

## ***Myanma Teak Plantation and Sustainable Conservation (1988-2008)***

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### **Abstract**

The British Colonialists invaded and waged three wars against Myanmar and the whole country was colonized in 1886. Due to the affairs of Bombay Burmah Timber Company, the Third Anglo-Myanmar War broke out in 1885 and finally the whole country was occupied by British colonialists. It is found that teak is one of the reasons to occupy the country. In this paper which is concerned with the establishment of teak plantations, the forest coverage areas with the country, the state of reserved forests, volume of teak logs produced from the forests annually, the intrinsic quality of teak, growing of teak plantations, conservation of teak trees and the state of natural environment by nurturing forests are presented. Myanmar places considerable reliance on natural teak forests not only for the development of the country but also for the socio-economic life, employment opportunities and economic growth of rural people. In order to ensure sustainable progress of natural teak forests, the special teak plantations are to be implemented timely. If this project could be able to implement successfully, it will greatly contribute to socio-economic life and environmental conservation of the country.

**Keywords:** Teak plantation, socio-economic life, environmental conservation

### **Introduction**

Teak is one of the durable kinds of timber. Fungus cannot grow on teak and termites cannot destroy it. It does not decay even if it is soaked in water for a long time. Its structure is firm, and it is neither shrinking nor stretching. Therefore, teak is well known among the valuable kinds of timber. In Myanmar, teak grows well in the areas that stand at an altitude of 2500 to 3000 feet (762-914 m) above sea level. Since the successive reigns of ancient Myanmar Kings, teak was mainly used in ship-building and in many kinds of buildings. Teak which is extracted from Myanma forests has been sold in domestic for the benefits of the people and for development undertakings in the country. Moreover, a lot of foreign income has been earned by selling and exporting teak to abroad. After Myanmar regained independence in 1948, the teak and timber industry was nationalized. For sustainable conservation of forests, not only reserved forests but also protected forests have been designated after 1988.

### **The Data and Methods Used**

The data required for this paper have been mainly collected from the Department of Forestry, the Department of Planning and Statistics, Myanma Timber Enterprise which are under the Ministry of Forestry, Teaknet (INGO) and Yangon Universities Central Library and also many personal interviews.

### **Results**

According to the special teak plantations project, about one million tons of teak will be exploited per year and thus there will be no adverse effects to natural teak forests in relation to teak extraction. In addition, natural teak forests can be managed properly. It is

required to get rid of the pressure on natural teak forests for their sustainable development. The only means to achieve the goal in this regard is to establish a sufficient number of teak plantations. In order to ensure sustainable progress of natural teak forests, the special teak plantations are to be implemented timely. This must be carried out steadfastly in line with the circumstances. The special teak plantations project will be a good inheritance passed to future generations. If this project could be able to successfully implement, it will greatly contribute to socio-economic life and environmental conservation of the country.

### Discussion

Myanmar is flourished with forest resources. These forests not only fulfill the basic needs of life of the people but also earn a lot of foreign income every year. Teak is well-known among the valuable kinds of timber. The botanical term of teak is *Tectona Grandis*. Teak grows naturally in India, Myanmar, Thailand and Cambodia. Myanmar lies at the center of the area where teak grows well and thus the finest and biggest teak logs are produced from the country. In the best forest reserves, the teak trees are 140 ft. to 160 ft. (43-49 m) high with a circumference of eight and a half feet to ten feet on average.<sup>1</sup>

The average annual rainfall of 50 to 150 inches (127-381 cm) (is necessary for the teak trees to grow naturally.<sup>2</sup> Especially the moist climate is needed. Teak is grown throughout the country except in Rakhine State and southern part of Tanintharyi Region. The importance of teak in the economy of the country was unnoticed from Bagan period to middle of the Konbaung period.

When Myanmar regained independence in 1948, the Ministry of Agriculture and Forestry was formed. After the independence, the private timber companies were nationalized and State Timber Board carried out the forestry undertakings. The working plans were rewritten under the leadership of Forest Commissioner U Chein Ho for sustainable conservation of forests in Myanmar. That benefited the forests in thirty-six districts. As the country's population is growing, the exploitation of natural forests is rising. Therefore, conservation and management of forests alone is become not sufficient. Since 1980s, the Government has stepped up the forestation with added momentum such as establishment of forest plantations and designation of special regions.<sup>3</sup> The Forestry Policy is to set up forest plantation of one acre area after extracting forty tons of logs from natural forests.

The successive experts of forestry strived in regeneration works to be able to conserve natural teak forests and to upgrade their value. There are two types of regenerations: (1) natural regeneration, and (2) artificial regeneration. The natural regeneration is that people help the regeneration of naturally grown plants.<sup>4</sup> To be successful, it depends on the condition of saplings, soil and suitable environment. The artificial regeneration is the nurturing of saplings by people in shifting cultivation. The artificial regeneration in shifting cultivation has advantages of low cost, easy management and without impairing of saplings.<sup>5</sup> The thinning work i.e. to remove some plants and trees which grow thickly in a forest in order to

<sup>1</sup>. U Chein Ho, *ဗမာ့ကျွန်း (Burma's Teak)*, Yangon, Sarpaybeikman Press, 1965, p.9. (Hereafter cited as Chein Ho, *Teak*).

<sup>2</sup>. *Ibid*, p.10.

<sup>3</sup>. Ministry of Forestry, မြန်မာနိုင်ငံသစ်တောရေးရာမူဝါဒ (*Myanmar Forestry Policy*), Yangon, Ministry of Forestry, 1994. p.20. (Hereafter cited as Ministry of Forestry, *Forestry Policy*).

<sup>4</sup>. Forest Department, မြန်မာ့သစ်တောအုပ်ချုပ်မှုလုပ်ငန်းများ (*Myanmar Forest Management Undertakings*) Yangon, Forest Department, 1986, p.44. (Hereafter cited as Forest Department, *Forest Management Undertakings*).

<sup>5</sup>. Tin Htut, *Forests*. p.68.

grow well for the remaining trees was important. The prevention of many kinds of insects was also important in nurturing forest plantations. Trees would be greatly impaired by hazardous insects.

In establishing the forest plantations, it was needed funds, vehicles and machineries, fuel oil, machine tools, new roads construction and nursery gardens. The Department of Forestry rendered sufficient assistance from 1976 onwards. The major project was East Pegu Yoma (Bago Yoma) Project (EPP) which was implemented from 1979-80 to 1986-87 with the loan of the World Bank. The second plantation project was Asia Bank (2) Project carried out by Asia Development Bank (ADB) in Mandalay Region and Shan State.<sup>1</sup> The project term was extended three times to 1993, so it lasted ten years and seven months. The total area of 567,650 acres (229,720 hectares) of teak plantations were established from 1948 to 1998. Therefore, about 17,303 acres (7,002 hectares) of teak plantations were nurtured per year. In 1998, 16,163 acres (6,540 hectares) of ordinary teak plantations were set up.<sup>2</sup> Therefore, the establishment of teak plantation was gaining momentum since 1980.

If the rotation of teak trees is fixed at eighty years, teak plantations set up in 1980 will have full rotation in 2060. If the average quality of these teak plantations in Special Quality III, the yield will be fifty-six tons of logs and 13.6 tons (13,818 kg) of tops and limbs per acre. The limbs will be exploited yearly from teak plantations which will have full rotation in 2060.<sup>3</sup> Since 2060, about 600,000 tons (609,628,100 kg) of logs and 140,000 tons (14,224,660 kg) of tops and limbs will be extracted from the forest plantations every year.

With the aim to promote the production of teak and forest products which was decreasing yearly due to the declining quality of natural forests and the depletion of forest areas, Forestry Department began to implement Special Teak Plantation Project in 1998. The Department of Forestry formed twenty centers to manage teak plantations in Sagaing, Mandalay, Bago and Ayeyarwady Regions. Therefore, the total area of 20,000 acres (8,094 hectares) of teak plantations were nurtured yearly and the rotation of teak trees were fixed at forty years. In 1998, the Forestry Department established 20,000 acres (8,094 hectares) of special teak plantations and 16,163 acres (6541 hectares) of ordinary teak plantations, numbering 36,163 acres (14635 hectares).<sup>4</sup>

The special teak plantations set up in 1998 will reach forty year rotation in 2038 when it will be exploited by clear felling system. Similarly, teak plantations set up in 1999 and 2000 will be exploited in 2039 and 2040 respectively. The clear felled plantations will be nurtured again by growing saplings or by sharpening stumps if the stumps are in good condition. The outturn of teak logs is estimated forty tons per acre and 800,000 tons (812,837,500 kg) of teak will be produced yearly from special teak plantations since 2038. The current teak yield was about 300,000 tons (304,814,100 kg) per year.<sup>5</sup> Teak yield from special plantations will be threefold of the current yield and as a result the pressure upon the natural teak forests will be decreased. It will be helpful in sustainable conservation of natural teak forests.

<sup>1</sup>. Dr. Kyaw Tint, အထူးကျွန်းစိုက်ခင်းများ၏ လူမှုစီးပွားရေးနှင့်သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုများဆိုင်ရာ အလားအလာများစာတမ်း (Paper on Socio-economic condition of special teak plantations and prospects on environmental conservation) Forest Department, 1999.p.121. (Hereafter cited as Kyaw Tint, *Special teak plantations* ).

<sup>2</sup>. Dr. Kyaw Tint, ပြည်သူ့အတွက်သစ်တောပညာ (Knowledge of Forestry for the People), Yangon, Aung Thein Than Press, 2008. p.120. ( Hereafter cited as Kyaw Tint, *Forestry for the People* ).

<sup>3</sup>. Kyaw Tint, *Special teak plantations*, p.122.

<sup>4</sup>. Kyaw Tint, *Special Teak Plantation*, p.123.

<sup>5</sup>. Kyaw Tint, *Forestry for the People*, p.50-51.

The total area of 4,000 acres of teak plantations were established; 2,500 acres (1,012 hectares) in *Margari* Reserved Forest in Taikyi Township from 1998-99 to 2000-2003, 1,000 acres of old plantations in 2003-2004 in *Taung Hlaing Yoma* Reserved Forest. The new teak plantations in *Taung Hlaing Yoma* Reserved Forest were grown by the method of grafting. This method helped teak trees to meet standard and quality. They were grown in Plot No.22 with the spacing of 9 ft. (3 m) around.<sup>1</sup> Therefore, the good trait of long stem of the teak tree will be achieved.

The Ministry of Forestry strived to get permission of private-owned teak plantations to be able to fulfill the requirement of the State in one way since November 2004, and the Government officially allowed it in February 2005. In granting permissions for private-owned teak plantations, the Ministry of Forestry charged the land-lease cost of 500 kyats per acre (0.4 hectare).<sup>2</sup> In Myanmar, the Department of Forestry grew teak trees in encompassed spacing of 6'x6' (2m x 2m) and 9'x9' (3m x 3m) respectively. When the thinning was carried out in forest plantations, the extra income from these thinning work by extracting timber logs of 5,10,15 years (or) 6,12,18 years old trees would be earned. The Trade Policy Council allowed the transfer of sale when the teak plantations were eight years old.<sup>3</sup> The thinning work is that the unpromising trees were chosen to cut down in order to get equal spacing for the remaining trees in a forest.<sup>4</sup> By thinning, the income was earned in short period rather than long-term forest plantations.

Under the guidance of Ministry of Forestry, representatives of eighteen timber companies and officials of Myanma Timber Enterprise on 11 February 2004 discussed to set up some 10,000 acres (4,047 hectares) of teak plantations with the funds of the companies, and began to implement it.<sup>5</sup> Representatives of timber companies and officials of Forestry Department held a second meeting and coordinated the amount of cash assistance for each acre, the number of acres, locations of the harvested area and term of the project on 4 March 2004. They stipulated to spend 50,000 Kyats of funds per acre and there were enough funds to establish 9,700 acres (3,925 hectares) of teak plantations. So they stipulated to grow teak plantations of 3,200 acres (1295 hectares) in 2004-2005 and 6,500 acres (2,630 hectares) in 2005-2006. Based on the calculation of set-up cost of teak plantations in Kantbalu Township, Sagaing Region, it was decided to spend 32,050 Kyats per acre in the first year of establishment. The rest of the funds would be spent in nurturing the teak plantations and in research plots. The private-owned teak plantations were implemented five months later than the ordinary time. In some regions, teak plantations were set up of teak saplings with average height of three feet. Mabein Township in Kyaukse District could set up 430 acres (174 hectares) of teak plantations. In 2004-2005, 3,050 acres (1,234 hectares) of teak plantations could be set up in six townships.<sup>6</sup>

<sup>1</sup>. Ba Chit, *The Great Grand Teak*, p. 42.

<sup>2</sup>. See Appendix I

<sup>3</sup>. San Lwin, *The Garden may be able to pick flowers*. p.203.

<sup>4</sup>. Chein Ho, *Teak*, p.59.

<sup>5</sup>. Planning and Statistics Department, သစ်ထုတ်ကုမ္ပဏီများမှ ပံ့ပိုးသောရံပုံငွေဖြင့် တည်ထောင်လျက်ရှိသည့် ကျွန်းစိုက်ခင်းများနှင့်ပတ်သက်၍တင်ပြချက် (*Presentation on Teak Plantations set up by the funds of Timber Companies*), Forest Department, 2005.p.1. (Hereafter cited as Planning and Statistics Department, *Presentation on Teak Plantations*).

<sup>6</sup>. Planning and Statistics Department, *Presentation on Teak Plantations*,p.1.

Table (1) The location of teak plantations set up by private timber companies in 2004-2005<sup>1</sup>

No.	Township/ District/ Region	Plot No. of Reserved Forest/ Unreserved Forest	Company	Acres	Hectares
1	Mabein Township Kyaukme District Shan State	Namtme Reserved Forest-104	Momentum	200	81
			Wood World	200	81
			Ten Ways	30	12
2	Kantbalu Township Shwebo District Sagaing Region	Sabei Nantha Reserved Forest- 26,42 Hlwe Seit Reserved Forest -65	Tin Win Tun	200	81
			Shwe Moe Thar	160	65
			Tun Myat Aung	160	65
3	Minhla Township Thayawaddy District Bago Region	Minhla Reserved Forest 11,12	Winmarlar Aung	300	121
			Pacific Timber Enterprise	300	121
4	Phyuu Township Taungoo District Bago Region	Myayarpin Reserved Forest-57 Phyuu Kun Unreserved Forest XIII	Win & Win	170	69
			Htoo	130	121
			Delta Combine	100	40
5	Yaydashay Township Taungoo District Bago Region	Sai Ya Reserved Forest-71,72	Kaung Myat	330	134
			Zarni Zaw	170	69
			Asia Green	300	121
6	Tagundwingyi Township Magway District Magway Region	Kinpuntaung Reserved Forest-31	Asia World	150	61
			Dagon Timber	150	61
Total				3050	1303

According to the data collected in December on teak plantations of 3,050 acres (1,234 hectares) grown in 2004, 92.62% of teak saplings were successful. The survival rate of teak saplings was highest with 96.12% in Phyuu Township and the lowest with 85.25% in Taungdwingyi Township.

Table (2) Survival rate of teak saplings in plantations carried out by private timber companies in 2004-2005<sup>2</sup>

No.	Location	Area		No. of surviving saplings	No. of dead saplings	Total	Survival Rate (%)
		(acres)	(hectares)				
1	Kantbalu	520	210	251166	29634	280800	89.45
2	Yaydashay	800	324	413439	18561	432000	95.70
3	Phyuu	400	162	207640	8360	216000	96.12
4	Minhla	600	243	305499	18501	324000	94.29
5	Taungdwingyi	300	121	138105	23895	162000	85.25
6	Mabein	430	174	234657	24633	259290	90.50
Total		3050	1234	1550516	123584	1674090	92.62

The eighteen timber companies set up 6,850 acres (2,772 hectares) of teak plantations in seven townships in 2005-2006. They could carry out the undertakings within targeted time fixed by Department of Forestry in 2005-2006. Teak plantations of 6,850 acres (2,772 hectares) were set up by August 2005. Although the launching time of teak plantations was late in 2004, it was said to be good as the survival rate of teak saplings counted in 2004 was above ninety percent.

<sup>1</sup>. Planning and Statistics Department, *Presentation on Teak Plantations*, p. attachment (1).

<sup>2</sup>. Planning and Statistics Department, *Presentation on Teak Plantations*, p. attachment (2).

Table (3) The location of teak plantations set up by private timber companies in 2005-2006<sup>1</sup>

No.	Township/District Division	Plot No. of Reserved Forest/ Unreserved Forest	Company	Acres	Hectares	Remark
1	Mabein Township Kyaukme District Shan State	Namtme Reserve Forest - 1,106,109	Momentum	400	162	1(500)
			Wood World	400	162	106(420)
			Ten Ways	70	28	109(450)
			One Star	500	202	
2	Naungcho Township Kyaukme District Shan State	Nyaun Htauk Reserved Forest – 7	Asia World	300	121	
			Tin Win Tun	500	202	42,43(500) 26(340)
3	Kantbalu Township Shwebo District Sagaing Region	Sabei Nantha Reserved Forest-26,42,43 Hleseit Reserved Forest -65	Shwe Moe Thar	340	138	
			Tun Myat Aung	340	138	65(340)
			Win Malar Aung	400	162	
4	Minhla Township Thayawaddy District Bago Region	Moatkha Reserved Forest - 40,42,51	Pacific Timber	400	162	
			Enterprise Nanthaphyu Co.	200	81	XI (700) XIII(500)
5	Phyuu Township Taungoo District Bago Region	Phyusoon Unreserved Forest – XI, XIII Myayarpinkyaw Reserved Forest 55, 56	Win & Win	330	134	55,56(100)
			Htoo	870	352	
			Detta Combine Kaung Myat	100 372	40 151	
6	Yaydashy Township Taungoo District Bago Region	Sai Ya Reserved Forest – 70,71	Zarni Zaw	156	63	
			Asia Green	372	151	
			Asia World	350	142	
7	Taungdwingyi Township Magway District Magway Region	Kinpuntaung Reserve Forest - 29,30	Dagon Timber	450	182	
Total				6850	2773	

Table (4) The amount of funds paid by private timber companies to set up teak plantations in 2004-2005<sup>2</sup>

No.	Township	Company	Acres	Hectares	Cost Per Acre (0.4 hectare) (1 <sup>st</sup> six months + 2 <sup>nd</sup> six months) (kyats)	Amount of funds period
1	Mabein Township	Momentum	200	81	50,230	10,046,000
		Wood World	200	81	50,230	10,046,000
		Ten Ways	30	12	50,230	10,506,900
2	Kantbalu Township	One Star	150	61	50,230	7,534,500
		Tin Win Tun	200	81	50,230	10,046,000
3	Minhla Township	Shwe Moe Thar	160	65	50,230	8,036,800
4	Phyuu Township	Tun Myat Aung	160	65	50,230	8,036,800
		Win Marlar Aung	300	121	50,230	15,069,000
5	Yaydashay Township	Pacific Timber Enterprise	300	121	50,230	15,069,000
6	Taungdwingyi Township	Win & Win	170	69	50,230	8,539,100
		Htoo	130	53	50,230	6,529,900
		Delta Combine	100	40	50,230	5,023,000
		Kaung Myat	330	134	50,230	16,575,900
		Zarni Zaw	170	69	50,230	8,539,100
		Asia Green	300	121	50,230	15,069,000
		Asia World	150	61	50,230	7,534,500
Dagon Timber	150	61	50,230	7,534,500		
Total			3200	1296	50,230	160,736,000

<sup>1</sup>. Planning and Statistics Department, *Presentation on Teak Plantations*, p. attachment (4).

<sup>2</sup>. Planning and Statistics Department, *Presentation on Teak Plantations*, p. attachment (5).

Table (5) Cost per acre to establish teak plantations<sup>1</sup>

No.	Subject	Cost (Kyat)
1	Selecting Harvested area	20
	(1) land survey	
2	Land Preparation	
	(1) Clearing the shifting cultivation / Fire protection	9200
	(2) Stumping / Farming	4800
3	Collecting seeds and saplings and Setting up nursery gardens	
	(1) collecting seeds	
	(2) Buying humus and sand for saplings	1100
	(3) Setting up temporary nursery gardens (buying mattocks, hoes, etc)	600
	(4) Growing saplings (including 10% of patching)	460
	(5) Growing stumps	
4	Growing tasks	1470
	(1) Buying stakes (cost of stakes)	-
	(2) Driving stakes	
	(3) Diggings	670
	(4) Carrying saplings from nursery garden	1200
	(5) Growing	
	(6) Replacing of dead plants	-
5	Maintaining teak plantations	800
	(1) Weeding / Putting fertilizer	
	(2) Fire protection	
	(a) Fire prevention	1500
	(b) Fire-watch / Fire sentry-duty	380
	(3) Building roads for inspection	8000
	(4) Counting the number of surviving and dead plants	530
6	General Cost	150
	(1) Camping for setting up plantations	600
	(2) Buying things for camping	300
	(3) Labour transportation	270
	Total	32,050

Up to now, teak produced from Myanmar is still standing as a seller's market. But the teak logs of first, second and third classes become to be rare. Foreign currency necessary for the State has been earned by exporting teak and hardwood. Due to the lack of production technology for value added finished wood products and modern machineries in the country; it only relies on exporting timber logs. If the export of timber logs can be reduced and the production of value added wood-based products can be upgraded within the country, it will greatly contribute for environmental conservation, minimum wastage and maximum usage of forest resources.

### Conclusion

Teak is the most famous and valuable kinds of timber not only in Myanmar but also in the world due to its quality. If it is only relied on extraction of teak from natural teak forests, the sustainable conservation of these forests in future will be worrisome. With the aim to promote the production of teak which was decreasing every year due to the declining quality of natural forests and the depletion of forest areas, the Department of Forestry began to implement Special Teak Plantation Project in 1998. It is required to get rid of the pressure on natural teak forests for their sustainable development. The only means to achieve the goal in this regard is to establish the sufficient number of teak plantations. In order to restore the

<sup>1</sup>. Planning and Statistics Department, *Presentation on Teak Plantations*, p. attachment (7).

deteriorating natural teak forests, it is needed to carry out gap planting, enrichment planting and natural regeneration. On the other hand, teak plantations are to be set up by means of artificial regeneration in the deforested areas. In order to ensure sustainable progress of natural teak forests, the special teak plantations are to be implemented timely. If this project could be able to implement successfully, it will greatly contribute to socio-economic life and environmental conservation of the country.

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