

Article

The History of Taungya Plantation Forestry and Its Rise and Fall in the Tharrawaddy Forest Division of Myanmar (1869–1994)

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ABSTRACT

In some areas of Myanmar (formerly Burma), trees are planted amongst agricultural crops in hill-farms (taungya). This “taungya system” is one method of restoring tree cover and can also be regarded as a forerunner of agroforestry. The system is widely believed to have originated in the Tharrawaddy forest division of Myanmar, but the actual location of its origin is likely to be the Kaboung forest area. The taungya system was first devised by Dr. DIETRICH BRANDIS, an early German botanist-turned-forester in Myanmar, in the mid-1800s after he observed the taungya of the Karen hill people. Taungya teak plantations expanded in the Tharrawaddy forest division from 1869 as teak grows well there and the facilities for teak timber extraction are good. However, the annual establishment rate in Tharrawaddy has fluctuated greatly. The establishment of taungya plantations has gone through three periods of growth and decline. The growth phase of the first period began in 1869 when Imperial foresters succeeded in employing the hill Karen to plant teak in their taungyas, and was followed by a decline from 1906 when the scattered taungya plantations became difficult to manage. The second period began from 1918–19 when concentrated regeneration under the Uniform System was introduced into the division. This period’s decline started in 1930 and was caused by the farmers’ revolution. The third period began in 1948, but the thirty years to 1979 were politically and socially unstable, so there was very little planting throughout this time. The growth in plantation establishment began in early 1980 when the government focused on reforestation to boost timber production, but its decline came in the late 1980s and was primarily caused by socioeconomic and government policy changes. Higher wages for taungya workers and more productive agricultural techniques for taungya crops are now necessary if taungya plantation management is to be successful in the future.

Keyword : natural regeneration, plantations, taungya, teak

INTRODUCTION

The objective of this paper is to establish the possible origin of the taungya plantation system in Myanmar (formerly known as Burma) and to review the rise and fall of taungya plantations in the nation’s Tharrawaddy forest division. The Tharrawaddy forest division²⁾ is located in

southern Tharrawaddy district, one of the four districts in Pegu Division³⁾, some 125 km north of Rangoon (see Figs. 1 and 2). The division’s forests can be classified simply along topographical lines into hill forests and plain forests. The former are mainly natural forests and are located in the eastern part of the district, while the latter are located in the central plain area of the district. Karen hill-tribes live in the hill forests, while the Bamar people and a few Karen live in the plain area.

The Tenasserim forests of Myanmar, which were occupied by the first British annexation war (1824–26), were devastated by the uncontrolled logging of private timber traders. This and other such experiences prompted the colonial government to more carefully manage the

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Pegu teak forests that were annexed in 1852, and in 1856, it appointed Dr. DIETRICH BRANDIS, a German botanist to manage these forests. BRANDIS introduced a Selection System⁴⁾ with the aims of producing a sustained supply of teak, and also started planting teak trees in taungya areas to increase the proportion of teak in forest areas.

The Tharrawaddy forest division is reputed to be the area where the taungya system originated. The Myanmar's first Forestry School was established there in 1898, and the success of taungya plantations under the Uniform System introduced in 1918 led to a wave of enthusiasm for taungya plantations.

THE TAUNGYA SYSTEM AND ITS VARIETIES

Taungya is a Bamar word meaning a hill-farm. *Taung* (hill) and *ya* (a farm area) give an exact translation of a farm on a hill. It is often translated as hill (*taung*) and cultivation (*ya*), but is most commonly translated as shifting cultivation. However, if this meaning is intended, the prefix *Shwe-pyaun* (a Bamar word meaning, "shifting") should be placed before taungya. The planting of trees in an area clearfelled for traditional taungya farming helps replace the forest cover, and thus this method of regeneration was given the name "taungya system" by Brandis

(CHEIN HOE, 1969). Depending the techniques used, the taungya system is classified as natural or regular taungya.

Natural taungya: This kind of taungya was developed to exploit teak's need for light, and it can only be applied in areas where some teak stumps remain. Specifically, a number of six-foot square sample plots are established and if there is at least one teak stump in more than 40 % of the plots, "natural taungya" is used. Taungya farmers are then allowed into this area to grow agricultural crops in the first year. By the second year, teak seedlings would have coppiced from the remaining teak stumps (CHEIN HOE, 1979). "In theory no planting should be necessary though in practice some assistance may be given to avoid blanks" (FOREST DEPARTMENT 1957).

Regular taungya: The commonly known taungya system of growing trees and agricultural crops at the same location is called "regular taungya". In this paper, the origin and development of regular taungya will be examined.

UNDERSTANDING THE ORIGIN OF THE TAUNGYA SYSTEM

As will be seen, it is commonly thought that the

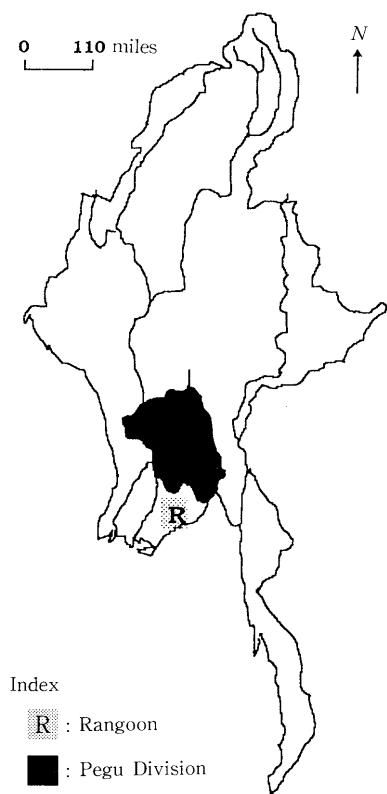


Fig. 1 The location of Pegu Division in Myanmar

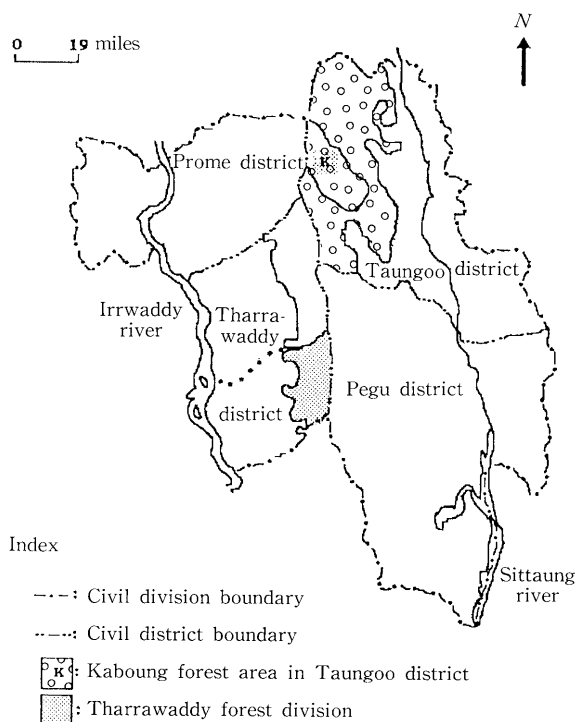


Fig. 2 The location of Tharrawaddy forest division and Kaboung reserved Forest

taungya system of teak plantation establishment originated in the Tharrawaddy forest division. However, it is the view of this writer that the system's origin is likely to be the Kaboung reserved forest in Myanmar's southern Taungoo forest division.

It is important to clarify the location and method of the system's origin, not just for the sake of technical accuracy, but also because it is an expression of the cultural and social conditions of the time, so is important historically. This will be done by examining a number of statements and opinions about the system's origin in relation to other published documents as well as the writer's own knowledge and experience gained by working in Myanmar's forests and taungya plantations. The writer spent 8 years in Tharrawaddy forest division and 6 of those years (1984-1989) were in the taungya plantations of Mokka, Kadinbilin, Konbilin and Thonze reserved forests working with the hill Karen and Bamars. One man was crucial to the development of the taungya system. He is Dr. DIETRICH

BRANDIS, a German botanist who became a teacher of botany in 1849 after studying at the Universities of Copenhagen, Göttingen and Bonn. He continued studying botany in Germany for a number of years, and then through a train of circumstances which originated in the desire of the Government of India to find a man who could take charge of its forests, he was offered a position as forester in Burma in 1856 by Lord Dalhousie, the then Governor-General of British-India (PINCHOT 1908).

BRANDIS is credited with establishing the system after having seen the taungya of the Karen hill people, and the following statement is typical of those that assume BRANDIS's involvement in its establishment in the Tharrawaddy forest area:

"The first attempt at taungya teak plantation was made as early as 1856. It is recorded that actually the first plantation to be so made was formed by U Pan Hee, a Karen in the Thonze forests as a personal present to Brandis" (BLANDFORD 1958).

This view is also common in Myanmar's forestry profession (CHEIN HOE 1969). However, the different dates given for the year when the U Pan Hee reportedly gave this taungya teak plantation to Brandis - 1856 (BLANDFORD 1958) and 1869 (Tharrawaddy Working Plan, 1946-47 to 1962-63) - are a sign that perhaps there is some doubt about the actual origin. WATANABE (1997) also considers that two stories about the origin of taungya seem credible.

1) "taungya" was first started at Tharrawaddy in the upper Burma by BRANDIS or by a Karen tribesman, U Pan Hee, under the supervision of Brandis in 1856; and,

2) Colonel W. J. SEATON introduced "taungya" on a small-scale in 1869 in the Tharrawaddy area.

Taungya-like systems had been used in Europe

(KERMODE 1964, KING 1968, STEBBING date unknown), and TAKEDA (1992) states that most accounts of the taungya system are credited to BRANDIS because he was a German forester, and was familiar with the "Waldfeldbau" system (a combined system of field crops and high forest), and with "Hackwaldbetrieb" or "Haubergswirtschaft" (a combined system of field crops and coppice). Thus, it seems logical that BRANDIS, knowing the efficiency of taungya style agroforestry in Germany, introduced the system and applied it to establish plantation forests in Burma.

The 1918 Working Plan for the Tharrawaddy forest division states that the idea of planting teak in taungya along with cereal crops was originated by BRANDIS, but BRYANT (1994b) puts the development of taungya forestry in a political context when he argues that it was one outcome of the antagonistic relationship between acquisitive British colonial rulers and the threatened indigenous people. Such a perspective is supported by BRANDIS's own admission that one of his objectives was to increase the amount of teak in the forests:

"There was, however, no doubt in my mind from the outset that something more was wanted, and that it was not sufficient to protect and aid the teak which sprung up naturally, but that it would be necessary to increase the proportion of teak in the forests by sowing and planting" (BRANDIS 1896).

BRANDIS also saw the opportunity to do this by using the local people and co-opting their traditional agricultural system:

"As soon as I had seen the first Karen taungya (sic) in 1856, I determined to devise some method by which this mode of shifting cultivation might be utilized for planting Teak on a large scale in those regions where this species attains its most perfect development" (BRANDIS 1896).

Here it is interesting to speculate whether the Karen taungya seen by BRANDIS in 1856 was a traditional Karen taungya or a taungya containing deliberately planted teak trees. Karens in this hill forest traditionally do not plant teak trees in their taungyas for several reasons. Firstly, all teak trees in Myanmar have been the property of either royalty or governments since 1752. Thus even if a landowner grows teak on his/her own land, it will not be that person's property - "A standing teak tree wherever situated in the State is owned by the State" (GOVERNMENT OF MYANMAR 1992). Secondly, if the Karens grew teak in their taungya, the area would not become *Phonezo*⁵¹ (an area where crops can be grown again) and so they could not return to farm it again. As well, they had little interest in the structural qualities of teak "building their homes entirely of bamboo" (BRYANT 1994).

Even if the Karen had wanted to give a teak plantation as a present to Brandis, the teak would have had to

have been planted in the taungya during 1855 at the latest, because BRANDIS took charge of the Pegu teak forests in January 1856 and set out on his first tour into the forests in early February, the beginning of the hot season⁶⁾ in Myanmar. To quickly establish a teak plantation in the hot season is impossible. However, when BRANDIS saw the Karen taungya he would have realized that there were inhabitants in the forest that could be used to plant teak.

It is also possible BRANDIS saw natural teak coppice in the Karen taungya. Teak grows on gentle slopes with good soil and Karens choose such places for taungya (Maling cited in Baillie as quoted in BRYANT (1994a), p: 131). Usually, teak coppices from already existing natural teak stock and grow quickly in taungya areas as the species is a light demander. The silviculturist KERMODE (1964) studied teak regeneration of various kinds in Myanmar forests and found that burning the forest for taungya cultivation in fact helps teak regeneration. It is also the writer's experience that teak coppice from already existing teak stocks will appear before the germination of planted teak seed.

The Pegu hills are part of Myanmar's "teak-heart", so it can be expected that teak coppice will grow well in the area's taungya. Thus what BRANDIS saw may have been a traditional Karen taungya with natural teak coppice, and as a result he decided to plant additional teak seedlings.

However, it seems that BRANDIS was reluctant to force the inhabitants to plant teak in their taungya because one of his three main objectives was to make friends of the inhabitants of the forests and surrounding areas. His other objectives were:

- to protect and, as far as possible, improve the forests, arranging the cuttings so as to stay well within the productive capacity of the forests thus ensuring a permanent and sustained yield of teak; and,
- as soon as possible produce an annual surplus revenue" (BRANDIS 1896).

Nevertheless he did realize that using the Karen to plant teak would be efficient, but that it would need some kind of inducement (ANON date unknown).

Brandis states that he explained his idea to plant teak in taungya to a Bamar forester, Mounge Tsadoon, who was in charge of the Kaboung forest area, and that it was Tsadoon who was the first to carry out the plan. "On a subsequent visit in 1868, I had the satisfaction to examine six small plantations made by him on taungyas (sic) in successive years, the oldest in 1856" (BRANDIS 1896).

This statement by BRANDIS is thus crucial to the history of taungya development as it supports the fact that he saw a Karen taungya on his tour during the dry season in 1856. It also shows that the first taungya plantation was established by a forester not a Karen, that this forester worked in the Kaboung forest area, and that BRANDIS did

not receive the first taungya plantation from a Karen. In fact, it is also doubtful that a Karen gave a taungya teak plantation as a present to BRANDIS, an unknown newcomer, because the hill Karens are fond of seclusion. The Karen is not servile, and it has never been to their custom to *shiko* (worship or show respect to officials) (MARSHALL 1922).

Even if a Karen had given a taungya teak plantation as a present to BRANDIS in 1869, as stated in the Tharrawaddy Working Plan for the period of 1946-47 to 1962-63, this writer considers that it might have resulted from an official's suggestion or pressure as a way of convincing other hill-tribes to plant teak in their taungya. Such action is documented for other parts of the world. For example, in Tokugawa Japan (1600-1868), the practice of thanksgiving afforestation (*myogazorin*) involved people giving their lord a plantation that they had established and tended. It was, formally at least, a voluntary act that expressed thanks to the lord, but actually it was made in compliance with an official's suggestion or pressure (SHIOYA 1967).

Thus, while it is clear that BRANDIS was in fact the originator of the taungya system, contrary to previous thought, there is a strong evidence to show the first taungya teak plantation was started in Kaboung forest area of South Taungoo forest division in Taungoo district. According to the Working Plan for South Taungoo forest division for the period of 1933-34, there were 132 Karen taungya cutters living in the Kaboung forests. It seems that the Imperial foresters then chose Tharrawaddy as the area in which to expand teak plantations using the taungya system as teak grows well here. It also close to Rangoon and can be easily accessed for timber extraction by waterways as well as roads and railway. The Myitmaka river has been used for teak since the mid-19th century (CHEIN HOE 1969). Also the Rangoon-Prome railroad opened in 1877, was the first rail line in Myanmar (GOVERNMENT OF MYANMAR 1994) (see Fig. 3).

IMPERIAL FORESTER'S USE KARENS TO PLANT TEAK

The Imperial foresters⁷⁾ of the time wanted to increase the amount of teak growing stock in Burma and attempted experimental plantations even in open areas outside the hill forests. However, they were not successful producing only fluted and crooked teak stems. They realized that the hill forests were the best teak producing areas and so chose the Tharrawaddy hill forests in which to begin establish teak plantations. They also saw the local inhabitants, the Karen, as the main labour force and made concerted attempts to involve them in teak planting.

It seems that Imperial foresters tried planting teak in Karen taungya before 1869. However, the Karen were most unwilling to participate as they correctly saw that a

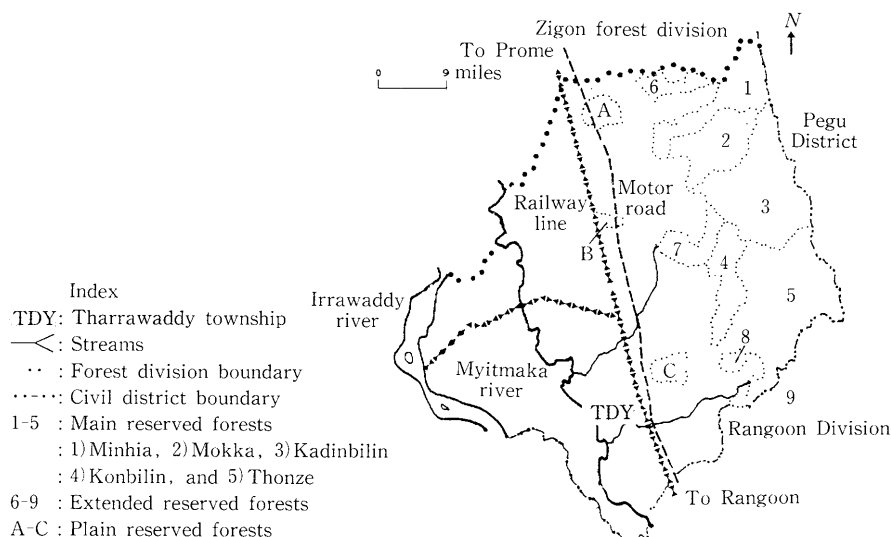


Fig. 3 Tharrawaddy forest division (southern Tharrawaddy District)

taungya so planted would not become phonezo, and could never be returned to again. As a consequence, only small areas of plantations were established in the Mokka forest. The foresters then turned to threatening the Karen, and this had the desired effect:

“The beginning appears to have been attained by pointing out to them (Karen taungya cutters) that they destroyed a good many teak trees in their taungya every year and were liable to be prosecuted for this breach of forest rules. As an alternative they were allowed to plant teak in expiation of the offence” (Tharrawaddy Working Plan, 1918).

In 1869, the Conservator, Colonel Seaton used force to make the Karen plant teak in their taungya, as he knew that land for taungya is a prerequisite for the Karen way of life.

“As soon as the intentions of Government are explained with reference to the formation of special reserves, and the abandonment of certain areas to the Karens for taungya ground, it is found they manifest an interest in the whole question of forest improvement and are quite too ready to admit that the sooner the special reserves are converted to compact teak forests, the sooner will Government be in a position to exclude other areas from the operation of the Forest Rules” (Tharrawaddy Working Plan 1918).

Thus, if the Karen refused to convert the special forest reserve into compact teak forest (ie if they refused to plant teak in their taungya), then the government would not give land to them for their taungya. After the Conservator met with Karen headmen, no less than 8 Karen villages had to undertake the planting of teak in their

taungya clearings. Also there was no difficulty in getting labour to plant teak in their taungya in return for being allowed to cut taungya within the reserves. It seemed that the Karen, finally, had to agree to plant teak trees in their taungya clearings after they were coerced, not merely persuaded, to do so by the Conservator of Forests. This was the start of the taungya plantation in this forest division. The Karen were employed for the benefit of the British colonial government, and this provided substantial financial benefits as BRANDIS (1896) notes:

“The principle of planting teak on the same area with field crops was adopted in the case of plantations made by means of hired labour, called regular plantations, in order to reduce the cost of these under-takings; nevertheless, the expense per acre was always six to eight times that of taungya (sic) teak plantations made by the Karens in the forests”.

In Tharrawaddy forest division, a regular plantation established in 1867 had cost the government 110 rupees per acre by 1880. However, the average cost of a taungya plantation over 40 years is about 31 rupees per acre (see Table 1).

THE LONG-TERM TRENDS IN TAUNGYA PLANTATIONS

Taungya farmers have established large areas of plantations in the Tharrawaddy forest division since 1869. Table 2 shows the total area established in the division up to 1994 by 10 year periods for the main reserved forests and also the lowland forests into which plantations extended. It is obvious that annual planted area fluctuated markedly. These fluctuations and their background will

Table 1 The average per acre cost of a taungya plantation over 40 years

Age	Operations	Cost/acre (Unit: rupees)
1	Clearing and planting	10
2	Weeding	2
3	Weeding	2
4	Weeding	1.5
7	Cleaning	2
10	Cleaning and thinning	2.5
15	Cleaning	2
20	Thinning	2
25	Cleaning	2
30	Thinning	2
40	Thinning	3
Total		31

Source: Working Plan for the Yoma (hill) forests in the Tharrawaddy Division, 1918, vol. I.

Table 2 Plantation establishment in the Tharrawaddy forest division

Unit: Acres

Year	hill reserved forests ^(a)						Others ⁽⁹⁾	Total
	Minhla	Mokka	Konbilin	Kadinbilin	Thonze	Extended ⁽¹⁰⁾		
1867-69	0.0	20.0	49.0	0.0	0.0	0.0	0.0	69.0
1870-79	140.6	802.9	0.0	40.9	70.0	0.0	0.0	1,054.4
1880-89	1,601.0	2,042.1	1,017.5	331.7	546.4	0.0	0.0	5,538.7
1890-09	2,083.0	1,386.8	113.1	447.9	877.4	0.0	0.0	4,908.2
1900-09	798.8	412.7	0.0	350.7	536.7	0.0	0.0	2,098.9
1910-19	86.0	94.0	53.0	120.5	821.6	194.0	58.0	1,427.1
1920-29	1,521.0	938.0	615.0	0.0	1,128.0	1,135.0	857.0	6,194.0
1930-39	321.0	481.0	363.0	50.0	213.0	627.0	1,052.0	3,107.0
1940-49	0.0	97.0	210.0	0.0	0.0	275.0	725.0	1,307.0
1950-59	0.0	0.0	0.0	0.0	0.0	0.0	585.0	585.0
1960-69	116.0	0.0	0.0	0.0	0.0	0.0	1,588.0	1,704.0
1970-79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-89	3,200.0	3,715.0	3,612.0	1,790.0	2,800.0	4,410.0	2,920.0	22,447.0
1990-94	1,924.0	1,917.0	1,830.0	900.0	1,620.0	2,800.0	50.0	11,041.0
Total	11,791.4	11,906.5	7,862.6	4,031.7	8,613.1	9,441.0	7,835.0	61,481.3

Sources: 1. From 1867 to 1917 (Tharrawaddy Working Plan, 1946-47 to 1962-63)

2. From 1918 to 1968 (Tharrawaddy Working Plan, 1946-47 to 1962-63, and 1963-64 to 1972-73)

3. From 1980 to 1994: Tharrawaddy Forest Department documents unpublished

Notes:

(a) The location of these reserved forests is shown in Fig. 3

(b) Extended reserved forests adjoining the main hill forests, including Nyaungbinzin-Kyinichaung, Kanni, Teinmyok and Thewa

(c) Plantations established in Thindawyo, Sitkwin, Satpok and public forest

(d) This 49 acres were regular plantations

now be examined. The whole period of examination is divided into three shorter periods: 1) The first period (1867 to 1917); 2) The second period (1918 to 1947); and, 3) The third period (1948 to 1994).

THE FIRST PERIOD (1869 to 1917)

During this period, more than 14,000 acres of teak taungya plantations were established. Establishment began in 1869 when the Karen people were forced plant teak in their taungya. The fluctuations in plantation establishment in the Tharrawaddy forest division from 1867 to 1917 are seen in Fig. 4. The area of taungya plantations increased and first peaked in 1889. Planting in the one small regular plantation stopped by 1869 (Tharrawaddy Working Plan, 1919).

The Forest Department was very pleased, and made the remark that in the hills, the true habitat of the teak, where labour was both difficult to obtain as well as to control, the system of employing the Karen taungya cultivators was particularly suited to the work of consolidating the teak forests (Tharrawaddy Working Plan 1946-47 to 1962-63).

However, in this initial period, the Forest Department had to let the Karen cut taungya wherever they pleased, and as a consequence these plantations were of various sizes and scattered over wide areas. They were thus difficult for the Forest Department to adequately tend and supervise. This system of plantation establishment eventually fell into disfavour, and a policy of restricting plantations adopted in 1905 led to the almost entire cessation of this work (Tharrawaddy Working Plan, 1919). It was decided in 1911-12 to discontinue establishment of scattered taungya plantations, but this was not implemented and some planting continued (Tharrawaddy Working Plan, 1963-64 to 1972-73). These events are reflected in Fig. 4.

The beginning of the 20th century was the time of first decline in the division's taungya plantations programme. Experiments in an alternative method of inducing natural teak regeneration using improvement felling (IF) were conducted during 1908 in Mokka and Minhla reserved forests. However, the results were uncertain and uneven, while the costs were no less than those of taungya plantations which gave more assured results and complete stocking.

THE SECOND PERIOD (1918 to 1947)

Plantation establishment philosophy changed markedly in this period. It was decided to intensify teak production activities and a Uniform System using a concentrated regeneration method was introduced into the division during 1918. All hill forests were placed in one working circle and teak production still had priority with hill teak bearing forests being planned for replacement with plantations. The annual target rate for converting accessible teak forests was set at 1,100 acres, and forest villages were established at regeneration centres across the hill reserves. A second peak in plantation establishment was reached in 1920.

"The immediate success of concentrated regeneration by taungya in the Tharrawaddy division led to a wave of enthusiasm for this method, and at one time proposals were made for working over the whole of Burma by planting up 1/R of the forest annually (R being the rotation considered necessary for plantations to come to maturity" (BLANFORD 1933).

However the annual target of 1,100 acres was not reached because it was impossible to dispose of all the wood left on the ground after felling. At first, the regeneration activities progressed well. Then, one regeneration

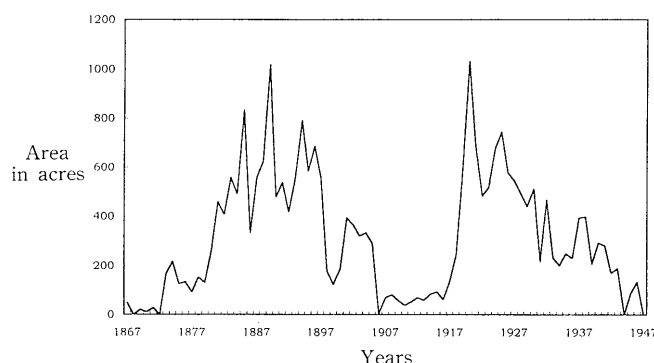


Fig. 4 Plantation establishment in Tharrawaddy forest division (1867 to 1947)

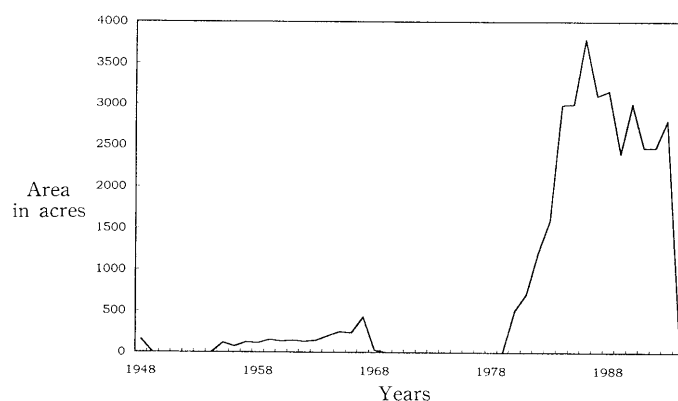


Fig. 5 Plantation establishment in Tharrawaddy forest division (1948 to 1994)

site was closed because of the 1930 Tharrawaddy farmers' revolt against British rule in which a Forest Conservator and some of his subordinates were killed. In 1931-32, four regeneration centres were also closed down because of financial stringencies. These closures might also have been influenced by the development of the then Chief Conservator of Forest's proposal, put forward in 1932-33, for a complete cessation of teak planting. He based his argument "on the assumption that the quality of plantation teak would be inferior to that of natural ones, as the former had been found to be three times more liable to be attacked by the bee-hole borers" (Tharrawaddy Working Plan, 1963-64 to 1972-73).

The Government accepted this proposal and issued the first plantation policy in 1935. The main thrust of this policy was to plant teak not for export, but only for domestic use. Planting was not to be carried out in areas heavily infected by the "bee-hole borer", and was to be confined to teak and Pyinkado (*Xylia dolabriformis*). The policy laid stress on natural regeneration. The government issued another plantation policy in 1937 that reaffirmed the 1935 policy, but put a higher priority on plantations for local people. The 1937 policy limited the planting of teak and Pyinkado, and promoted species suitable for local people's needs. The area of forest regenerated each year progressively declined because of these policies. Other regeneration centres in hill forests were closed prior to the Second World War, and only small areas were planted in the plain reserved forests up to 1946-47 (see Fig. 1).

THE THIRD PERIOD (1948 to 1994)

Myanmar gained its independence in 1948, and the rate of taungya planting stayed extremely low through to 1980 mainly because of civil unrest. The Forest Department of Burma was only able to establish an average of 330

acres a year between 1948 and 1962 throughout the whole country (WINT 1986).

The area of new plantations in Tharrawaddy forest division also decreased because of the civil unrest, which continued up to the mid-1970s in the Pegu hills. The rate of plantation established for the years 1948 to 1994 in Tharrawaddy forest division is shown in Fig. 5.

Only 2,448 acres of plantations were established in the Tharrawaddy forest area from 1948 to 1979, an average of 76.5 acres per year. Almost all of these (more than 95%) were established in the plain reserves, as the hill forests were in a state of unrest.

After 1980, the then Socialist government approved its policy on the forestry sector. The aim of this policy was to ensure the supply of forest products for domestic use and export and to introduce advanced planting and extraction techniques.

The government paid increased attention to plantations, and in 1983 a plantation scheme was adopted. Moderately large-scale plantings using the taungya method began in 1980 in the Tharrawaddy forest division. From 1980 to 1994, a large plantation area of 33,488 acres was established, of which 91.5% comprised commercial species - mainly teak and Pyinkado.

The agricultural trade policy prior to 1988 made growing rice unprofitable for farmers, so some began working in plantation areas where agricultural produce from taungya was not required to be sold to the government's crop purchasing centres. As a result, farmers and agricultural labourers (mostly Bamar) worked with Karen hill tribe labourers in the Tharrawaddy district, and plantation establishment here up to 1988 was very successful. The life of a Taungya cutter was better than that of a rice farmer in the lowlands and based on the writer's experience in Mokka and Kadinbilin reserved forests from 1984 to 1987, the Bamar population increased mark

edly to about three times that of the Karen taungya cutters.

However, Myanmar's socioeconomic and political situation changed dramatically in 1988. The new government made considerable economic changes, especially in the agricultural sector. Its new economic policy provided strong price incentives to increase agricultural productivity. Farmers are now allowed to grow any crops they wish and sell them wherever possible (MAUNG 1992).

Rice growing has become profitable for farmers, and the wage of a worker in wetland rice farming has increased to more than that of taungya plantation worker. Farmers and agricultural workers have returned to their former work, but the hill tribe Karen continue to work in taungya. Other factors which contributed to this decline in taungya workers were: the increasing price of forest products (some taungya farmers entered the timber, bamboo, and charcoal industry as the pay is better than that from taungya farming, which cannot cover daily living costs); the poor social welfare and inadequate infrastructure provided to taungya cutters, even though the new plantation areas are further from their villages; the pegged payment for forestry work; and increased commodity prices.

The 1994-95 consumer price index was about 6 times that of 1985-86 (CENTRAL STATISTICAL ORGANIZATION 1995). However, the average per acre budgetary allocation for plantation establishment rose only 2.4 times over the same period. The annual plantation target has not been reduced in line with the changing costs and reduced workforce. The Forest Department has had to continue its heavy workload with less resources (WIN 1995).

A final fall in Tharrawaddy's taungya plantation establishment rate occurred in 1994-95. No concrete explanation for this abrupt fall has been identified. However, there was a slight fall in new plantation establishment over the country as a whole, while greater priority was given to plantation establishment for local people during 1994. Of these, the latter might be the main reason for the fall, as commercial plantation establishment dominated in the Tharrawaddy forest division for many years.

CONCLUSION

The available evidence shows that the taungya system of teak production was originated by Dr. DIETRICH BRANDIS in the Kaboung forest area of Taungoo, not in Tharrawaddy as stated by many researchers. Tharrawaddy was the area where the large-scale development of taungya plantations began. The taungya system that the botanist-turned-forester refrained from forcing on the inhabitants in the initial stages of colonial rule, was later imposed by the army officer-turned-forester as colonial rule became entrenched.

Three periods of growth and decline occurred in the

Tharrawaddy's history of teak plantation establishment. The growth phase of the first period began in 1869 when Imperial foresters succeeded in coercing the hill Karen to plant teak in their taungyas, while its decline occurred in 1906 when the scattered taungya plantations became difficult to manage and natural regeneration was attempted by the improvement felling. The growth phase of second period began in 1919 when concentrated regeneration using the Uniform System was introduced. The decline of this growth phase began in 1930 with the farmers' revolt in Tharrawaddy and continued up to 1945 because of the both government financial stringencies and heavy beehole-borer attacks on planted teak. No large-scale plantations were established between 1948 and 1979 and the growth phase of this third period began in early 1980 when the government increased reforestation work to boost timber production. Plantation areas established during this last phase comprise more than half of all plantings since the taungya system was introduced. The final phase of decline was caused by a shift in government priorities during 1994.

The taungya system will certainly remain an important method of forest regeneration in Myanmar. However, if taungya plantations are to be successfully managed in the future, two great needs must be met: the provision of an adequate wage for forest workers; and the introduction of high yield production techniques for taungya agricultural crops. The former will enable the recruitment of necessary labour, and the latter will encourage them to work permanently in taungya areas. Currently there are no specially recruited forest workers, and such work relies mainly on using agricultural workers from nearby villages. Changes in the agricultural sector will thus impact on the forestry sector and its labour supply. If the Forest Department fails to provide a wage that is equal to or higher than that paid by the agricultural sector, attracting willing workers will be difficult.

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FOOTNOTES

- 1) In Myanmar, the older spelling of some towns, rivers, etc., have been changed. The following words in parentheses show the former spellings of modern place names used in this paper: Ayeyarwady (Irrawaddy), Bago (Pegu), Pyay (Prome), Taninthayi (Tenasserim), Taung gu (Taungoo), Thayarwady (Tharrawaddy). As the primary concern of this paper is the historical context of taungya plantation development, the older spellings are used for the sake of consistency.
- 2) This "division" means forest boundary division.
- 3) Here "Division" means a civil boundary division.
- 4) Selection system: Felling and regeneration are distributed uniformly over the whole area; the trees are thus uneven-aged. Uniform system: Opening up the canopy and regeneration is confined to certain portion of forest area while the timber crop is mostly even-aged and uniform.
- 5) A Bamar word meaning an abandoned farm area overgrown with trees and bushes where crops are grown again after a period of 8 to 10 years.
- 6) In Myanmar, February is the beginning of the hot period that includes the dry hot days of summer season, and finishes at the end of May when the monsoon rains set in.
- 7) Imperial foresters were mostly British and were high-ranking officials such as the Conservator of Forests, divisional forest officers, etc. On the other hand, Burmese foresters were lower ranking foresters who may have been responsible for a small forest area in a forest division.

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