

COMPOSITION AND CONDITION OF THE CROP

General :- Before reservation, nearly a century ago, the forests of Palamau were subjected to 'Jhuming' I.e, shifting cultivation and the people indulged in the unrestricted cutting of trees and burning of forests. This is evident from the note of the Dupty Commissioner of Lohardaga in the year of 1864 which is reproduced below :-

“The Mode of cultivation cotton in Palamau is, I believe, analogous to that of Kumari cultivation of Madras and the Jhuming in East Bengal. Large patches of forests are cleared burning down the trees and Jungles”

The most remarkable feature of the Palamau forests was the fact that with the exception of rocky hill slopes most of the area contained a pole crop 8"-16 in diameter and that in many forests large trees of any size except of such species as Salai were very rare at the time of reservation. Mr. Johnston who carried out a linear valuation survey over a total length of 154 miles in 1874-75, found the growing stock of sal of the following composition per acre.

Girth Class	Sal
Under 18"	32.7
18" to 3'	1.2
3' to 4'	0.4
4 to 6'	0.2
Over 6'	0.1

This unusual condition of the crop composition was an exciting item of discussion and study at the time of reservation. It has, however, since been more or less accepted that large scale Jhuming I.e. shifting cultivation in the past, may be attributed for this. The peculiar feature in certain compartments is the alternate patches of sal and miscellaneous forests and the presence of profuse sal regeneration under miscellaneous crop.

The forests dealt with in this plan lie mostly in the deciduous zone, except the forest in the southern portion of the division in the valleys of Baresand block south of the river Koel and on the Netarhat plateau and its slopes which are in the moist or semi moist zone. Sal is the main species, Which is found in pure crop, mixed with miscellaneous species. Percentage of sal increases as one proceeds towards south of the division and almost gets the pure crop of sal on Netarhat plateau and the adjoining Baresand blocks.

This is attributed mainly due to the aspect and soil conditions. The northern part of the division contains almost pure miscellaneous forest. In the central zone, sal comes in and the percentage of sal increases in varying proportions depending upon the aspect and the soil. Considering the importance of rock and soil Nicholson in the first working plan for the tract dealt with had classified the forest according to the character of the underlying rock which is reproduced below :-

No. of type	Designation	Nature of crop	Approx. area in sq. miles over which found
I.	Laterite Pure	Pure sal forest.	14
II.	Quartzite	Sal and mixed forest.	95
III.	Gneiss	Sal, mixed & bamboo foest	110
IV.	Amphibolite	Mixed & bamboo forest	13
V.	Gondwana	Sal & mixed forest.	11
VI.	Alluvial	Sal with small proportion of bamboo & mixed forest.	6

There is no doubt that the parent rock and the soil derived from them play an important role in governing the distribution and determining the growth of different species, and that detailed field study should yield most interesting results but for the convenience of management a silvicultural on the synecology of principal species is more rational and desirable.

According to Champion and Seth's concept of classification of the forests types of India the forests of parent Daltonganj South Division come under the following types and sub-types :-

Type- I Moist Tropical Forests:-

Group-3 Tropical Moist deciduous forests

Sub-Group-3C Northern Indian Moist deciduous forests.

Sub-types-2C3 (e) Moist peninsular sal forests.

Type-II- Dry Tropical Forests

Group 5- Tropical Dry deciduous Forests.

Sub-Group5 B- Northern Tropical Dry deciduous forests.

Sub-types 5B/C1 (e)- Dry Peninsular Sal forests.

- (i) 5B/C2-Northern dry mixed deciduous forests.
- (ii) 5B/E6-Aegle forest.
- (iii) 5B/ E9- Dry bamboo brakes.

From the stand point of management the forests may be conveniently divided into following main types:-

- (i) Dry Mixed Forest.
- (ii) Dry Sal Forest.
- (iii) Moist Sal Forest.
- (iv) High level Plateau Sal Forest.
- (v) Moist Mixed Forest.

Type- Dry Mixed Forests.

This is a widely distributed type found on exposed rocky hill tops, and slopes generally but also on low grounds where the biotic influence have a far reaching effect. It is not particular as to aspect and slopes, being found on both northern and southern slopes. The aspect, no doubt, influences the composition of the community to certain extent. This type occurs on Quartzite, Gneiss, Amphibolite, and Gondwana groups of rocks. Its general composition is very similar on all types of rocks on which it is found except that a slight difference exists in the flora occurring in the Amphibolite group. On the exposed rocky hill tops and on the southern and western aspects the vegetation consists of xerophytes. (*Anogeissus latifolia*), (*Boswellia religiosa*, *Cleistanthus collinus*, *Lannea coromandelica* (Syn. *Odina woodier*), and *Lagerstroemia parviflora*, are among the chief associates with thorny shrubs like *Gardenia turgida*, *Carissa carandas* *Feronis*

Limonia (syn. *Lacidissima*), *Acacia catechu* and *Zizyphus* bushes. *Nyctanthes* is frilly common. The trees except *Anogeissus* and *Bosellia* are mostly stunted and malformed. On the low hills and broken grounds as also in the northern and eastern aspects of higher ranges the composition of the forests improves. *Adina cardifolia* *Mitragyna Parviflora*, *Buchanania Lanza*, *diospyros melanoxylon* *Sonymida febrifusa*, *pterocarpus Marsupium*, *Madhuca indica* (Sys. *M. latifolia*) and *Terminalia tomentosa* become fairly common. On lower ground *Holoptenia intergrifolia*, *Salmalia malabarica*,

Schpeichera oleosss, Milimusa tomentosa (syn. Saccopetalum tomentosum), Hymenodicyon excelsum, and Bridelia retusa further enrich the composition. Chilbil, Bherul, Semal, karam and Kusum attain their largest dimension on amphibolite group of rocks. A characteristic feature of this type of forest on the plain is the presence of a pure crop of bel, a result of past Jhuming. Sal is a very rare species in this type and is only met with in pockets with deep soil. On plain and broken ground the biotic influences have a very far reaching effect on the quality and composition of the forest crop. On account of continued and unrestricted backing, over grazing, and fire the crop has become very much open and degraded. Bherul, Dhaura, Khair and Salai are the only surviving tree species mixed with Zizyphus, Carissa and Khair bushes. Practically every tree is stunted and gnarled. Never exceeding 20 feet in height. Emblica officinalis is common every where. Dendrocalamus strictus occurs commonly mixed with tree species in this type of forest. It attains its most luxuriant growth on gneiss and amphibolite formations which support some of the best bamboo forests in this state.

In the undergrowth Carissa Carands, Feronis Limonia, Flueggea obovata, Flacourtia indica, Wrightia tomentosa, Wood fordia fruitcosa, Zizyphus cenoplia, Zezylopyrus, Z. Mayrirtiana (syn. Z. Jujuba) and Acacia catechu are the most common species met with. Nimiltonia suareolus occurs at rocky places. Climbers are not prominent, the only species frequently come across are Butea Superba and Porana Paniculata, Among the grasses Apluda Varia, Themeda quadrivalyis Arundinella setosa Heteropogon contortus, Chrysopogan, Montanus and Cymbopogon martini are typical.

The forests of Kechki, Betla and parts/Saidup, Ramandag, Baresand and others belong to this type.

Type II- Dry Sal Forest:-

This type of forest is met with on the plains, low hills and on the northern and eastern aspects of higher hill slopes over shallow and infertile soil. The plain areas have been extensively Jhumed and maltreated. Owing to adverse physical and biotic conditions the tree crop is very poorly stocked and is generally very open. Sal is the dominant species but it seldom attains 70 feet in height. Regeneration is very poor throughout. The most common associated of sal in this type are Ptrocarpus marsupium, terminalia tomentosa, Ougenia coteinensis, (syn. o. dalbergoeotis), Emblica officinalis Cassia fistula, Anogeissus latifolia, Buchanania lanzan, Lagerstroemis parviflora, Madhuca indica, Diospyromelanoxylon, and Zizyphus xylopyrus. Among the shrub Carrissa carandas, Woodfordia fruiticosa, Indigofera Pulchela and Gardinia turgida are most

prominent. *Heteropogon contortus* And *Chrysopogon Montanus* are the typical grasses. Climbers are absent. *Phoenix acualis* is locally abundant.

Bamboos are not typically found in this type and their occurrence is usually limited to broken ground along nala banks and in the areas where the sal forest begins to disappear.

On account of continued overgrazing and forest fires the forest floor has become bare and compact, and the crop tends to become open. Indeed at some places it has already degenerated to savannah type. Sheet and gully erosion are fairly common. Regeneration whether by seedling or by coppice is extremely deficient. The soil has become impoverished and the area has become exceedingly dry. As result of this not only the sal seeds do not get a chance to germinate and establish themselves the coppice stumps also fail to throw new shoots on account of drought and poor site quality. In consequence there is a heavy mortality in coppice stumps. Drying of standing trees is of frequent occurrence and at times assumes serious proportion. The speed at which the trees are dying presents a serious problem for management and silviculture. This mortality is not confined to any particular category of sal trees and is equally common in every age gradation. At times it seems that the only solution appears to stop all green felling and a rigid protection of the area against fire and grazing for a considerably long period. The forest of Saidup, Ramandag, Barichatan, Part of Baresand etc. come under this type.

Type III- Moist Sal Forest .

This type is met with on the lower slopes of the hills, more particularly on the sheltered aspects, and in the valleys of the Baresand block south of the river Koel. Optimum condition obtain in sheltered valleys where the soil is fairly deep, well drained loamy clay with an adequate supply of soil moisture all the year round. The underlying rock may be either quartzite or gneiss but the geological formation is of lesser importance in this case owing to the fact the there is always a deep or at least moderately deep mantle of soil with adequate moisture.

This type varies between wide limits and merges at either extreme into the drier and moister communities. In this sheltered moist valleys where the soil is deep well drained loamy clay this type progress to the Singhbhum valley sub-type with sal often reaching up to 110 ft. in height.

In most sal forest the over wood consists principally or moderately of well stocked Q III sal which along often constitutes as much as ninety percent of the over

wood. In the localities which have been subjected to adverse physical and biotic conditions in the past the tree crop is often only poorly stocked. In such localities the characteristic tree associates are *Buchanania Lanza*, *Melanoxylon*, *Terminalia tomentosa* and *Emblca officinalis* with *Wendlandia tinctoris*, *Diospyros melanoxylon*, *Woodfordia fruticosa* and *Symplocas recemosa* as typical shrubs. *Phoenix acaulis* is often abundant. Elsewhere the most typical associates are *Terminlaia tomentosa*, *Tbelerica*, *Ceibamalabarica*, (*Semal*), *Syzygium cumini* (*Syn. Eugenia Jambolana*), *Adina cordifolia*, *Hymenodictyon Excelsum*, *Bridelia retusa portium serratum*, (*syn. Bursera serrata*), *Garuga pinnata*, *careya arborea*, *Semecarpus anacardium*, *Madhuca indica*, *Bauhinia spp.* *Capearia graveolens*, *Miliusa tomentosa* (*syn. Saccopetlum tomentosum*), and, *Miliusa velutina*. Among the shrubs the most common are *Moghania chapper* (*syn. Flemingia chapper*), *Croton oblongifolius*, *Glochidion lanceolarium*, *Randia dumetorum*, *Indigofera Pulchela*, *Wendlandia tinctoria*. Bamboo may or may not be present. In the most sheltered valleys this type progresses to the Singhbhum valley sub-type which is characterized by the presences of species which are not met with any where else. The following species become more abundant and constitute a considerable portion of the crop :- *Terminalia tomentosa*, *Syzygium cumini* *Adina cordifolisa*, *Schleichera oleosa* and *Portium serratum*, *Mangifera indica* and *Cedrela toona* are among the shrubs the following new species become typical- *Moghania stricta* (*syn. Flemingia stricta*) *Ardisia solanacea*, *Colebrookia oppositifolia*, *Clerodendrum viscosum*, (*Syn. c. infor tunatum*), *Mallotus philippinensis* and *Reinwardtia trayna*. Among the climbers *Bauhinia vahlii*, *Millettia auriculata*, *Butea parvi flora* and *Cobretum decandrum* are most frequently met with. The typical grasses are *Oplismensum* composites and *Pantcum Montanga*: and the only remn seen was *Lastree sacutaria*. Numerous grassy blanks commonly occur in this type forming Local edaphic societies. These blanks represent the old abandoned cultivation sites of pre-reservation date. Some of these areas have not yet succeeded in recolonising themselves presumably because of impeded drainage and frost. The forests of pandra, Henar, Bukka kona, Bharwar Bandha, Dauna Valley and Paharkocha come under this type.

Type-IV-High level Plateau Sal Forests.

This type of forest is confined to the Netarhat plateau above 3000 feet in elevation characterized by higher rainfall and lower temperature. The underlying rock is almost exclusively laterite. The soil derived from this is often highly ferruginous lateritic clay. It seldom attains any depth except in small pockets and only consist of a shallow layer of a

few inches directly overlying the parent rock. It seldom attains any depth except in small pockets and only consists of a shallow layer of a few inches directly overlying the parent rock. It has a poor moisture-retaining capacity. In many cases, it has become impoverished or much reduced in depth owing to past cultivation followed by exposure and surface erosion.

The most characteristic feature of the crop is the presence of uniform stands of sal in great purity. At places the stocking is almost complete. The quality of the crop is never better than QIV though in sheltered valleys it may attain a height up to 70 feet. The present condition of the crop is an outcome of past cultivation. Most of the forest appears to be secondary growth and the uniform size may be partially due to this cause. At places, particularly where it is of secondary growth, sal occurs in gregarious patches but elsewhere it is commonly mixed with *Syzygium cumini*, *Madhuca indica*, *Anogeissus latifolia*, *Lagerstroemia parviflora*, *Bauhinia retusa*, *Kydia calycina*, *Miliusa velutina*, *Callicarpa arborea*, *Symplocos racemosa*, *Careya arborea*, *Elaeodendron*, *Brodelia retusa*, *Butea mono-sperma*, *Casearia graveolens*, *Terminalia tomentosa*, *T. Chebula*, *Cassia fistula* and *Heynea trijuga*. Among the shrubby species the most commonly represented are *Indigofera pulchella*, *Sophora bakeri*, *Woodfordia fruticosa*, *Antidesma diandrum*, *A. ghaesembilla*, *Strobilanthes auriculatus*, and *Moghania Chappar*. *Bauhinia vahlii* is a common climber. The rocky ravines which have an exclusive flora often abound in *Pittosporum floribundum*, *Colebrookia*, *Sreblus asper* and *Schefflera venulosa* (syn. *Heptapleurum Venulosum*) the beautiful yellow flowering shrub *Hypericum gaitii* is commonly met with in marshy banks of perennial streams. *Thalictrodon*, *Rubus* and *Berberis* occur in sheltered narrow valleys. *Polvgala* is fairly common.

Type V- Moist Mixed forests :-

This type of forests is very limited and scattered in its distribution, mostly confined to valley bottoms occupying the flat lands on the bends of larger streams. The soil is invariably a deep loam or loamy clay. This type of forest definitely owes its existence to the basic nature of the soil and to the presence of sub-soil moisture in the dry season and impeded drainage.

The vegetation is characterized by the absence of sal in general and the presence of a host of mesophyllous species among which the predominant are *Terminalia tomentosa*, *Adina cordifolia*, *Syzygium cumini*, *Bauhinia retusa*, *B. purpursera*, *Albizia cordifolia*, *Syzygium cumini*, *Bauhinia retusa*, *B. purpursera*, *Albizia procera*, *Ceiba*

malabarica Bridelia retusa, Portium serratum Caruga pinnata, Litseaglutinosa (synn. L. chinensis) Stercospermum pergonatum (syn. s. chelonoides), Hymenodictyon Miliusa velutina and Miliusa tomentosa. Among the climbers most frequently come across are Millettia auriculata, Combretum decandrum and Bauhinia bahlii. The canopy is invariably closed and hence grasses are usually absent but the blanks are often colonized by Imperata Cylindrical with tufts Vetiveria zizanioides. The nala banks are covered with coarse grasses like some of the species of Saccharum.

The ecological status of this type of forest is interesting to determine. Apparently it would seem to be logical to term this type of vegetation to be a post climax of type III (Moist Sal Forests) but this does not stand the scrutiny of closer examination. It has already been extensively Jhummed in the past. Continued cultivation has altered the texture of the soil in certain pockets and have affected the drainage. As a result of this such areas have become partially water logged. Sal does not tolerate such soil whereas many of the species typical of this type of forest are tolerant in this regard. There cannot be any doubt that in most cases this type of vegetation is a second growth, being the result of past human interference leading to clear felling and cultivation. The true ecological status of such areas may therefore, be regarded as pre climax of damp valley sal. The stability of this type of forests is chiefly due to edaphic factors, impeded drainage has brought a succession termination and has held the vegetation in a stable preclimax. If the drainage and aeration of the soil is improved there is no doubt that succession will start and pave the way for the invasion of sal in due course.

Silviculturally this type of forest present many difficulties if natural regeneration in to be relied upon to establish sal or any other Valuable species. The question of opening the canopy obviously does not merit any consideration in this type because of vigorous weed growth. The simplest solution is to abandon all attempts at natural regeneration and to resort to clear felling and planting with valuable species. This has been adopted as standard procedure for regenerating such areas in other division. Some of the areas have been planted.

Ecology of blanks :-

The extensive jhumming and cultivation in the past has resulted in the numerous blanks or quasi blanks areas. Although in most cases the higher grounds are gradually being colonized, in the low lying paddy fields or old village sites, which for a greater period during the rains and after remain waterlogged, no tree species has net appeared. Effort made in the past to drain such areas and plant the damp living species

have failed so far. The pioneer species that first appear in colonizing work are Mallotus, Woodfordia, Carissa, Lagerstroemia, Zizyphus, Wendlandia, Khair, Asan, Simul, Janun and after them Flemingia, sal, and other species follow. Another type of blanks often seen in sal forest on the flatter areas are in strips often 1 to chains wide and varying in lengths. It is presumed that of first reservation when these forest came to be worked, strip felling might have been made, all tree stumps might have been burnt and completely removed. There is a little progress of such areas being naturally colonized by tree species so far.

Plantation:-

(a) A large number of plantation had been raised in the past in the division, but unfortunately many of them have failed or have been damage by the wild elephant and other wild animals. Worst n the case of Teak Plantation of Betla area which have suffered not only due to elephant damage but by theft also. The future of the remaining plantations also appears gloomy due to above factors. Besides, another zone of teak plantation known as tene and Maromar teak plantations in Baressand 1 and 9 (in core area) and in Baresand 10,11 & 14 have met with the same fate of destruction by elephants and other wild animals like Sambhur, Cheetal etc. Bamboo plantations in Betal, Saidupe and Baresand compartments and in other forests have also suffered due to elephant damage and browsing by wild animals. Remaining bamboo plantation have merged with the existing bamboo forests. Besides, a number of plantations of sal, Semul and other miscellaneous species viz. Eucalyptus and Acacia auriculiformis had also been raised. Most of them have failed expect the plantations raised outside the elephant operating zone i.e, Barwadih beat of Chhaipadohar Range.