

VI.—1921—1922.

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**REPORT**

BY

**THE CONSERVATOR OF FORESTS**

ON

PLANTATIONS IN THE NORTHERN TERRITORIES

OF THE

**GOLD COAST.**

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Ordered by His Excellency the Governor to be Printed.

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GOLD COAST.

GOVERNMENT PRESS, ACCRA.

## REPORT ON PLANTATIONS IN THE NORTHERN TERRITORIES.

Three plantations or Agricultural Stations were inspected, *viz* : at Tamale, Yendi and Wa. The largest is at Yendi and was begun by the Germans many years ago, but there is no record as to when. There are three large Teak trees in the plantation which appear to be between 25 and 30 years old so it may be assumed that the age of the plantation is not more than 30 years.

2. Yendi station was in charge of Mr. Maurice D. Reece, Assistant Superintendent of Agriculture, at the time of my inspection while the other two were looked after by West African learners.

3. At Yeji there is a little groupe of Teak trees about 6 years old near the Rest House and a strip of land 150 yards long by 100 feet wide, near by, is being planted up with Teak, but the planting distance 10' x 7' is not right. In order that they may make good length and not branch too soon, the maximum interval at which Teak should be planted is 6 feet owing to the poor soil.

4. The District Commissioner of Salaga who was also in charge of Yeji in February, 1922, was superintending all planting operations in the Station.

As Yendi plantation is by far the largest it will be described first. The plantation lies to the right of the road as it enters the Civil Station from Tamale and covers an area of about 200 acres. Quite recently 20 acres of this land has been handed over to the Trade School for buildings, recreation and Agricultural training.

A rough plan of the plantation, not drawn to scale, is attached.

The following Timber and other trees have been raised in the Plantation :—

Azelia Africana	(Opapao) 2 plots of $\frac{1}{2}$ acre each. Plants about 10 years old but only $2\frac{1}{4}$ " diameter—Evidently very slow growing or the soil is unsuitable.
Cedrela Odorata	(West Indian Mahogany) 650 seedlings 9" x 9" apart have not been a success as many perished from drought.
Eucalyptus.	58 trees, average girth 31" and height 84'—The age of these is unknown but they are magnificent specimens.
Khaya Senegalensis	(dry zone mahogany) Four 10 acres plots planted in lines 10' apart with plants at intervals between 1 and 2 feet in the lines. The age of these is unknown but the trees have not done well—The stems vary in girth between 22" and 7" and are barely $7\frac{1}{2}$ ' long before they branch and hence are not of much use as poles.
Tectona grandis	(Teak). There are 42 acres of this species originally planted as follows :— 2 acres 10' x 10' Quincunx. 10 " 10' x 10' In straight lines at right angles to each other. 10 " 7' x 7' " " " 10 " 6' x 6' " " " 10 " 10' x 5' possibly 5' x 5' with every alternate line cut out subsequently.

5. In plot 8 (10' x 10') every other line of trees has been cut out. The average girth of trees in the East  $16\frac{1}{2}$ " but only  $12\frac{1}{2}$ " in the West. Age unknown, also whether the smaller girth in the Western end is not due to later planting. Height of trees about 30'.

Plot 16 (12' x 6') every other line cut out, girth 9, height 15'.

Plot 15 (12' x 6') every other line cut out, girth  $10\frac{3}{4}$ ", height 17'.

Plot 3 by nursery, girth 22", height 30'—35'.

Plot 3 by limes, girth 17", height 30'.

6. There is a solitary line of Teak along the path North of the Eucalyptus containing trees 10 feet apart with an average girth of 27 $\frac{3}{4}$ " and height 40'. Close to this line are three of the largest Teak in the plantation, all of which branch at about 6 feet from the ground. The thickest has a girth of 58".

7. Ten acres of oil palms are in the plantation, the fruit of which has been much appreciated in Yendi. The leaves have been found very useful for roofing. The annual cutting of the lower will leaves supply such roofing materials as is required.

8. Fruit trees consist of Guava, Lime, Mango, Sugar Apple and Bannana. Recent additions have been made of Avacado Pear, Grape fruit, Lemons and better varieties of Mango.

#### RECOMMENDATIONS.

9. *Senegal Mahogany*. As this species is found growing naturally throughout the Northern Territories, usually on banks of streams and in other places where there is a good depth of soil, it would appear that the substratum of laterite in the plantation area is not favourable. The young trees having begun to branch quite early are not likely to produce good poles, so they should be used up and the plot put under Teak.

10. *Afzelia Africana*. These are only 2 $\frac{1}{4}$ " in diameter and are said to be about ten years old. As this species is among the commonest in the Northern Territories and is a very hard and excellent timber although the boles are seldom straight and never very long, 20 feet being about the limit, planks and beams of moderate length can be obtained from them.

It is a waste of time attempting to raise *Afzelia* if it is actually so slow in its growth.

11. *Cedrela Odorata*. These should continue to be raised in the plantation but planted out along roadsides chiefly.

12. *Eucalyptus*. No extension is recommended for the present. The magnificent trees are a great feature in the plantation and prove that here, at any rate, the species does well. The Assistant Inspector of Agriculture has distilled oil from the leaves and if this product can be proved to be a Commercial proposition a larger area may be put under *Eucalyptus*.

13. *Teak*. This species is far and away the best and most useful species which can be grown in the Northern Territories.

14. There has been a tendency in Yendi to over conserve the poles even to the extent of retarding Government work.

I recommend that so long as Teak poles are absolutely necessary for roofing and other purposes that they should be supplied from the plantation.

15. As I am quite convinced that owing to the poor and shallow soil of West Africa, Teak will never grow into large trees capable of supplying sawn timber for furniture, flooring, &c., that it be raised for the express purpose of providing poles for scaffolding, roofing, &c., especially as there is no indigenous species in the Northern Territories which produces material to compare with Teak poles in straightness, length, strength and durability.

16. For the purpose, however, of experiment, one plot of 5 or 10 acres of the oldest and thickest poles should be reserved in order that they may attain their maximum dimensions. The remainder of the area under Teak should be completely clear felled in the next ten years and as one tenth is cleared in the first year it should be replanted so that eventually there will be a regular gradation of saplings and poles from one to ten years of age.

17. A rotation of ten years is prescribed as poles of this age are in most demand.

18. The annual fellings should be made when the trees have shed all their leaves, that is about March, and the poles stacked on end and not horizontally on the ground.

The yearly output should be used by Government as required and the surplus sold to the town people who are very badly off for roofing material and at present cut down every young pole met with, irrespective of species, and hence a heavy toll is levied on the Shea.

19. For the present the oldest trees in the plantation are able to supply the necessary seeds for raising new transplants, but a supply of about 1 cwt. of seed from Burmah should be obtained yearly for a few years for distribution throughout the Northern Territories as soon as the finances of the Colony are in a better state.

20. As the Teak seed does not germinate very readily, and owing to this fact many people have been disheartened in trying to make plantations (*e.g.*, The Ashanti Gold Field Corporation) I quote in extenso the paragraph on "preparation of seed" from Professor Troup's work "Silviculture of Indian Trees," Volume II., which is practically the last word on Indian Silviculture.

"Preparation of seed. In most parts of India it is customary to subject teak seed to some form of preliminary preparation in order to hasten germination, without which the seed is found to lie dormant for a year. Provided the seed is sown well before the early showers preceding the monsoon, such preparation is not always necessary; it is not ordinarily resorted to in Burma, and the results are all that can be desired. In India many different plans are adopted. At Nilambur soaking for 48 hours before sowing in the nursery is found to give good results; the soaking is effected by placing sacks of seed in running streams. Exposing the seed to the weather for a whole year in the open has been found successful in Bombay. In Kanara seed sown in beds early in April, and watered daily until the rainy season, has been found to germinate fairly well, though some of the seeds lie dormant for a year. Mr. L. S. Osmaston has described a method which has given uniformly excellent results in Satara, where the rainfall is about twenty-four inches. A hole large enough to hold all the seed is dug in April in a sunny spot, filled with seeds, covered with a layer of earth one inch thick, and thoroughly drenched with water every third day for six weeks. The seed is then taken out and spread in the sun for three weeks, by which time the rainy season is about to commence, when the seed is sown and germination takes place readily. Another plan, successfully tried in Surat, is to subject the seed to alternate soaking in water for twenty-four hours and drying on the ground for four days, repeating this process for a fortnight; the seed is then placed in a hole in the ground and kept moist until germination begins, when the germinating seeds are removed daily and sown. Slight charring has been found to stimulate germination, but this method is not to be recommended, since the vitality of the seed is destroyed if the heat is too intense. Mr. E. M. Hodgson, in Surat, found that soaking for twenty-four hours in lukewarm water prior to sowing invariably induced germination in twelve to twenty-four hours. A method which is said to give good results in Bombay is to fill a pit with alternate layers of seeds and earth one inch thick, cover it with earth, and keep it well drenched with water for about a fortnight; the seeds and earth are then mixed well together and watered until germination begins. A method tried with success in Ceylon is to spread the seed in a layer four inches thick on a mat in the sun and keep it constantly watered; germination starts in about three days, and the germinating seeds are removed daily and sown in the nursery. This method should be carried out only in fine weather, since the seeds are apt to rot if kept too moist without being exposed to the sun. In an experiment carried out by Mr. H. Tireman in Coorg in 1916 good results were obtained by placing the seeds between gunny-bags in April and watering them well; germination commenced in 13 days, and ceased 26 days later."

21. Teak seeds, after they have been duly treated so as to ensure germination (the best and quickest method being arrived at by experiments), should be sown in the nursery and covered with half an inch of soil, and the seedlings should be transplanted when they are about 3" high. The time chosen for sowing should be shortly before the rains set in so as to have transplants of the right size for putting out when the rains begin.

22. In the planting area pits about 10-12 inch cube should be made in lines 6' x 6' apart and filled in with loose earth ready for the reception of the young seedlings. Planting must always be carried out during a light but continuous drizzle. A hole should be made in the loose earth of the pit, the roots of the seedlings carefully inserted and the earth pressed round them with the hand. The seedlings should not be in a hollow but raised slightly above the surrounding level of the ground to allow for settling of the earth.

23. If large transplants, say a year old, have to be used, then both the stem and the roots should be pruned before they are put into their new position.

24. I recommend that at Yendi 40 acres be retained for Teak and that 4 acres per annum be replanted 6' x 6'. This will ensure for an indefinite period a supply of 4,500 poles a year, and as the bulk of this could be disposed of to natives at a price sufficient to recoup Government, they will be provided with good roofing material and the necessity for denuding the country of young trees will not occur.

25. *Oil Palms.* I do not recommend any extension to be made. This species is outside the latitude within which it thrives and it cannot be expected to approach in bearing capacity the oil palms in their proper habitat.

26. Fruit trees are very desirable and good varieties should be raised.

27. It is the province of the Agricultural Department to decide whether *Strophanthus*, *Cassada* and Pigeon peas are necessary, and whether it is wise to grow native food crops at a cost of more than double the price at which these can be purchased locally.

28. A good vegetable garden, such as Wa and Lorha have, would be a great boon to Yendi residents.

#### TAMALE AGRICULTURAL STATION.

29. This plantation besides containing *Strophanthus*, *Cassada*, Pigeon peas and some native food crops, has guavas, mangoes, grape fruit, Lemons, Bananas and pine apples. All these are reported to have fruited well, but suffered somewhat from drought in 1921.

30. Three 5 acre plots of sisal produced useful material for ropes during 1921, 8,790 eaves weighing 9,440 lbs, yielded 425 lbs; of fibre, Prison labour being employed on this work.

31. Attempts have been made to raise Shea butter trees but the annual plantings have proved a failure. I could not find out the reason for such failures, but as this species is found very extensively throughout the Northern Territories there is no object in attempting artificial regeneration.

32. Experiments with Mahogany and Eucalyptus have not been successful.

In 1921 the one acre mahogany plot was extended to 5 acres, but nearly all the seedlings died. Very heavy casualties occurred among Eucalyptus seedlings;

33. There is a 5 acre plot of six years old Teak; The saplings show very poor growth owing to the poor soil, and also to the seedlings having been put out 12' x 12'. Young Teak plants, one and two year old, in an acre plot, show comparatively better growth, but in this instance also the planting interval 10' x 5' is too great in one direction.

#### RECOMMENDATIONS.

34. The only Timber tree which should be persevered with is the Teak. It is the only species which yields suitable material in the shape of straight, long and strong poles for roofing and scaffolding in a reasonably short time and the lack of good poles is sorely felt in Tamale.

The present Teak plots should be interplanted with Teak seedlings so as to have an interval of 6' x 6' in the older 5 acre plot and 5' x 5' in the smaller plot.

35. A plot of 100 acres should be chosen within a few miles of Tamale where the sub-soil is not laterite and 10 acres be planted up annually with Teak 5' x 5' or at most 6' x 6'. This work should be taken in hand as soon as possible.

36. A firewood plantation is not recommended at present. It is a costly operation and must be postponed till funds are available or the work can be done by free Communal labour.

37. As the population in and around Tamale is dense the land for several miles in every direction is needed for food crops, but the country east of the Capital would appear to offer a site suitable both in respect of natural vegetation and size for a fuel reserve, when it is possible to start one.

38. In order that such a Reserve may be of practical value, that is capable of meeting the requirements of the people in regard to fuel for their domestic wants certain data will have to be collected before the size of the Reserve can be definitely fixed. For example, the minimum annual consumption per household or compound, and the present average yield in tons per acre of normal natural forest, excepting all shea trees.

39. When it is ascertained how many acres of such natural forest would supply the annual demand of the population dependent on the Reserve, and area at least fifteen times this acreage should be demarcated as a Fuel Reserve.

This Reserve would be protected from fire, its density increased by silvicultural operations favourable to natural regeneration and by introducing quick growing species, and the whole area worked on a fifteen years rotation.

40. If all Shea trees in such Reserve were not felled, the Reserve would serve the double purpose of protecting a considerable area of Shea and supplying firewood to the people.

41. There is a small Agricultural Station at Wa in charge of a learner of the Agricultural Department.

42. Teak in the plantation was sown in June, 1919, and are about 20' high and from 6" to 9" in circumference. The acreage under this species is only  $3\frac{1}{2}$  but there are three separate plots. Evidently the maximum area to be planted with Teak was not fixed on at the beginning, and extensions have since been made wherever there was unoccupied space. Trees planted 9' x 9'.

43. Half an acre has been planted with Eucalyptus and the saplings are very well grown for the age. They were likewise planted 9' x 9' in June, 1919, and one sapling is about 30' high and 15" circumference.

44. Other species of plants found in the plantation are Strophanthus, Pigeon peas, &c.

45. *Recommendations.* So far as Timber and other trees are concerned I recommend that 10 acres be put under Teak, planted 6' x 6', to be worked on a ten years rotation, and that a nursery be maintained for raising plants for avenues.

As Eucalyptus does so well, rather than have them growing in the plantation young plants should be used for avenues and for dotting about the station in small groups.

46. Whether the Agricultural Station as such should be enlarged for the purpose of making experiments with economic plants and food crops is a matter for the Director of Agriculture to decide.

At present there is hardly sufficient work for the learner.

#### GENERAL REMARKS.

47. Having stayed in very many Rest Houses in the Northern Territories, some very good, as in the Lorha District, most of the others good and a very few not good only by comparison with the best, I was struck with the large demand for roofing material in a country where the majority of the poles are small and crooked and a heavy toll is levied on young Shea. Under such circumstances it would be profitable to induce chiefs of all large towns and villages to have small Teak plantations for their own use.

48. An acre plot of Teak at all places where Government Rest houses exist would be sufficient for renewals, as over 100 poles per annum could be used for this purpose if necessary, but as poles of this species are very durable renewals would not be necessary for five years at least. With regard to the plantations in Togoland, where the Germans went in largely for Teak, the chief consideration is whether these poles are much in demand. Where they are, plantations should be clear felled to the extent of about one-fifteenth of the total area as a maximum, and after the requirements of Government are satisfied, the remainder of the poles should be sold to the natives. Before felling operations are undertaken (when the trees have shed all their leaves) a requisition should be called in from all persons needing poles, and the extent of felling regulated according to the demand.

49. In no single year should more than one-fifteenth of the total area be clear felled (*i.e.*, every tree felled over the required area).

50. As Teak coppices very freely, if the poles are cut flush with the ground and the stools dome shaped in order to avoid water lodging in them two or more shoots will make their appearance during the next growing season from each stool. In the second or third year the best of these shoots should be left to grow into poles and the rest cut back.

51. Replanting need not be undertaken at first, but if it is found that the stools do not coppice satisfactorily planting should be done.

Weeding will be necessary only in the freshly cleared areas, and then only till the poles have made sufficient growth, as the leaf canopy of poles 6' x 6' apart will prevent the growth of grass and weeds likely to harm the poles.

52. Protection of all existing plantations from fire should be rigidly enforced.

The method of ensuring protection has been described elsewhere.

53. All the plantations are too valuable to be subjected to recurring fires and these are bound to happen if the boundaries are not fire-traced and some measure of patrol not afforded.

N. C. MCLEOD,  
*Conservator of Forests.*

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