

CHAPTER VII

Problems and constraints to adoption of the IRFSs

The chapter will describe farmers' opinion and agreement on adoption of each land use system in the study areas, namely, the *hai* system and IRFSs practice. In addition, farmers' opinion about the effects of these practices on the environment relating to their land resources will be explored. Moreover, the problems and constraints of the IRFSs through farmers' experiences and ideas will be explained in detail.

7.1 Farmers' opinion concerning the adoption of the *hai* system and IRFSs practice

Due to the advantaged technical practice, the market demand of rubber of IRFSs, and the government's strategy which is to transfer the *hai* system practice so as to reduce the unsustainable cultivation in the upland area to the stability of land use pattern by the IRFSs in the northern region. Many farmers showed their opinion of preferences to change from their traditional practice (the *hai* system) to the IRFSs practice depending on their available own-land resource. Farmers' opinion were classified by the three main group of interviewing respondents i.e. the *hai* system (46 households), the IRFS 1 (40 households) and IRFS 2 (4 households). Then, several questions dealing with technical implementation were asked to farmers in both the *hai* system and IRFSs, as below.

Table 7.1 presented the farmers in the study areas who preferred the IRFS and the traditional practice (the annual crop productions). 59% of farmers in study areas

preferred to do the IRFSs, while 41% of them still wanted to practice the traditional practice.

Table 7.1 Percentage of farmers who preferred IRFSs and the *hai* system practice in the study area

Farmers' opinions	Farm typology			
	<i>hai</i>	IRFS 1	IRFS 2	Total
a). What do you prefer ?				
Integrated Rubber-based Farming System (IRFS)	23 (50%)	28 (70%)	2 (50%)	53 (59%)
The traditional practice (the annual crop productions or the <i>hai</i> system)	23 (50%)	12 (30%)	2 (50%)	37 (41%)
Total	46	40	4	90 (100%)

Based on farmers' opinions in the IRFSs, there were several reasons, such as: the IRFSs could apply in the limited areas, because both the annual crops and perennial crops were planted in the same place. So, they could be saving time and labor for working in the same fields, especially during maintenance, and farmers could maintain their crop in the same time. In addition, IRFSs were following a government strategy dealing with shifting cultivation reduction. Farmers needed to transform their conventional cultivation skills, which usually involved shifting to another place very far from village each year, to be the new introduced practices which provide more income from diverse species of crops in the fields. On the other hand, farmers who still preferred the traditional practice gave reasons that: rice and maize were the main crops for consumption, and they provided rapid yields. Moreover, the traditional practice had less weed and it was easy to do the weeding

and harvesting as the field could be slashed and burned directly after harvesting the crops.

The question about the adoption in the future was asked for the farmers in three main groups as well. Table 7.2 shows the percentage of farmers' prospect in adoption of the IRFSs practice. 87% of farmers wanted to adopt the IRFSs practice and hope to continue it in the future, while 11% of farmers would still practicing the traditional one as usual and 2% were not certain to change to the IRFS practice yet. They wanted to further observe these practices.

Table 7.2 The percentage of farmers who would like to adopt IRFSs practice

Farmers' opinions	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
b). Will you adopt the IRFSs practice for your farm in the future?				
Yes	38	37	3	78 (87%)
No	7	2	1	10 (11%)
Not sure	1	1	-	2 (2%)
Total	46	40	4	90 (100%)

For the farmers who still practiced the traditional cropping system and were not sure to adopt the IRFSs practice (12 households), it was found that they did not have any skills to invest in another long term alternative or they had insufficient labor in the family or insufficient fund for investing in the new skills or they had a small amount of land, they had to borrow land for cultivating crops for their family consumption. In contrast, farmers that were expected to adopt the IRFSs in the future covered 78 households. 38 households were still in the *hai* system practice, 40

households were using the IRFSs but they saw the benefit of the diverse crops growing in the same area.

Besides the opinion of farmers in practicing the IRFSs in the study area, the opinion of members in the family were also sought as well. Table 7.3 illustrated that 93% of households had members within the same family agreed to the household head's decision on choosing the crop for growing in the seasonal cultivation. Whereas, 7% of the households which family members disagreed and no answer.

Table 7.3 Percentage of family members' agreeing to the carrying out the IRFSs practice

Farmers' opinions	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
c). Does your family member agree in the IRFSs practice?				
Agree	42	39	3	84 (93%)
Disagree	3	1	1	5 (6%)
No answer	1	-	-	1 (1%)
Total	46	40	4	90 (100%)

For the household those family members that disagreed with the household head decision into the practice of IRFSs (which covered 6 households), they reported

that the annual crop cultivation in the *hai* system was their familiar skill and it was important for their livelihood for a long time. Some reported the lack of cultivating area and not wanting to have more risks of their harvested yield. For the family

members that agreed to adopt the IRFSs because they wanted to stop the traditional practice and they need to change to another alternative that could be better in their

livelihood. For example, the alternative would reduce time for working in the field and could generate compensated income in many years to come.

As for the farmers' opinion on the suitability of selection the IRFSs practice to their land resource, Table 7.4 showed the percentage of farmers' opinion on the suitability of choosing the IRFSs practice in the study area. It was shown that 78% of total respondents (90 households) stated that the IRFSs practice was suitable for their land resource, because of the several crops will provide varied income into family and they could be grown in the same area. Long term crops (fruit tree and rubber) could provide income for the long term and the annual crops could provide income for three years at the beginning of planting period. In addition, it was easy for maintaining many crops in the same place, weeding for the annual crop likes a clearing land area for perennial crops at the same time. When the perennial trees matured, they would be able to provide shading and to cover the weeds.

Table 7.4 Percentage of farmers who thought that IRFSs was suitable to their land resources

Farmers' opinions	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
d). Do you think that the IRFSs practice suitable for your land resource available?				
Yes	38	29	3	70 (78%)
No	7	9	1	17 (19%)
Not answer	1	2	-	3 (3%)
Total	46	40	4	90 (100%)

On the other hand, 22% of respondents said that the IRFSs practices were not suitable for their land resource. They thought that when inter-cropping of many types

of crops were in the same areas, they would affect to the growth and yield of crops in the field. Rubber trees might grow slowly and the annual crop might give lower yields than area in the mono crop cultivation in the *hai* system. For the land owners that have small areas (one or two land plots) and interested in the IRFSs practice were afraid that after the rubber trees planted, the soil in that area would lost fertility and other crops could not grown well.

As for the farmers' opinion on the quality and quantity of the annual yield in the IRFSs practices. Table 7.5 showed the percentage of farmers reported on the quantity of annual yield in the IRFSs practice in the study area based on the three main farm types. 40% of respondents reported that the annual crop yield in the IRFSs was higher than the mono crop cultivation in the *hai* system, whereas 8% of respondents thought that yield would not be so different.

Table 7.5 Percentage of farmers reported about the quantity of annual crop yield in the IRFSs practice

Farmers' opinions	Farm typology			
	<i>hai</i>	IRFS 1	IRFS 2	Total
e). What is about the quantity of yield?				
High	10	23	3	36 (40%)
Low	29	17	1	47 (52%)
Similar	7	-	-	7 (8%)
Total	46	40	4	90 (100%)

In contrast, 52% of them claim that the annual crop yield in the IRFSs was lower (30 – 60%) than the annual crop yield in the *hai* system. The first year, its yield would be as the same but next years later its will be less than. This was because some

of the annual crop yields would be lost by the spacing surround the trees, when the trees would shade the annual crops when they were mature, so the annual crop could not have good production. Moreover, farmers believed that the soil in the IRFSs practice was not burnt after harvesting crop yield, they called “no cooked soil”, that meant the soil still raw and would be insufficient in some nutrients. If the soil was burnt like the *hai* system practice, the annual crop yield will be high.

As for the farmers’ opinion on the quality of the annual crop yield in the IRFSs practice in term of the difference of grain/seed characteristic e.g. size and leaning grain, Table 7.6 showed that 20% of respondents claimed that the annual crops’ grain quality in the IRFSs practice were different to the *hai* system. They thought that grains would be smaller than the *hai* system due to the fact that they was shaded from tree and other broad leaves. While 63% of respondents thought that there was no change in the quality of grain and 17% of them stated that the grains were similar as the annual crop yield in the *hai* system

Table 7.6 Percentage of farmers’ opinion on the quality of annual crop yield observation in the IRFSs practice

Farmers' opinions	Farm typology			
	<i>hai</i>	IRFS 1	IRFS 2	Total
f). Does it have any change in quality of yield?				
Yes	3	14	1	18 (20%)
No	30	25	2	57 (63%)
Same	13	1	1	15 (17%)
Total	46	40	4	90 (100%)

7.2 The long term environmental changes in the hai system and IRFSs practice

Farmers have many experiences in the *hai* system for many decades. Beside the traditional cultivation, they also have observed the environmental conditions as well. They realized that the changes of environment surrounding village would affect to the traditional practice and land use pattern.

Based on interviewing farmers on their experience of using the *hai* system practice on the soil quality changes, Table 7.7 showed the percentage of farmers who thought that soil quality changed in the *hai* system and IRFSs practice. The table showed that 53% of total respondents agreed that the soil fertility changed after growing annual crops continuously for a few years in the same place.

Table 7.7 Percentage of farmers' opinion on the soil quality changes observation in the hai system and IRFSs practice

Farmers' opinions	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
a). Have you noticed any change of soil quality since use these practices?				
Yes	22	24	2	48 (53%)
No	18	16	2	36 (40%)
Have no noticed one way or another	6	-	-	6 (7%)
Total	46	40	4	90 (100%)

The soil in fallows after three years had moisture and black color at the first year, after growing crops for two to three years, its texture became dried and hardened and color became red and/or brighter than before. Crop yield would be reduced each year and the soil fertility and moisture were reduced. Then, weeds would grow fast and the crops could not be grown well on that area. In the other hand, 40% of

respondents said that there was not any change in their land and 7% of them did not notice this situation in their land.

As for the farmers' opinion on the changes of water quantity in both the *hai* system and IRFSs practices, Table 7.8 showed that 44% of total responders remarked that recently the rain came late, the water decreased and dried out for a month every year (mostly in April). Water was observed to be dirty and had much particles than in the past, due to some farmers were done the *hai* system practice on the upstream river forest and cut down many big tree in forest. In contrast, 56 % of respondents stated that they did not observed that there were any changes or did not observe about water situation in their land.

Table 7.8 Percentage of farmers' opinion on the water quantity changes observation in the *hai* system and IRFSs practice

Farmers' openiences	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
b).Have you observed any change of water quantity since use these practice?				
Yes	19	21	-	40 (44%)
No	22	19	4	45 (50%)
Have no observed one way or another	5	-	-	5 (6%)
Total	46	40	4	90 (100%)

As for the soil erosion conditions, farmers' opinion has also shown in Table 7.9. 75% of total households did not observe any changes of soil erosion problem on their fields in the both of *hai* system and IRFSs practice. But 26% of them told that there were the changes of soil on the same field e.g. the *hai* system practice in the

fallow system at the first year. After a few years, the yield at the top of the field decreased but the bottom of field was the same and/or better, if crops were grown for many years on the *hai* system practice, the soil at the top part would become dry and solid.

Table 7.9 Percentage of farmers who had opinion on the soil erosion changes observation in the *hai* system and IRFSs practice

Farmers' openiences	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
c). Have you observed any change of the soil erosion since use these practice?				
Yes	10	11	2	23 (26%)
No	31	29	2	62 (68%)
Have no observed one way or another	5	-	-	5 (6%)
Total	46	40	4	90 (100%)

In the opposite way, the IRFSs practice would be better because they have the terrace along contour lines to keep the soil erosion from the top of the mountain.

Nevertheless, based on their experiences in the *hai* system and the rubber preferences, the percentage of farmers who had opinion in the expansion of the IRFSs areas in the future was shown in Table 7.10. 73% of total respondents believed that the IRFSs practice areas were expanding, even though the land in the village was limited. But some farmers might be buying or renting the land for expansion of their rubber plantation in the neighbor village areas. They needed to change to IRFSs practice skills that could support them more income and more optimized land use than the traditional practice system. For example, in the *hai* system practice, farmers were required to grow the galingale as an alternative because it could stand for a long

period of time as a perennial crop and could provide some income more than maize. Farmers also need to spread IRFSs and look forward as a replacement for the *hai* system when rubber could support better income in the future. Subsequently, farmers needed expand their owned available land resource to another choice of land use system for improving their income and livelihood.

Table 7.10 Percentage of farmers' opinion on the expansion of the IRFSs areas' observation in the study areas.

Farmers' openiences	Farm typology			Total
	<i>hai</i>	IRFS 1	IRFS 2	
d). Has there been any expansion farm land for the IRFSs in the village?				
Yes	31	32	3	66 (73%)
No	14	8	1	23 (26%)
No answer	1	-	-	1 (1%)
Total	46	40	4	90 (100%)

7.3 Problems and constraints of the IRFSs practices

While the IRFSs could provide a lot of benefits to farmers and/or land owners both in economical and technical aspects, there are still some problems and constraints which need to be mentioned during the IRFSs' implementation, namely

a) The problems of the IRFSs practices

Regarding to the problems in the IRFSs practice, it was found that there were several problems, namely forest encroachment, high investment and maintenance requirement.

Limited land for practicing the IRFSs. Although the majority of farmers in the study areas wanted to adopt IRFSs, but some farmers needed to keep their own land for growing rice as their main crop for subsistent their family consumption. In other words, they disliked the risk of losing the opportunity to use their exiting land resource. So, the forest lands in the village were cleared. Some farmers preferred rubber plantation but they had a small land size and they illegally opened the village forest and/or protected forest areas for producing the new rubber plantation without the community's permission. Land in those villages was not yet officially allocated and managed but was still in the plan of land allocation.

The IRFS implementation also involved some problems. High labor requirement and high investment cost at the beginning stage, these systems need a lot of labor on the duration of land preparation and maintenance stage until rubber tree will be mature and ready for harvesting. Moreover, farmers have not yet acquired good maintenance skill to produce the good yield of rubber's resin. Rodent and insect damages (e.g. termite and bamboo rat biting root of rubber) also have affected the seedling at the beginning stage. Farmers have not had any method to prevent them yet. They can only prepare seedling for replanting one more time. Some farmers claimed that weeds grew very fast in the IRFSs practice, due to the fact that this practice has some space between trees and crops. Maintenance requirement of the rubber trees and the crops has been high.

Problems in the inter-cropping pattern. Some farmers thought that when many crops were grown in the same place, it would have effects on the low soil quality. The soil could lose its fertility, the nutrients competition, because the several crops would be competing for nutrients and the land could decline in its efficiency for

producing crops and also could be useless in the future. Other farmers had opinion that the annual crop yield in the IRFSs practice had 30-50% less productivity than the mono cropping system in the *hai* system because of the spacing and the repeatedly cropping at the same areas. A number of farmers said that the IRFSs practices had an advantage only on weeding process. The yields of the annual crops in IRFS were thought to be less. Some farmers used low fertile soil area for doing IRFSs and also got the lower crop yield. In the case of IRFS with fruit trees, the fruit trees could not provide any fruit until fourth year. Consequently, farmers were not sure to adopt IRFS practices.

b) The constraints of IRFSs practices

According to farmers' interview on the integrated rubber-based farming system practice, some constraints of the IRFSs practice adoption were also found.

As the rubber plantations were very popular in the study areas and over all areas in the upland, and due to the high benefit of rubber plantation in the future, some farmers were opening old forest areas to find good fertile land areas for planting rubber. There were land conflicts between villagers in the same village, who want to use more land. These conflicts arose from the fact that the villager had not yet permanent land document.

Another constraint of IRFSs dealt with water requirement. IRFSs have generally insufficient water on the mountainous area, if there are droughts, farmers have to spent more money for replanting once again in the second year. Farmers are afraid to lose the opportunity to use the land for growing another crop. In the case that rubber tree could not have much resin after eight or nine years because farmers are uncertain on their land suitability for the long time duration before the time to harvest

rubber. Most of them do not have experience in the litchi growing either. The high initial cost for investment was an important issue on starting to invest in an alternative. The IRFSs need more initial cost compared to the *hai* system. Farmers therefore need to invest too many crops and materials and also they have to make a good plan before carry out the IRFSs activity. Some farmers who practice the IRFSs mentioned that they needed to pay more attention to carefully on the weeding process because the seedlings are small and they could be damaged when farmers do weeding around it.

In addition, some farmers had opinion that the IRFSs were not suitable for farmers who had only one plot of land because they could be face rice shortage when rubber could not be harvested yet. The majority of villagers who decided to invest in the IRFSs practice were those who have approximately two to three plots of owned land. They would use a plot of land for the IRFS practice and they still have other plots for growing rice, maize and/or other crops for fulfill food for their family. If the new plot provided a low yield of annual crop, farmers may face a problem of insufficient rice yield. Some farmers were worried about the river in the villages that they would be reduced and dried-out, because of the rubber will use much water and it would create water scarcity in the future. Moreover, the extreme lower temperature is an important factor that farmers are worried about in rubber plantation in the study areas because frost could happen every 10 years. Seedlings and cultivated crops could die and/or have less productivity when the extreme lower temperature occurs.