are between the Dima and the Jainti and between the Jainti and the Sankos river of the district. These reserved forests are found with all their magnificence with small patches of cultivated lands and forest villages in between. The actual beauty of the forests in Doobears is found from the places like Buxa and Sinchula and the Sachaphu, stretching right upto Mahakal. The most attractive portions of forests of Jalpaiguri are Chapramari, Garumara and Moraghat forests west of the Torsa, the Nilpara and Chilapata - Manabari forests between the Torsa and the Dima, and the forest stretches between Dima and Sankos on and the Jainti and Sachaphu forests. A splendid view of the Sal, Champ and Cider forests about 70 feet high in average can be seen on the both side of Alipur Buxa road.

Tourism

Besides, Madarihat Tourist Lodge and Hollong Forest Lodge there are another Forest Bungalow and rest
Chilapata - Moist Deciduous Forest

Chapramari Forest
houses had been set up to attract tourists to visit these areas. They are Baradabri Forest Bungalow, 5 km away from Hasimara in Kalchini, Baradabri Youth Hostel is also situated in the same place. Nilpara Forest Bungalow is situated amidst a number of tea gardens and is famous for their scenic beauty. Phuntsholing town in Bhutan is also near for sightseeing. Jaldapara wildlife sanctuary is also approachable by road. Another attraction is Chapramari Forest Bungalow in Chalsa. A thick forest surrounds the Bungalow. Bisons, elephant herds, and rhinos can be seen regularly at the salt lick. Rhinos appear at the salt lick occasionally.

It may be mentioned here that in 1885 Government Forest Act had been passed by the then Governor General of India in council to provide for the management and preservation of Government forests. For better management and preservation of Government forests, rules were made in 1871 by the Government and was enacted in the lower provinces of Bengal. "The Indian Forest Act came into force in 1878. In this Act wild animals, skins, tusks, horns, bones and all other parts or produce of animals when found in or brought from a forest were considered to be forest produce. In Bengal, rules were framed in 1915 to regulate hunting, shooting and fishing within reserved and protected forests within the compass of the Indian Forest Act, 1878. The rules prohibited hunting, shooting, trapping or fishing in forests meant to be wildlife sanctuaries and thus the extinction of any species were guarded against."
The rules also provided for permits for shooting etc. in some forests in certain specified periods of the year.

The Elephant Preservation Act was passed in 1879 and Bengal amended this Act in 1932 by enacting the Elephant Preservation Act, 1932, to provide for destruction of elephants gone wild and thus endangering life and property. Bengal Rhinoceros Preservation Act was also passed in 1932.

The wild life protection Act was again amended in 1972.

**Elephant depredation**

As the pressure of growing population encroaching forest areas, vis-a-vis the wild animals are also coming out of their wild territories. The best example of this is the case of intrusion of elephants in the tea gardens and killing of human beings and the consequent destruction of property is a great matter of concern of the people living here. The number of elephants has increased considerably. Herds of elephants entered into the tea gardens situated close to these forest areas, and kill several tea garden workers, damaged the labour houses, irrigation equipments and even plantation. The wild elephants made havoc in the gardens of Dooars. The affected gardens are Kalchini, Dima, Bhatpara, Satali, Oodlabari, Manabari and other estates. This incurred huge losses due to the damages done to the Plantation and labour houses. The Elephants depredation has become a menace in Dooars. There is a wild life squad in
Mal who attends call for help to drive away the wild elephants. But it is quite difficult for this squad to cover such a vast area Dooars.

**Conclusion**

The forests in Jalpaiguri Division have a tremendous influence upon the economy of Jalpaiguri District in maintaining the ecological balance, the growth of industries based on forest products, the employment potential, development of wild life sanctuaries and tourism and above all the development and growth of the most organised industry, 'tea' by supplying timber for tea chests and the wood fuel for the workers employed in the industry.
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