

## CHAPTER IV

### DYNAMISM OF SWIDDEN FARMING: LOCAL ADAPTATION TO CHANGE

The literal meaning of cooked rice “*mii*” is important for the highland Pwo Karen, as Hinton (1975:76) mentions. When you meet Pwo Karen people in the village, you are often asked by people of all ages, “*amg mii gyo wa* (Have you had a meal yet?)” or “*ang mii ni thale* (What did you eat with your rice?).” As exemplified by these, the word *mii* can be frequently found in the daily standard greetings in Pwo Karen society<sup>1</sup>.

During the past several decades, however, the fallow-period has been reduced to less than half in Ban Mae Chang. In Ban Dong Luang, it is now nearly impossible for the villagers to rotate their farmland in the traditional manner any longer. As a consequence, rice productivity per unit area of land has fallen. This, together with other factors, has caused rice shortage in both villages.<sup>2</sup> To supplement the rice shortage, different approaches have been adopted at both village and individual levels.<sup>3</sup>

This chapter studies how the swidden farming in the two villages has changed since Hinton’s research (1975) approximately three decades ago. During this thirty-year period, the type of swidden farming has changed from swidden almost exclusively for dry-rice production to swidden for the production of both rice and cabbage. To meet this purpose, this chapter first discusses highlanders’ land use strategies across the swidden and terrace farmland. Then it examines the change process in agricultural production system.

#### 4.1 Strategies for Land Use: Over Swidden and Terrace

##### 4.1.1 Land Tenure System

<sup>1</sup> In addition to rice, they produce a wide range of other crops for their own consumption though not so much in quantity.

<sup>2</sup> In 2002 as shown by Table 4.2, 37 households (73%) of the total 51 households in Ban Mae Chang were rice-insufficient, while 26 households (41%) of the total 63 households were also rice-insufficient in Ban Dong Luang.

<sup>3</sup> There are also reversed causal relationships between the rice shortage and adopted approaches such as the

The traditional land tenure system and technology of farming of the Pwo Karen are still commonly maintained to some extent in both Ban Mae Chang and Ban Dong Luang. At the same time, they have been changing, in different ways for each of the villages, especially since the introduction of the cabbage cultivation into their swiddens.

The landholding of highlanders in swidden has been based on the principle of “usufruct” or “tenure” which reflects the concept of a “private right to the use of land to produce crops during a recognised cropping cycle only” (Spencer 1966:88, cited from Hinton 1975:106). According to customary law in this region, all land which villagers use generally belongs to the village, which is the embodiment of territory for the community. This applies to the Pwo Karen people residing in Ban Mae Chang and Ban Dong Luang. The village religious leader and the village council, which consists of a number of adult males, have the authority to control migration into their community to use its land (Hinton 1975:106, interview with the official village headman in Ban Mae Chang). Hinton explains the practice of land transfer under the principle of usufruct in the Pwo Karen communities:

By clearing a field, a household established a residual right to use that area when it was next ready for cultivation. Any other households wishing to use a fallow field was obliged to approach the last user who, if he held residual rights over sufficient land for his own long term use, usually granted his permission. If he did so, he relinquished all right over the land, and full residual rights passed to the second household. Residual rights over fallow land could be inherited by the children of a deceased person, irrespective of their marital status. These rights lapsed if the inheritors did not cultivate the land within about five years.

(Hinton 1975:106-107)

In this process of granting usufruct observed in the 1960s, according to Hinton (1975:108), if wife or husband of the newlywed couple comes from outside the village, close relatives of the couple would usually express their willingness to transfer residual rights to a portion of their land. In the case of migrant families, after the procedure mentioned in the above citation is completed, relinquishing all rights over the land, the community membership are granted to new comers.

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case of cabbage-cultivation development, which would lead to the less available land for rice production.

No households are allowed to sell or barter their land to even the villagers within the same village. However, the transfer of usufruct without monetary exchange with due procedures is possible as mentioned above. All the villagers, including even children, know which plots are held by whom (Hinton 1975:109, and interview).

According to Hinton (1975:103-105), the Pwo Karen have a definite sense of land as a “limited resource,” and they believe that rich harvests are granted because of efforts to make favourable relationships with a variety of local spirits. The following four measures of the Pwo Karen are reported as conservation methods within their traditional swidden; 1) fallowing the land, 2) carefully firing the swidden, 3) not cutting large trees, 4) properly managing the soil.

These four measures in swidden farming and the traditional tenure system used to be fundamental for the Pwo Karen’s agriculture. However, this basic framework has partially changed in both Ban Mae Chang and Ban Dong Luang under the phenomena of rapid population growth and increasingly intensive cultivation of cabbage.

#### **4.1.2 Irrigated Terrace: Strategic Option (1)**

One of the examples of this change is that, in both the villages, the terraced fields can be now sold to anybody regardless of whether the purchaser comes from the same village or not. This is quite different from the traditional swidden tenure system described above. As for the irrigated terrace, it is reported that the Karen people learned the technique of terrace construction and terrace farming from the lowland Thai farmers around Mae Sariang and Hod (Hinton 1975:121-122). In general, irrigation is defined as “the use of an artificial means to influence the supply of moisture to increase crop production (Yudelman 1989:63),” and the irrigated terrace does not require a fallowing period to regenerate itself as does the swidden. In order to grow wet rice in the irrigated terrace in the mountainous regions, however, it is necessary to select suitable valleys to build a series of terraces by laborious work of cutting the land along the slope. In addition, the farmers have to construct a dam, canal, and dyke to control the natural flow of rainfalls. Thus, the terraced farming, occasionally create job opportunities for wage

labourers.

#### 4.1.2.1 Terrace Ownership in 1968-1969

Under the rapid growth of population, the villagers of Ban Dong Luang are reported to have thought “more in terms of irrigation than they had in the past because of the difficulties they were experiencing in maintaining subsistence from swidden farming alone” (Hinton 1975:142). During Hinton’s fieldwork in Ban Dong Luang from 1968 to 1969, some households in this village started irrigated-terrace cultivation. The irrigated terraced farming has been, in fact, one of their key strategic choices to cope with the issue of population growth. However, several geographical limitations in the hilly area of the swidden society did not allow villagers to adopt irrigated-terrace farming so easily.

For the villagers of Mae Cang (Ban Mae Chang) in 1968-69, as shown by Table 2.1, its population (144 persons) was larger than that of Dong Luang (Ban Dong Luang) (118 persons) by around 20%.<sup>4</sup> The Ban Mae Chang villagers were striving against decreasing arable land and rapidly increasing population. In this situation, Ban Mae Chang villagers turned to the development of irrigated terrace in the 1960s more actively than Ban Dong Luang villagers. This resulted in, as shown by Table 4.1, that 11 households owned irrigated terraces in Mae Cang and Mae Cang Phu in contrast to the fact that four households owned irrigated terraces in Dong Luang and Dong Luang Phu. This is because there are richer water resources in Ban Mae Chang than Ban Dong Luang as shown in Figure 3.4.

#### 4.1.2.2 Gross Yield of Swidden Rice (Dry Rice) and Terrace Rice (Wet Rice) in 2002

Not only from the rapid population growth, but also from the increasing desire of villagers for the cabbage cultivation, the total area of the irrigated terrace in the research site of this thesis has been enlarging since over three decades ago. In this connection,

<sup>4</sup> In the time of 2002-03 when I conducted my fieldwork in my research site, Ban Mae Chang had 245 persons (growth rate between the two time-points of 1968-69 and 2002-03: 70.1%) and Ban Dong Luang had 248 persons (growth rate: 110.2%).

Table 4.2<sup>5</sup> shows the 2002 production levels (gross yield<sup>6</sup>) of swidden rice<sup>7</sup> (dry rice) and terrace rice<sup>8</sup> (wet rice) (1) by household income and (2) by rice-sufficiency and insufficiency category of household for Ban Mae Chang and Ban Dong Luang.

### **Whole Households**

From Table 4.2 (a) we know that, out of the total rice yield (6,041 *thang*) of Ban Mae Chang produced by 51 households surveyed in this village, the yield of swidden rice (4,571 *thang*) was 76%, while the terrace rice (1,470 *thang*) was 24%. Taking it into consideration that the yield of terrace rice in Ban Mae Chang was exceptionally low in 2002 due to the severe flood damage, if we assume that the flood had not taken place, then the share of the terrace rice of the village in 2002 would have been much higher than shown in this table.<sup>9</sup> We know from Table 4.2 (b) that, out of the total rice yield (8,190 *thang*) produced by 63 households surveyed in this village, the yield of swidden rice (5,950 *thang*) was 73%, while the terrace rice (2,240 *thang*) was 27%. Furthermore, the number of households owing the irrigated terrace in the time of 2002-03, is 22 for Ban Mae Chang and 14 for Ban Dong Luang,<sup>10</sup> to make the number more than double in each of the two villages over the past three decades or so.

From the above, we know that the share of the terrace rice is around a quarter of the total rice yield in each of the two villages. This would imply that the irrigated-terrace farming has become increasingly important for rice security in both Ban Mae Chang and

<sup>5</sup> Table 4.2 has been constructed based on the responses from each household to the question on whether the 2002 rice yield was plenty enough for its own consumption. This survey was made in my research site, Ban Mae Chang and Ban Dong Luang in December 2002 through February 2003.

<sup>6</sup> "Gross yield" as compared with the "per-household yield."

<sup>7</sup> The swidden rice means the rice yield from the swidden.

<sup>8</sup> The terrace rice means the rice yielded from the irrigated terrace.

<sup>9</sup> From Tables 4.2 and 4.3, we know that the terrace-rice productivity is 46.7 *thang/rai* for Ban Dong Luang. Applying this productivity to Table 4.4, we can estimate 4,763 *thang* for the yield of terrace rice in Ban Mae Chang in the normal year without any serious flood damage. Therefore, without the severe flood damage in 2002, the yield of the terrace rice would have shared 51% of the estimated total rice yield (9,334 *thang*).

<sup>10</sup> Table 4.1 tells us that, for the time of 1968-69, the number of terrace owners was 11 for Ban Mae Chang and Ban Mae Chang Bon together and four for Ban Dong Luang and Ban Dong Noi together. Therefore, at least the number of households owing the irrigated terrace has remarkably increased in both villages between the two time-points of 1968-69 and 2002-03.



Ban Dong Luang as compared with the time of 1968-69 when Hinton conducted his research in this area.

### ***Rice-sufficient and Rice-insufficient Households***

From Table 4.2 we know the following by rice-sufficiency and insufficiency categories for Ban Mae Chang.

- (1) Out of the total rice yield (2,830 *thang*) produced by the rice-sufficient households, the yield of the swidden rice (1,780 *thang*) was 63%, while the terrace rice (1,050 *thang*) was 37%.
- (2) Out of the total rice yield (3,211 *thang*) produced by the rice-insufficient households, the swidden rice (2,791 *thang*) was 87%, while the terrace rice (420 *thang*) was 13%.
- (3) For all income, the percentage share of the terrace rice within the same income class, is higher for the rice-sufficient households than for the rice-insufficient households, with the share ranging from 32% (for rich income class) to 47% (for middle income class).

For Ban Dong Luang, we know the following.

- (1) Out of the total rice yield (6,250 *thang*) produced by the rice-insufficient households, the yield of swidden rice (4,010 *thang*) was 64%, while the terrace rice (2,240 *thang*) was 36%.
- (2) Out of the total rice yield (1,940 *thang*) produced by the rice-insufficient households, the swidden rice (1,940 *thang*) was 100%, while the terrace rice (0 *thang*) was 0%.
- (3) For all income classes, the percentage share of the terrace rice within the same income class, is higher for the rice-sufficient households than for the rice-insufficient households, with the share ranging from 24% (for poor income class) to 48% (for rich income class).

In addition, we also know from Table 4.2 that Ban Mae Chang has 14 rice-sufficient households (27% of the total households), which yielded sufficient rice for

them to consume for their daily life in 2002. There are 37 rice-insufficient households (73%), which did not yield enough rice for them, and needed to purchase rice for their daily life in 2002. In the case of Ban Dong Luang, there are 37 households (59%) in the rice-sufficient category and 26 households (41%) in the rice-insufficient category.

Based on the above data, we can summarize for both Ban Mae Chang and Ban Dong Luang, that the share of the terrace rice against the total rice yield in the rice-sufficient category of households is over one third, while that in the rice-insufficient category is below one seventh. This general tendency holds true even if each category is disaggregated into income classes. That is, for each income class, the importance of the terrace rice in the total rice yield (*i.e.*, the share of the terrace rice against the total rice yield) is larger for the rice-sufficient category than for the rice-insufficient category.

These all would perhaps suggest that, in general, the more irrigated terrace they own, the higher the degree of rice sufficiency (*i.e.*, rice security). Or, the causal relationship may perhaps be the other way round. Or, perhaps there is interdependency (*i.e.*, feedback effect) between the size of owned terrace and the degree of rice sufficiency. Actually, within the limited information which has been collected in my fieldwork, we can not be sure which assumption in the above reflects reality appropriately. We need additional information to confirm these findings. Nevertheless, we can at least point out that there exists a positive correlation between the degree of rice sufficiency for each household and the size of irrigated terrace it owns.

#### 4.1.2.3 Per-household and Per-capita Yields of Swidden Rice and Terrace Rice in 2002

##### *Whole Households, and Rice-sufficient and Rice-insufficient Households*

We can construct Table 4.3 from Table 4.2 to show, for both villages, the per-household yield of swidden rice and terrace rice in 2002, by income class of households and by rice-sufficient and insufficient category of households, for Ban Mae Chang and Ban Dong Luang. Table 4.3 also shows some of the per-“household member” (*i.e.*, per-capita) figures. Based on Table 4.3 together with Table 4.2, we know the following for

Ban Mae Chang.

- (1) The per-household yield of total rice is 118 *thang* which is disaggregated into 90 *thang* for swidden rice and 29 *thang* for terrace rice, while the per-capita yield of total rice is 26 *thang* which is disaggregated into 20 *thang* for swidden rice and 6 *thang* for terrace rice.
- (2) For the rice-sufficient category of households, the per-household yield of total rice is 202 *thang*, which is disaggregated into 127 *thang* for swidden rice and 75 *thang* for terrace rice, while the per-capita yield of total rice is 42 *thang* which is disaggregated into 27 *thang* for swidden rice and 16 *thang* for terrace rice.
- (3) For the rice-insufficient category, the per-household yield of total rice is 87 *thang* which is disaggregated into 75 *thang* for swidden rice and 11 *thang* for terrace rice, while the per-capita yield of total rice is 20 *thang* which is disaggregated into 17 *thang* for swidden rice and 3 *thang* for terrace rice.
- (4) Among the four income classes, the per-capita yield of total rice for the rice-sufficient category ranges from 36 *thang* (for well-to-do class) to 44 *thang* (for middle class), while the per-capita yield of total rice ranges from 11 *thang* (for well-to-do class) to 26 *thang* (for middle class) for the rice-insufficient category.<sup>11</sup>

On the other hand, we also know from Table 4.3 together with Table 4.2, the following for Ban Dong Luang.

- (1) The per-household yield of total rice is 130 *thang* which is disaggregated into 94 *thang* for swidden rice and 36 *thang* for terrace rice, while the per-capita yield of total rice is 34 *thang* which is disaggregated into 25 *thang* for swidden rice and 9 *thang* for terrace rice.
- (2) For the rice-sufficient category of households, the per-household yield of total rice is 169 *thang* which is disaggregated into 108 *thang* for swidden rice and 61 *thang* for terrace rice, while the per-capita yield of total rice is 48 *thang* which is disaggregated into 31 *thang* for swidden rice and 17 *thang* for terrace rice.

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<sup>11</sup> Figures for the per-capita yield of rice by income class for Ban Mae Chang, have been calculated on the



- (3) For the rice-insufficient category, the per-household yield of total rice is 75 *thang* which is disaggregated into 75 *thang* for swidden rice and 0 *thang* for terrace rice, while the per-capita yield of total rice is 18 *thang* which is disaggregated into 18 *thang* for swidden rice and 0 *thang* for terrace rice.
- (4) Among the all four income classes, the per-capita yield of total rice for the rice-sufficient category ranges from 39 *thang* (for middle class) to 52 *thang* (for poor class), while the per-capita yield of total rice range from 8 *thang* (for rice class) to 22 *thang* (for middle class) for the rice-insufficient category.<sup>12</sup>

### **Threshold Points for Rice Sufficiency**

Based on the aforementioned, if we try to estimate the threshold point for rice sufficiency<sup>13</sup> in terms of the rice yield per year in 2002, the following can be obtained.

- (1) For Ban Mae Chang, the per-household threshold point is around 145 *thang/year*, and the per-capita threshold point is 31 *thang/year*.<sup>14</sup> It is to be noted that, for each income class, the values of 145 *thang/year* estimated as the overall per-household threshold point falls, between the per-household rice yield of the rice-sufficient category and that of the rice-insufficient category. The same can be applied for the value of 31 *thang/year* estimated as the overall per-capita threshold point.
- (2) For Ban Dong Luang, the per-household threshold point is around 122 *thang/year*, and the per-capita threshold point is 33 *thang/year*.<sup>15</sup> It is to be noted that, for each income class, the value of 122 *thang/year* estimated as the overall per-household threshold point falls between the per-household rice yield of the rice-sufficient

basis of Tables 4.2 and 4.3.

<sup>12</sup> Figures for the per-capita yield of rice by income class for Ban Dong Luang, have been calculated on the basis of Tables 4.2 and 4.3.

<sup>13</sup> The threshold point for rice sufficiency means the level of rice yield under which the rice-sufficiency would not in general be secured.

<sup>14</sup> The per-household threshold point (145 *thang/year*) is the arithmetic mean between the per-household rice yield (202 *thang/year*) of the rice-sufficient category and that (87 *thang/year*) of the rice-insufficient category. The per-capita threshold point (31 *thang/year*) is similarly calculated as the arithmetic mean between 42 *thang/year* and 20 *thang/year* (see Table 4.3).

<sup>15</sup> The per-household threshold point (122 *thang/year*) is the arithmetic mean between the per-household rice yield (169 *thang/year*) of the rice-sufficient category and that (75 *thang/year*) of the rice-insufficient category, while the per-capita threshold point (33 *thang/year*) is similarly calculated as the arithmetic

category and that of the rice-insufficient category. The same can be applied for the value of 33 *thang*/year estimated as the overall per-capita threshold point.

Judging from the above, the rough benchmark of “the per-household threshold point for rice sufficiency in the area of my research site as a whole,” is around 134 *thang*/year<sup>16</sup>. The benchmark of the per-capita threshold point for my research site is around 32 *thang*/year<sup>17</sup>.

#### 4.1.2.4 Actually Cultivated Area: In Swidden and Terrace

In swidden society, the land area owned by a household<sup>18</sup> is generally different from the land area which is actually cultivated by that household. Table 4.4 shows the per-household “actually cultivated area in 2002” by income class. From this table, we know the following for Ban Mae Chang for the year 2002.

- (1) For the whole household, the per-household “actually cultivated area (ACA)” of the swidden is 6.6 *rai* which is disaggregated into 5.3 *rai* for the dry-rice yield and 1.4 *rai* for the cabbage cultivation, while the per-household ACA of the irrigated terrace is 2.00 *rai*. Therefore, the per-household ACA of the total farmland<sup>19</sup> is 8.6 *rai*.
- (2) If we look at the figures by income class, we see that the per-household ACA of the swidden used for cabbage cultivation has a reasonably positive correlation with income level. It is also indicated that the per-household ACA of the total farmland has a general trend of positive correlation with the income level though the middle-income class shows the lowest value of 7.4 *rai* among the four income classes. On the other hand, the per-household ACA of swidden used for dry-rice production shows a reasonably negative correlation with the income level.
- (3) Taking into consideration the per-household landownership of swidden (27.4 *rai*)

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mean between 48 *thang*/year and 18 *thang*/year (see Table 4.3).

<sup>16</sup> If we dare to throw the two figures of threshold points (145 *thang*/year for Ban Mae Chang and 122 *thang*/year for Ban Dong Luang) into one by calculating their mean, then we obtain 134 *thang*/year.

<sup>17</sup> This is the mean between the value of 31 *thang*/year for Ban Mae Chang and the value of 33 *thang*/year for Ban Dong Luang.

<sup>18</sup> The data on land ownership in my research site is provided in Table 3.2 and 3.3.

<sup>19</sup> The total farmland here means the aggregation of the land area of the swidden and irrigated terrace.

shown in Table 3.2 together with the per-household ACA of swidden (6.2 *rai*) shown in Table 4.4, we can estimate that the average “fallow period” is around four to five years<sup>20</sup>.

From Table 4.4, we know the following for Ban Dong Luang for the year 2002, concerning per-household farmland, correlations of per-household ACA with income level and the average fallow period.

- (1) For the whole households, per-household ACA of the swidden is 5.9 *rai*, which is disaggregated into 3.4 *rai* for the dry-rice yield, and 2.5 *rai* for the cabbage cultivation, while the per-household ACA of the irrigated terrace is 0.8 *rai*. Therefore, the per-household ACA of the total farmland is 6.7 *rai*.
- (2) If we look at the figures by income class, we find that (a) the per-household ACA of the swidden area for the cabbage cultivation, (b) the per-household ACA of the irrigated terrace area, and (c) the per-household ACA of the total farmland, all show their reasonable positive correlation with the income level. On the other hand, the per-household ACA of swidden used for the dry-rice production shows a reasonably negative correlation with income level.
- (3) Taking into consideration per-household landownership of swidden (9.1 *rai*) shown in Table 3.2 together with the per-household ACA of the swidden (5.9 *rai*) shown in Table 4.4, we can estimate that the average “fallow period” is around 1.5 years<sup>21</sup>.

If we calculate the rice productivity per unit area of land based on Table 4.2 and 4.4, we know the following for Ban Mae Chang for the year 2002.

- (1) The dry-rice productivity of the swidden is 17.0 *thang/rai*<sup>22</sup>, while the wet-rice productivity of the irrigated terrace<sup>23</sup> is 14.4 *thang/rai*<sup>24</sup>.

<sup>20</sup>  $27.4 \text{ (rai)} \div 6.2 \text{ (rai/year)} = 4.4 \text{ (years)}$

<sup>21</sup>  $9.1 \text{ (rai)} \div 5.9 \text{ (rai/year)} = 1.5 \text{ (years)}$

<sup>22</sup>  $4,571 \text{ thang (from Table 4.2)} / 268 \text{ rai (from Table 4.4)} = 17.0 \text{ thang/rai}$ .

<sup>23</sup> It should be noted, as mentioned before, the wet-rice yield of Ban Mae Chang was seriously damaged by the flood in 2002.

<sup>24</sup>  $1,470 \text{ thang (from Table 4.2)} / 102 \text{ rai (from Table 4.4)} = 14.4 \text{ thang/rai}$ .

- (2) The dry-rice productivity of the swidden by income class ranges from 13.0 *thang/rai*<sup>25</sup> (well-to-do class) to 17.3 *thang/rai* (middle class).

From Table 4.2 and 4.4, we can also calculate the following for Ban Dong Luang for the year 2002.

- (1) The dry-rice productivity of the swidden is 27.9 *thang/rai*, while the wet-rice productivity of the irrigated terrace is 46.7 *thang/rai*.
- (2) The dry-rice productivity of the swidden by income class shows it's a reasonably positive correlation with the income level, ranging from 22.4 *thang/rai* (poor class) to 36.0 *thang/rai* (rich class). On the other hand, the wet-rice productivity of the irrigated terrace shows a reasonably negative correlation with the income level, ranging from 40.0 *thang/rai* (rich class) to 59.5 *thang/rai* (poor class).

Turning our attention to the quick comparison between Ban Mae Chang and Ban Dong Luang, based on the above data, we can point out the following for the year 2002.

- (1) The per-household ACAs of (a) swidden and irrigated terrace (8.63 *rai*), (b) swidden (6.61 *rai*), and (c) swidden for dry-rice production (5.26 *rai*) in Ban Mae Chang, are respectively larger than those (6.68 *rai*, 5.92 *rai*, and 3.38 *rai*) in Ban Dong Luang.
- (2) The per-household ACA of the irrigated terrace in Ban Mae Chang (2.00 *rai*), is more than two and a half times that of Ban Dong Luang (0.76 *rai*).
- (3) The per-household ACA of swidden used for cabbage cultivation (1.36 *rai*) in Ban Mae Chang, is approximately a half of that (2.54 *rai*) in Ban Dong Luang.
- (4) The dry-rice productivity of the swidden in Ban Mae Chang (17.0 *thang/rai*), is less than two thirds of that in Ban Dong Luang (27.9 *thang/rai*).<sup>26</sup>
- (5) The per-household ACA of the arable land (*i.e.*, swidden and terrace) of the poor-income class (8.24 *rai*) is around three quarters of that of the rich-income class (10.76 *rai*) in Ban Mae Chang, while in Ban Dong Luang the per-household ACA of

<sup>25</sup>  $664 \text{ thang (from Table 4.2) } \{ 5.10 \text{ rai/household} \times 10 \text{ households (from Table 4.4) } \} = 664 \text{ thang} / 51 \text{ rai} = 13.0 \text{ thang/rai}$ .

<sup>26</sup> We cannot rationally compare the wet-rice productivity of the irrigated terrace between the two villages

the arable land of the poor-income class (4.14 *rai*) is less than two fifths of that of the rich-income class (10.56 *rai*).

#### 4.1.2.5 Underlying Context behind the Data

In the following, I will examine the underlying context behind the data shown by Tables 3.2, 3.3, 4.2, 4.3 and 4.4, with the understanding especially that the per-household ACA of arable land is larger in Ban Mae Chang than that in Ban Dong Luang, that the per-household cabbage cultivation area in Ban Mae Chang is significantly smaller than in Ban Dong Luang, that the dry-rice productivity of the swidden is significantly lower in Ban Mae Chang than in Ban Dong Luang, and that the gap in the per-household ACA of the arable land between the rich-income and poor-income classes is significantly smaller in Ban Mae Chang than in Ban Dong Luang. This is a preliminary base for the subsequent discussion in CHAPTER V, in which I analyse the adaptive practices and survival strategies of each household in the research site.

#### *The Rich Income Class*

The eight households in the rich-income class in Ban Mae Chang own on average 23.13 *rai* of swidden, which is the smallest size among all income classes in this village. Conversely, their per-household terrace ownership (2.88 *rai*) is the largest in size among all income classes. The per-household total rice yield<sup>27</sup> of the dry rice and wet rice together by the rich class is 154 *thang*. The six out of the eight rich-class households in Ban Mae Chang own irrigated terraced fields. In addition, the per-household yield of both dry and wet rice in total for the rich-income class, is also the highest among all income classes.

In Ban Dong Luang, it is crucial for the rich-income class households to own relatively larger irrigated terrace and higher rice security as compared with other income classes, in order to maintain their economic status as rich in the village. Although the

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due to the flood which damaged the yield of the wet rice for Ban Mae Chang in 2002.



per-household land ownership of swidden for the rich income class in Ban Dong Luang is only 12.44 *rai*, which is smaller than that in Ban Mae Chang, four out of the nine households in this class own the irrigated terraces of on the average 2.22 *rai*. Even though the rich-class households in Ban Dong Luang own, on the average, only about a half size of the swidden of those in Ban Mae Chang, their per-household total rice yield (189 *thang*) is larger than that (154 *thang*) in Ban Mae Chang. This would imply the existence of the effects of continual chemical use in the swidden of Ban Dong Luang due to the high rate of cabbage cultivation, which requires the intensive input of chemical fertilizer. This phenomenon can be applied to the cases of other income classes in that village.

#### ***The Well-to-do Income Class***

In Ban Mae Chang, if we assess economic status only in terms of rice output, the well-to-do class is regarded as the poorest with rice output of 78 *thang*.<sup>28</sup> The per-household size of swidden (31 *rai*) of the well-to-do class, however, is the largest among all income classes. Contrary to this, only two households in this class own irrigated terraces, resulting in that the per-household size of the irrigated terrace for the well-to-do class, is 1.50 *rai* which is the smallest among the all income classes. According to my field survey, the households belonging to the well-to-do income class can be described as diligent and steady cash-earners, aiming basically for food security for survival, rather than for making a high profit. In their generally larger swiddens, the nine households out of ten in this income class grew cabbage in 2002. Besides, they are keen to work also as wage labourers to supplement their cash income from the agricultural products to buy rice and food as a first priority.

In contrastive, the well-to-do class in Ban Dong Luang holds the smallest per-household size of swidden (7.78 *rai*) among the all income classes. The five households out of 17 in this income class hold irrigated terrace, the per-household size of which is

<sup>27</sup> The level of the rice yield is measured in terms of the “unhusked” rice.

<sup>28</sup> This low per-household yield of the well-to-do class in Ban Mae Chang is partially because of the existence of one household that does not grow dry rice at all but only cabbage, and which buys rice for

1.06 *rai*. Under these conditions, the per-household rice yield of this income class in Ban Dong Luang is as much as 154 *thang*, produced from the relatively small arable land.

In both villages, the households in the well-to-do class are managing their smaller land resources well to cope with their relative disadvantage to secure the daily rice.

### ***The Middle Income Class***

In Ban Mae Chang, the per-household rice yield of the middle-income class is the second highest (123.63 *thang*) among the all income classes. This amount of rice is produced from 26.44 *rai* of swidden and 1.81 *rai* of terrace per household. The terrace ownership rate (37.5%) of the middle-income class, which has six households owning terraces, is higher than that (29.4%) of the well-to-do class. However, in terms of cash-income, the middle class is regarded as poorer than the well-to-do class, which has made profit through the cabbage cultivation in 2002.

Table 3.3 shows that, in Ban Dong Luang, the middle-income class holds the smallest per-household swidden-size among the all income classes. The per-household rice output of the middle-income class in this village is 112 *thang*, primarily produced from swidden, since in Ban Dong Luang only one middle-income household owns terrace.

### ***The Poor Income Class***

The households in the poor income class in Ban Mae Chang hold the second highest position in per-household land ownership of both swidden and terrace among all income classes. Their per-capita land ownership of swidden is 28.29 *rai*, which are mainly used for the production of dry rice. This size is larger than that of the middle-income class (26.44 *rai*). Furthermore, the per-household size of the irrigated terrace for the poor-income class (2.06 *rai*) is larger than that of well-to-do class and that of middle class. The per-household rice output is 120 *thang*, which is higher than that of the well-to-do class in the village.

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their daily consumption. On this point, see also CHAPTER V.

For the household in the poor-income class of Ban Dong Luang per-household size of swidden is 9.27 *rai*, which is the second highest among the all income classes only to the size of the rich class, while the per-household size of terrace is 0.24 *rai* which is a slightly larger than that of the middle class in the village. However, per-household rice yield (99 *thang*) is the lowest. As for the economic status in terms of rice-security, the poor income class in Ban Dong Luang is the lowest, among all income classes of both villages.

### **Overview**

In the above, through the cross-sectional comparisons of each class in the two villages, we examined the positive effectiveness of the irrigated-terrace farming and of the use of chemical fertilizer upon the production level in the highland agriculture. However, since these effects are based on a modernized agricultural framework that is highly dependent on non-traditional inputs of technology and chemicals, it is rather difficult for the households in the lower income class to enjoy such opportunities. If they can neither utilize the irrigated-terrace farming in the new agricultural frameworks nor use the continuously changing agricultural technology, their livelihood in terms of food-security is in a severe situation. Poor-income households are generally experiencing this in each of the villages.

The above describes the background of the phenomena that the rice-insufficient households in each village are suffering from a low rice-yield compared to the rice-sufficient households. From Table 4.3, we know that, in Ban Mae Chang, the per-household yield of rice for the rice-insufficient household is 20 *thang*, which is the outcome mostly from swidden with a rotational fallow period of four to five years. Among the 37 rice-insufficient households in Ban Mae Chang, nine households own irrigated terrace fields, but this does not satisfy their rice sufficiency. As to the rice-insufficient households in Ban Dong Luang, their per-household yield of rice is 18 *thang*, showing the similar rice-yield pattern to the rice-insufficient households in Ban Mae Chang. But there is the difference that the rice-insufficient households in Ban Dong

Luang are using almost all available arable land on the mountain side with only a short or no fallow period at all.

In the case of Ban Dong Luang, since almost all the villagers have already launched cabbage cropping in their swidden field with the intensive use of soil, which has shortened the fallow period, the soil now cannot keep up with the natural regeneration process. Therefore, the villagers must depend on chemicals; they have to put increasing amounts of new type of fertilizers on their farmland.

At any rate, almost all the villagers in each income class have been struggling with the continuously declining rice productivity per unit area of land unless they continue to input additional chemical fertilizer. Under these deteriorating circumstances, the highlanders in both villages have to produce more rice, or to find new income sources.

#### **4.2 Changing Agricultural Production System**

As can be seen from Table 4.5, the agricultural activity of the Pwo Karen community in my research site usually starts in February, when they slash bushy trees over the fallow plot which is planned to be used for the next rice farming, followed by burning the field during the month of April. May is the month for the final preparation for dry rice to be planted and the time when they actually plant dry rice. After that, the work of weeding goes on continuously until the time of the rice harvest in late October or in the beginning of November. Then, the villagers have time to rest after the harvest, until February when they again start cutting and slashing bushy trees over the new fallow plot for the next farming.

Hinton (1975) presents the traditional agricultural calendar of the swidden and irrigated terrace in the region. Hinton's calendar is still relevant for the case of Ban Mae Chang even though it was done three decades ago, but it is not relevant any longer for Ban Dong Luang. Table 4.5 has been constructed based on Hinton's skeleton, with the additional information which I have collected in my field survey, for Ban Mae Chang and

Ban Dong Luang, on the agricultural activities associated with rice production and the new farming system of cabbage cultivation in both swidden and terrace.

Since cabbage cultivation had started to change the traditional agricultural calendar, the characteristics of their farming activities have changed with a more and more intensive use of the farm land. In this section, the transition of the traditional swidden agriculture of rice into its mixed agriculture with the irrigated-terrace rice farming and cabbage cultivation, is examined for both cases of Ban Mae Chang and Ban Dong Luang.

#### **4.2.1 Case of Ban Mae Chang: Four-to-Five Year Rotational Fallow Farming System**

The villagers in Ban Mae Chang have traditionally practiced the “rotational swidden cultivation” (Yos 2003:26) to use their own cultivation fields of four to five plots in total for rotational farming. Basically, each household practices dry rice farming every year to secure enough rice for the life of family members. Together with the dry rice in the same dry rice field, they simultaneously grow such crops as corn, potatoes, pumpkins, beans, sesame, chilli, and cucumbers and other green vegetables mainly for household consumption. A plot of dry rice field is usually used for farming for one year<sup>29</sup> and left fallow in the following four to five years.

##### **4.2.1.1 The Swidden Cycles: Dry Rice and Cabbage Production**

The villagers’ approach to swidden agriculture is essentially based on a pragmatic judgment of weather and soil conditions which has been accumulated through their experiences. Most of the crops necessary for the villagers’ diet are grown in their swiddens and watered only by direct rainfall during the rainy season in the period between May and November.

#### ***Dry Rice Farming***

<sup>29</sup> Precisely speaking, “for a half year during the rainy season.”



After they cut trees and bushes<sup>30</sup> for the new swidden field in February, the land is left to dry for a month. Larger trees are not felled in this clearing process. It is because these large trees are considered to play an important role in the regeneration of the land after cultivation, by holding the soil structure intact with their roots, and by sowing seeds (Hinton 1975:84). In the beginning of April, before the earliest shower comes, they set a fire in the field to prepare for planting. It is important for the villagers to correctly decide the burning timing by carefully reading the wind before the rainy season arrives (Hinton 1975:85, Grandstaff 1980:10, and my interview). In the case of the farming season of 2003, the villagers in Ban Mae Chang planned to burn the field on April 5<sup>th</sup> according to the local climate condition (interview with Mr. Tusa and Mr. Tai in March 2003).

Right after the burning and before planting, it is necessary for the villagers to construct or fix the fence-barriers to prevent the encroachment of cattle and buffalo which are allowed to graze freely on the village territory, and which possibly eat the growing crops. One more important preparation at this stage is the construction of small field huts, one in each household's swidden, for the purpose of securing the shelter for the farmers from the sudden heavy showers and of functioning as a base for agricultural ceremonies.

After this, they plant the dry rice by the middle of May, before the regular monsoon rain comes to the region. The Pwo Karen people use a special planting tool and planting method in their dry field as described by Hinton.

The Karen used dibbling poles consisting of a long bamboo rod, tipped with a small metal spade shaped head. The flexibility of bamboo helped the operator to bounce the implement from one hole to the next with great rapidity. The holes picked in the earth by this technique were randomly scattered, about 30 cm apart and 8 cm deep. Dibbling was usually men's work, owing to the sustained strength it demanded. Groups of men and women followed the dibblers, dropping approximately 20 seeds into each hole.

(Hinton 1975:89)

They are even now still using almost the same instrument as reported by Hinton. It is called *ponchui*, and has nowadays a wooden rod instead of a bamboo rod. Its length is

<sup>30</sup> These trees and bushes are those which have grown during the fallow period.

approximately 1.2 m from top to toe. In addition to it, they have now an iron dibble named *li jule*, which is thinner and shorter<sup>31</sup> than *ponchui* and used for the sake of their convenience (my survey on February 21, 2003).

Soon after the monsoon rains arrive, the green rice shoots burst out of the surface of the soil. This is the time for them to start continuous weeding in their swidden for the survival of dry rice and other *catch* crops. The task of weeding is done by both men and women as well as elder children who are able to distinguish the *catch* crops from the weeds which surround the catch crops and who are able to assist the adults when they are on holidays from school. The Pwo Karen farmers engage in the tough task of weeding continuously before the harvest time in the drizzle or rainy weather, giving little time for the villagers to rest in this period.

Around July to August when the height of the rice plants reaches about 30 cm, a series of agricultural ceremonies is held which is known as *bjang xək* meaning “feasting the field spirits” (Hinton 1975:91). The villagers pray for the guardian spirit of the territory and several natural spirits for a rich yield by offering liquor, rice and a couple of chickens to these spirits in these rites. Only males are allowed to conduct those rites and to be involved in them. While they are holding, not only these ritual ceremonies but also every ceremony related to the guardian spirits, the females are banned from entering the sacred area. If a female breaks this taboo, the annual harvest will be adversely affected, they claim.

### ***Catch Crops***

In dry rice fields, some of the villagers grow such *catch* crops as maize, taro, a kind of yam, pumpkin, bean, sesame, chilli, cucumber and other green vegetables. This variety of vegetation is mainly for their daily consumption, and usually not for sale. Maize, which is raised by many of households in some quantity, is an especially important crop for the villagers. In June or July, maize is harvested to supplement their daily food from July to October when the rice reserves are usually getting depleted

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<sup>31</sup> The length is approximately 80 cm.

(Hinton 1975:91). Through my field survey, some of the villagers emphasize that one of the virtues of the traditional rotational swidden system is for them to be able to grow various kinds of *catch* crops together with dry rice, which enables them to survive even if there is not enough rice.

When I was in Ban Mae Chang in June 2002, the villagers gave me steamed maize. In January 2003, they served me yam potatoes roasted by the fireside.

### ***Cabbage Cultivation***

Since some villagers had begun to grow cabbage towards the end of the 1980s, the function of the swidden system in my research site has been enlarged as whole although their per-household area of the arable land has become continuously smaller. Cabbage cultivation, which is usually carried out in the swiddens near the road, is conducted simultaneously with rice farming in other part of swidden by utilizing rainfalls. The wage labour done by the villagers is heavily burdened by cabbage cultivation and by the work of tending and weeding their rice fields.

The typical work schedule for the cabbage cultivation starts around the end of May or June. They start to clear the land, and to grow a nursery of cabbage for about 35 days. In August, the seedlings from the nursery are transplanted in other plots at an interval of 30 cm. They start to weed often and continue this work until the harvest time. During this period, they put chemicals on the seedlings 10 days after their transplanting, and apply three kinds of fertilizers (*e.g.*, type 16-20-0 fertilizer to enrich the soil in the beginning, and type 21-0-0 fertilizer for making the cabbage a good-looking round shape) three weeks after transplantation. If they find insects on the cabbage, they apply pesticide. It generally takes about three months before harvesting the cabbages until around the end of September or early October, depending on when they start. The family members usually work together, and sometimes, the relatives share the labour needed for the cabbage cultivation. In that case, the benefit gained from the cabbage is shared with the relatives. When school is over, the elder children are required to work with the adults in the cabbage fields as well as in the rice fields.

#### 4.2.1.2 The Terrace Cycles: For Wet Rice and Cabbage Production

Wet rice is also an important products for those villagers who own irrigated terraces and get rice from them. During the rainy season, wet rice farming in the terrace is conducted concurrently with the dry rice farming in the swidden. The wet rice in the terrace is not only dependent on rainfall, but also is sometimes affected by floods. The terrace farmers are therefore required to manage their water much more skilfully than swidden farmers.

The terrace farming usually begins in April to prepare the field for the new planting, including work to construct and repair dams, dykes and canals, usually after the months of disuse during the dry season. Buffalos sometimes cause the considerable damage to the terraces, which requires the terrace farmers to maintain or rebuild fences in the vicinity of the water courses where the terraces lay (Hinton 1975:96). In early May, they start to raise the nursery beds near water and one side of the terrace. Meanwhile, they plough the soil of the terrace using a power cultivator rented from its owner in the village.<sup>32</sup> It is the job of males to power-cultivate the terrace around June. A 25-year-old man in the village said to me that the power-cultivation is the most burdensome work for him in rice farming in both swidden and terrace. After that, the terrace is irrigated for transplanting the rice seedlings. Seedlings are raised at the nursery beds, and transplanted to the terraced field in July. The terrace farmers hold rites for the spirits of terrace in a similar manner to the swidden field when the plants become high enough (over 30 cm).

After planting the rice seedlings in the terrace, the farmer does not need to pay much attention to the growth condition until the harvest, but must be careful that the flow of water in the terraces is well controlled so that the water does not damage the rice. During the rainy season in 2002, the heavy rain caused floods in such a way that the terrace farmers got serious damage to their wet rice in Ban Mae Chang. They told me that the wet rice harvest is usually favourable to them as long as they can avoid floods in

<sup>32</sup> The rental is 1,000 baht for five to six *rai*, and 500-600 baht for three *rai* including the petroleum.

their terraced fields.

In Ban Mae Chang, there is one household that owns terrace close to the residential area of the village. In 2002, this family began to grow wet rice in the terrace during the rainy season, and cabbage during the dry season in the same terrace using sprinklers. The family starts to plant the cabbage nursery beds in the beginning of January. At the same time, they start to prepare the land for transplanting the cabbage seedlings into the terrace. In February, the seedlings are transplanted, and fertilizer and pesticide are applied in the same manner as for the swidden fields. In January 2003, as a new effort, this family started to grow cabbage in another plot of the terraced field (2 *rai*), which is owned by the parents of the head of this family, and the terrace used for the last time is fallowed. The harvest takes place during April when the market price is usually the best, and the cabbage crops are transported from the village to the trading market at Mae Ho by small-sized trucks.

#### **4.2.2 Case of Ban Dong Luang: “Two-place Rotational Rice Farming System Mixed with Cabbage Cultivation” and “Three-place Rotational Fallow System Mixed with Cabbage Cultivation”**

The aforementioned swidden practice in Ban Mae Chang at present, is almost the same as the farming in Ban Dong Luang thirty years ago. It is reported that the average fallow period in Ban Dong Luang surveyed in 1968 to 1969, was about five and a half years (Hinton 1975:108, 111). As one of the virtues of land conservation practiced by the Pwo Karen people, Hinton (1975:104) reports that “they never used a field for more than one year before returning it to fallow” in Ban Mae Chang and Ban Dong Luang at that time. Under the rotational fallow system in 1968, the 32 households conducted swidden farming in Ban Dong Luang with the average swidden area of 5 *rai* or 0.80 hectare (Hinton 1975:110).

This system in Ban Dong Luang has been, however, dramatically changed over the past three decades. One of the major reasons for this is the increase in village population. In fact, in order to survive under severely limited conditions, they have taken



rather drastic methods of growing cabbage regularly as the sole complement to rice. The average household owns two or three farming plots out of which two plots are used at the same time to grow rice and cabbage. The per-household landownership of swidden<sup>33</sup> in Ban Dong Luang is 9.06 *rai*, considerably smaller than that in Ban Mae Chang (27.39 *rai*). On the other hand, the per-household ACA<sup>34</sup> of the swidden in Ban Dong Luang is 5.92 *rai* as compared with 6.61 *rai* in Ban Mae Chang as can be seen in Table 4.4. This clearly indicates that the arable land in Ban Dong Luang is under intensive use for the production of rice and cabbage.<sup>35</sup>

#### 4.2.2.1 Swidden and Terrace Cycles: For Rice and Cabbage Production

The major pattern of the agricultural method adopted in Ban Dong Luang is as follows. The two swidden plots are simultaneously used to grow dry rice and cabbage during the rainy season. The agricultural calendar for the Pwo Karen in Ban Dong Luang described in Table 4.5, shows that rice and cabbage are cultivated in both swidden and terrace. In the village, 28 households out of the 63 households still maintain three or four plots of swidden, while the other majority holds one or two plots and some farmers own over three plots which can be left fallow every other year.<sup>36</sup> Many of others use all of their own plots nearly every year for the production of cabbage and dry rice with nearby no fallow period.

#### *Dry Rice Farming and Wet Rice Farming*

The basic procedure for dry rice farming in Ban Dong Luang is almost the same as in Ban Mae Chang, and the dry rice is still essential for the majority of the villagers even though its amount of yield has been reduced partially due to the increase in cabbage cultivation. A female villager at the age of 20 years told me that she prefers dry-rice

<sup>33</sup> The swidden can be used for the production of both dry rice and cabbage.

<sup>34</sup> Actually cultivated area.

<sup>35</sup> As already discussed in subsection 4.1, from Tables 3.2 and 4.4, we can estimate that the fallow period is around five years for Ban Mae Chang and around one and a half years for Ban Dong Luang.

<sup>36</sup> This distribution of plots over the households, results in that the average household in Ban Dong Luang owns two or three farming plots of swidden.

farming to the farming of wet rice and cabbage. During the dry rice farming season, many villagers get together to help each other. She therefore feels more pleasant during the dry rice farming season even though she feels less fatigues in the cabbage cropping in swidden than in the dry-rice farming. This feeling is shared with other school girls of the age 10 years, who help their parents and elder siblings out of school time (my interview in January 2003).

There are 12 households owning the irrigate terraces in Ban Dong Luang. There exist only three streams available in and around the village, one of which passes through its satellite village, Ban Dong Noi ("*Thi Tho Kha*," or Huai Dong Noi in Thai). Along this stream, seven households from Ban Dong Luang own terraces to grow the wet rice in approximately 20 *rai* in total in 2002 (surveyed in 2003). Four of them do not grow dry rice in the swidden anymore. Most of the other wet-rice farmers are fully utilizing their swidden land for the production of dry rice and cabbage. All of those that own terraces got sufficient rice in 2002, and enjoy a higher cash income than the cash income from the cabbage cultivated in the swidden. Some of the villagers have already stopped dry-rice farming in the swidden because they had bought the terraced field. In some of these cases, the usufructs of swidden land were yielded to the younger generation in the family or other relatives to grow cabbage. If the rice yield from the terrace is enough for the members of a household, then they tend to divert the use of swidden from the dry-rice production to the cabbage production in a larger scale for gaining higher level of profits.

### ***Cabbage Cultivation***

In the procedure of cabbage farming, the villagers cut and burn the bushy fields in the period of March through April, which is also the period for preparing the fields for the dry rice farming. Then they make contracts with cabbage middlemen in May; plough the fields from May to June; make a nursery for growing cabbage seedlings in July; a month later, they transplant the young cabbage plants into the swidden fields; three weeks later, applying fertilizers and chemical pesticides; weed during the next three months to grow cabbage; and harvest towards the end of October. Since they do not have in the

village any special irrigation system for cabbage cultivation in the swidden they just practice the cabbage farming under the natural condition as in the case of dry-rice farming. Therefore, their cabbage cultivation starts with the rain's arrival in May, as with dry rice.

Regarding the chemical usage for farming in Ban Dong Luang, the cabbage farmers claim that their cabbage is grown with less pesticide than in the lower areas. This remark is supported by the school teachers as well (interviewed on August 16<sup>th</sup> 2002 in Ban Dong Luang). The cabbage farmers explain that they need to apply pesticide only in the event that they find insects troublesome for the cabbage growth. Owing to the high altitude of the village location, the Pwo Karen people apply pesticide basically once every 45 days, which is only one-sixth of the amount used by the lowlanders, who apply pesticide once a week. Generally speaking, it is necessary for farmers in Ban Dong Luang to use pesticide for cabbage cultivation if they grow cabbage continuously in the same field more than five years (interview with a cabbage farmer in a rich income class in Ban Dong Luang). On the other hand, a special type of fertilizer (*e.g.*, 16-20-0 and 21-0-0) must be used to make cabbages have a good-round shape for the sale in market at higher price (my interview).

Regular cabbage cultivation is conducted only by the households above the middle-income class since it is difficult for the households in the poor-income class to grow cabbage every year. Only two out of 22 households (33.3% of the whole households) in the poor-income class grew cabbage by themselves in 2002. Many of those poor-income class farmers are always looking for the chance to get an outside investor to help them grow cabbage. The cabbage cultivation by the households in the rich-income class in this village, contributes to the higher yields of their dry rice farming. It is because the left-over fertilizer used for the cabbage cultivation this year passes on some effects to the rice farming carried out in next year on the same farmland. On the other hand, the rice production is almost always insufficient for poor households that cannot grow cabbage regularly. It is to be noted here that cabbage cultivation by their rich-income households in this village is helpful for the fellow villagers in the poor-

income class by offering them the wage-labour opportunities inside or near the village so that they can gain cash for rice. The labour-wage rate per day inside the village of Ban Dong Luang is 50 baht, and more than ten of the poor-income households make their living by being involved in the wage-labour inside the village under the successful cabbage farmers in the rich-income class, or at the regional cabbage trading market in Mae Ho, or in the construction works in the towns.

### 4.3 Summary

Swidden farming in Ban Mae Chang still demonstrates traditional agricultural practices which are almost the same as the farming system observed in Ban Dong Luang three decades ago. On the other hand, in Ban Dong Luang, the agricultural system has been dramatically changed. One of the primary reasons for this change is the increase in the village population. The village has been forced to change its traditional agricultural practices to a new approach of growing cabbage regularly as a complement to rice under severely limited conditions. The per-household area of swidden (used for dry rice and cabbage) in Ban Dong Luang is only one third of that in Ban Mae Chang. On the other hand, the per-household actually cultivated area of the swidden in Ban Dong Luang is not so different from that in Ban Mae Chang (see Table 4.4). The above-mentioned indicates the obvious difference between the rotational fallow system of Ban Mae Chang and the quasi-permanent farming scheme of Ban Dong Luang.

There are several reasons why their fallow system has been shortened and the per-household farmland area is getting smaller. In the case of Ban Mae Chang, the reason is not only due to the natural population growth, but also due to the external immigration pressure by the Skaw Karen people who have moved to the place near Ban Mae Chang in the past eight decades as aforementioned in CHAPTER III. As to Ban Dong Luang, the village population growth is the primary factor, and is partially attributed to the transfer system of the swidden land which has allowed the new immigrants mainly due to marriage to reside inside the village and to share the fallow land with their kin. In this

context, some of the households in Ban Dong Luang had already turned their farming emphasis to the irrigated terrace cultivation as their major adaptive strategy in the 1960s (Hinton 1975:142). Since then, the movement to integrate the irrigated farming into their conventional swidden farming had been started by the highland farmers around the Pwo Karen community.

Cabbage cultivation in this region is a vital way for the Pwo Karen to survive under the scarcity of arable land and under the situation in which they are caught up into the market economy. However, cabbage cultivation is not always available or helpful to all of them. It generated a new social stratification tension through which the inner-gap of socio-economic status among the villagers has been augmented. More precisely, the upper-income households can make profits on the cabbage cultivation in swidden and terrace all through the year, and reinvest in the cash crop by using his profit. On the other hand, the lower-income households have to grow cabbage for the supplement to rice in small-sized farmlands, but in general have no budget to restart it or have much debt accumulated by the previous fails in the cabbage cultivation, all of which persecutes them continually.

In addition to the above-mentioned comprehensive summary, additional points from this chapter's discussion are reiterated below:

- (1) As for households owning irrigated terraces in the years of 1968-69, there were 11 households in Ban Mae Chang and Ban Mae Chang Bon and four households in Ban Dong Luang and Ban Dong Noi. In the years of 2002-03, the number of households owning irrigated terraces was 22 in Ban Mae Chang (excluding Ban Mae Chang Bon) and 14 in Ban Dong Luang (excluding Ban Dong Noi).
- (2) In Ban Mae Chang, out of the total rice yield (6,041 *thang*) of this village in 2002, swidden rice (dry rice) and terrace rice (wet rice) occupy shares of 76 percent and 24 percent, respectively. In Ban Dong Luang, out of the total rice yield (8,190 *thang*) of the village in 2002, the shares of swidden rice and terrace rice were 73 percent and 27 percent, respectively. It should be noted that the terrace-rice production in Ban Mae Chang for the year 2002 was severely damaged by flooding.



- (3) For the year 2002 in Ban Mae Chang, the number of rice-sufficient households was 14, representing 27 percent of the total 51 households. In Ban Dong Luang, the number of the rice-sufficient households was 37, or 59 percent of the total 63 households.
- (4) In Ban Mae Chang, out of the total rice yield in 2002 produced by the rice-sufficient households (2,830 *thang*), swidden rice was 63 percent. Meanwhile, out of the total rice yield in 2002 produced by the rice-insufficient households (3,211 *thang*), the swidden rice was 87 percent.
- (5) For each of the four income classes in both villages, the percentage share of the terrace-rice yield in 2002 is higher for the rice-sufficient households than for the rice-insufficient households. In other words, there exists a positive correlation between the magnitude of rice sufficiency (*i.e.*, rice security) and the amount of the terrace-rice yield.
- (6) For the year of 2002, the estimated “per-households threshold point for the rice sufficiency” for the area of Ban Mae Chang and Ban Dong Luang is 134 *thang/year* (134 *thang* as the total of swidden rice yield and terrace-rice yield), and the “per-capita threshold point for the rice sufficiency” is 32 *thang/year*.
- (7) In Ban Mae Chang, the per-household “actually cultivated area of the farmland (ACA)” in 2002 was 8.6 *rai*, which is disaggregated in to 6.6 *rai* for the swidden and 2.0 *rai* for the irrigated terrace. In Ban Dong Luang, the per-household ACA in 2002 was 6.7 *rai*, which is disaggregated into 5.9 *rai* for the swidden, and 0.8 *rai* for the irrigated terrace.
- (8) For Ban Mae Chang, the estimated average “fallow period” of the swidden is 4.4 years that can be obtained by dividing the per-household swidden area (27.4 *rai*) by the per-household ACA of swidden (6.2 *rai/year*) in 2002. For Ban Dong Luang, the estimated average “fallow period” is 1.5 years.
- (9) For both villages, there are (a) a positive correlation between the income level and the per-household ACA of the swidden used for the cabbage cultivation, (b) a positive correlation between the income level and the per-household total ACA, and (c) a

negative correlation between the income level and the per-household ACA of the swidden used for the dry rice.

- (10) For the year 2002, the swidden-rice productivity is 17.0 *thang/rai* for Ban Mae Chang and 27.9 *thang/rai* for Ban Dong Luang, while the terrace-rice productivity is 14.4 *thang/rai* for Ban Mae Chang and 46.7 *thang/rai* for Ban Dong Luang.
- (11) The per-household ACAs of (a) arable land, (b) swidden and irrigated terrace together, (c) swidden, (d) swidden used for the rice production and (e) irrigated terrace in Ban Mae Chang are respectively larger than each of those in Ban Dong Luang.
- (12) The per-household ACA for the cabbage-cultivation and the swidden-rice productivity per *rai* of swidden for Ban Mae Chang, are respectively smaller than each of those for Ban Dong Luang.
- (13) The gap in per-household ACA of the arable land between the households in the upper-income class and those in the lower-income class is bigger in Ban Dong Luang than in Ban Mae Chang.

**Table 4.1 Pwo Karen Terrace Ownership and Area Size for the Period 1968-1969**

Village	Number of Ownership	Area (in hectares)
Dong Luang & Dong Luang Phu <sup>1)</sup>	4	0.36; 0.25; 0.24; 0.15
Mae Cang <sup>2)</sup> & Mae Cang Phu <sup>3)</sup>	11	1.23; 0.38; 0.16 Remainder unknown

[Notes] 1) Ban Dong Noi 2) Ban Mae Chang 3) Ban Mae Chang Bon

Source: Peter Hinton. "Karen Subsistence: The Limits of a Swidden Economy in North Thailand," Ph. D. Thesis, Sydney University (1975:124).

**Table 4.2 Gross Yield of Swidden Rice (Dry Rice) and Terrace Rice (Wet Rice) in 2002: By Income Class for Rice-sufficient and Rice-insufficient Households**

**(a) Ban Mae Chang** □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ **Surveyed: December 2002 - February 2003, Direct hearing from each household**

Cash-income Class	Whole Households				Rice-sufficient Households				Rice-insufficient Households			
	No. of Hlds	No. of Hldms (person)	Swidden Rice (thang)	Terrace Rice (thang)	No. of Hlds	No. of Hldms (person)	Swidden Rice (thang)	Terrace Rice (thang)	No. of Hlds	No. of Hldms (person)	Swidden Rice (thang)	Terrace Rice (thang)
Rich	8	37	859	370	3	17	500	230	5	20	359	140
Well-to-do	10	54	664	120	1	7	150	100	9	47	514	20
Middle	16	65	1,478	500	4	16	380	330	12	49	1,098	170
Poor	17	74	1,570	480	6	27	750	390	11	47	820	90
All	51	230	4,571	1,470	14	67	1,780	1,050	37	163	2,791	420
			6,041				2,830				3,211	

**(b) Ban Dong Luang** □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ **Surveyed: December 2002 - February 2003, Direct hearing from each household**

Cash-income Class	Whole Households				Rice-sufficient Households				Rice-insufficient Households			
	No. of Hlds	No. of Hldms (person)	Swidden Rice (thang)	Terrace Rice (thang)	No. of Hlds	No. of Hldms (person)	Swidden Rice (thang)	Terrace Rice (thang)	No. of Hlds	No. of Hldms (person)	Swidden Rice (thang)	Terrace Rice (thang)
Rich	9	40	900	800	8	35	860	800	1	5	40	0
Well-to-do	17	64	1,730	890	14	48	1,530	890	3	16	200	0
Middle	16	63	1,530	250	6	24	680	250	10	39	850	0
Poor	21	73	1,790	300	9	24	940	300	12	49	850	0
All	63	240	5,950	2,240	37	131	4,010	2,240	26	109	1,940	0
			8,190				6,250				1,940	

[Notes] (1) 1 *thang* = 20 kg of unhusked rice, No.: Number, Hlds: Households, Hldms: Household members  
 (2) It should be noted that the terrace-rice production of Ban Mae Chang was exceptionally low in 2002 because of the severe flood damage.  
 (3) See Table 3.1 for the cash-income classification.

**Table 4.3 Per-household Yield of Swidden Rice (Dry Rice) and Terrace Rice (Wet Rice) in 2002: By Income Class for Rice-sufficient and Rice-insufficient Households**

**(a) Ban Mae Chang**

Surveyed: December 2002 - February 2003, Direct hearing from each household

Cash-income Class	Whole Households		Rice-sufficient Households		Rice-insufficient Households	
	Swidden Rice ( <i>thang</i> )	Terrace Rice ( <i>thang</i> )	Swidden Rice ( <i>thang</i> )	Terrace Rice ( <i>thang</i> )	Swidden Rice ( <i>thang</i> )	Terrace Rice ( <i>thang</i> )
Rich	107	46	167	77	72	28
Well-to-do	66	12	150	100	57	2
Middle	92 <sup>1)</sup>	31	95	83	92 <sup>2)</sup>	14
Poor	92	28	125	65	75	8
All	90 (20 per Hldm)	29 (6 per Hldm)	127 (27 per Hldm)	75 (16 per Hldm)	75 (17 per Hldm)	11 (3 per Hldm)
	118 (26 per Hldm)		202 (42 per Hldm)		87 (20 per Hldm)	

**(b) Ban Dong Luang**

Surveyed: December 2002 - February 2003, Direct hearing from each household

Cash-income Class	Whole Households		Rice-sufficient Households		Rice-insufficient Households	
	Swidden Rice ( <i>thang</i> )	Terrace Rice ( <i>thang</i> )	Swidden Rice ( <i>thang</i> )	Terrace Rice ( <i>thang</i> )	Swidden Rice ( <i>thang</i> )	Terrace Rice ( <i>thang</i> )
Rich	100	89	108	100	40	0
Well-to-do	102	52	109	64	67	0
Middle	96	16	113	42	85	0
Poor	85	14	104	33	71	0
All	94 (25 per Hldm)	36 (9 per Hldm)	108 (31 per Hldm)	61 (17 per Hldm)	75 (18 per Hldm)	0 (0 per Hldm)
	130 (34 per Hldm)		169 (48 per Hldm)		75 (18 per Hldm)	

[Notes] 1) More precisely, 92.4. 2) More precisely, 91.5.

(1) 1 *thang* = 20 kg of unhusked rice, Hldm: Household member

(2) It should be noted that the terrace-rice production of Ban Mae Chang was exceptionally low in 2002 because of the severe flood damage.

(3) See Table 3.1 for the cash-income classification.

(4) There are some rounded errors in the calculation of total figures.

**Table 4.4 Per-household Actually Cultivated Area in *Rai* (For Dry Rice and Cabbage) and *Naa* (For Wet Rice) for 2002: By Income Class**

Surveyed: December 2002 - February 2003, Direct hearing from each household

**(a) Ban Mae Chang**

Cash-income Class	Number of Households	Per-Hld Total ( <i>Rai</i> and <i>Naa</i> ) ( <i>rai</i> )	<i>Rai</i>			<i>Naa</i> <sup>1)</sup>
			Per-Hld Total ( <i>rai</i> )	For Dry Rice ( <i>rai</i> )	For Cabbage ( <i>rai</i> )	For Wet Rice ( <i>rai</i> )
Rich	8	10.76	7.88	4.38	3.50	2.88
Well-to-do	10	9.60	8.10	5.10	3.00	1.50
Middle	16	7.37	5.56	5.13	0.44	1.81
Poor	17	8.24	6.12	5.88	0.24	2.06
All	51	8.63 (TACA: 440)	6.61 <sup>2)</sup> (TACA: 337)	5.26 (TACA: 268)	1.36 (TACA: 69)	2.00 (TACA: 102)

**(b) Ban Dong Luang**

Cash-income Class	Number of Households	Per-Hld Total ( <i>Rai</i> and <i>Naa</i> ) ( <i>rai</i> )	<i>Rai</i>			<i>Naa</i>
			Per-Hld Total ( <i>rai</i> )	For Dry Rice ( <i>rai</i> )	For Cabbage ( <i>rai</i> )	For Wet Rice ( <i>rai</i> )
Rich	9	10.56	8.33	2.78	5.56	2.22
Well-to-do	17	7.71	6.65	2.94	3.71	1.06
Middle	16	6.75	6.44	3.63	2.81	0.31
Poor	21	4.14	3.90	3.81	0.10	0.24
All	63	6.68 (TACA: 421)	5.92 <sup>3)</sup> (TACA: 373)	3.38 (TACA: 213)	2.54 (TACA: 160)	0.76 (TACA: 48)

[Notes] 1) Some households of Ban Mae Chang grow cabbage in *Naa* (irrigated terrace) during the dry season by using sprinklers. This type of land area is not included here to avoid double-counting.

2) Per-household total *Rai* (swidden) in Ban Mae Chang is **27.39 *rai*** as shown in Table 3.2.

3) Per-household total *Rai* (swidden) in Ban Dong Luang is **9.06 *rai*** as shown in Table 3.3.

(1) *Rai*: Swidden, *Naa*: Irrigated terrace, 1 *rai* = 0.16 ha, Hld: Household, TACA: Total actually cultivated area.

(2) See Table 3.1 for the cash-income classification.

(3) There are some rounded errors in the calculation of total figures.



**Table 4.5****Pwo Karen Agricultural Calendar: For Ban Mae Chang and Ban Dong Luang**

Month	Farming Category→ Rain↓	Swiddens		Terraces	
		Dry Rice	Cabbage	Wet Rice	Cabbage <sup>3)</sup>
Jan.	Nil	No work		No work <sup>1)</sup>	Plant nursery beds, Preparing the land for planting
Feb.	Nil	Slash field		No work	Transplant seedlings, applying fertilizer and pesticide
Mar.	Nil	No work		No work	Harvest, Conveying crop to the trading point at Mae Ho
Apr.	Some Storms	Burn, build fences, huts, etc.		Repairs to dykes, canals, etc.	
May	Some Storms	Planting		Plant nursery beds, plough terraces	
Jun.	Monsoon	Weeding	Plant nursery beds (35 days), Preparing the land for planting	Flood terraces and transplant seedlings from nursery beds	
Jul.	Monsoon	Weeding (Ceremony)		General attention <sup>2)</sup>	
Aug.	Monsoon	Weeding	Transplant seedlings from nursery beds, applying fertilizer and pesticide	General attention	
Sep.	Monsoon	Weeding	Harvest, Conveying crop to the trading point at Mae Ho	General attention	
Oct.	Occas. Showers	Harvest		General attention	
Nov.	Nil	Carry crop to village		Harvest begins	
Dec.	Nil	No work		Carry crop to village	

[Notes]

- 1) No work is carried out in established terraces, but new irrigable land may be prepared during this period.
- 2) Repair of washaways, controlling flow of water to and from fields.
- 3) Some households grow cabbage by using sprinklers during the dry season in terraced fields.

Source: Constructed from Hinton's study (1975:81) and the information obtained through my fieldwork.