

## CHAPTER IV

### THE CHARACTERISTICS OF THE STUDY SITES

#### 4.1 Background of the CSPUCS project

The Commercial Strawberry Production Using Certified Seedlings Project (CSPUCS) was funded by BOTEC<sup>6</sup>. The objectives of the project are to improve strawberry varieties by using the biotechnology and to produce virus-free strawberry seedlings. The tissue culture is produced at Kanda Building Laboratory in the Faculty of Agriculture, Chiang Mai University. The numbers of strawberry tissue culture plants was produced in 1996/97 were as shown in table 4.1.

Table 4.1. Production of strawberry plants from tissue culture technique in 1996/97

Variety names	No. of TC plants (plants)
Phraradchatan 16	27,000
Selva	22,000
Phraradchatan 20	2,000
Phraradchatan 50	7,500
Phraradchatan 70	500

*Source: Udom (1998)*

<sup>6</sup> National Center for Genetic Engineering and Biotechnology

The tissue-cultured plants were looked after in a nursery house. After they adjusted to the environment, they were brought to the Research Stations and the Upland Agricultural Centers. These centers and stations propagated the strawberry runners for 1<sup>st</sup> to 3<sup>rd</sup> generation. The centers and stations carried out this project are shown in table 4.2. The total certified runner production cover was 28 rai in the year 1996/1997.

Table 4.2. Extension areas of runner production from tissue cultured plants.

The conducting area of runner production	Area (rai)
Kob Dong Upland Agricultural Extension Center	22
Mae Hae Upland Agricultural Extension Center	3
Doi Pui Upland Agricultural Research Station	2
Kon Wang Royal Project Development Center	1

Source: Udom (1998)

The 3<sup>rd</sup> generation runners were distributed to the farmers within the Royal Project Foundation (RPF) in order to propagate the runners of the 4<sup>th</sup> generation. These runners in the 4<sup>th</sup> generation were distributed to the other farmers for strawberry production. The promoted areas introduced in order to produce the runners are the Kob Dong and the Mae Hae Royal Project Centers, and The Doi Pui Upland Agricultural Research Station (Udom, 1997). The figure 4.1 shows the virus-free runner production process.

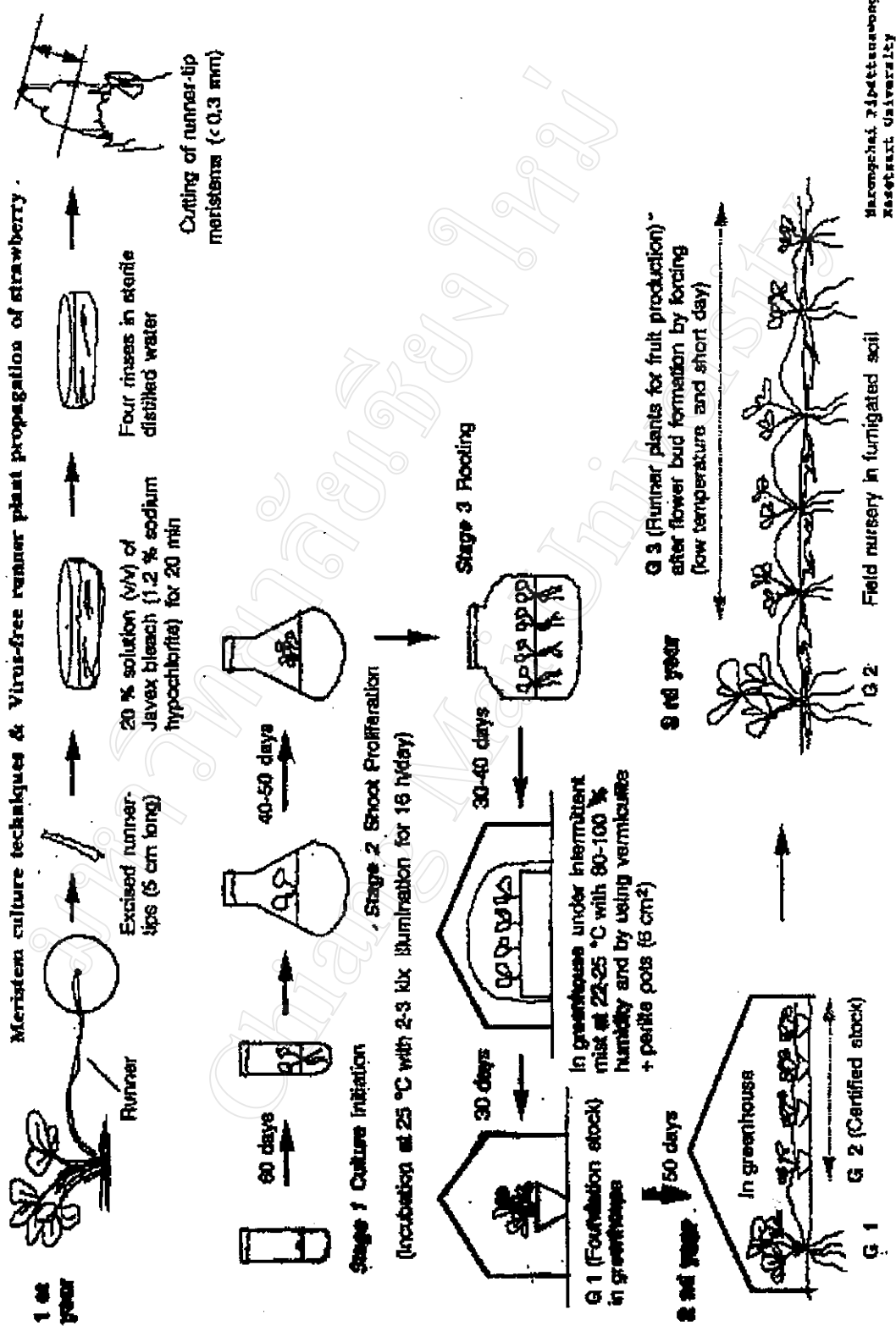


Figure 4.1 The production process of virus-free runners

#### **4.2 The characteristics of promoted sites with in the CSPUCS**

The CSPUCS project transferred the technology to the farmers in the RPF. The project is conducted in the Fang district and by the Royal project in Intanon, Huai Nam Rin, Tong Raw, Pang Da, Mae Sa Mai and, Ang Kang. The RPF controlled the program of cultivation with concerning to chemical and fertilizer practices, runner production and marketing.

#### **4.3 The characteristics of the promoted sites**

This study is focused at the Intanon and Huai Nam Rin RP in order to study strawberry production using virus-free runners. Ang Khang is an area for production of the virus-free strawberry runners. These three study sites are supported by the Royal Project Foundation to undertake research and the extension of strawberry development programs. These sites are located in the highlands in Northern Thailand with a low temperature and suitable to grow strawberries. The characteristics of the individual sites are explained as follows.

##### **4.3.1 Intanon Royal Project**

The Intanon Royal Project is located in Chom Tong district, Chiang Mai province. It covers a surface area of 150 square kilometers. Geographically, it is an highland and slope valley which is rugged terrain ranging between 500 m and 1,400 m above sea level. The annual average temperature is 20.1 °C. The annual average highest and lowest temperatures are 24.9 °C and 16.5 °C respectively. The annual average rainfall is 1,780.9 mm/year. Karen and Mong hill-tribes live in Intanon area.

The promoted flowers are chrysanthemum, gerbera, lily, carnation, statics, Gypsophila, Alstroberia, and roses. The promoted vegetables are cabbage, lettuce zucchini, and turnip. For the temperate fruit crops being promoted are apricots, lichee, pears, peaches, persimmons and strawberries. The other crops developed in the Intanon area are lignin and coffee.

Intanon is a big strawberry production area. Most farmers grow strawberries by using virus-free runners from the RPF. About 90 household numbers grow strawberries. Strawberry has been a strategic fruit crop for replacement of opium cultivation and deforestation (Sukumonnan, 1987).

#### **4.3.2 Huai Nam Rin Royal Project**

The Huai Nam Rin Royal Project is located in Chiang Rai province. Huai Nam Rin Royal Project covers a surface area of 14 square kilometers. Geographically, it is characterized by upland and slope valley which is 950 m above sea level. The annual average temperature is 22 °C. The annual temperatures of 35 °C and 11.5 °C are the highest and lowest temperatures respectively.

The farmers living in there are Black Lahu tribe and Thais. This area has been selected for promoting strawberry production since 1997. However, the Royal Project promotes and transfers strawberry production technology to only Thai farmers. The Black Lahu produce runners, not strawberries.

Apart from the strawberries, the farmers are encouraged to grow vegetable crops such as Japanese onion, leek, fennel, parsley, spinach, carrot, red leaf lettuce, head lettuce, jack bean, green pea and sweet corn. The encouraged flowers are gladiolus

statics, and pussy willow. Some farmers are encouraged to grow ferns for making dried flowers. Otherwise, the farmers grow upland rice, red kidney bean, and corn.

#### **4.3.3 Ang Khang Royal Project**

The Ang Khang Royal Project is research station for developing temperate fruit crops. It is located at Fang district, Chiang Mai province. The Ang Khang Royal Project takes care farmers covering a surface area of 14 square kilometers. Geographically, it is characterized by upland and slope valley which is 1,400 m above sea level. The annual average temperature is 16.9 °C. The annual temperatures of 23.5 °C and 11.9 °C are the highest and lowest temperatures respectively. The annual average rainfall is 2,074.6 mm per year. The people living there are hill-tribe farmers classified as Lahu and Palong

### **4.3 The household characteristics**

The household characteristics of the farmers growing strawberries and producing runners in the virus free system (VFS) and the normal (NS) were collected and consist of household information and land ownership, debt condition, household income, farming activities and cropping pattern.

#### **4.3.1 Farmers growing strawberries**

##### **4.3.1.1 Household component**

From this survey, the household information collected consists of demographic information (Table 4.3). The numbers of interviewed SVFS and SNS farmers were 57 and 61 people. The SVFS farmers interviewed were male and female as 74% and 26% respectively. The SNS farmers were male as 80%. The remainders were female. The

averaged age of the SVFS farmers (Intanon and Hui Nam Rin) was 33 years old ranging between 18 to 57 years old. The average of age of the SNS farmers was 40 years old ranging between 28 to 61 years old.

The level of education of interviewed farmer is classified into 4 groups as non-education, lower than *Patom 4*, *Patom 4 to 6* and higher than *Patom 6* level. The SVFS farmers were more uneducated because most of SVFS farmers were hill-tribe (Table 4.3). About 30% and 9.8% of among the SVFS and SNS farmers were educated in lower than *Patom 4* level. 28% and 68.9% of the SVFS and SNS were educated in between *Patom 4 to 6* level. 6% and 12.2% are educated in higher than *Patom 6* level (Table 4.3).

On the average, the family size of the SVFS and SNS households were 5 and 4 people with ranging between 3 to 9 people and 3 to 12 people respectively. The numbers of children averaged at about 3 children in the SVFS households. The SNS households had 2 children per household (Table 4.3).

Table 4.3. Demographic information of the farmers growing strawberries.

Items	VFS	NS
1. No. of respondent (people)	57	61
Male (%)	74	80
Female (%)	26	20
Average of age (years)	33	40
2. Education level		
Uneducated (%)	36	9.8
<i>Patom</i> 1 to 4 (%)	30	9.8
<i>Patom</i> 5 to 6 (%)	28	68.9
Higher than <i>Patom</i> 6 (%)	6	12.2
Total (%)	100	100.0
3. Family size(people)	5	4
4. No. of children (people)	3	2
No child (%)	1.8	2
1-2 children (%)	52.5	46
3-4 children (%)	36.9	40
Higher than 4 children (%)	8.8	12
Total (%)	100.0	

Source: survey 1998



#### 4.3.1.2 Land tenure and land ownership

From the table 4.4 shown as land tenure and land holding of the farmers growing the strawberries, about 46% of the SNS farmers had not owned land. All the SVFS farmers had owned lands. On the average, the sizes of land ownership of the SVFS and SNS were 7 and 2.06 rai respectively. The percents of the SVFS and SNS farmers possessed lands between 1–5 rai were 62% and 45.9% respectively. The SVFS and SNS farmers possessed lands between 6-10 rai as 16% and 4.92% respectively. The SVFS and SNS farmers possessed lands higher than 10 rai as 22% and 3.28% respectively.

Table 4.4. Land tenure and land holding of the farmers growing the strawberries.

Item	VFS	NS
1. Land holding		
1.1 No owned land (%)	0	45.9
1.2 Owned land (%)	100	54.1
1-5 rai (%)	62	45.9
6-10 rai (%)	16	4.92
Higher than 10 rai (%)	22	3.28
Total (%)	100	100
2. Land tenure		
2.1 No rented land (%)	70.2	16.4
2.2 rented land (%)	29.8	83.6
0.25-0.75 rai (%)	15.7	8.2
1-5 (rai)	10.6	73.8
6-10 (rai)	3.5	1.6

Total (%)	100	100
3. Average of land ownership	7	2.06
4. Average land size for strawberry production (rai/hh)	0.46	2.18
5. Average land size for runner production (rai/hh)		

Source: survey 1998

About 70% and 16% of the SVFS and SNS farmers did not have rent land for farming activities. Apart from that about 30% and 82% of the SVFS and SNS farmers respectively had to rent land for their farming activities (table 4.4).

#### 4.3.1.3 Debt condition

Generally, the farming activities depend on capital for management the farms. About and 53% and 80% (Table 4.5) of SVFS and SNS farmers borrowed money from institutional sources. Before beginning cultivation, the farmers have to find credit sources. The main sources are the Bank of Agriculture and Agricultural Cooperative (BAAC), Agricultural Cooperative and the Agricultural groups. Otherwise, some assemblers in the villages gave credit to the farmers.

Table 4.5. Source of credit of the farmers growing the strawberries

Source	Virus-free system (VFS)		Normal system (NS)	
	Frequency.	Percent	Frequency.	Percent
1. No debt	4	7.1	12	19.7
2. Debt	53	92.9	49	80.3
Agricultural Coop.	8	14.0	15	24.6
BAAC	4	7.1	31	50.8
Agricultural group	0	0	3	4.9

RPF	41	71.8	0	0
3. Total	57	100	61	100

*Source: survey 1998*

About 7% and 20% of the SVFS and SNS farmers did not have debts. 50.8%, 24.6% and 4.9% of the SNS farmers got credit from the Bank of Agriculture and Agricultural Cooperative (BAAC), the Agricultural Cooperatives and Agricultural groups respectively (Table 4.5). About 70% of the SVFS farmers got credits from the RPF. These credits given by the RPF are for the production factors such as fertilizers, chemicals, seedlings, and so on.

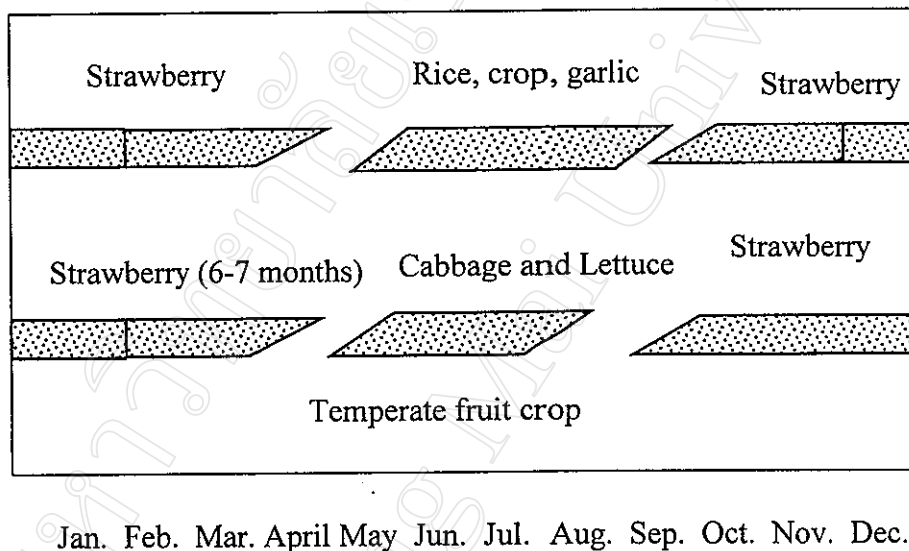
On average, the debt of SVFS farmers was 5,138 baht/household, which is less than the debt condition of the SNS farmers. The average debt of the SNS farmers was 48,173 baht per household.

About 2% of the SVFS farmers borrowed for non-agriculture such as building houses and buying motorcycles. 88.9% of the SVFS farmers borrowed on short-term credit -- period of 1 year or one cropping (6 months). About 11.1% were long-term credit.

#### **4.3.1.4 Farming activities and cropping patterns**

This study collected data from the farmers growing strawberries in many areas. The farming activities in each area were, however, different. The areas using NS are Samoeng, Fang, Mae Rim and Mae Sai. Samoeng at Ban Bool Kawl sub-district where is the main strawberry production area. The areas using VFS are Intanon and Huai Nam Rin.

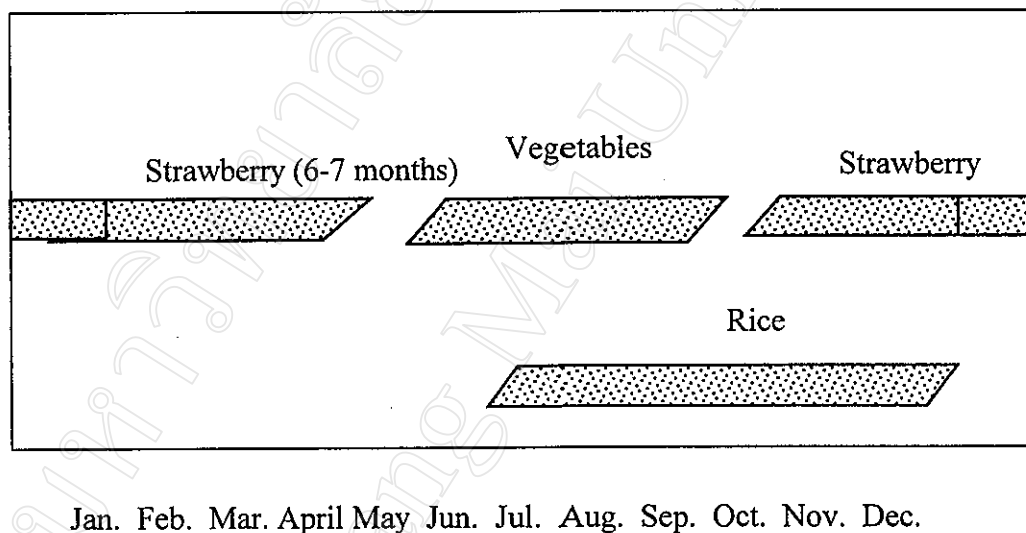
Most of the farmers in Samoeng also grow strawberry runners. The strawberry farmers understand that the runners are of good quality since it is suitable area to produce runners. Most farmers in Fang, Mae Rim and Mae Sai districts order the runners from Samoeng. Besides strawberries and runners, Samoeng farmers grow rice, corn, garlic, and temperate fruit crops such as avocado, apple, pear, peach and so on. The cropping pattern is shown below (Figure 4.2).



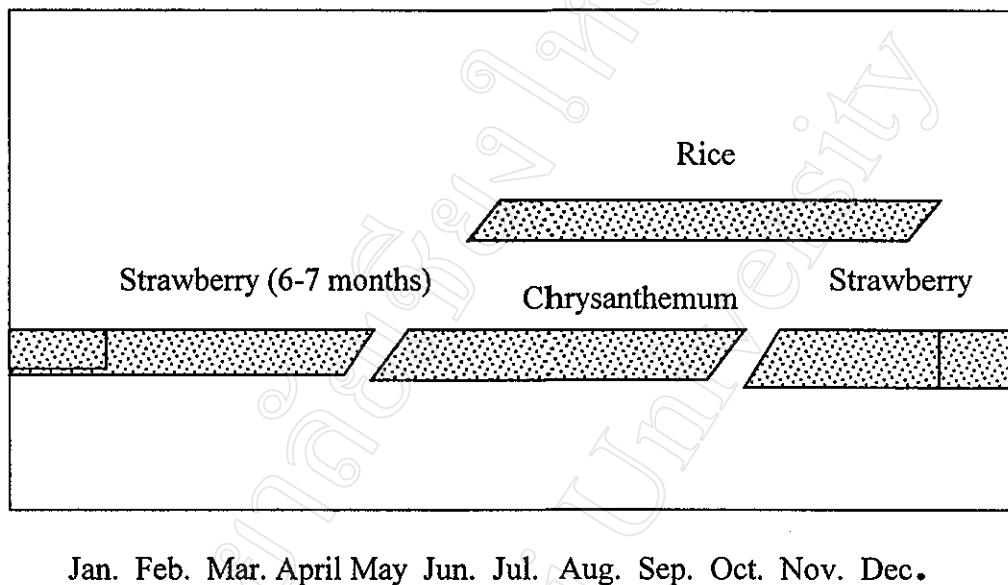
**Figure 4.2 Cropping pattern of the farmers growing strawberry in Sameong district**

Mae Ngone sub-district (Fang district) produces strawberries for processing. Moreover the farmers there grow lettuce, cabbage, vegetable soybean, red kidney bean, and black bean. Some farmers also grow rice for their household consumption. The commercial fruit crop is lichee. It is also a processed fruit in this area. In other words, most of farmers in this area produce agricultural raw materials for supplying the Doi Khum Royal Project Factory Company. The pattern of cropping is shown in figure 4.3

Pong Yang village in Mae Rim district is a main source of strawberry cultivation in Chiang Mai province. The farmers in this area do not grow strawberry runners. They will grow flowers such as chrysanthemum and spray after having finished strawberry cultivation. Some farmers grow cabbage, lettuce, green bean and upland rice. The cropping pattern is shown in figure 4.4

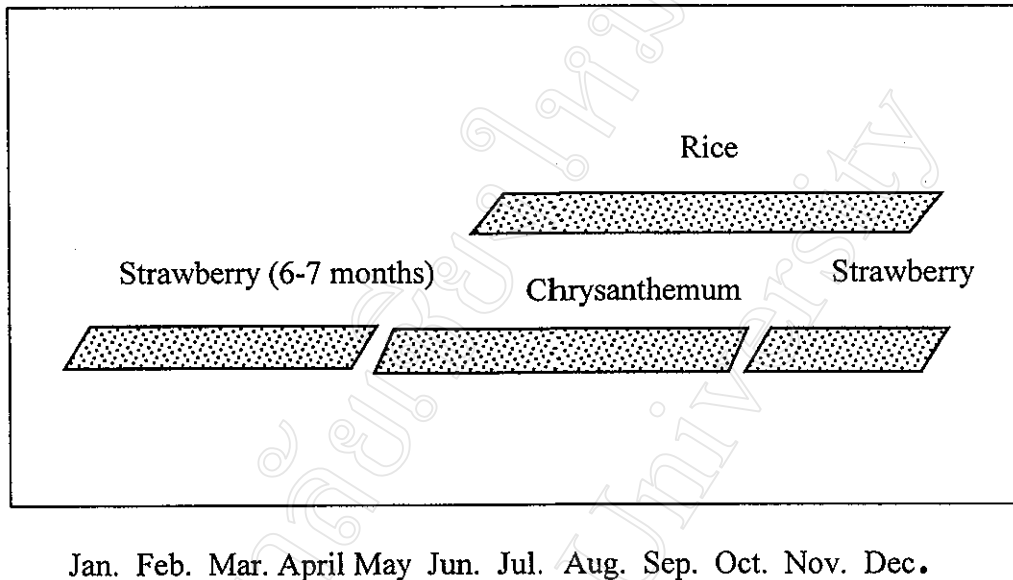


**Figure 4.3 Cropping pattern of the farmers growing strawberry in Fang District**



**Figure 4.4 Cropping pattern of the farmer growing strawberry in Mae Rim**

Mae Sai is also a main source of strawberry cultivation in Chiang Rai province. Out of strawberry cultivation season, the farmers produce the runners for selling and their own use. Other the producing runner and strawberries, they grow corn, rice, and garlic (see cropping pattern in figure 4.5).



**Figure 4.5 Cropping pattern of the farmer growing strawberry in Mae Sai**

Intanon and Huai Nam Rin are areas for the strawberry production using VFS. There are many crops, which are grown in Intanon and Hui Nam Rin RPF such as cabbage, lettuce, chrysanthemum, gerbira, lily, carnation, apricot, lichee, peach, corn and rice.

Hill-tribes in of Northern Thailand used to grow opium production extensively especially Intanon and Ang Khang. But now, most hill-tribes have stopped growing opium. From interviewing the SVFS farmers, about 10% had grown opium. They said that many reasons that government officer might catch them if they grow opium and the RPF suggests and promote growing the other commercial crops.

#### 4.3.1.5 household income

Farming activities are the main household income of the SVFS and SNS farmers, which classified income from strawberry production, income from runner production and income from other crops.

The data of income from strawberry production is complicated for to collect. Each farmer produces more than one variety of strawberries. Each variety is different in quality and market. So, the strawberry price of each variety is also different. Hence, this chapter describes the estimated income per household and income per rai approximately. Moreover, the income of the strawberry production is also explained in chapter 7.

Most incomes of the FVFS farmers came from farming activities such as fruit crops, flowers, corn and rice productions. The yearly income from the strawberry production averaged out at about 7,004 baht/household. The income of other farming activities averaged about 9,006 baht/household. The average total income was 15,010 baht/household.

The household income of the SNS farmers came from the farming activities, which were strawberry, and runner production and other farming activities. On the average, the strawberry and runner incomes were 94,463 baht/household and 5,834 baht/household respectively. About 23% of the SNS farmers produced the runners. The runner income averaged 5,834 baht/household.

Income from other farming activities such as flower, lettuce, cabbage and so on (apart form the strawberry and runner production) was 19,646 baht/household. The averaged total income was 119,943 baht/household. The total highest incomes were 470,000 baht/household. The lowest total incomes were 4,000 baht/household.



This study compares incomes of the households of SVFS and SNS farmers. Therefore, it was found that the incomes of the SVFS farmers were less than SNS farmers (Table 4.6). A reason for the lower income of the SVFS farmers is their small scale of production. The farmers in RPF have been restricted to owning land where is in the watershed areas.

Table 4.6 Household income of the farmers growing the strawberries.

Source of income	VFS (baht/household)	NS (baht/household)
Strawberry	7,004	94,463
Runner	0	5,834
Others farming activities	9,006	19,646
Total	15,010	119,943.

Source: Survey 1998

### 4.3.2 Farmers producing runners

#### 4.3.2.1 Household component

The 15 farmers producing runners using virus-free system (RVFS) were interviewed. All of them were Pa Long hill-tribe. Among the RVFS farmers, about 80% were male and 20% female. The hill-tribe farmers producing runners by using NS (RNS) are Karen and Mong. 17 RNS farmers interviewed were interviewed. About 77% were male and 23% were female. The average ages of RVFS and RNS farmers were 34 and 40 years old respectively.

Table 4.7. Demographic information of the farmers producing the runners

Items	VFS	NS
1. No. of respondents (people)	15	17
Male (%)	74	60
Female (%)	26	40
Average of age (years)	34	40
2. Education level		
Uneducated (%)	36	6.7
<i>Patom</i> 1 to 4 (%)	30	20.0
<i>Patom</i> 5 to 6 (%)	28	66.6
Higher than <i>Patom</i> 6 (%)	6	6.7
Total (%)	100	100.0
3. Family size(people)	5	6
4. No. of children (people)	2	2
No child (%)	2	17.6
1-2 children (%)	46	75.6
3-4 children (%)	40	2.7
Higher than 4 children (%)	12	4.1
Total (%)	100	100.0

Source: survey 1998

The information about the education of the farmers producing runners is classified as uneducated, *Patom* 1 to 4 level, *Patom* 5 to 6 level and higher than *Patom* 6 level (table 4.7). More RFNS farmers were uneducated than RNS farmers. The average family

size of the RVFS and RNS were 5 and 6 people/household. On the average, the number of children of both farmer groups was 2 per household.

#### **4.3.2.2 Land tenure and land ownership**

The farmers in Ang Khang Royal Project have no legal land document. They have simply occupied land for a long-time, so Thai Government has given them a permit to use the land. They are not allowed to cut down the forest. On average, the size of the land occupied was 5.3 rai per household. One farmer rented additional land for runner production using VFS.

About 7% of the RNS farmers did not own land. In Mae Jae where there is NS runner production, most of land was occupied by hill-tribes with no legal land documents. The Mae Jae village is a suitable area to produce runners since it is in a low temperature area. Some farmers (33%) have to rent land for runner production. In addition, some farmers living in the other villages such as Ban Bo Kaew and Ban Mai rent land in Ban Mae Jae for runner production. On average, the owned land was about 30 rai/household.

#### **4.3.2.3 Debt condition**

The interviewed farmers producing runners using VFS (RVFS) are members of the RPF. They can get production factors from the RPF. All of the farmers interviewed producing VFS, have debts coming from farming activities. The average debt of the RVFS farmers was at about 16,000 baht/household.

About 47% of RNS farmers had no debts. Apart from that about 53% had debt loan from many sources such as BAAC, Agricultural Cooperatives, assemblers and so on. The group of assemblers is powerful and can determine the runner and strawberry prices.

They give credit for production factors to the farmers. When the farmers harvest their runner production, they have to sell their production to the assemblers. The average debt of the farmers was 30,000 baht per household (calculated from the number of farmers having debt).

#### **4.3.2.4 Farming activities and cropping patterns**

In Ang Khang station, since it is upland and in a temperate area, so the farmers grow mostly temperate crops, especially fruit crops such as apricots, peaches, apples, pears, persimmons, lichee and avocados. Moreover, some farmers grow many kinds of ornamental plants such as flowers, roses, eucalyptus leaves and temperate flowers. About 60% of this farmer group grew rice for their household consumption. The remainders bought rice from other household.

Ban Mae Jae is a suitable area to produce strawberries especially their runners. The runner production using NS was studied in this area. Therefore, either strawberries or runner production is the main source income of this area. Beside the strawberries and runner, the RNS farmers grow other crops such as peaches, pears, avocados, apricots, and vegetables--lettuce, carrot and cabbage.

Rice is their main consumption farming activity. From this survey, about 13% of the RNS farmers grew rice. Strawberry or runner cultivation was the main crop of 77% of the RNS farmers.

#### 4.3.2.5 Household income

The main source of income of the farmers in Ang Khang came from the agricultural sector. This study classifies income sources into 3 groups as follows 1) income from runner production, 2) income from strawberry production and 3) other income apart from runner and strawberry incomes (Table 4.8).

Table 4.8. Sources of income of the farmers producing runners.

Source of income	Virus-free System	Normal system
Runners (baht/household)	16,594	38,963
Strawberries (baht/household)	46,866	41,364
Other farming activities (baht/household)	13,866	32,600
Total (baht/hh)	77,326	112,937

*Source: survey 1998*