Report on Forest Management Review on Teak Plantation in Anamaduwa, Puttalama, Batticaloa

CONDUCTED BY

ASIA TEAK GROUP

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Report on visit at Anamaduwa, Puttalam and Batticaloa Teak Plantation for forest management review on 2021.12.11-12

Summary of review

Mr Paul, Mr Jayalath, Mr Eranda Rathnamalala and I visited Anamaduwa, Puttalam and Batticaloa Teak Plantation for forest management review on 2021.12.11 and 12. In this study, we have used the 2020 December and 2021 April tree inventory data for growth analysis and recommendations to be made. Some of the selected trees' DBH data of the year 2020 and DBH data presently (2021 December) were compared to find out the diameter growth of each plot, Block and Estate.

In this visit, 108 trees' diameters at breast height were measured in 20 plots covering three plantations (4 plots from Anamaduwa, 11 plots from Batticaloa and five plots from Puttalam.

Anamaduwa: The extent of the Anamaduwa plantation is 4.8 ha(planted area 4.18ha) in which 3683 trees were found with an average of 15.67 cm DBH and 14.6 m height and 881 trees per ha according to inventory results of 2020 December. However, according to thinning regime developed for the Anamaduwa plantation, Tree stocking needs to be reduced up to 730 ha in 2021. The present study showed that the mean DBH of the Anamaduwa plantation is 16.26cm. The comparison of individual tree growth (DBH) between 2020 December (DBH 15.78cm) and 2021 December (DBH 16.3cm) is 5mm. (See detail table 1.1)

Puttalam. The extent of Puttalam plantation is 10 ha (planted area 8.3ha) in which 5093 trees are found with an average of 17.62 cm DBH and 12.7 m height and 613 trees per ha according to inventory results of 2020 December. However, according to thinning regime developed for the Puttalam plantation, Tree stocking needs to be reduced up to 560 ha in 2021. The present study showed that the mean DBH of the Puttalam plantation is 18.74cm. The comparison of individual tree growth (DBH) between 2020 December (DBH 17.86cm) and 2021 December (DBH 18.74cm) is 8.8mm. (See detail table 2.1)

Batticaloa. The extent of the Batticaloa plantation is 48 ha(planted area 29.5ha) in which 15,774 trees are found with an average of 11.34 cm DBH and 8.3 m height and 549 trees per ha according to inventory results of 2021 April. The present study showed that the mean DBH of the Batticaloa plantation is 13.15 cm. The comparison of individual tree growth (DBH) between 2021 April (DBH 12.15cm) and 2021 December (DBH 13.15cm) is 10 mm. (See detail table 3.1)

Diameter at breast height has increased 5mm and 8.8mm per year in Anamaduwa and Puttalam plantations respectively. Diameter at breast height has increased 10mm within 8 months in Batticaloa plantation. This data revealed that the Batticaloa plantation showed better DBH growth than the other two sites and the Anamaduwa plantation exhibited the slowest value of DBH growth.

Table 1. Summary of Tree inventory data collected from Anamaduwa, Puttalam and Batticaloa Teak Plantation on 2021.12. 11-12

Plantation name	Planted area ha	No. of trees in ha	Mean DBH(cm)	Current Annual Increment(CAI) mm.
Anamaduwa	4.18	730 based on 2020 December data	16.26	5mm
Puttalam	8.3	560 based on 2020 December data	18.74	8.8 mm
Batticaloa	29.5	627 based on 2021 April data	13.15	10 mm

Table 2: Thinning regime developed for Anamaduwa plantation based on planted area of 4.18ha

Age/ Year	Main crop before thinning					Crop removed		Main crop after thinning				
	Tree No.	Trees / ha	Mean DBH (cm)	Mean Height (m)	Tree Vol. (m^3) or Tree Vol. / ha	Tree No.	Trees / ha	No of trees	Trees /ha	Mean DBH (cm)	Mean Height (m)	Tree Vol. (m^3) or Tree Vol. / (ha)
10/ 2020	3683	881	14.37	13.3	0.094/84.4							
11/ 2021	3683	881	15.67	14.6	0.126/	636	152	3047	730			1st thinning
12/ 2022	3047	730										
13/ 2023	3047	730										
14/ 2024	3047	730										
15/ 2025	3047	730										
16/ 2026	3047	730				555	132	2492	596			2nd thinning
17/ 2027	2492	596										
18/ 2028	2492	596										
19/ 2029	2492	596										
20/ 2030	2492	596										Final felling

Table 3: Thinning regime developed for Puttalam plantation based on planted area 8.3ha.

Age/ Year	Main crop before thinning					Crop removed		Main crop after thinning				
	Tree No.	Trees / ha	Mean DBH (cm)	Mean Height (m)	Tree Vol. (m^3) or Tree Vol. / ha	Tree No.	Trees / ha	No of trees	Trees /ha	Mean DBH (cm)	Mean Height (m)	Tree Vol. (m^3) or Tree Vol. / (ha)
9/ 2020	5093	613	16.37	12.4								
10/ 2021	5093	613	17.62	12,7		442	53	4651	560			1 st thinning
11/ 2022	4651	560										
12/ 2023	4651	560										
13/ 2024	4651	560										
14/ 2025	4651	560										
15/ 2026	4651	560				740	89	3911	471			2nd thinning
16/ 2027	3911	471										
17/ 2028	3911	471										
18/ 2029	3911	471										
19/ 2030	3911	471										
20/2031	3911	471										Final felling

1. Teak plantation (Palugahayaya) in Anamaduwa

Location and name of the plantation: Teak plantation (Palugahayaya) in Anamaduwa

Extent of the land (plantation): 4.8 ha and Planted area 4.18ha

Planting year and present age (Years): 2009 / 2010 and 11 years old

Present tree number in 4.18 ha of planted area: total trees 3047 and 730 /ha

Figure 1.1: Out side view of Anamaduwa teak plantation managed by Vision Forestry (PVT) limited.

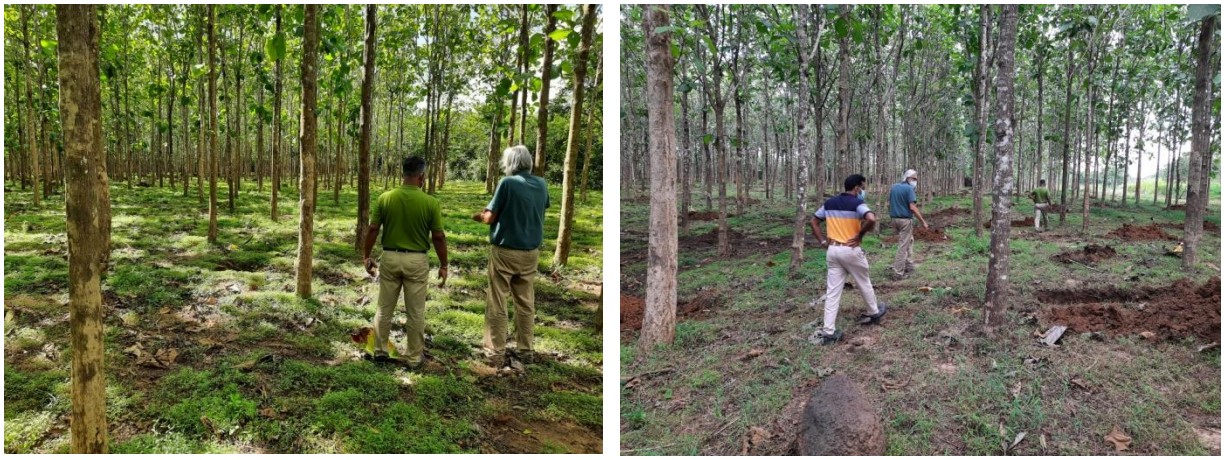
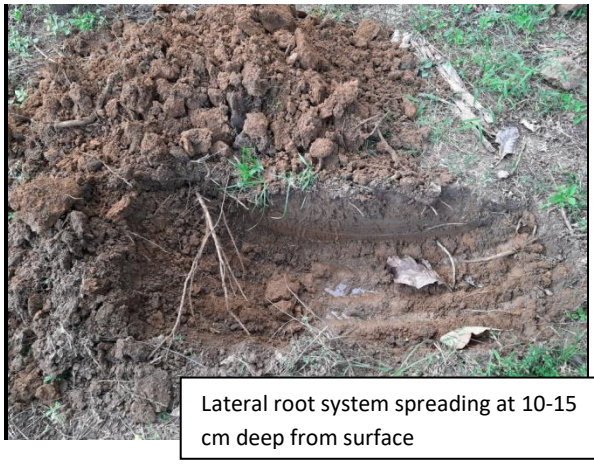


Figure 1.2: Inspection of applying fertilizer in pits which were dug at center to four trees in two rows of teak plantation



Lateral root system spreading at 10-15 cm deep from surface

Figure: 1.3: 10-15 cm deep pits were dug by studying the spread of root system of teak. Extra depth made were filled by top soil and compost

Table 1.1: Tree inventory data (DBH) collected from plots in Anamaduwa plantationon on 2021.12.11. (DBH values were taken from the known trees which can be identified in tree map in order to compare with previous year growth.

Plot no.	No. of trees measured for DBH	Mean DBH(cm)of year 2020.December	Mean DBH(cm)of year 2021.December	Current Annual Increment (DBH) mm
Plot 1	5	17.44	17.92	4.8 mm
Plot 2	5	16.3	16.68	3.8mm
Plot 3	5	14.92	15.66	7.4mm
Plot 4	5	14.46	14.8	3.4 mm
Grand Average		**15.78**	**16.26**	**5 mm**

Observation and recommendation

1. Present study showed that mean DBH of Anamaduwa plantation is 16.26cm. The comparison of individual tree growth (DBH) between 2020 December (DBH 15.78cm) and 2021 December (DBH 16.3cm) is 5mm. (see detail table 1.1)

2. First thinning has been applied in first quarter of year 2021. Now there are 3047 trees which represent as tree stocking of 730 trees per Ha.

3. Slow growth trees were observed in Plot 4. More attention needs to be focused on these planting areas.

4. by studying the spread of root system of teak. 10-15 cm deep pits need to be used for application of fertilizers. Extra depth made can be filled by top soil and compost.

5. Weeding and pruning have been done timely.

6. Teak Plantation is healthy and good condition

2. Location and name of the plantation: Teak plantation (Singhanagavillu) in Puttalam.

Extent of the land (plantation): 10 ha

Planting year and present age (Years): 2011 and 9 years old

Present tree number: 4651 trees in 560/ha of 8.3 ha of planted area.

Figure: 2.1. Entrance of Asia Teak Lanka (pvt) LTD and Tree measurements are being taken.

Figure 2.2: Inspection by Mr. Paul in Teak Plantation.

Table 2.1.Tree inventory data (DBH) collected from plots in Puttalum plantation on 2021.12.11. (DBH values were taken from the known trees which can be identified in tree map in order to compare with previous years' growth).

Plot no.	No. of trees measured for DBH	Mean DBH(cm)of year 2020.December	Mean DBH(cm)of year 2021.December	Current Annual Increment (DBH) mm
Plot 1	13	18.6	20	13 mm
Plot 2	5	18.22	18.96	7 mm
Plot 3	5	18.56	19.2	6 mm
Plot 4	5	16.36	17.14	8mm
Plot 5	5	17.5	18.4	9 mm
Grand Average		**17.8**	**18.7**	**9mm**

Observation and recommendation

1. Present study showed that mean DBH of Puttalam plantation is 18.7cm. The comparison of individual tree growth (DBH) between 2020 December (DBH 17.8cm) and 2021 December (DBH 18.7cm) is 9mm. (see detail table 2.1)

2. First thinning has been applied in first quarter of year 2021. Now there are 4651 trees which represent as tree stocking of 560 trees per Ha.

3. Slow growth trees were observed in Plot 4. More attention needs to be focused on these land areas.

4. It was observed that the spread of lateral root system of teak occur around 10-15 cm deep from surface level, hence pits need to be dug for application of fertilizers according to that, in case Extra depth of pits occurred which can be filled by top soil and compost.

5. Weeding and pruning have been done timely. Plantation is healthy and good condition.

3. Location and name of the plantation: Teak plantation (Kumburuwela) in Batticaloa

Extent of the land (plantation): 48 ha

Planting year and present age (Years): 2012 and 9 years old

Planting spacing: 4m x 4m (zigzag / spacing between two rows is 3.5m but 4 m between in two trees)

Present tree number: Total tree -15774 trees and 549 trees/ha in 29.5 ha of planted area.

Figure 3.1: Trees in Block and plots. Asia Teak team is taking the tree parameters

Figure 3.2: Tree growth habit of some section of plantation which needs more attention to improve the tree growth. Continuous weeding has been carried out.

Few local teak trees with minor splitting

Seriously wounded Stem due to bark splitting which has damage to cambium by exposing the wood.

Figure 3.3: Bark splitting were observed in some trees. This damage has been healed in many trees. This splitting has gone deeply upto tree wood in serious cases then it has taken some time to recover. This problem is not severe in local Teak trees planted in this site. It is recommended to apply the fungicide in wounded tree stems.

Table 3.1.Tree inventory data (DBH) collected from plots in Batticoloa plantation on 2021.12.12 (DBH values were taken from the known trees which can be identified in tree map in order to compare with previous year growth.

Plot no. and Block	No. of trees measured for DBH	Mean DBH(cm)of year 2020,December	Mean DBH(cm)of year 2021,December	Current Annual Increment (DBH) mm
Block 1 Plot 1	5	9.4	10.2	4mm
Block 1 Plot 3	5	17.2	17.7	4mm
Block 1 average		**13.5**	**13.9**	**4mm**
Block 2 Plot 1	5	14.8	15.7	8mm
Block 2 Plot 3	5	12.4	12.9	5mm
Block 2 Average		**13.6**	**14.3**	**7mm**
Block 3 Plot 1	5	11.1	12.5	14mm
Block 3 Plot 2	5	13.4	15.1	17.4mm
Block 3 average		**12.2**	**13.8**	**15mm**
Block 4 Plot 1	5	14.5	15.1	8mm
Block 4 Plot 2	5	8.9	10.6	16.8mm
Block 4 Average		**11.6**	**12.8**	**12.4mm**
Block 5 Plot 1	5	6.9	8.4	13.8mm
Block 5 Plot 2	5	13.1	13.8	7mm
Block 5 Plot 4	5	9.5	10.6	10.6mm
Block 5 Average		**9.8**	**10.9**	**10.9mm**
All block average		**12.15**	**13.15**	**10mm**

Observation and recommendation

1. Present study showed that mean DBH of Batticaloa plantation is 13.15 cm. The comparison of individual tree growth (DBH) between 2020 December (DBH 12.15cm) and 2021 December (DBH 13.15cm) is 10mm. (see detail table 3.1)

2. Now there are 15774 trees which represent as tree stocking of 549 trees per Ha. However tree stocking vary with Plots in different Blocks. Examples: highest stocking of 628 trees/ha was found in Block 1. But lowest stocking of 445trees/ha was found in Block 5. Considering this, first thinning regime needs to be planed according to stocking of Blocks. First thinning has been applied in first quarter of year 2022 for selected some parts of Blocks.

3. Slow growth trees were observed in Plot 4. More attention needs to be focused on these land areas.

4. It was observed that the spread of lateral root system of teak occur around 10-15 cm deep from surface level, hence pits need to be dug for application of fertilizers according to that, in case Extra depth of pits occurred which can be filled by top soil and compost.

5. Bark splitting was observed in some trees. These damages have been healed in many trees. This splitting has gone deeply up to tree wood in serious cases , under this circumstance it has taken some time to recover the wounds. This problem is not severe in local Teak trees planted in this site. It is recommended to apply the fungicide in wounded tree stems.

6. Plots demarcation poles need to be maintained

7. Weeding and pruning have been done timely. Plantation is healthy and good condition.

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