CHAPTER II

REVIEW OF INDIGENOUS *MIANG* SYSTEMS

2.1 *Miang* Systems

The people in northern Thailand has long acquaintance with *miang* consumption. One of the evidence is tea plant has been cultivated in so many area in provinces of Chiang Mai, Chiang Rai, Mae Hongson, Lampang, Lamphun, Nan and Phrae. *Miang* is picked four times a year from April to November, i.e., *miang huapi*, *miang klang*, *miang soi*, and *miang moei* (Del Castillo, 1990; Preechapanya, 1996). Distribution of harvestable yields among *miang huapi*, *miang klang*, *miang soi*, and *miang moei* are 27%, 35%, 23% and 15%, respectively (Del Castillo, 1990).

2.1.1 Processes and Cost of *Miang* Systems

(1) Picking: The picker of average skill can pick about 50 *kam* day^{-1}. However, the work considers easy, and the experienced pickers can pick up to 100 *kam* (Keen, 1978). The picking cost constitutes about 52% (Table 2.1) of the total expenditure (Sangchai, 1993).

(2) Cutting and transporting the fuelwood: The fuelwood is cut into lengths of about 2 m and then splited into convenient size for burning (Keen, 1978). About 87% of fuelwood came from their own orchard, and less than 1% bought from the other places (Sangchai, 1993).

(3) Processing: Processing of leaf is carried out at night by the family. The *kam* of *miang*'s leaves are packed tightly into a wooden barrel that has based

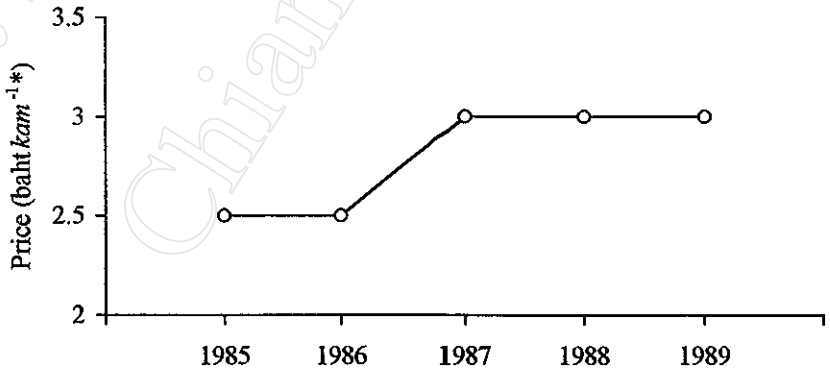
of bamboo mesh. It is placed over the iron boiler, steam for one and half hours and then put into seal container ready to distribute to the market (Keen, 1978; Ritsom, 1981).

Table 2.1 The cost of *miang* practice at Pa Pae sub-district, Mae Taeng district, Chiang Mai

Task	Cost	
	Percentage	baht
Tea's seed and stalk	1	140
Materials	26	3,369
Labour for weeding and pruning	19	2,443
Labour for picking leaf	52	6,812
Labour for planting	2	264
Total	100	13,028

Source: Adapted from Sangchai (1993)

2.1.2 Marketing of *Miang*



Remark: * *Kam* is handful of processed *miang* weighed about 500 g

Figure 2.1 Market prices of *miang* during 1985-1989 (Del Castillo, 1990)

From interviewed with the farmers at Pa Pae sub-district by Sangchai (1993), the price of *miang* was controlled by the middle man such as the local merchants who had the transportation. *Miang* are sold at different markets in the provinces of Lampang, Lamphun and at the district of Chom Thong, Chiang Mai (Del Castillo, 1990). The market prices of *miang* during 1985-1989 are shown in Figure 2.1.

2.2 Indigenous *Miang*-based Agroforestry Systems

Keen (1978) related that the customary method of establishing *miang* garden, at least in the past, has been simply to clear the forest from around already growing trees. It may be only walking path, perhaps six meters wide, cut through the forest for several hundred meters, wherever the tea plants may be growing.

Preechapanya *et al.* (1985) *cited by* Preechapanya (1996) evaluated durability, income, and adoptability of the 30 distinct agroforestry practices in the highland northern Thailand. One of these practices is *miang* garden in the hill evergreen forest which has the durability more than 10 years, rather high income and high adoptability. The overall performance of *miang* orchard is the highest compared with the other 30 agroforestry practices. The study concluded that *miang* tea garden in the hill evergreen forest is one of the most suitable land use practices for the highland, because it has been practised and remained productive over a long period of time. Watanabe (1990) *cited by* Sangchai (1993) studied the structure of *miang* orchard in the hill evergreen forest with animal at Pa Pae sub-district, Mae Taeng district, Chiang Mai province, and

pointed out that the *miang* system is a desirable combination in the aspect of forest ecology and agroforestry.

Del Castillo (1990) assessed the sustainability of a forest-*miang* production system through a case study in Ban Kui Tuai, Mae Taeng district, Chiang Mai province, which the system pattern consisted of forest trees, bamboos, fruit trees and vegetable crops (Table 2.2). He found out that no inputs such as fertilisers and pesticides were applied to crops, and that, in spite of this, there had been absolutely no problems concerning pests and diseases.

Table 2.2 Components of *miang* orchard of Ban Kui Tuai, Pa Pae sub-district, Mae Taeng district, Chiang Mai province.

Forest tree	Bamboo	Fruit tree	Vegetable
Lithocarpus calathiformis	*Bambusa arundinacea*	Apricot	Cabbage
L. trachycarpus	*B. tulda*	Coffee	Chilli
Schima wallichii	*Gyantoehloa albeiliata*	Jack fruit	Garlic
		Lemon	Onion
		Litchi	Pumpkin
		Mango	Taro
		Peach	Ginger
		Pomelo	Maize

Source : Del Castillo (1990)

Sangchai (1993) studied the density of *miang* plants in the fields which was grown in the partially clear forest at Pa Pae sub-district, Mae Taeng district, Chiang Mai province found that the density of *miang* ranged from 312 to 3,000 plants ha^{-1}, averaging 637 plants ha^{-1}. Meanwhile the sole tea production or non-agroforestry system in hilly area had plant density 6,250-13,125 plants ha^{-1} (Khatikan and Swynnerton, 1986). In the flat area of northern Thailand, the plant

density averaged 18,125 plants ha^{-1} (Krasaesin *et al.*, 1984). However, to get the maximum yield, the plant density should be 30,000 plants ha^{-1} (Krasaesin *et al.*, 1984).

2.3 Environment for Tea Plant

Tea plant grows well in humid tropical zone and temperate zone. The favourable environment of tea production includes: pH between 4.5-6.0, rainfall more than 1,500 mm $year^{-1}$, mean temperature between 21-32 °C, elevation of 500-1,000 m from mean sea level, and relative humidity more than 80% (Decho, 1992; Laongsri, 1983). Tea can be grown in various soil properties but it is grows best in well drainage soil (Krasaesin *et al.*, 1984).

2.3.1 Shading Effect

Tea plant can grow well in bamboo forest and the yield will decrease, if it were grown without shade. Accordingly, growing tea plant in Thailand is needed shade tree. However, there are various contrasting opinions about having shade trees in tea field. Poosawang *et al.* (1978) studied the effect of environment changes on shoot growth, found that sun adapted tea plants, when they were moved to shade condition shoot growth increased. However, when shade adapted tea plants were exposed to full sun light, shoot growth was better than those remained under shade. They also found that number of new leaves per plant of tea was higher under full sun than under shade, but the numbers of old leaves per plant of tea was higher under shade than full sun. Experiment in Sri Lanka, in an event that the beneficial trees in the tea fields were removed, the major result was an immediate increase in tea yield. In the long run, this practice has proved detrimental to the tea plant due to its effects on soil fertility, wood

rot, recovery ability from pruning and resistant to moisture stress during dry weather (Funchs, 1989).

However, the effect of shade to tea plant depends on the type of tea. Yields of two different forms of tea in Assam (India), i.e., Assam type and China type under sun and shaded by bamboo lath frames transmitting approximately 60% of daylight showed that in the second year after ground cover had been achieved the Assam type produced a 10% increase while the China type produced 20% less yield under shade. By the end of the seventh year from complete ground cover the yield of Assam type under shade was some 40% higher than under full sun, while that of the China type was about 30% lower (Hadfield, 1975).

2.3.2 Temperature Effect

The microclimate around the tea plant affects the tea's leaves temperature, which in turn affecting photosynthesis and respiration. The photosynthetic rate is increased when the temperature increased, but it is decreased when the temperature is higher than 35 °C (Krasaesin *et al.*, 1984). They also pointed out that temperature also affects to root growth. The optimal soil temperature for root growth is 25 °C, and the root growth is reduced whenever temperature is lower than 20 °C. Regarding to the efficiency of photosynthesis which is measured in term of carbon dioxide uptake, the rate of carbon dioxide uptake is increased when the leaf temperature increased and is maximum between 30-35 °C but falls rapidly when leaf temperature is more than 37 °C. There is no net uptake if the temperature were beyond 42 °C (Hadfield, 1975).