

CHAPTER - II THE FORESTS

COMPOSITION & CONDITION OF THE CROP

Among the different factors responsible for the determination of the composition and condition of the forests of Chatra North Division, human interference has played an extremely influential part. It is the single factor which has considerably affected the existing vegetation of this division, since the last fifty years. It is true that climate, topographical and edaphic conditions also played their part, but their role was subordinate to the biotic factor. Prior to the assumption of the control of these forests by the Forest Department in 1947 under section 29 (provision) of Bihar Private Forest Act, all the forest of Chatra Sub-division were being grossly mismanaged by the private owners due to lack of technical knowledge. The appreciation of the value of forests as a national asset was also lacking at the time. More over these forests were supporting rights of different natures of the raiyats. The combined affect of this resulted in continuous maltreatment and over exploitation of the crop for a long period.

The gradual reduction in the quality and extent of the forest property due to the reasons stated above will be evident from the following figures. During the survey and settlement of 1917, forests were recorded in as many as 1475 villages of Chatra sub-division. During 1947 however at the time of demarcation under the B.P.F. Act, forest could be found in only 1170 villages. Thus 305 villages i.e. 21% of the total were fully divested of their forest area during a period of 30 years, prior to the assumption of control and management by the Forest Department. Again out of total area of 1082 sq. miles (2802.37 sq. km.) of forest notified under section 15 (3) of the B.P.F. Act, only 899 sq. miles (2328.40 sq. km.) of forests could be demarcated. Thus 183 sq. miles (473.96 sq. km.) of forests i.e. 17% of the notified area also disappeared. The rate of destruction was found to be very alarming. The destruction was further accelerated due to increase in the growth of population and consequent rise in the demand for wood and wood products.

The forests of Chatra North Division conform broadly to Champion and Seth's sub group 5-B, namely, Northern Tropical Dry Deciduous Forests.

According to revised Forest Types of India by Champion and Seth (1964) they fall in the following types :-

Sub Type	Type no.
1. Dry peninsular Sal	5B/C 1c
2. Northern Dry mixed deciduous forest	5B/C 1
3. Dry deciduous scrub forest	5B/DS 1
4. Boswellia forest	5B/E ₂

Coming to details however it will be best to describe the forest by parts since the plan covers several classes of forest which are wildly different from one other in quality and composition.

In this locality, next to biotic factor, aspect shows its great effect in deciding the composition of the crop. Northern aspects generally support sal where as miscellaneous crops occupy the southern and hotter aspect.

In general the forests of this division exhibit the following characteristic features. In the climax from the upper canopy of the crop is light which is fairly even, but in other forms broken canopy is usual. The trees have relatively short boles and poor form. The height is rarely more than 45'-50' (15.17m) and often it is less. Deciduous trees form the entire canopy. Usually there is a thin shrubby under growth, which includes some of the evergreen xerophytic species like *Carassa opeca*. One of the noticeable features of these forests is the total leafless-ness with fully exposed soil conditions during summer and appearance of luxuriant leaves during monsoon. This creates a sharp contrast in the general out look of the forests between these two seasons. Only one species of bamboo namely *Dendrocalamus strictus* is found to occur in the division, but it is an important feature in some of the sub-type. This species too remains leafless during summer.

Adverse biotic factors of the past such as complete clearance, over grazing and fire induced soil erosion. This resulted in the reduction of soil depth and moisture. The conditions created in this way were unsuitable for the survival of the superior stock, and favoured scrub vegetation which ousted the former crop. Localised patches of dry tropical serial

type vegetation also came in as the after effort of the prevalence of adverse conditions for the existing superior flora.

As has already been stated, the forests of this division correspond to the Northern Tropical Dry Deciduous type. Sal is by far the most important species, but only in value and not in numbers. In this division it occurs under several conditions. In hilly tracts it occupies the northern foot hills and has extended in pockets. In plains, it is seen only along the nala banks, and is gradually being replaced by dry miscellaneous crop. What ever may be the condition it is confined to narrow belts only. Its proportion shrinks in less favorable situations to only 2 to 3 trees per acre, in the midst of dominating miscellaneous crop.

Owing to the open nature of the crop and existence of dry conditions, sal is rarely seen pure except in small patches.

The crop had suffered a lot due to the mismanagement and faulty treatments of the past and has retrograded to open dry miscellaneous forests. Xerophytic species like Salai, Dhauta and Bel have taken the place of valuable species like Sal, Asan and Sidha.

Bamboo occurs extensively in some areas. The proportion and extent seems to be governed mainly by biotic interference like fire, over exploitation and grazing. It is found in almost pure state to the drier extreme with xerophytic species like Khair, Sidha and Dhaunta. The incidence of Khair is extensive and it is this species which seems largely to be the out come of biotic factors. Fire, over exploitation and excessive grazing causing soil erosion results in the retrogression of the existing flora and invasion of the site by Khair. It is found in bushy condition near the outer fringes of the forests and ordered sites. It is not uncommon to see a Khair sapling struggling hard for life on denuded sites.

The hills generally have suffered extreme denudation and soil loss has occurred. The exposed faces of many of these hills hardly bear any useful species of forest. The forests in the said tracts have been reduced to xerophytic thorny shrubs. The new classification by champion and Seth (1964) recognizes this types as a 'Degradation stage of the Dry Deciduous Forests.'

The following sub types of the forest can be recognized.

(A) Dry Sal Forest

(i) Dry sal forest

(ii) Sal rooted waste.

(B) Mixed Miscellaneous Forest

(i) Mixed miscellaneous without bamboo

(ii) Mixed miscellaneous with bamboo

(iii) Inferior miscellaneous scrub forest

(C) Salai Forest

(A) (i) Dry Sal Forest

The dry peninsular sal sub-type occurs on shallow soil derived usually from crystalline and metamorphic rocks, where the soil moisture conditions are unfavourable for the development of moist Sal. In this division this type is found generally on the northern aspect of hills, in valleys and along the nalas where the conditions are favourable. Its occurrence is confined to narrow belts and patches. Pure Sal is not extensive in occurrence. In majority of the area, sal loses its existence among the surrounding dry miscellaneous species. The crop varies from young sapling to pole stage. Most noticeable feature in the size of the trees, is deficiency of natural stems. Very few trees over 3' (1m) are found due to unrestricted cutting in the past. The average height of tree is 45' to 50' (15 to 17m) with an average diameter of 5" to 6" (12.5 to 15 cms).

The quality of the crop corresponds to B of coppice quality. The average density of the crop varies from 0.3 to 0.4.

The main associates in the top canopy are Asan (*Terminalia tomentosa*), Sidha (*Lagerstroemia parviflora*), Pandan (*Ougenia oojainensis*), Bija sal (*Pterocarpus marsupium*), Siris (*Albizzia procera*), Kendu (*Diospyros melanoxylon*), Salai (*Boswellia serrata*), Dhaura (*Anogeissus latifolia*), Jamun (*Syzygium cumini*), Karam (*Adina cordifolia*), and few others. The crop is seldom above 1' (30 cm) in girth and is severely malformed with bulging boles due to pollarding.

No other storey can be distinguished except the top storey in fact other stories are absent.

The under storey consists of *Woodfordia fruitcosa*, *Wendlandia*, *Croton*, *Phoenix*, *Clerodendron* species etc. *Heterropogon contortus* (Spear grass) is the common ground cover.

The important climbers are *Bauhinia vahilli*, *Millettia auriculata*, *Butea superb*, *Smilax*, *Acacia pinnta* and *Cryptolepsis buchnanii*.

This type is in the climatic climax stage, but retrogression has occurred due to mismanagement. It seems that only further degeneration in the site quality will bring about a change in the type of vegetation replacing the superior species by less valuable xerophytic type.

Kutil, Kunda, Jobeya, Bhurha P.Fs have this type of crop.

(A) (ii) Sal Rooted waste

As a result of repeated hacking of Sal it has been reduce to the bushy stage over large areas. This type can be distinguished easily by its typical stunted coppice shoots and scattered bushy form. The ground is devoid of humus and rapid erosion is in progress through out the area. Improvement of such a site is very difficult. Large areas of rooted wastes of sal occur in the Rajpur Range.

(B) Mixed miscellaneous forests

(i) Mixed miscellaneous forest without bamboo

This type is found generally on sites having shallow and degraded soils both on the hills and plans. Forests with less than 30% of Sal are included in this type of forest.

The species constituting such forest are *Terminalia tomentosa*, *Diospyros melanxylon*, *Acacia catechu*, *Anogeissus latifolia*, *Lagerstroemia parviflore*, *pterocarpus marsupium*, *Buchanania lanzan*, *Aegle marmelos*, *Boswellia serrata*, *Ougenia oojeinesis* and others.

The middle storey is not very distinct. The under storey consists of *Holorrhena antidysenterica*, *Nyctanthes arebortristis*, *Casearia tomentosa*, etc. The main climbers are *Bahuhinia vahlii*, *Millettia auriculata*, *Butea superb* and *Acacia pennata* etc.

Natural regeneration is scanty and coppice regeneration though adequate is not as vigorous as in sal areas.

A small belt of *Hardwickia Binata* (Anjan) is found in the northern part of the Hunterganj Range on the border of the Gaya District.

Lipta, Paini, Nanaikalan, Jhanti P.Fs are typical of this class.

(B) (ii) Mixed miscellaneous forest with bamboo

This is commercially the most important type in this division. It is found on shallow soils where the conditions are drier e.g. in greater parts of the Pratappur, Hunterganj and Rajpur Ranges. The incidence of sal in this type of forests is almost negligible.

The trees and plants found in this type are the same that occur in type B (1) above. In addition, bamboo (*Dendrocalamus strictus*) of fairly good quality also occurs. The incidence of bamboo is of varying degree. At some places the proportion is quite low whereas in the Ascal, Sarjamatu, Bantha and Dari P.Fs. It is almost pure with the clump spacing as close as 10 ft. (3.05 m). Clumps are usually 30 ft. to 45 ft. (9.15 m to 13.7 m) apart Culms of 2"-2" (5 to 6cm) diameter are common in the area but culms of 3" (7.5cm) diameter are also met with on good sites.

The bamboo clumps were in a very bad way when the management of the forests was taken over in 1947. They are at present in excellent condition due to their proper and scientific management in the last decades.

(B) (iii) Inferior miscellaneous scrub forests

This type is the out come of the degradation of the forest. Such forests occur in the eroded areas and plains which have been subjected to maltreatment in the past. Lack of

adequate ground cover is responsible for the loss of soil and sub soil and ultimately the parent rocks have also been exposed at places. These are found mostly near the outer fringes of the forests and around density valuable species. *Carissa opaca*, *Zyzyphus* species, *Lantana camara* form the main crop with occasional *Butea monosperma* and *lagerstroemia parviflora*. The occurrence of this type is quite extensive in the hunterganj and Pratappur Ranges.

Salai Forests

Champion and Seth (1964) recognize it is an edaphic climax type. Salai (*Boswellia serrata*) is found on Southern aspects, hill tops and ridges. The percentage of salai in the crop is very high, at times upto 90%. A large proportion of the Salai trees are defective. The species is getting the upper hand in the forest due to biotic influences. It is encroaching the Sal and mixed miscellaneous forests in certain area due to drier condition. Incidence of young to mid nature aged trees are common with some scattered mature trees. Its chief associates are *Lannea coromandelica*, *diospyros malanoxylon*, *Buchanania lanan*, *Anogeissus latifolia*, *Aegle marmelos*, *Ciochlosperrum religiossum*, *Garugu pinnata*, etc.

Coming to the size of the trees 2'-3' (0.6 to 1 m) girth is quite common but its associates do not attain more than 1' (0.3m) girth. Density is more than 0.5 in inaccessible areas, otherwise crop is open elsewhere. Climber incidence is moderate and main climbers are *Smilax*, *Acacia pennata* and *Butea superba*.

Regeneration of Salai both natural and coppice is satisfactory.

INJURIES TO WHICH THE CROP IS LIABLE

FIRE : Fire is definitely a great nuisance through out these forests and causes the greatest damage to the existing crop, particularly to the young plants.

Fires in the forests are started by the interested villagers who burn the dry leaves during the leaf-fall period and thereby set fire to the entire forests in the area. This they do purposely with the object of getting a clear ground floor for collection of the Mahua corollas. Some times fires are also started to secure new shoots of grass in the grassy localities for

purposes of grazing. Some fires are also caused by the careless discard of burning match stricks or biri stubs on the foot paths passing through the forests.

The soil nutrients remain partly unrecouped and are not replenished due to the burning of the humus and leaf litter. The result is that soil becomes deficient in nutrients.

The micro-organism are some times killed outright or are commonly damaged or badly injured.

Soil erosion is increased as there is nothing to check the direct action of water on the ground surface.

Ground surface is hardened making it difficult for the tender root hairs to penetrate into the earth.

The porosity of the soil is minimized to a very great extent making the rain water drain off instead of seeping down into the earth.

Establishment period is lengthened and in extreme cases regeneration is inhibited for a considerable period.

FROST

It has been observed that heavy damage occurs due to frost in valley bottoms and valleys. A number of standards along with fruit bearing trees may be retained to provide a sort of shelter to prevent the frost damage.

GRAZING

Grazing, either directly or indirectly, caused the maximum damage to the forest flora and the soil. It is the most important cause of devastation and degeneration of coppiced forests into rooted waste and scrub forests. Grazing also makes the ground hard and compact by constant trampling which in addition to other types of damages, greatly contributes to erosion of the surface.

DROUGHT

During the hot months of May and June drought causes considerable damage to young seedlings, particularly in open areas. The damage increases with the late outbreak of summer monsoon. Drought or insufficient rain increases the depth of water table and affects very adversely, the growth and healthy development of the crop.

CLIMBERS

Climbers menace is not of much importance in this division except in the moist patches. The main species are *Bauhinia vahilli*, *Millettia auriculata*, *Butea superb*, *Acacia pennata*, *Zizyphus* species, *Combretum decandru*, *Celastrus paniculata* and a few others. In moister localities, especially around nalas and river banks, the young crop has to be made free from them.

MAN

Man is by far the worst enemy of the forests. Irregular, illicit and bad fellings in the past years coupled with fire and grazing have very greatly degenerated the forests. The increase of population and unlimited number of right holders, who keep on increasing from year to year, have caused the heaviest damaged to the fauna and flora of this division. Unless some vigorous measures are enforced by legislation, it is very difficult to control the extent of damage to the forest.

CHAPTER – III UTILISATION OF PRODUCE

AGRICULTURAL CUSTOMS AND WANTS OF THE PEOPLE

The Chatra North division falls in the interior of the Chatra North Division. It is free from sophisticated urban populace. The people are mainly Santhals, Ganjhua, Birhors, Goalas, Bhuiyans, Rajputs, Sheika (Weavers), Kalal and others. The populace is mostly confined to villages surrounded by forests and the only town Chatra, the headquarters of the division, too, has the look of a village. Almost every village in the area is either surrounded by forests or has them in the vicinity. In the absence of any modern industry the people depend entirely upon agriculture for their livelihood.

The people live mostly in huts of mud and nuria tiled houses. Masonary and cemented buildings are few.

There being little irrigation facilities, the agriculturists have to depend upon rain. Like all other places of Chotanagpur plateau, the main agricultural crop is Rice, Maize, Sarguja, Til, Rahar, Gram, Sugar-cane are grown where conditions are suitable for them.

People often immigrate to adjoining colliery and mica and other industrial areas to work as labour in order to supplement their income.

The development of forests has, of course absorbed to some extent a number of such people in timber and bamboo coupes, forests depots, forests roads, saw-mills, etc. but the number of people engaged throughout the year is not much.

Unlike parts of the Hazaribagh districts which abound in mineral wealth there are no mines and industrial in the Chatra North Division. The result, therefore, is that is the poorest part of the district.

The needs of the population, on the whole are few and simple. Their main requirements are fire-wood, poles and small timber and bamboo for house building and

agricultural purposes and grasses and leaves for cattle fodder. There is a good demand for bamboos for basket making industry also.

Mahua corollas along with Kend and Piar fruits provide the poorer villagers with a substitute for the main food i.e. rice, during summer months of the year.

The need for fencing material is very great in this division because of the fact that all agricultural crops except rice have to be protected from the menace of animals both domestic and wild. Therefore, a considerable amount of fencing material is consumed by farmers every year. The people use valuable bamboo almost every where every year. The fencing material used in the previous year is burnt as fuel or used as manure next year. Thus, the availability of the produce is being grossly misused.

MARKET AND MARKETABLE PRODUCE

Most of the timber and fire-wood is consumed by the local population. Some surplus of timber and fire-wood is exported and sold in the adjacent district of Gaya and Hazaribagh. The chief consumers of Salai and other pit props are the mines and collieries.

BAMBOO

Bamboo is surplus to the needs of the people, Chatra North being one of the richest bamboo divisions of the state. Raniganj (Gaya) is an important market for the local bamboo. Thousands of cart loads of bamboo goes to Raniganj market each week, during the working season.

Many people earn their livelihood by purchasing bamboo from the coupes, carting it to Raniganj and selling it there in the market. Bamboo is supplied to all the carters from fixed depots.

SAL LOGS POLES AND POSTS

Sal is exported mostly as poles and in log form but other species are generally roughly dressed into beams and sleepers. Only the bigger sizes are exported in log form.

KHAIR

“Katha” is derived from the extract of Khair trees and consumed locally and at Gaya. Chatra is one of the oldest ‘katha’ producing centre of the State.

SALAI

Salai is common all over the area. The demand is very little for this species. It is in demand by the collieries, where it is used in coggings and as small sized sleepers. It is also utilized in the packing cases industry and in paper industry.

SABAI GRASS

Sabai is locally consumed for making strings and ropes. It is local cottage industry and provides employment to the villagers. No sabai is exported to paper mills.

KENDU LEAVES

“Kendu leaves” fetch a good amount of revenue. They are utilized for ‘Biri making’. Kendu leaves of Hunterganj and Pratappur are much in demand and are exported to Gaya, Jhajha Bihar Sharif and Gidhour.

KHAJUR AND PALM LEAVES

Khajur and palm leaves are used for the manufacture of mats fan locally.

LINES OF EXPORTS

Railway communication does not exist in the division. The nearest rail stations are Gaya, Koderma and Tori.

The following important roads are at present utilized for the transport of forest product of this division.

(i) Chatra-Chouparan Road :- The Grand Trunk road at Chouparan is linked with Chatra by a 50 kms. Metalled black topped road, which is used throughout the year.

(ii) Chandwa-Chatra-Dobhi Road :- This new all weather road takes off from the Ranchi-Daltonganj road at Chandwa and runs across the division joining the Grand Trunk road at Dobhi. Before opening of this road Gaya was 80 miles (128kms) from Chatra. Now it is only 50 miles (80kms).

In addition to the two roads mentioned above, the division is served by an excellent network of fair weather forest which facilitate the extraction of forest produce.

WATER TRANSPORT

In past rivers Lilajan and Mahane were used for transporting the bamboos during rainy season from Chatra division to Gaya district. But now a days with the development of roads and other transport facilities, water transport is not practiced.

CHAPTER – VI
STATISTICS OF GROWTH AND YIELD

No statistics of growth was collected. Though the entire forest has been worked for one full rotation and it should have been possible to collect the growth figures of crop for the whole rotation, this could not be done as it was not possible to locate crops of definite ages on the ground as the year of felling could not be definitely known from available records.

The forests of Khurchutta Reserves in Hazaribagh (W) division are being worked in the second rotation. There has been no change in the constitution of Felling Series and sequence of felling. Hence the yield figures of Khurchutta Reserves Forests coupes will give a correct picture of the size of timber that a coupe of 40 years age is expected to produce. The area is adjacent to and similar to Chatra North Division.

The actual yield of poles of 10 coupes of 40 years age of Khurchutta Reserve Forests is given below :-

Dia under bark at stump height :

Name of F.S.	C. No.	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
East F.S.	7	2102	2293	2406	2240	1871	1403	748	311	112	36
West F.S.	7	2462	2704	2431	2116	1293	1009	480	179	71	22
East F.S.	8	3429	4337	3314	2238	1565	1160	468	200	35	15
West F.S.	8	2670	2278	2332	2129	1814	1412	1002	660	225	98
East F.S.	9	2015	3341	3295	3082	2036	1925	1224	675	75	35
West F.S.	9	3725	4041	3711	3809	2640	2715	1525	454	112	148
East F.S.	10	2715	2625	2511	3315	1475	1270	1020	351	60	65
West F.S.	10	1837	2359	3255	2105	1643	675	504	605	236	175
East F.S.	11	825	1976	1347	1175	596	305	109	42	8	12
West F.S.	11	1127	1897	1322	1054	1143	309	584	373	275	70
Grand Total		22907	27851	25924	23263	16046	909	12783	3850	1209	676

The average dia of crop, which will be produced in a 40 years rotation on the basis of yield figures mentioned above, comes to 5.57 inches under bark at stump height. The maximum number of poles is of 4" and 5" dia. The poles above 8" dia are all form standards left

at the time of last coppicing. The average for the poles from 3" to 8" dia works out to 5.15 inches.

The composition of crop at maturity (40 years rotation) including the standards of the previous felling is as follows:-

3" dia 16.10 percent
4" dia 19.57 percent
5" dia 18.2 percent
6" dia 16.35 percent
7" dia 11.28 percent
8" dia 8.98 percent
9" dia 5.40 percent
10" dia 2.70 percent
11" dia 0.85 percent
12" dia 0.47 percent

In Mr. Prasad's Plan for Ex. R.Fs of Ramgarh Raj the age-dia graph shows that, sal will grow to a dia of 6" over bark at the age of 40 years. This very much tallies with figures obtained from actual felling of 40 years old crop of Khurchutta Range. Hence for all practical purposes the age-dia, graph of Mr. Prasad's Plan will hold well for Chatra North Division also.

The age-dia graph for Sal and Asan from Mr. Prasad's plan is reproduced below for ready reference.

ESTIMATE OF FUTURE OUTTURN

The Forest Resources Survey Division, Bihar, in his report for Hazaribagh, Giridih and Dhanbad Districts has estimated the outturn of various types of forest produce from Hazaribagh West Division.

The following figures are reproduced from this report

Timber	Pole	T.L. & Coggins.	Other timber	Firewood
1.850	1.630	1.341	1.469	2.680

.505	0.185	0.241	0.155	0.324
3691.55 to 9885.71	6073.38 to 8892.01	3256.56 to 6054.84	2479.08 to 3550.34	11655.69 to 17497.13
3882.40 to 10495.85	5802.53 to 9162.06	2982.28 to 6329.11	2372.37 to 3657.08	11081.60 to 18068.22

On this basis the total outturn of all types of produce is 6,770 Cu.M. per acre = or 16.73 Cu.M. per hectare. The total estimated outturn of the Division on the basis of the above figures at 10% probability of error works out to as given below:

Estimated outturn (Cu.M.)

	(At 5% level)		(At 10% level)
Timber	3,699.55	to	9,885.71
Pole	6,073.83	to	8,892.01
T.L. Coggins	3,225.56	to	6,054.84
Other Timber	2,479.08	to	3,550.34
Firewood	11,655.69	to	17,497.13
Total :-	27,163.71		45,880.03

GROWING STOCK

The conventional formulae for computing the value of growing stock is:

$$G = \frac{1}{2} g.r. + K \text{ or } \frac{1}{2} (g + gk) r \text{ or } \frac{1}{2} g.r. (1+k)$$

Where G denotes the volume of growing stock in Cu.M.

g denotes the annual outturn in Cu.M.

r denotes the rotation in years, and K denotes the volume of unfilled trees like the fruit trees reserved species standards. This formulae and written as $G = \frac{1}{2} .r.(g+g.k) = \frac{1}{2} .g.r. (1+k)$ where k denotes the fraction of total value left unfilled as standards, fruit trees and reserved trees.

In Hazaribagh West Division the rotation for Coppice Working Circle is 30 and 40 years. The area under 30 years rotation is about 80% and under 40 years rotation it is about 20% of the total area. Hence the average rotation is $(30 \times 80 + 40 \times 20) / 100 = 32$ years.

The 'K' represents the volume of unfilled trees. The number of standards and fruit trees is about 35 and if the number of unfilled reserved trees is another 10 then total number of unfilled trees is 45. If the volume of one trees on average is half Cu.Ft. the total volume of such unfilled trees is 22.5 cft. i.e., 0.63 Cu.M. Thus 'K' workout to $0.63/6.77 = .093$ or 0.1 approximately.

On the basis the volume of growing stock on total area under coppice working circle only lies between.

$$\frac{1}{2} \times 27,163.71 \times (1+0.1) \times 32 = 4,78,171 \text{ Cu. M. At 5\% level}$$

$$\text{And } \frac{1}{2} \times 45,880.03 \times (1+0.1) \times 32 = 8,07,488 \text{ Cu.M. At 10\% level}$$

The estimation of the volume of the growing stock of other Working Circles the Rehabilitation Working Circle and Plantation Working Circle could not be possible since sufficient data were not available.

Estimation of Growing stock

Forest survey of India, Eastern Zone, Kolkata can calculate growing stock of forests of Hazaribagh West Division on the basis of report on Forest Resources of Giridih district, 2002; as Giridih is an adjoining district of Hazaribagh and there is a close resemblance between the forest of both districts.

In this report, the following local volume equations have been used for volume estimation.

<u>Species</u>	<u>Equations</u>
Shorea robusta	= - 0.046597+2.227.73 D
Other species	= - 0.077380+2.592167 D
Boswellia	= - 0.026499 + 2.592167D ²

Total local volume table of these species is given as follows

Species (Volume in MS)

Diameter Class (cms)	Shorea Robusta	Boswellia serrata	Rest of Species

10-19	0.0763	0.0809	0.0890
20-29	0.2491	0.1820	0.3110
30-39	0.5209	0.3950	0.6673
40-49	0.9419	0.5398	1.1581
50-59	1.3624	0.7964	1.7832
60+	1.9319	1.1049	2.5540

Volume of each enumerated tree was estimated with the help of volume tables/equation and was used for generation of stocks tables by species and diameter classes.

Distribution data of stem/ha by species and diameter classes compile in the report is reproduced as below:

The distribution of stems/ha by species and diameter class has been found as below :-

Stratum	Stems/ha
Sal	77.054
Miscellaneous	71.304
Average	74.343

On the basis of above information Volume/ha by stratum and district is summarized as below.

Stratum	Volume (m ³)/ha
Sal	8.007
Miscellaneous	10.689
Average	9.27

From above table it is observed that growing stock of forests is 9.27 m³/ha. As the total area of dense and open forest of division is 44274.65 ha. Total growing stock as calculated is 410428.00 cu.m.

CHAPTER – V
BIO-DIVERSITY & WILD LIFE OF CHATRA NORTH DIVISION

INTRODUCTION

- Chatra North Division cover 93999.01 ha. of forest area compared to the total geographical area 939.99 sq.km.
- Percentage area under forest is % of total geographical area.
- This Division lies between 24° 10' N to 24° 32' N latitude 84°-24' to 85°7' E East longitude.

It is important to note that the tract covered by this working plan does not have any protected area and hence wildlife preservation in the forests and outside must be given a priority. Compact patches of dense forests exist in this area and they harbor a good number of herbivores and carnivores. Majority of nalas and streams become dry during summer season. Small bunds and anicuts should therefore be constructed across nalas and streams in the interior areas where probability of getting wild animal is high and the moisture conservation structures are otherwise not available. Salt licks should be embedded in the ground near the water holes created by the construction of bunds anicuts. Plantations adjoining such areas must contain suitable fruit and fodder species to provide for animals and birds. Special attention should be paid to fire protection of these localities.

Survey of birds should be conducted at regular interval to count number and variety of birds, if possible with the help of Nature Clubs or Groups interested in the conservation activities.

Wild life census of the area should be conducted.

A register should be maintained in the division and range officers to records the occurrence of carnivorous and herbivorous species separately. Any subordinate should send his report giving the name of the animal sex of the animal if possible date, time, place of observance number seen and other details direct to the ranges and division on wireless. He will also report in writing to ROF giving all the above details. Based on these reports, register in the

ranges and division will be maintained. Every three months DCF would review the status of wild life in the Divisions.

FLORA

- The forests of this tract can be classified according to revised survey of forests types of India by Champion & Seth as Northern Dry Sal bearing forests 5B/C type & Northern Dry mixed Deciduous forest 5B/C₂.
- The associates in top & middle storey in 5B/C₁ are *Shorea robusta*, *Terminalia*, *Mahua*, *Adina cordifolia*, *Diospyrus tomentosa*, *Buchannia lanzan*, Occasionally *Bamboo brake*.
- The shrubs consist of *Holorrhana antidysentrica* *Randia spp*, *Cassia species*. *Indigofera pulchella*, *Carissa opaca*. *Wendlandia tinctoria*, *Woodfordia fruticosa*, *Croton oblongifolius*, *Zizyphus spp*. & *Phoenix*.
- The grasses consist of *Heteropogon contortus*, *Eulaliopsis binata*. Main climbers are *Bauhinia vahlii*. *Acacia pinnata*, *Butea superba* *Milletia auriculata*, *Smilax species* & few species of *Asclepiadece*.
- In the type Northern Dry Mixed Deciduous forest 5B/C₂, the top storey has *Boswellia serrata*, *Anogeissus latifolia*, *Lagerstromia parviflora*, *Diospyros tomentosa*, *Pterocarpus marsupium* *Sterculia*, *Cochlospermum religiosum* *Madhula indica*, *Emblica*, *Aegle-marmelos*, *Odina wodier*.
- The middle storey consist of *Bamboo brakes* of *Dendrocalamus strictus*. The shrubs consist of *Woodfordia fruticosa*, *Nyctanthes arbor-tristis*, *Zizyphus species*.
- Miscellaneous spp of forest generally occur on the southern aspect of the hills. Soil is shallow & poor.
- Sal forests occupy the largest area of the Division. Total area of Sal forests as per stock map is 3161.66 ha.
- Dry mixed forests have extreme biotic factor like illicit felling, grazing & fire.

List of Common Tree in Chatra North Division

S. No.	Botanical Name	Common Name
1.	<i>Cassia fistula</i>	Amatlas

2.	<i>Emblia Officianalis</i>	Awala
3.	<i>Mangifera indica</i>	Am
4.	<i>Terminalia arjuna</i>	Arjun
5.	<i>Terminalia tomentosa</i>	Asan
6.	<i>Spondias Pinnata</i>	Asan
7.	<i>Acacia Arabica</i>	Babul
8.	<i>Aegle mermelos</i>	Bel
9.	<i>Melia azadiracta</i>	Bakain
10.	<i>Caseeria tomentosa</i>	Beri
11.	<i>Ficus bengalensis</i>	Bar
12.	<i>Pterocarpus marsupium</i>	Paisar
13.	<i>Terminalia belerica</i>	Behera
14.	<i>Hymendodictyon excelsum</i>	Bhurkud
15.	<i>Semecarpus anacardium</i>	Bhelwa
16.	<i>Holoptelia integrifolia</i>	Chilbil
17.	<i>Ehrtia lavis</i>	Chamror
18.	<i>Anogeissus latifolia</i>	Dhanta
19.	<i>Ficus glomerata</i>	Dumar
20.	<i>Ailanthus excels</i>	Ch-orneem
21.	<i>Gmelina arborea</i>	Gamhar
22.	<i>Cochlospermum religiosum</i>	Galgal
23.	<i>Mitgrajyna parviflora</i>	Guri Karam
24.	<i>Lannea coromandelica</i>	Jhingan
25.	<i>Terminalia chebula</i>	Harra
26.	<i>Tammarimndus indica</i>	Imli
27.	<i>Syzygium cumini</i>	Jamun
28.	<i>Artocarpus integrifolia</i>	Kathal
29.	<i>Ponamia glabra</i>	Karanj
30.	<i>Miliusa velutina</i>	Kari
31.	<i>Acacia catechu</i>	Khair
32.	<i>Bauhinia purpurea</i>	Konar
33.	<i>Albizzia lebbak</i>	Kala siris
34.	<i>Banhinia variegata</i>	Kachnar
35.	<i>Bauhinia retusa</i>	Kath Mahuli
36.	<i>Bridelia retusa</i>	Kajh
37.	<i>Schleichera oleosa</i>	Kusum
38.	<i>Sterculia urens</i>	Keonjhi
39.	<i>Anthrosphalus cadamba</i>	Kadam
40.	<i>Adina cardifolia</i>	Karam
41.	<i>Careya arborea</i>	Kumbhi
42.	<i>Clieistanthes collinus</i>	Karla
43.	<i>Garuga pinnata</i>	Kekar
44.	<i>Madhuca indica</i>	Mehua

45.	<i>Azadirachta indica</i>	Neem
46.	<i>Cerdinia latifolia</i>	Papra
47.	<i>Buchanania lanzan</i>	Piar
48.	<i>Butea monsoeperma</i>	Palas
49.	<i>Ficus religioussa</i>	Pipal
50.	<i>Ongeinia oojeinesis</i>	Pandan
51.	<i>Trewla nudiflora</i>	Pani gamhari
52.	<i>Flaeodendron glaucaum</i>	Ratangarur
53.	<i>Sapindus mukorossi</i>	Ritha
54.	<i>Albizzia procera</i>	Safel siris
55.	<i>Dalbergia latifolia</i>	Satsar
56.	<i>Bombax malabaricum</i>	Semal
57.	<i>Boswellia serrata</i>	Salai
58.	<i>Dalbergia Siso</i>	Sixso
59.	<i>Acacia ruriculiformis</i>	Sanajhur
60.	<i>Oroxylum indicum</i>	Sonapatta
61.	<i>Shorea robusta</i>	Sal
62.	<i>Tectona Grandis</i>	Teak
63.	<i>Borassus flabelifer</i>	Tar
64.	<i>Sterculia villosa</i>	Udal

List of Climber in Chatra North Division

S. No.	Botanical Name	Common Name
1.	<i>Acaccia pinnata</i>	Arar
2.	<i>Cascutta reflexa</i>	Amarbel
3.	<i>Macuna ruriata</i>	Alkusi
4.	<i>Zizyphus onenoplia</i>	Dithor
5.	<i>Millettia auriculata</i>	Gaj
6.	<i>Vetilago maderasatana</i>	Keoti
7.	<i>Smilax zeylanica</i>	Ramdatwam
8.	<i>Combretum decandrum</i>	Ratend

Shrubs in Chatra North Division

S. No.	Botanical Name	Common Name
1.	<i>Calotropis giganta</i>	Akwan
2.	<i>Helicteres isora</i>	Airitha
3.	<i>Casearia tomentosa</i>	Beri
4.	<i>Loranthus species</i>	Banda
5.	<i>Hyptis suaveolens</i>	Bantulsi

6.	<i>Sidha cardifolia</i>	Bariar
7.	<i>Zyzyphus mauratiana</i>	Ber
8.	<i>Woodfordia fruticosa</i>	Dhawai
9.	<i>Maghania spp.</i>	Galfuli
10.	<i>Nyctanthes arbortristiss</i>	Harsingar
11.	<i>Indigofera pulchella</i>	Jirhul
12.	<i>Ixora parviflora</i>	Khonta
13.	<i>Carissa opaca</i>	Kanod
14.	<i>Vallaris salanacea</i>	Kokur-btur
15.	<i>Agave Americana</i>	Murabba
16.	<i>Lantana camara</i>	Putus
17.	<i>Asparagus recemosus</i>	Satwar
18.	<i>Vitex negundo</i>	Sindwar
19.	<i>Agave sisalana</i>	Sisal
20.	<i>Wedlandia tintoria</i>	Tilai
21.	<i>Clerodendron viscosum</i>	Titbhant
22.	<i>Eulaliopsis binata</i>	Sabai - grass
23.	<i>Vetiveria Zizanoides</i>	Khus-Khus grass

FAUNA

- In the Division compact patches of dense forest exist & they are capable of harboring a good no. of herbivores & carnivorous.
- Present status of wild life in the Division is not satisfactory wild life needs to be protected effectively.
- Potential habitat of wild life & water shade should be identified.

List of Birds found in Chatra North Division

S. No.	Habit Birds	Zoological Name	Common Name	Local Name
1.	Omnivore	<i>Pavo cristatus</i>	Peacock	More
2.	Carnivore	<i>Pseudogyps bengalensis</i>	Vulture	Gidh
3.			Fishing kite	
4.			Kite	Cheel
5.			King Fisher	
6.	Herbivore	<i>Edynamis seolopaceous</i>	Koel	Koel
7.		<i>Francolinux pondicerianux</i>	Patridges	Panduk
8.		<i>Aeridotheres trisitx</i>	Hill Myna	Hill Myna
9.		<i>Painocula krameri</i>	Parrot	Tota

10.		<i>Dryopates mahrat-tensis</i>	Wood Pecker	Wood Pecker
11.		<i>Gallus gallus</i>	Jungle fowl	Ban Murgi
12.			Canary or Golden oriole	Pealak
13.			Crane	Saras
14.			Duck	Batak
15.			Crow Pasant	Mahakul
16.			Barbet	
17.			Drango	Koyler
18.			Blue jay	Nilkhanth
19.			Red vented Bulbul	Bulbul

CHAPTER – VI
STAFF AND LABOUR SUPPLY

STAFF

Formerly the forests of Chatra North Division were under the control of Hazaribagh Division. The Chatra division was created in 1962, which included the forest of Chatra Civil sub-division. Subsequently the Chatra Division was further sub-divided into two divisions, namely Chatra North and South division from 1st April, 1962. For the sake of proper and smooth management, some changes have been introduced in the working of the division. The ranges and beats have been reoriented.

The Chatra North Division has four ranges at present namely Rajpur, Kunda, Pratappur and Hunterganj.

The creation of Kund and Rajpur ranges was sanctioned in Revenue Department memo no. C/F-1(A) 936/62-1002F, dated 7th June, 1962.

The set up of staff sanctioned for this division is as follows, vide Government order no. C/F-1(A) 044/62-502R, dated the 29th March, 1962.

TABLE

Name of Staff	Pratappur Range	Hunterganj Range	Kunda Range	Rajpur Range	Total Range
Range Officer	1	1	1	1	4
Beat Officer	3	4	2	2	11
Forest Guards and spl. Forest Guards	21	21	9	11	62
Coupe Overseers	2	3	2	0	7
Naka Guards	8	2	2	2	14

The office establishment of the Divisional Forest Officer consists of 4 clerks which has been sanctioned vide Government order no. C/F-1(A) 09/62-773R, date 31-01-1962.

