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SOCIOECONOMIC ANALYSIS OF FARMER'S MOTIVATION FOR TREE PLANTING IN FARMLAND : A CASE STUDY IN HUA NA KHAM VILLAGE, NORTHEASTERN THAILAND

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บทคัดย่อ

การปลูกสวนป่า โดยเฉพาะอย่างยิ่งไม้ยูคาลิปตัส ได้ขยายตัวอย่างรวดเร็วในประเทศไทย รายงานวิจัยนี้ได้วิเคราะห์ปัจจัยด้านเศรษฐสังคม ซึ่งมีผลกระทบต่อการปลูกต้นไม้ในพื้นที่ของเกษตรกร โดยการศึกษาเปรียบเทียบในระหว่างกลุ่มผู้ปลูก และไม่ปลูกสวนป่า โดยทำการศึกษาที่หมู่บ้านหัวนาคำ จังหวัดมหาสารคาม ได้พบว่า การขาดแคลนแรงงานในพื้นที่ชนบท ทั้งแรงงานในครอบครัวและแรงงานจ้างเป็นปัจจัยที่สำคัญยิ่งต่อการตัดสินใจปลูกต้นไม้ กล่าวคือ การที่แรงงานขาดแคลนทำให้เกิดระบบการใช้ที่ดิน ซึ่งไม่ต้องใช้แรงงานมาก ซึ่งรวมถึงสวนป่า ผู้วิจัยได้สรุปว่า การเปลี่ยนแปลงรูปแบบการใช้ที่ดินเกษตรกรรมในภาคตะวันออกเฉียงเหนือมีแนวโน้มว่าจะเกิดขึ้นอย่างต่อเนื่องไปช่วงระยะเวลาหนึ่ง

ABSTRACT

Farm forest, especially *Eucalyptus* farm forest, is rapidly expanding in Thailand. This research analyzes socio-economic factors that affect tree planting in farmland by comparing planter with non-planter, through a field survey conducted in Hua Na Kham Village, Mahasarakham Province. The shortage of agricultural labor in rural areas, both family labor and employment, was found to be one of the crucial factors affecting tree planting. Thus, the labor shortage has changed the more labor extensive land use system, including farm forestry. We conclude that rapid agricultural and land use reformation is likely to continue for some time in northeastern Thailand.

INTRODUCTION

Recently farm forestry area has been rapidly expanding in Thailand. Though there is no statistical data which covers the whole country, it can be said that in northeastern Thailand, about 2% of agricultural land has been replaced with tree plantation, mostly *Eucalyptus*, in the last decade (Nagata and Kono, 1996).

Eucalyptus is the genus which has faced the strongest controversy in tropical regions, and especially in Thailand. Recent arguments have mainly been concerned with

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whether the adoption of *Eucalyptus* is desirable or not. Those who object to its planting show how it has infringed on farmer's rights under strong pressure from government and industrial sectors, and how it disturbs agricultural ecology in the farmlands (Lohmann, 1990; Puntasen *et. al.*, 1992 and Carrere and Lohmann, 1996). On the other hand, those promoting it insist that the problems arise more from "*the insensitive application of the government policies on afforestation and social injustice than from the eucalypts*" (FAO, 1995). To date, little research has been presented on the factors that affect the recent rapid diffusion of *Eucalyptus* planting in Thailand. This research analyzes socio-economic factors that affect tree planting, mostly *Eucalyptus* planting, by comparing planter with non-planter, through a field survey conducted in Hua Na Kham village, Mahasarakham Province.

METHODOLOGY

The field survey was conducted at Hua Na Kham Village, Kosum Pisai District, Mahasarakham Province, from August to November, 1996. 50 of 86 households (noted as "farmers") were investigated by interviewing based on a semi-structured questionnaire. 20 of them are "planters"; farmers who have farm forest where *Eucalyptus camaldulensis, Pterocarpus macrocarpus, Azadirachta indica* has been planted. The remaining 30 are "non-planters" who have no farm forest. The survey covered 95% of planters, and 50% of non-planters in the village. The interview focused on basic information; socio-economic characteristics, motivations for tree planting, perception on farm forest, management of farm forest, and so on. An in-depth survey was also conducted on some key persons, including the village head, middle men, and elders, etc.

In this paper, general information on the farm forest in the village is first described. Then, land profitabilities of *Eucalyptus* and cassava, one of the competitive cash crops, are compared. Following this, some socio-economic characteristics of planters and non-planters are compared. Finally, case studies are presented to highlight the previous analysis.

RESULTS AND DISCUSSION

Farm forest in Hua Na Kham Village

Hua Na Kham village is located in the southern part of Kosum Pisai District, Mahasarakham Province. It is about 40 kilometers from Khon Kaen city. As transportation conditions are relatively good, villagers can easily go to work in Khon Kaen city from the village.

According to the interviews, hillsides which were not suitable for paddy fields were covered with forest for over 20 years.

Then villagers began to cut some parts of the forest to grow kenaf as a cash crop. In the 1980's, hillside forest disappeared because of a further invasion of cash crops, mainly cassava cultivation.

Figure 1 shows the present land use in Hua Na Kham Village. Approximately 12% of the total agricultural land is farm forest in this village. This proportion is considerably higher than the forest rate of Mahasarakham Province; 0.66% of the total land in 1993 (Royal Forest Department, 1995).

Figuer 2 shows the farm forest area in the village. In 1994, Tree Plantation Promotion Project (Khrongkan Songsoem Kasetakon Plukpa), was introduced in this village, resulting in the establishment of non-*Eucalyptus* farm forest. This project subsidizes farmers who establish farm forest with 3,000 baht (US$ 120) for 5 years (Royal Forest Department, 1996). It is clear that the area has been steadily increasing, especially since 1992.

At the time of the survey, all of the farm forest area in the village was land previously used to cultivate cassava. However, some farmers intend to replace other land uses; grassland, paddy fields, and wasteland, etc., with farm forest in the near future.

Land profitability

As all farm forest in the village was previously cassava fields, it is therefore quite natural to compare the profitability of these cash crops. Land profitability of cassava and *Eucalyptus* in this village are shown in Table 1. As cassava production was seriously damaged in 3 instances in the research year, 2 categories, one which includes these cases (9 cases) and another which do not include (6 cases) them, are presented. At the current market interest rate of 8-12% (deposit; 1 year), NPV/year of *Eucalyptus* farm forest is 295-365 baht/rai (US$ 11.8-14.6; 1 rai=0.16 ha), while net income from cassava is 270-400 baht/rai (US$ 10.8-16).

According to the farmers, they perceive that the profit from *Eucalyptus* and cassava are similar. It can be said that the land productivity of *Eucalyptus* farm forest is, in fact, not so different from that of cassava under current conditions.

It may still be naive, however, to make this conclusion because of a lack of enough data and the fluctuation of cassava prices and production. Such fluctuations may be influential for risk-aversive farmers. Additionally, as shown in Figure 3, cassava prices have been decreasing. Recent surveys on the economic feasibility of *Eucalyptus* plantations suggest that *Eucalyptus* farm forest is more profitable than cassava under the 12% discount rate (Niskanen, 1993 and Makarabhirom, 1994). Different results seems to reflect differences in approach and different research cites.

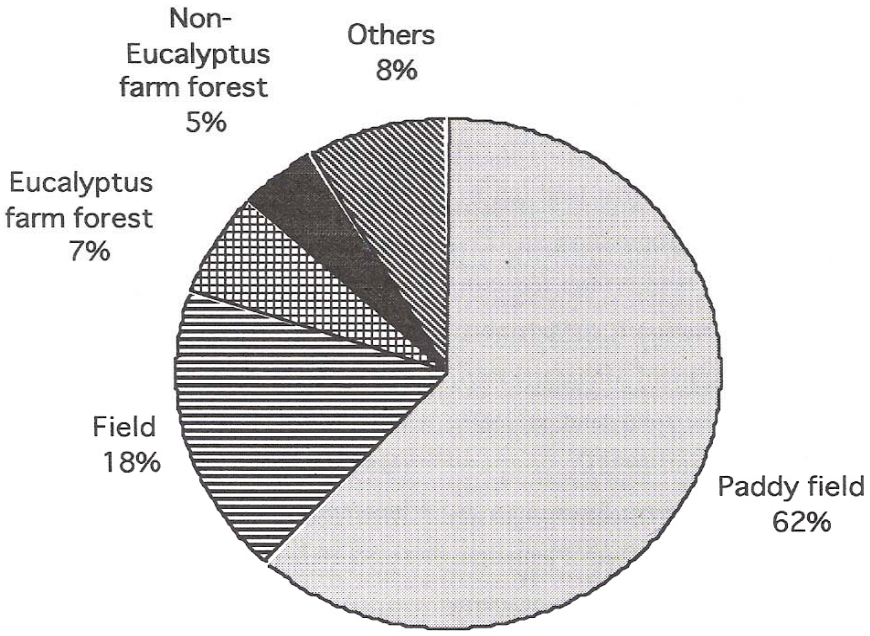
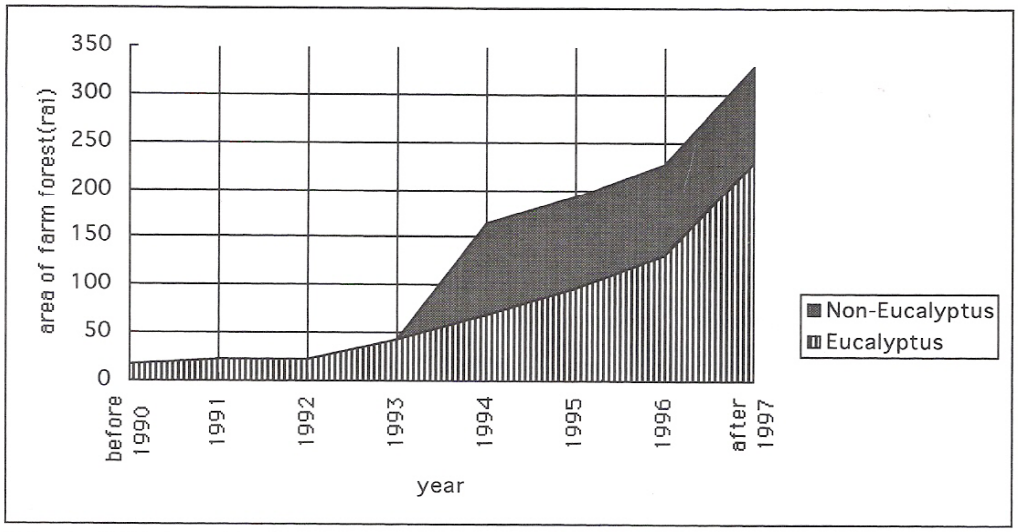


Figure 1. Present land use in Hua Na Kham Village (based on a survey conducted in 5 households).



Data in 1997 is estimate.

Figure 2. Area of farm forest in the village.

Table 1. Profitability of *Eucalyptus* and cassava

	Cassava		*Eucalyptus*
	9 cases	6 cases	
Net income	273.4	401.5	n.a.
NPV/year (8%)	n.a.	n.a.	364.6
10 %	n.a.	n.a.	328.1
12 %	n.a.	n.a.	296.3
14 %	n.a.	n.a.	268.5

All data shown are average. "6 cases" excludes the cases whose productions were seriously damaged.

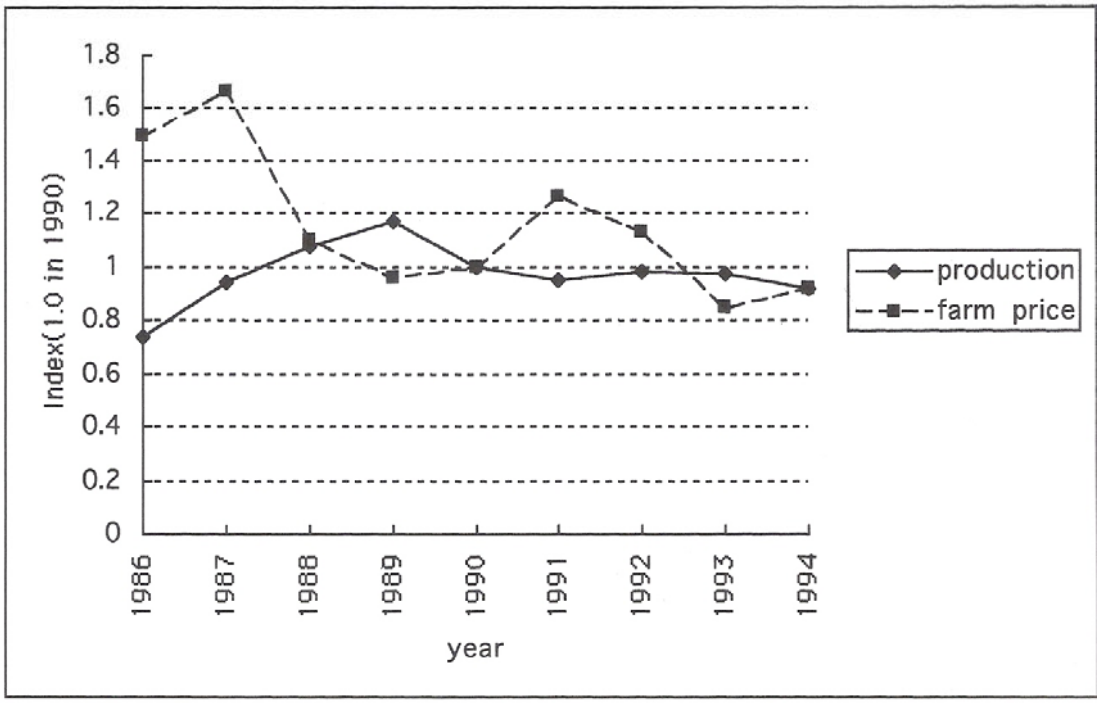


Figure 3. Farm price and production of cassava in Thailand.
Source: Agricultural Statistics of Thailand Crop Year 1994/95, Key Indicators of Developing Asian & Pacific Countries 1996.

Though it has yet to be discussed, it is likely that *Eucalyptus* can compete with cassava in land profitability because of the above mentioned factors.

Socioeconomic characteristics of planters

Table 2 shows some socio-economic characteristics of planter and non-planter. First, it is cleared that farmers who have

large pieces of land (especially non-paddy land) tend to establish farm forests.

Agricultural labor is divided into permanent labor for supervision, which is defined as family members who can work in their agricultural sector through the cultivation, and hired labor. The planter's average land holding per permanent labor is larger than that of non planter's. This indicates that planters tend to confront the labor shortage for supervision.

In addition, the interviews suggest that many farmers claimed raise in their wages for agricultural hired labor, around 10-40 baht (US$ 0.4-1.6) during the last 5 years. This phenomenon is parallel to the duration of farm forest expansion. These facts indicate that labor shortage, both permanent and temporary labor, has been a crucial factor affecting tree planting.

A comparison on the number of family members who work in non-agricultural sector does not show significant differences between planters and non planters. This may be explained by the fact that supervision does not require excess permanent labor, therefore most farmers including non-planters allow family members to work in the non-agricultural sector. In this case, labor shortages arise when family labor the non-agricultural sector. In this case, labor shortages arise when family labor is too young or too old to supervise the farmland, or the wages of hired labor increase. As shown in Table 2, the average age of planters tend to be older than that of non-planters. Many farmers claimed that they were too old to supervise their farmland. This trend has been common in northeastern Thailand (Funahashi, 1996)

Table 2. Comparison of socio-economic characteristics

	Planter	Non-planter
No. of Households	20	30
Land owning (rai)**	33.7	20.3
Non-paddy land owning (rai)**	16.8	6.7
Land holding per permanent laborer (rai)*	20.1	13.9
Family members who work in non-agricultural sector	1.5	1.6
Farmer's age*	49.9	45.9
Asset index (10 thousand baht)	17.9	15.3

All data shown are averages.
* Significant in 5% by Mann-Whitney's U test
** Significant in 1%
In calculating the family members who work in non-agricultural sector and family members who work temporarily in non-agricultural sector is considered as 0.5

Finally, houses, livestocks, agricultural machines, cars, and motorcycles are evaluated with a household asset index. A comparison reveals no significant difference between planter and non planter. *Eucalyptus* farm forest does not require any specific assets except land, and management cost is usually low.

Farmer's perception on tree planting

In general it is believed that land fertility will decrease once *Eucalyptus* is planted. They say that it is difficult to change the landuse after planting. However, according to the interview results, 22 of 37 farmers said that they wished to plant *Eucalyptus* (if they can), or they would like to plant it. It is clear that many villagers are now interested in *Eucalyptus* plantation. Table 3 shows their motivation for *Eucalyptus* planting. Labor shortage, low production of cassava, and the fall of cassava price are pointed out. Those who do not want to plant *Eucalyptus* claim that it decreases soil fertility, they can not keep their livestock in the *Eucalyptus* plantaiton, and they would like to receive income every year from their crops, etc.

As for the non-*Eucalyptus* trees like *Pterocarpus macrocarpus,* and *Azadirachta indica,* the motivation for planting is similar to *Eucalyptus* planting. However, many of them feel unsure of how to obtain benefits from these plantations in the future. In field observation, it was easy to see poor performing plantation.

In this project, the planters were subsidized with 3,000 baht for 5 years. According to interview results, they spend 1,000 baht/rai (US$ 40) on total management costs. Thus, we can roughly estimate that annual gain from subsidies is around 400 baht (US$ 16). It is cleared that this

Table 3. Motivation of tree planting stated by planters

Reason to plant	No.
Labor shortage	4
High wage rate	1
Cassave cultivation became troublesome	4
Decrease of cassava productivity	3
Unsuitable for cassava production	4
Fall of cassava price	5
Project (only non-*Eucalyptus* planter)	2

Based on interviews. Some farmers stated several reasons.

amount is at least as much as that of *Eucalyptus*, and cassava production. If the farmers intend to sell timber in the future, they will confront a marketing problem. It is questionable whether this timber can compete with imported timber in terms of qualities and prices.

Some case studies of planters

Case 1: Pioneer planter; Mr.A, 50 years old

Mr. A lives in the village with his wife, second daughter and her husband, and his third daughter. He is the pioneer *Eucalyptus* planter in the village. He had previously worked in Bangkok as a driver since the age of 42. Two years ago he came back and, with a small shop, started a business for transportation service.

They own 33 rais of farmland, which consists of 8 rais of paddy field, 12 rais of abandoned paddy field, and 13 rais of *Eucalyptus* farm forest. Though he had cultivated cassava earlier, the place was no longer suitable for cassava because of frequent floods. Thus, he planted 9.5 rais of farm forest in 1985. Since then, he gained 4 times higher profits. In 1996 he extended 3.5 rais of *Eucalyptus* in the same area. He felt that negative attitudet may exist because it was believed that weeds could not grow under *Eucalyptus* plantations. However, he did not want to change the *Eucalyptus* farm forest because it made more profits and easy to manage.

Case 2: Adopting labor shortage; Mr. R, 52 years old

He lives in this village with his wife and their grandchildren. All their children now work in Bangkok. In addition, he himself often goes to work in Bangkok as a road construction worker.

They hold 71 rais (own 51 rais), which consists of 38 rais (own 18 rais) of paddy field, 11 rais for grazing, 5 rais of non-*Eucalyptus* farm forest, and 17 rais of *Eucalyptus* farm forest. Though he had cultivated cassava earlier, it was too hard for him to cultivate 17 rais of cassava. Therefore, he started to plant *Eucalyptus* 2 years ago. He feels that planting *Eucalyptus* is similar to planting forest, which contributes to the environmental improvement.

Case 3: Non-Eucalyptus planter; Mr. S., 44 years old

He lives with his wife and mother in law. Their children, a son and 2 daughters, stay outside village for their study and work. He is a teacher teaching at the nearest school. Compared with other villagers, his salary is quite high (16,500 baht or US$ 660 per month).

They own 48 rais of farmland, which consists of 38 rais of paddy field, and 10 rais of tree plantation. They started planting trees because of the low soil fertility caused by cassava and the production has been decreased for more than 10 years.

Case 4: Eucalyptus in paddy field; Mrs. C, 31 years old

She lives with her husband and 2 children. Her husband used to work in Bangkok as a driver. He came back to this village 3 years ago and now he is working as a truck driver during the off season from farming. Though they own 21 rais of paddy field, they intend to plant *Eucalyptus* in 12 rais of the paddy field next year. They feel it is difficult in managing fields.

CONCLUSIONS

First, it was found that the land profitability of *Eucalyptus* farm forest is at least as much as that of cassava cultivation under current conditions. Fluctuation of price and production, decreasing soil fertility and raise of agricultural wages may affect the decreasing trend towards cassava.

Second, it was found that the shortage of agricultural labors in rural areas, both permanent family labor and employment, is one of the crucial factors that affect tree planting.

The recent rapid economic growth in Thailand, has offered many jobs in urban areas, which has caused a migration from the rural areas. On the other hand, the rural areas have confronted the labor shortage. The rise of agricultural labor wages have caused cassava cultivation to be less profitable. Farmers who had large land holdings have confronted difficulties in supervising their farmland. The expansion of farm forest has been one of their options. In India, *Eucalyptus* planting diffused under a similar process during the 1980s (Saxena, 1994). This process may apply elsewhere under certain conditions.

Thus, the labor shortage has changed to a more labor extensive land use system, which includes farm forestry. It is likely that rapid agricultural and land use reformation will continue to take place in northeastern Thailand for some time.

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