



# **AsiaTeak Tropical plantations**

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### **Introduction**

Asia Teak Tropical Plantations Pvt. Ltd is a one of responsible commercial forestry company in the world that is eagerly wanted to maintain the quality of investments on forestry. As a long term investment plan, forestry plantations are very expanding business in the world with the high concern on the environment conservation. Investment on Forestry is one of profitable business with contributing to protect environment.

Independent annual audit programme was conducted by Austhai Geophysics consultants company in the month of February 2018 for all Teak plantations in Thailand. As a part of the audit, that tree growth were measured to analyze the current growth conditions to schedule the next management plan for all Teak plantations. Height and Diameter should be maintained properly to achieve the final growth target.

As par the objects of measuring trees, It was important to analyze the below data to predict the growth rates and current growth conditions in the plantations. Which are, a. Diameter @ Breast height in centimeters

- b. Current Annual Increment of Diameter
- c. Mean Annual Increment of Diameter
- d. Growth predictions in Diameter

## Observations of U-Thong Plantation

Plantation conditions of U-thong plantations are in satisfactory level with well maintained fire gaps, roads and plantation sanitary conditions.

However, We noticed some points which should be considered further more for better growth condition of plantation.

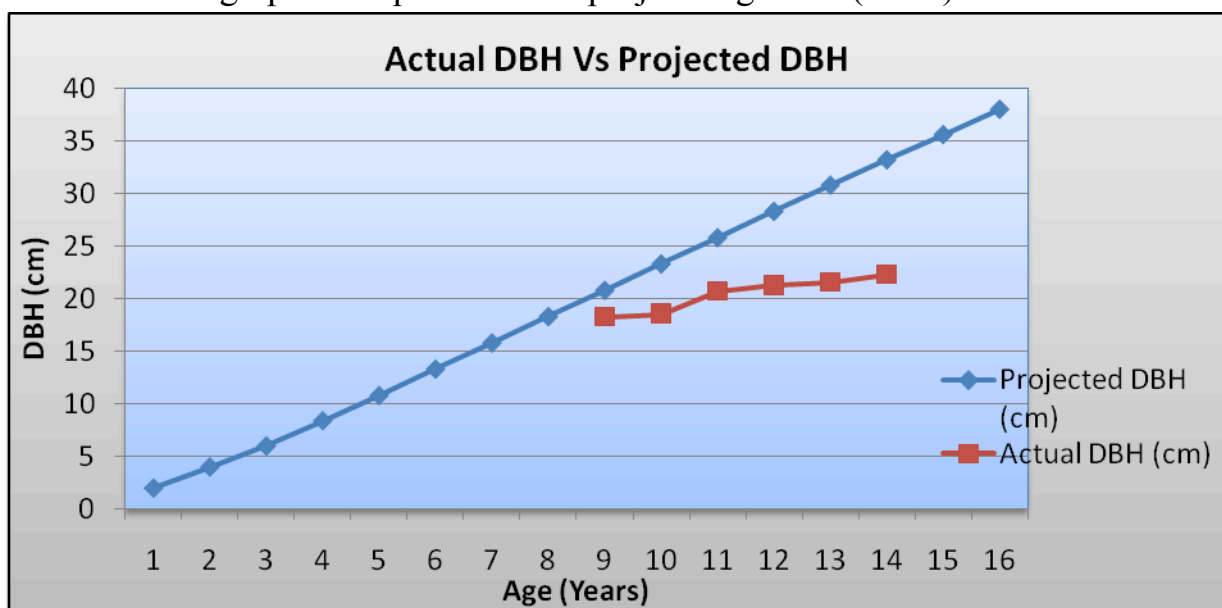
- Termite damaged has recovered in some extent and has to be more cared of Teak trees to control the termite attack of some trees in all blocks in U-Thong plantation. Termite attack could be a one reason to increase the tree quality of some trees in the field. But it could be harmful to some trees with low tolerance level to termite attack in the field.
- Fence damages could be seen in some places.  
Fence of U-Thong estates could be seen damage in some areas and it should be repaired to control any unauthorized entrance of outsiders and cattle etc.,
- Pruning of trees has been done in satisfactorily and need more pruning of some trees.  
Pruning has been completed most part of the estate and Pruning is required to do for some trees in U- Thong estate to harvest good quality timber at the end. Although, most of trees have pruned well in previous pruning programmes.

### Growth condition of U-Thong estate

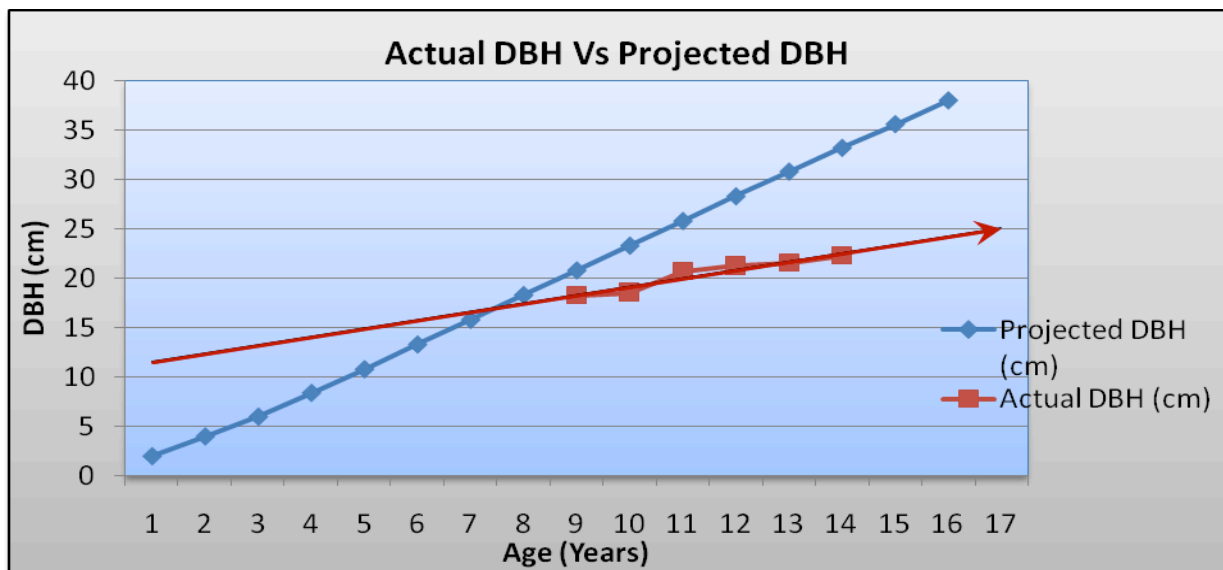
According to the analyzed sample plot data, growth conditions in U-thong estate as in the below condition.

Age	Projected DBH (cm)	Actual DBH (cm)	MAI (cm)	CAI (cm)
1	2			
2	4			
3	6			
4	8.4			
5	10.8			
6	13.3			
7	15.8			
8	18.3			
9	20.8	18.3	2.03	-
10	23.3	18.6	1.86	0.3
11	25.8	20.7	1.88	2.1
12	28.3	21.3	1.78	0.6
13	30.8	21.6	1.66	0.3
14	33.2	<b>22.3</b>	<b>1.59</b>	0.7
15	35.6			
16	38			

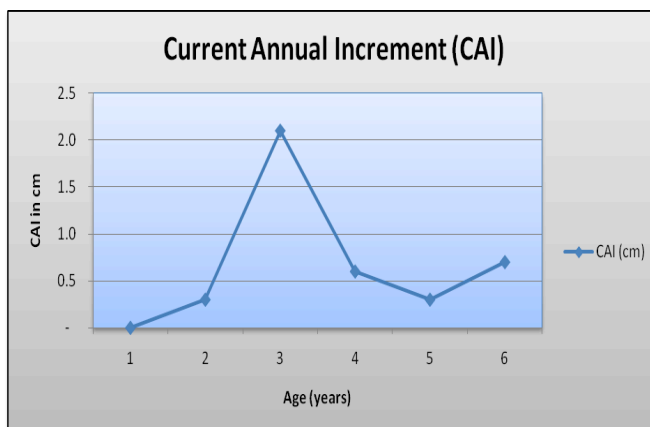
Growth graphs comparison with projected growth (DBH)



## Growth graph with projected trend line of future growth



## Current Annual Increment and Mean Annual Increment



According to the analyzed data in U-Thong estates, It is already achieved the more than 50% from the target within this short period of plantation under the management of Thai orchid lab company in Thailand and supervision of AsiaTeak plantations company. But it will has to be manage more additional years to harvest good quality timber with high value.

Projected timber volume can be obtained from the additional teak stock in buffer stock plantations within projected period without any hesitations. Timber value can be increased by comprehensive timber quality improvement programme within this period.

## **Observations of Chon Daen Plantation**

Generally plantation condition is in satisfactory level. The growth condition of Teak trees is in satisfactory level.

However, We noticed some points which should be improved further for better growth condition of plantation.

### **Silvicultural Conditions**

- Thinning programme has been completed satisfactorily and it would be very helpful to increase the growth rates basically in girth.

Average tree height of Chon Daen plantations have already been achieved due to high tree density. But it will lead to low increment of girth with high rate of height increment. Therefore, it is very important to manage the stand density of teak trees to let them to achieve the growth targets.

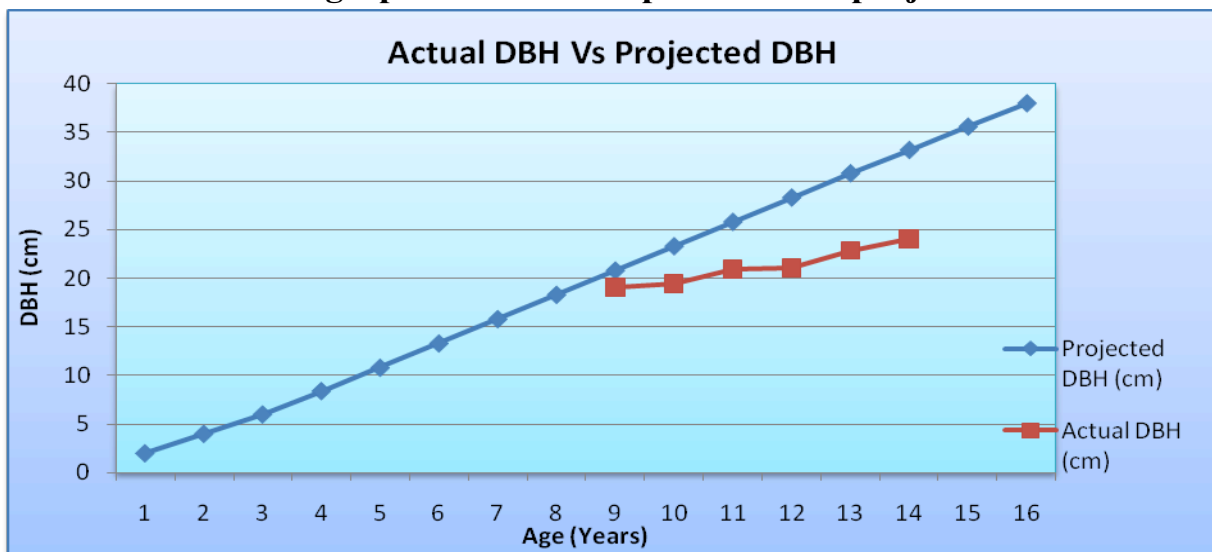
- Pruning of Teak trees has been done adequately of most Teak trees.  
Pruning of below branches of teak trees are necessary to improve the wood quality of trees. Generally, it is recommended to keep 60% of branches from the tree for the food production. Although, it is difficult to remove upper branches due to the labour intensive operation.

### Growth conditions of Chon Daen estates

It is included the conditions of the growth of Chon Daen estates analyzing the sample data and details are as below.,

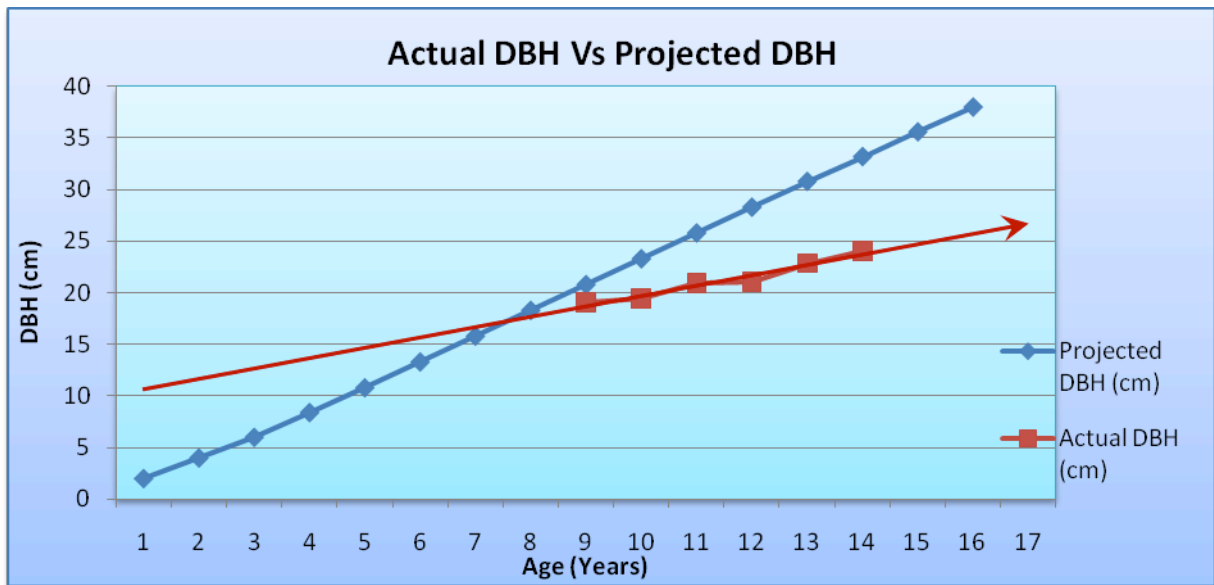
Age	Projected DBH (cm)	Actual DBH (cm)	MAI (cm)	CAI (cm)
1	2			
2	4			
3	6			
4	8.4			
5	10.8			
6	13.3			
7	15.8			
8	18.3			
9	20.8	19.1	2.1	-
10	23.3	19.5	2.0	0.4
11	25.8	21.0	1.9	1.5
12	28.3	21.1	1.8	0.1
13	30.8	22.9	1.8	1.8
14	33.2	<b>24.1</b>	<b>1.7</b>	<b>1.2</b>
15	35.6			
16	38			

### Growth graphs of DBH comparison with projected

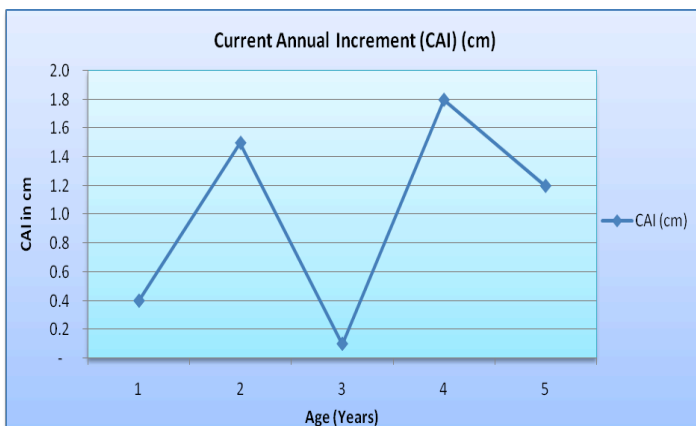




## Growth graph with projected trend line of future growth



## Current Annual Increment and Mean Annual Increment



When consider the analyzed data in Chon Daen estates, it is very important to implement some timber quality improvement programme to add value for standing Teak trees in the plantation.

Bad climatic and weather conditions have been negatively effected to the slow growth of DBH of Teak trees in this area. It can understand by Current annual increment in before last year. But this condition could be positively affected to the quality of timber. It is tended to increase the hart wood percentage of timber.

Most of trees in Chon Daen estate will be achieved the 70 % of growth target within the projected period and among these trees, considerable

amount of trees will achieve the 100 % of growth target within the projected time line.

According to the analyzed height data on previous years, that average tree height of this plantation have already been achieved the projected height of end of rotation. It will help to increase the value of timber.

## Growth comparisons of all plantations in Thailand

		2018		2017 vs. 2018	2018	2017 vs. 2018
Estate	Block no.	No. of trees measured	Average DBH (cm)	Variance in DBH	Average GBH (cm)	Variance in GBH
<b>CHON DAEN</b>	1	254	23.5	1.30	73.79	4.08
	2	28	22.6	1.50	70.96	4.71
	3	117	22.5	1.30	70.65	4.08
	4	200	24.7	1.40	77.56	4.40
	5	30	23.3	0.60	73.16	1.88
	6	99	23.9	1.30	75.05	4.08
	7	150	23.8	1.00	74.73	3.14
	8	89	28.8	1.60	90.43	5.02
<b>Estate Average</b>			<b>24.1</b>	<b>1.3</b>	<b>75.8</b>	<b>3.9</b>
<b>Total</b>		<b>967</b>				
		2018		2017 vs. 2018	2018	2017 vs. 2018
Estate	Block no.	No. of trees measured	Average DBH (cm)	Variance in DBH	Average GBH (cm)	Variance in GBH
U-Thong - 02	1	45.00	23.0	0.40	72.22	1.26
	2	100.00	22.8	0.80	71.59	2.51
	3	62.00	23.5	0.60	73.79	1.88
	Avg	207.00	23.1	0.60	72.53	1.88
U-Thong - 03	4	59.00	21.1	1.00	66.25	3.14
U-Thong - 04	5	41.00	21.2	0.80	66.57	2.51
<b>Estate Average</b>			<b>22.3</b>	<b>0.7</b>	<b>70.1</b>	<b>2.3</b>
<b>Total</b>		<b>307</b>				
		2018		2017 vs. 2018	2018	2017 vs. 2018
Estate	Block no.	No. of trees measured	Average DBH (cm)	Variance in DBH	Average GBH (cm)	Variance in GBH
Chon Daen 224	1	477	18.8	0	59.0	0
	2	106	17.2	0	54.0	0
	3	37	19.9	0	62.5	0
<b>Estate Average</b>			<b>18.6</b>	<b>-</b>	<b>58.4</b>	<b>-</b>
<b>Total</b>		<b>620</b>				

## Recommendations

- ❖ Thinning programme have been completed up to the satisfactory level in U-Thong and Chon Daen estates but it is very important to remove some broken trees in Chon Daen 224. Most of trees have marked to remove by tagging red color paint mark on trees in Chon Daen 224 but still has not been removed these trees. It is very important to remove these unwanted poor form trees to get increase the growth rate of good trees in the plantation.
- ❖ Pruning programme is doing well in most of plantations and it is important to keep 60% of the tree canopy for better growth rates of trees.
- ❖ Fire gaps is important to manage properly in this stage of all plantation in Thailand. Because, now the plantation is in mature stage and fire can damage to the mature trees with reducing the tree quality. Fire gap maintenance is important to implement in dry period to get protect the plantation from outside fires.
- ❖ Soil erosion should be controlled by implementing some proper techniques which suitable for each estate accordingly. Soil erosion methodologies can be changed with the condition of each estate and has to be consider about the topography of plantations.
- ❖ Growth condition in Chon Daen 224 plantation is in satisfactory level and more technical details can be obtained by analyzing growth rate with comparing the data in next year.
- ❖ As recommendations, it is important to develop the drainage system of lower part of Block 01, 02 and 03 in Chon Daen 224 plantation. And some areas have been subjected to soil erosion condition with heavy rains. Poor drainage is not a good factor for Teak plants due to low tolerance for the water log conditions of Teak.