

# 28. EXPLORING THE SOCIO-ECONOMIC SITUATION OF PLANTATION VILLAGERS: A CASE STUDY IN MYANMAR BAGO YOMA

Tin Min Maung and Miho Yamamoto

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Massive scale plantation forestry in Myanmar began in the early 1980s as a drastic measure to fulfil the increasing demand for timber and to prevent the conversion of deteriorated forestland to agricultural land. Myanmar Forest Department is recruiting shifting cultivators, establishing plantation villages and applying the taungya method in establishing teak plantations. From the very beginning, there was an argument about whether the project is creating forest protective groups or forest destructive groups. A key determinant to that question from the researcher point of view is the socio-economic situations; knowing the present situation of the plantation villagers can help to understand the forest management practices. Interview surveys were carried out in three villages in Bago Yoma, the main region of the special teak plantation program, to examine the current economic benefits to plantation villagers. Questions were designed mainly to explore the incentives for people participation and the socio-economic situations of the plantation villagers. Principal component analysis was used to analyze the collected data. It was found that local people are willing to participate in the initial establishment of plantations. However, all the incentives relating to the project are temporary, with no long-term consideration for taungya farmers, which jeopardizes the plan to create forest protective groups. It is concluded that the time has come for the Myanmar Forest Department to change its main aim of earning foreign exchange from establishment of teak plantations through the taungya method to redressing deforestation through people participation based on rural socio-economic development.

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## INTRODUCTION

Massive scale plantation forestry in Myanmar began in the early 1980s as a drastic measure to fulfil the increasing demand for timber and to prevent the conversion of deteriorated forestland to agricultural land. More than 30,000 ha of forest plantations have annually been formed since 1984 (Myanmar Forest Department 2000). Myanmar has also launched a Special Teak Plantation Program in 1998 which has an annual plantation target of 8000 ha in addition to the normal plantation scheme.

Myanmar Forest Department is recruiting shifting cultivators and applying the taungya method in plantation projects because it can avoid conflicts at the time of teak plantation establishment, achieve large plantation area targets in remote areas and overcome the problems of insufficient funding and insufficient labour. Further, as the plantation area is under the intensive care of taungya farmers for their intercrops, the Forest Department can expect a higher survival rate of trees for the first year.

The Forest Department is planning a joint venture by establishing plantation villages near or inside the reserved forests with the aim of securing labour for plantation establishment at reduced cost and with increased efficiency, as well as protecting the existing natural resources including old plantations more intensively with the participation of the taungya farmers. In brief, Myanmar Forest Department is trying to get people participation in the promotion of reforestation.

From the commencement of the project, the foresters have been arguing about whether the project would create forest protective groups or forest destructive groups. Past experiences suggest that taungya farmers are likely to destroy the plantations once they have been established. 'Evidently there were destructions of many teak plantations and other plantations of valuable species during the Second World War (1942-45) and again during the 1988 pro-democracy movement by the villagers who had involved in establishment of those plantations' (Ba Kaung 2001).

Why did the taungya farmers become destructive instead of the intended protective groups? In the author's judgment, the underlying issue is an economic one, and it is essential to explore the socio-economic situations of the groups involved in taungya teak plantations.

## OBJECTIVES OF THE STUDY

The specific objectives of the study are: (1) to assess the institutional choice of plantation village establishment, (2) to examine the current economic benefit of plantation villagers as a key determinant to encourage their participation, (3) to identify measures that should be culturally and socially suitable for plantation villagers and achieve the objectives of the Forest Department. To fulfil the objectives in a comprehensive manner, the following hypotheses have been developed.

Hypothesis 1: Establishment of temporary plantation villages may have difficulties in accommodating social welfare systems.

Hypothesis 2: Establishment of permanent plantation villages without a long-term economic development program may lead to system failure.

Hypothesis 3: Establishment of plantation villages just to escape a current crisis will lead to system failure.

## THE STUDY AREA

The study area is the Bago Yoma Region<sup>1</sup>, where taungya teak plantations and a plantation village system are being implementing under the Special Teak Plantation Program. A survey was carried out in Gontaung, Sanpya and Taungya plantation villages, which are located on the eastern slope of the Bago mountain ranges (Figure 1).

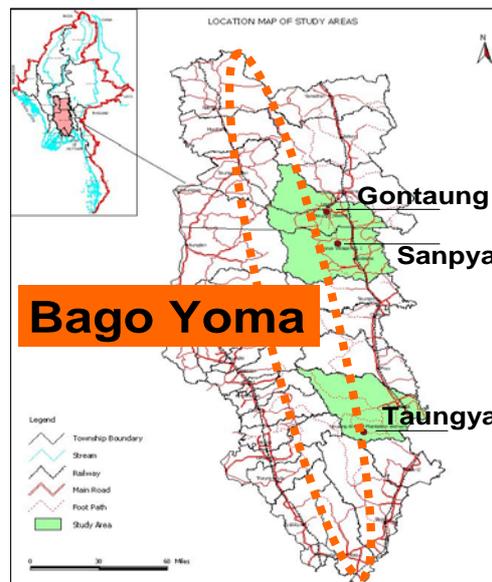


Figure 1. Location of the study area

The dotted circle represents the mountainous area, the actual Bago Yoma. *Yoma* means mountain ranges in Myanmar.

Vast and complex tropical forests exist in Bago Yoma region. The region was once famous as the home of teak (*Tectona grandis*). Associated with teak are pyinkado (*Xylia dolabriformis*), padauk (*Pterocarpus macrocarpus*), yon (*Anogeissus acuminata*), thadi (*Protium serratum*), hnaw (*Adina cordifolia*) and htawk-kyant (*Terminalia crenulata*). The characteristic bamboo species are kyathaung-wa (*Bambusa polymorpha*) and tin-wa (*Cephalostachyum pergracile*).

In recent years, these forests have rapidly degraded because of improved access to remote forested areas, over-exploitation of wood and forest products for domestic use to supply the increasing population, and agricultural expansion. Although plantation forestry cannot replace all functions of natural forests, it is one option for redressing deforestation. A large-scale teak

<sup>1</sup> This region is composed of three divisions, namely Bago East, Bago West and part of Mandalay.

plantation project known as the East Bago Yoma Project was carried out from April 1979 to March 1985. There is also a continuing Bago Yoma Greening Project which commenced in April 2004.

## RESEARCH METHOD AND DATA SOURCES

Bago Yoma region is composed of 31 townships from eight districts, divided into four divisions with a total area of 1.96 M ha. In order to select suitable townships, three common elements were identified: the existence of currently established special teak plantation programs, the existence of areas affected by shifting cultivation, and the existence of rural indigenous groups near teak plantations. After interviewing the staff of the Forest Department who are familiar with the local area, 12 townships were found to satisfy the desired criteria. However, it was not possible to conduct an intensive study of all the 12 township areas because of time and financial constraints. The researcher selected the two permanent villages and one temporary village from three township areas as case studies for the survey after discussion with the academic supervisors.

The research was based on the exploratory social survey method. Because the demographic data of the villages were unknown prior to the survey, it was planned to interview 100 households using quota sampling. However, due to the field situations of the study sites<sup>2</sup>, only 90 households were selected using judgment sampling (Table 1).

Table 1. Planned quota and actual selection of households in study areas

Township	Surveyed village	Ethnic group	Planned quota	Actual selection
Lewe	Gontaung	Bamar	25	24
Yedashe	Sanpya	Bamar	25	20
Kyauktaga	Taungya	Bamar	25	28
Kyauktaga	Taungya	Karin	25	18

The questionnaire was composed of four main parts, namely general information about the household, socio-economic situation of the household, relation to taungya teak plantation and relation to community forestry plantation. Questions were designed to explore the incentives for people participation and the socio-economic situations of the plantation villagers. Face-to-face interviews were conducted using structured questions, quantitative in nature, for easy communication with local people. All the family members were welcome at interviews, which were conducted in the form of conversations to avoid unease.

Finally, a principal components analysis was carried out to explore the inter-relationship among a set of socio-economic variables in order to confirm the developed hypothesis.

## PEOPLE PARTICIPATION IN REDRESSING DEFORESTATION

Myanmar launched a special teak plantation program in 1998. The Township Forest Departments<sup>3</sup> have been facing problems of shortage of labour, limited budget to accomplish large areas of planting, and conflict in handling agricultural encroachment in planned target areas.

There is a need for incentives for people participation. In the case of plantation establishment, shelter can be an incentive, opportunity for informal employment can also be an incentive, and concern for family welfare can be another incentive for gaining the participation in successful reforestation. In contrast, food insecurity, economic hardship and failure to meet the expected welfare can be disincentives for participation.

If a group decides to participate in a teak plantation project, they will first of all be given the right to build a temporary settlement near the plantation. Taungya farmers have the right to decide how many hectares their family would like to take for the planting season and have the right to choose agricultural crops provided these don't interfere with the teak plantation. All of these are formal incentives designed to gain the participation of the people in teak plantation projects.

<sup>2</sup> At Gontaung, systematic sampling was used to select 25 houses. Sanpya had only 20 households, which was less than the planned quota of 25, and all the 20 households were included in the sample. Residents of Taungya village were in the process of moving from an old plantation site to the present site at the time of the survey. The scattered uphill locations of Karin dwellings created logistical difficulties, and a decision was made to exclude those who had not arrived at the new plantation site.

<sup>3</sup> Each township has a Township Forest Department. The performance of these offices varies according to the will and motivation of Township Forest Officers, e.g. some build schools for the plantation villages, some do not.

Local foresters also judge between need and greed, and grant some informal rights relating to forest resource use.

Ba Kaung (2001) claimed that local people and even taungya farmers did not welcome plantation projects. However, according to interviews carried out in three plantation villages during 2004, taungya farmers do not oppose plantation projects, and even participate in the establishment of plantations at their initial stage. They know they can gain formal right to cultivate taungya and receive wages from their participation. Lack of participation simply arises due to the absence of a long-term development program.

## TAUNGYA TEAK PLANTATIONS AND THE PLANTATION VILLAGES

Taungya is a Myanmar word meaning *upland fields* or *upland farming*. Taungya teak planting is defined here as the growing of teak seedlings together with taungya. Land in the reserved forests in Myanmar falls under the management of the Forest Department which would prefer to establish teak plantations. The forest occupants and the landless poor would like to cultivate taungya in the reserved forests. The establishment of taungya teak plantations provides a win-win situation for both sides.

According to widely accepted opinion (Blanford 1958, Chein Hoe 1969 and Nair 1993), raising teak by the taungya method was first attempted in 1856 at Tharyawady in the Bago Division. The Forest Department (2000) reported that the first taungya teak plantation in Myanmar was established in 1856 by U Pan Hee, a Karen farmer, as a personal present to Dr Brandis, the Governor<sup>4</sup>.

The first attempt to establish a forest village in Myanmar occurred during the period 1918–47 after the Forest Department had decided to introduce a uniform system using a concentrated taungya regeneration method. Unfortunately, the plan did not go well due to the 1930 Thayarwady farmers' revolt, economic depression and the extensive attacks of bee-hole borer (*Xyleutes ceramica*) in teak plantations of Burma and Thailand, which led to termination of the taungya teak plantations. Most of the taungya farmers went back to their traditional shifting cultivation.

In 1983, the second attempt for reforestation using the taungya system and the coexisting plantation village took place with the East Pegu Yoma Project (EPP). In those days taungya farmers had relatively high incomes, so even lowland farmers from the central plain joined the project. However, at the end of the project, the primary aims for reforestation and forest protection faded away due to lack of a long-term development program. Most of these village areas were transformed into *grey zones* of forest administration<sup>5</sup> and later claimed as forest destructive groups.

Since 1998, the Myanmar Forest Department has been involved in a third attempt to establish plantation villages in an attempt to avert the crisis by accomplishing the special teak plantation project. Most of the abovementioned groups have joined the teak plantation establishment as experienced workers. The process of reforestation using taungya methods and establishment of plantation villages is happening again.

## SYSTEM FUNCTIONING AND THE SOCIO-ECONOMIC SITUATION OF THE PLANTATION VILLAGERS

The main source of income for villages is casual employment in the teak plantations. Taungya farmers are paid by the Forest Department after finishing their tasks in allocated areas. Alternative sources of income include income from cash crops and livestock raising. There is also income from forest resource extraction which has a strong relation to sickness<sup>6</sup>, crop loss and rice insufficiency (from interview).

Table 2 reports the income level assessment of plantation villagers in the research area, based on the survey of the villagers. About 45.5% of the households fall in the low income bracket of casual plantation workers. Income assessment reveals that about 67% of households receive medium or higher income from taungya cash crops. Low levels of income from cash crops occur among those who no longer have a taungya area for cultivation or may be the result of crop loss caused by too

<sup>4</sup> Dr Brandis was a German botanist-turned-forester, who was hired by the British in 1856 to oversee the administration and management of the vast and complex Bago Yoma Region.

<sup>5</sup> A grey zone of forest administration signifies an administrative dilemma, where the border between protective and destructive is unclear.

<sup>6</sup> This relationship arises because sickness causes economic hardship. Sick people are unable to engage in casual employment at teak plantations and also incur medical expenses.

little or too much rain. Most of the households fall in the low income bracket of livestock raising which represents the needs of encroachment to reach a moderate scale. However, the higher level income from livestock raising might lead to economic hardship because it generally is the result of selling domestic animals used for farming. Similarly, income from forest resource extraction has a strong relation with economic hardship. The more severe the economic hardship, the more taungya farmers engage in forest resource extraction which might lead to illegal extraction of forest produce. Thus, the Forest Department should try to manage the income from forest resource extraction in such a way that it will remain at a moderate scale.

Table 2. Income level assessment

Type of income	Low (< 50,000 Kyats <sup>7</sup> /yr)		Medium (50,000-100,000 Kyats/yr)		High (> 100,000 Kyats/yr)	
	No.	%	No.	%	No.	%
Casual plantation work	41	45.5	24	26.7	25	27.8
Cash crops	30	33.3	20	22.2	40	44.5
Livestock breeding	79	87.8	3	3.3	8	8.9
Forest resource extraction	78	86.7	7	7.8	5	5.5
Total	228	63.3	54	15.0	78	21.7

Source: Survey interview of the researcher (2006).

The most common human diseases are malaria and tuberculosis. Influenza, coughing and tonsillitis, are prevalent in the rainy season while some cases of diarrhoea also occur. Most of the villagers have difficulty accessing hospitals. Even though health care services exist in normal administration villages, medical services in the plantation villages are limited to midwives appointed by the Township Forest Department. In the case of serious diseases, the villagers have to go to the hospital in the nearest town.

Primary schools have been established in permanent plantation villages. However, it is difficult to arrange schools for the children in temporary villages, and the children's education depends solely on temporarily hired teachers. The appointment of temporary teachers is the responsibility of the local Forest Department and thus depends on the will and motivation of the local forest officials.

#### Legal Rights for Plantation Villagers

The plantation villagers are granted the formal right to cultivate intercrops in teak plantation areas. Depending on the ability of the family to work, the size of the taungya varies from 1 to 6 ha. Intercropping is possible for at least two to three years after planting teak. However, most of the villagers intercrop only for one year, because the nutrients enriched through the slash-and-burn are lost through leaching or erosion, and they have to migrate as the plantation project moves on to new areas. Regarding the species chosen to intercrop, the villagers have the right to choose the agricultural crops they would like to grow as long as cropping does not interfere with the planted teak. In addition, they receive payments for participating in teak plantation work. Local Forest Departments sometimes give plantation villagers access to about 0.4 ha per household of *wetland*<sup>8</sup> areas to cultivate rice for household consumption.

Community forestry plantations introduced by forestry officials can be seen in some permanent villages, although only at a very limited scale and only among the most trusted groups. The duration of land lease for the establishment of a community forest is initially set at 30 years. After a period of 30 years, a decision is made on whether to extend the lease depending on the performance and desire of the users' group.

<sup>7</sup> US\$1 = 1280 Myanmar kyats, as on 27 April 2007.

<sup>8</sup> Wetlands are areas flooded with water for most of the rainy season. Since it is impossible to grow teak in such areas, the Forest Department allows taungya farmers to cultivate paddy fields. Taungya farmers transform these areas into rain-fed paddy fields.

### The Socio-economic Situation of Plantation Villagers

Gontaung Plantation Village (hereafter Gontaung) emerged through one of these resettlement programs for agricultural encroachers in 1998. In that year, Lewe Township Forest Department planned to establish a special teak plantation of nearly 405 ha. However, the planned teak plantation area had already been encroached by the nearby villagers. Some farmers, agricultural labourers and their families even lived inside the reserved forest. Although it took back all the farmlands to establish teak plantation, Lewe Township Forest Department allowed the villagers to continue cultivating about 96 ha of traditionally owned rice fields.

According to the data obtained from the village head, the population of Gontaung is 280, comprising of 56 households with an average household size of five. The major ethnic population is Bamar. The village resource map of Gontaung is presented as Figure 2.

The villagers plant coconut palm (*Cocos nucifera*), bananas (*Musa spp.*), mango trees (*Mangifera indica*) and vegetables in their home gardens. A major problem is lack of land for cultivation and lack of income opportunities from plantation work. They make their living by working as agricultural labourers or by illegal logging and charcoal burning, which both pose a threat to the sustainability of teak plantations. Agricultural encroachment is also taking place in the plantation area.

Sanpya Plantation Village (hereafter Sanpya) was formed in 2004 through the strong will and participation of both the Yedashe Forest Department officials and taungya farmers who had a long history of involvement in taungya teak plantations. According to the village head, the population is 88, with 20 households. As in Gontaung, there is only one major ethnic population, the Bamar. All the families are actively participating in taungya teak plantation establishment. The village resource map of Sanpya (Figure 3) indicates the taungya teak plantation established in 2004.

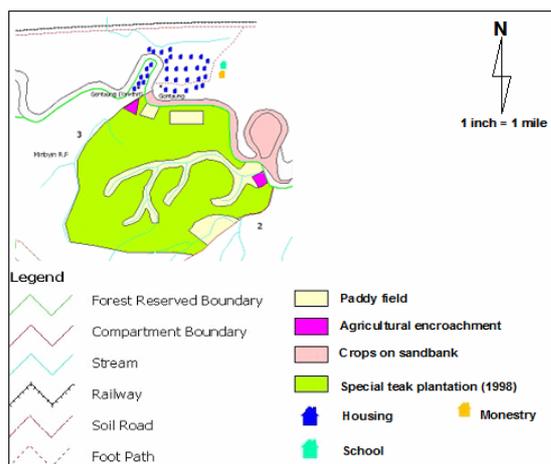


Figure 2. Village resource map of Gontaung Plantation Village

The size of the taungya varies from 2 to 8 ha per household. Besides taungya intercropping, the Forest Department granted rights to cultivate rice fields of 0.32 ha per household inside the reserved forest. The villagers also have a certificate to establish a community forest of 8 ha on reserved forestland. The Forest Department have also encouraged every household to establish home gardens, consisting of edible fruit trees including coconut palm (*Cocos nucifera*), bananas (*Musa spp.*), mango (*Mangifera indica*), guava (*Psidium guajava*) and vegetables, by providing the seeds and seedlings at no cost.

The taungya farmers in Taungya Plantation Village (hereafter Taungya Village) are experienced in moving around the reserved forests and have been working in taungya teak plantations within the Kyauktaga township for more than 20 years. For some of the Taungya villagers, the custom of participation in taungya teak plantation establishment dates back to their parent's time. The total population is 796, made up of 173 households. The ethnic composition is Bamar (62%) and Karin (38%).

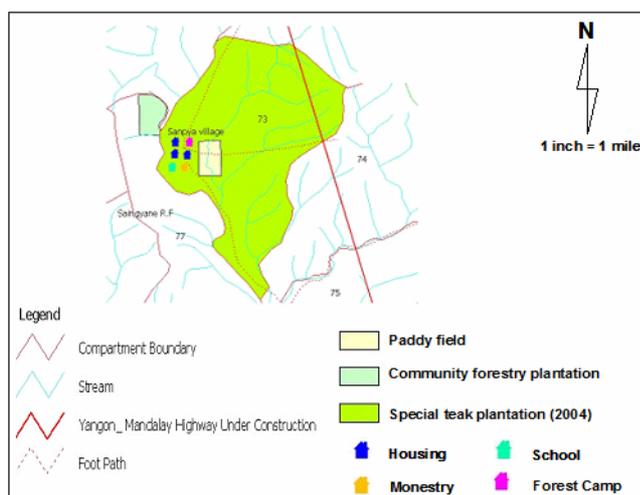


Figure 3. Village resource map of Sanpya Plantation Village

All the households are participating in taungya teak plantation establishment. Depending on their capability, the size of the taungya varies from 1.6 to 4.8 ha per household. Types of intercrops cultivated with teak are upland rice (*Oryza sativa*), sesame (*Sesamum indicum*), maize (*Zea mays*) and vegetables. The village resource map of Taungya Village is presented as Figure 4.

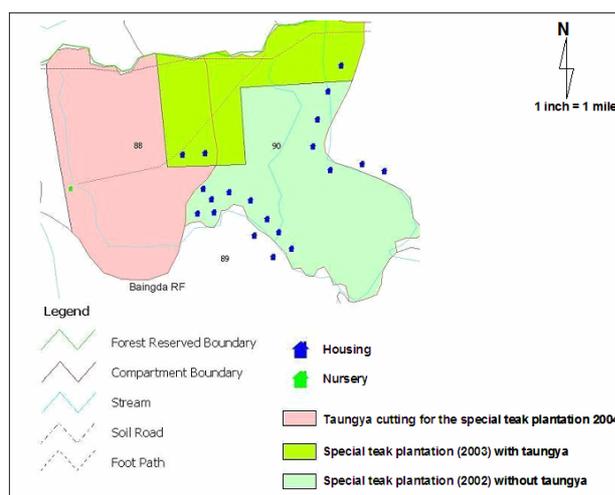


Figure 4. Village resource map of Taungya Plantation Village

Taungya Village is temporary in nature. Both the Township Forest Department and the taungya farmers intend to establish a permanent village so that taungya farmers can settle in one place. Several discussions have been held within the forest officials and group leaders of the Bamar and the Karin since 2000. However, they have not been able to reach a final agreement because:

1. Bamar wants to settle in a lowland area where they can engage in *paddy rice*<sup>9</sup> farming which needs a wetland area.
2. Karin wants to settle in an upland area because it is their tradition and they do not need wetlands for rice farming because they grow *upland rice*<sup>10</sup>.
3. The Township Forest Department wants both groups to settle in one place, mainly to secure the labour force.

<sup>9</sup> The word 'paddy' is derived from the Malay word pady, meaning rice. Paddy rice or rough rice means that the whole grain has been taken off the plant at harvest. After milling and polishing the white rice grain makes up less than three-quarters of the weight of paddy rice.

<sup>10</sup> Upland rice can be grown without the need of surface water. It relies solely on rainfall.

Each of the three plantation villages was established mainly with the intention of obtaining labour for tree planting. However, the establishment does not have a close relationship with the Forest Department Headquarter. The success and failure of plantation villages depend solely on the will and motivation of local forest officials in each plantation zone and the degree of participation from the taungya farmers, since there is no official aid for supporting education, health care services and social amenities.

## VILLAGE NEEDS ASSESSMENT

In order to construct a wish list, plantation villagers were asked during interviews what they thought the highest priority for development of plantation villages was. Responses were highly diverse, varying according to the situations faced by the plantation villagers. Health care services for family members and schools to educate children were the highest ranked on the wish list. Establishing health care services and schools are the two major tasks that the Forest Department need to accomplish to uplift the living standards of the plantation villagers. Availability of funding for agricultural investment is the second highest priority, although this is a priority for only a small percentage of villagers.

There is a high level of inequality of services among the plantation villages. Even though taungya farmers living in temporary villages have been working in the taungya teak plantations for several years, some of these villages do not have schools even for primary education nor the basic health care services. They have the poorest social welfare system due to their non-permanent and mobile state. For this reason, their living standard is low.

Even in permanent villages, resource inputs differ from one village to another. Some get the opportunity to establish community forestry plantations but others do not. Only some villages are given the right to cultivate traditional rice fields inside the reserved forests (such as the rice fields inside the teak plantations near Gontaung). In some cases, all the rice fields are taken back, and then divided equally between the plantation villagers as has been the case in Sanpya. For some villages (Sanpya), primary schools have been established by the Township Forest Departments but some are run on a self-help basis (Taungya Village). Very few villages have access to basic health care services (Sanpya).

## PROBLEMS FACING TAUNGYA VILLAGES

In the early 1980s, the supply of rice instead of cash for daily wages had been used as one of the incentives for the establishment of plantation projects. However, after the advent of a market-oriented economy, rice distribution at a low price has been terminated. That may be one of the reasons why lowland Bamar farmers abandoned taungya teak plantations in the late 1990s.

The local forest officials try to give villagers informal rights to cultivate rice fields in the wetland areas of reserved forests, but have limited authority to grant informal rights in reserved areas. Most taungya farmers do not own cattle or buffalo for ploughing. If they have to hire cattle or buffalo, they need to pay the owner more than 1,000 kg of paddy rice for one crop season. The areas granted for cultivating rice are sometimes too small to cover both the payment and household consumption. Thus the rice insufficiency problem remains unchanged.

Access to fuelwood, though not a problem for temporary villages with continuing plantation projects, becomes a problem for left-over permanent villages surrounded by teak plantations. People in Gontaung have to undertake a three-day trip with bullocart to gather firewood. Establishment of community forestry plantations should be considered and encouraged in these types of plantation projects. In this way, the Forest Department may even be able to create buffer zones for the main teak plantations.

As stated in the Tharrawaddy Working Plan (Government of Burma 1946), education seems the only solution for the long-term development of the plantation villagers. At the very least, primary schools should be established to educate the next generation of taungya farmers. For temporary villages, even if it is difficult to establish schools, appointing teachers to educate the children should be considered. Health care services which are a critical need in plantation villages should also be a priority. Even though it is a formidable task, the local Forest Department should consider the possibility of training the educated women in the plantation villages to become midwives or health workers.

## DATA ANALYSIS FOR EXPLORING THE SITUATION OF PLANTATION VILLAGERS

## Factor Extraction

In this study, the most commonly used approach (principal components analysis) has been used as an extraction technique to identify the typology of the plantation villagers. The sample size is 90, and 19 key variables have been used in data analysis. The selected variables can be classified into seven groups according to their related fields:

- |  |                 |
|--|-----------------|
| 1. Variables relating to rice paddy            | V1, V2          |
| 2. Variables relating to taungya               | V3, V4, V5, V13 |
| 3. Variables relating to animal husbandry      | V6, V7, V8      |
| 4. Variables relating to household consumption | V9, V10, V11    |
| 5. Variables relating to community forestry    | V12             |
| 6. Variables relating to income                | V14, V15, V16   |
| 7. Variables relating to expenditure           | V17, V18, V19   |

The software package XLSTAT Software has been used for the analysis.

Kaiser's criterion, the Scree test and Parallel analysis have been used to make decisions on retaining three factors out of six. In this research, the aim is to explore the socio-economic groups which implied the use of orthogonal rotation. For this reason, Varimax rotation was performed to aid in the interpretation of these components. The loadings of each of the variables on the selected three factors are presented in Table 3.

Table 3. Varimax rotation of three factor solution

Variable	Component 1	Component 2	Component 3
V19: Total household expenditure	0.86		
V17: Kitchen expenses	0.85		
V12: Community forestry plantation (ha)	0.74		0.36
V16: Total net income of the household	0.64		
V15: Income from informal work	0.62		
V18: Medical expenses	0.54		
V5: Harvested agro crops (kg)	0.52	0.34	
V11: Monthly oil consumption (kg)	0.42		
V7: Harvest (cow, cattle, buffalo)			
V14: Net income from agricultural related activities		0.84	
V13: Taungya area for the year 2006 (ha)	0.36	0.75	
V8: Poultry		0.69	
V10: Monthly chicken consumption (kg)		0.67	
V3: Taungya area for the year 2005 (ha)	0.51	0.66	
V4: Harvested upland rice (kg)		0.61	-0.56
V2: Harvested paddy (kg)			0.89
V1: Paddy fields (ha)			0.88
V9: Monthly rice consumption (kg)	0.46		-0.49
V6: Cow, cattle, buffalo			0.45
% of variance explained	23.32%	17.78%	14.90%

Note: Only loadings above 0.3 are displayed.

The three factor solution explained a total of 56.0% of the variance, with Component 1 contributing 23.32%, Component 2, 17.78%, and component 3, 14.90% respectively. The first factor deals with variables relating to taungya, household consumption, community forestry, income and expenditure, which share the conceptual meaning of a promising living standard. The second factor has strong loadings only on variables relating to taungya, and explains the concept of sole dependency on the taungya teak plantations. The third factor can be interpreted as the dependency on paddy fields as the main farming activity. The highest loadings are on the harvested paddy and the paddy fields.

**Score Plots Presenting the Typology of the Plantation Villagers**

In the first score plot (Figure 5), households from Sanpya and Taungya villages fall in the first quadrant which represents the promising living standard and participation in taungya work. Households from Taungya Village are found in the second quadrant which still represents participation in taungya work but not having a promising living standard. Households from Gontaung are found in the third quadrant which has no relation with taungya nor promising living standard. The fourth quadrant, which has no relation with taungya but has promising living standard, comprises Gontaung and Sanpya households.

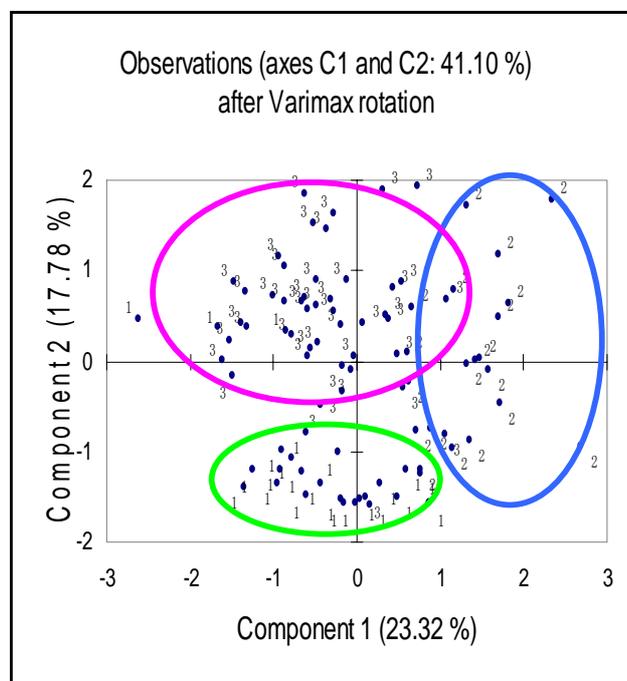


Figure 5. Score plot of Component 1 and 2

In the second score plot (Figure 6), almost all the households from Sanpya fall in the first quadrant, having opportunities for rice farming and having a promising living standard. Households from Gontaung seen in the second quadrant are those which have rice fields but not promising living standard. In the third quadrant, which has no relation with rice fields nor promising living standard, households from Gontaung and Taungya villages can be seen. Lastly, households from Taungya Village which have promising living standard but no relation with rice fields can be found in the fourth quadrant.

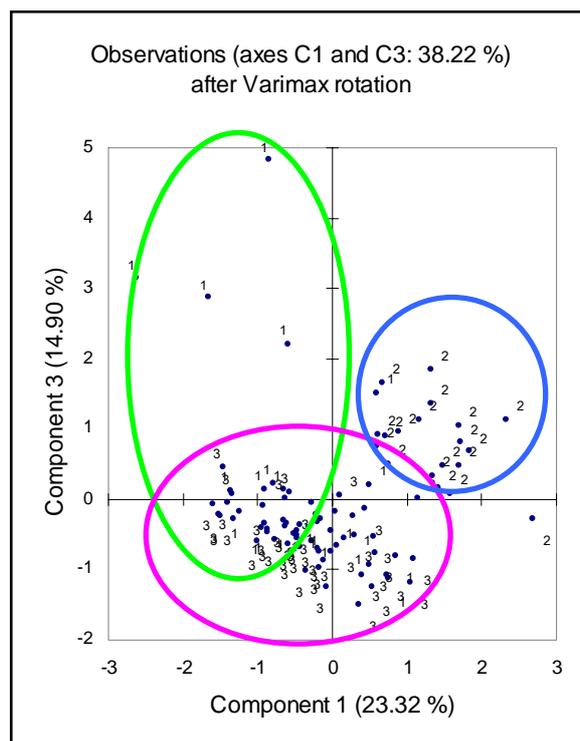


Figure 6. Score plot of Components 1 and 3

In summary, 10 households, all from Sanpya, have positive loadings on all the three components which mean they have taungya, paddy fields and all the income opportunities which are an indication of a promising living standard. Another 10 households, all from Taungya Village, are engaged in taungya farming and have a promising living standard, all having positive loadings on Component 1 and Component 2. Two households from Gontaung, 9 households from Sanpya and 1 household from Taungya Village show higher loadings on Component 1 and Component 3 indicating a promising living standard with paddy fields as the major farming activity.

Data from 7 households, 3 from Gontaung and 4 from Taungya Village, reveal that even though they have paddy fields and are engaged in taungya farming, they do not have a promising living standard. Twenty-four households from Taungya Village have positive loadings on Component 2 but are negative on Component 1, revealing that even though they participate in taungya farming, they do not have a promising living standard. Five households from Gontaung have high loadings only on Component 3.

Fourteen households have no access to taungya or paddy fields and are without any prospect for a promising living standard. These include 9 households from Gontaung and 5 from Taungya Village. The rest have no access to taungya or paddy fields but have a promising living standard. These are 5 from Gontaung, 1 from Sanpya and 2 from Taungya Village.

## DISCUSSION

Forty of the 90 sample households have what can be described as a promising living standard. It seems that the plantation village system in Myanmar works well from a socio-economic point of view. At this point a misjudgement could easily be made that will lead to mismanagement. From a one-dimensional view, the percentage of households with a promising living standard, 44.4% in total, seems impressive, however, closer examination reveals some problems.

Among the households which have a satisfactory socio-economic situation, 50% are in Sanpya, 32.5% in Taungya Village, and the remainder in Gontaung. In terms of the social and environmental characteristic of the two villages, Sanpya village was only formed in 2005, and is thus well-resourced. These resources include nearby teak plantations for casual plantation work and taungya cultivation, paddy fields officially granted by the Forest Department to encourage their participation and access to forest resource use. Gontaung, which was formed in 1998, might once have had such opportunities, however, as it is now the permanent village, it has had no further

contact with teak plantation projects since 1999. It no longer has access to casual work in plantations or land for cultivating taungya, and has been facing difficulties in accessing forest resource because all the nearby forest areas have been transformed to teak plantations. Some of the villagers have attempted agricultural encroachment in teak plantation areas as well as illegal logging. These villagers are now what the Forest Department would describe as 'a forest destructive group'. The main underlying factor is the socio-economic hardship caused by the lack of long-term development programs.

Households in Sanpya actively participate in taungya teak plantation establishment because at present they have the best socio-economic situation among the three villages. They might follow the same path as Gontaung once they begin to face economic hardships after the nearby plantation projects have been completed. Further, even though Component 1 generally represents a promising living standard, the highest loadings of Component 1 happen to be variables for expenditure instead income. It can be interpreted that the villagers from Sanpya who have the most promising living standard, might still have some economic problems, and thus the above judgment is supported.

## CONCLUSION

A socio-economic survey carried out in three plantation zones in special teak plantation areas in the Bago Yoma exposed a change in socio-economic pattern of the plantation villagers during the eight-year period of the special teak plantation project. An analysis of these data provides insights into policies for redressing deforestation and creating forest protective groups.

The reason for the forest protective groups turning into destructive groups appears to be due to defects in the design of the taungya project. The Forest Department chose to establish plantation villages, not with the intention of improving the quality of community life, but to overcome difficulties in establishment of large-scale plantation projects. Local people joined the project not because they are aware of the vital role of the forests in the well-being and socio-economic development of the nation, but because they needed land to cultivate taungya for survival.

Data analysis to explore the socio-economic situations of the plantation villagers clearly reveals that those permanent plantation villagers have the best prospects of a promising living standard at the initial stage. However, as the incentives for permanent villagers are temporary with no long-term consideration for their sustainable socio-economic development, permanent villagers have to face the worst socio-economic hardships after the end of nearby plantation project. For temporary villagers, they are also in a highly vulnerable situation from a social welfare point of view. The families of the temporary villagers face difficulties in accessing health care services and their children do not even have the opportunity to attend a primary school.

It can be concluded that permanent plantation villagers are more likely to become forest destructive groups than are the temporary villages. Destruction of teak plantations, agricultural encroachment and even illegal logging can mostly be seen in the permanent villages. This destruction takes place because the villagers are surrounded by untouchable teak plantations without any formal resources to survive. This finding does not necessarily mean that permanent villages should not be established. To improve the quality of community life permanent villages must be established. However, it must be recognized that the sustainable socio-economic development of the plantation villagers is the key for the success of redressing deforestation through people participation.

## POLICY IMPLICATIONS

Many researchers criticize the top-down forest management in Myanmar and encourage a transformation to decentralization, benefit sharing, and a bottom-up management approach with citizen's participation in plantation establishment. However, there are a number of reasons why such a policy change may not succeed. First, it may be difficult to change Article 8.A of the *Myanmar Forest Law* which explicitly stipulates that 'a standing teak tree wherever situated in the state is owned by the state'. Second, even if the above statement could be revised with high financial incentives from tree planting, only large organizations could replace the Forest Department in the taungya teak plantation development. The lives of the local people may remain unchanged because it is difficult for them to secure a place in this profitable but long-term enterprise.

At present, the Myanmar Forest Department is the only enterprise and taungya farmers are the main participants in taungya teak plantation projects. Instead of criticizing the centralized

management, consideration should be given to what changes might be possible under the present situation and to what extent these changes would benefit the local community.

For establishing permanent plantation villages, it would be beneficial to identify areas for special teak plantations, for at least a 5-year project. The village could be established in the middle of a planned 5-year project area so that the plantation villagers would have a secure income for at least five years. The village should be established on a manageable scale in terms of sharing the resources among the villagers and the feasibility for the Forest Department to grant land allocation to the villagers for agroforestry practice. In conformity with Act 15 of the *Forest Law*, which allows use rights in village-owned firewood plantations, and *Community Forestry Instructions*, which permit agroforestry practice in allotted land, the plantation villagers should be given the right to establish a community forestry plantation of 1.2 ha per households in the initial year of 5-year plantation projects.

During the 5-year period, a sound landscape system could be introduced which will ensure sustained income from agroforestry practices. As suggested by Keh (2000), the landscape system should be arranged to include much greater space for initial agricultural products and fruit trees for income generation, with multipurpose trees and also soil improving trees and plants included in the system. At the same time, the establishment of home gardens should be encouraged. In this way, permanent villagers will be able to continue independently when the teak plantation projects are completed after five years.

It would be beneficial if income generating groups could be formed with financial assistance from the government or in cooperation with donor organizations. The aim is to create self-help management groups which can manage their own finance in the best interests of their own community with the participation and guidance of township forest officials. It is further suggested that this finance should be circulated within the community at low interest rates and the money received through interest payments be used for education, health care and social amenities.

Where it is not possible to ensure sustainable development for permanent villages, such villages should not be established, because the villagers will through necessity eventually become forest destructive groups. In this situation, the custom of a temporary village system would be a wise choice. However, it is critical to arrange a basic social welfare system for temporary villages. The Forest Department itself or in cooperation with other organizations, should appoint teachers to educate the children and some of the prospective local villagers should be trained to become midwives and health workers for the taungya families.

Finally, it is necessary to respect the social and cultural difference of the ethnic groups, and not force uplanders to move to the lowland or lowlanders to uplands by creating these permanent villages, nor should they be forced to live together in one place. The plantation village system will be successful if, and only if, it is created as an acceptable environment for the participants. In this way, forest protective groups can be created.

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