

CHAPTER V

GENDER ROLES IN AGROFORESTRY SYSTEMS

The household is the most important component of the agroforestry system, especially as it deals with labor use patterns and decision making. Therefore, it is very necessary to understand the role of the members of the farm family household to ensure efficiency of production. This chapter reveals the roles of men and women in agroforestry systems of the study area by addressing three major questions: (1) What do women and men do? (2) What do women and men know? (3) What do women own or use in crop, animal, and forestry production, as well as off-farm activities as compared with men in the formal survey? The analysis of their roles will show areas of concerns, needs and problems of men and women which can be resolved to contribute to the improvement of the agroforestry systems under investigation.

5.1 Gender participation in agroforestry activities

The data used in this section is obtained from the formal survey by using questions such as who often do each activity (men/ women/ both/ or all of family members) in all forms of agroforestry production system of the region which are crop, forestry, animal production and off-farm occupations. The results were shown by using descriptive statistics to analyze the data.

5.1.1 Crop production

The survey results showed that all of the household members participated in crop production but there were some certain gender-specific activities (Figure 5.1). In seed preparation activity, only around 10 percent of respondents answered that this task was carried out by the men while nearly 40 percent of the respondents reported that seed preparation was the responsibility of women. The majority of respondents (about 50 percent) answered that seed preparation activity in crop production often

was implemented by both men and women. This was not the same in the Gujranwala district of Punjab, Pakistan, where seed selection is mainly the responsibility of the women (Nigar, A., 1990).

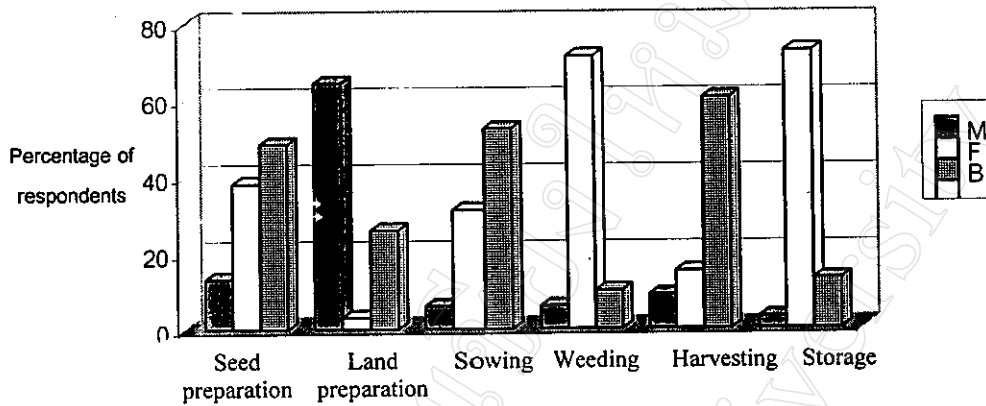


Figure 5.1 Gender participation in crop production activities
Source: Survey data, 1998.

Like seed preparation activity, sowing and harvesting are done by both men and women (more than 50 and 60 percent of respondents for sowing and harvesting activities, respectively). This is different compared to harvesting of rice in Hai Phong which is a province in the North of Vietnam where 90 percent of the respondents answered that this was the responsibility of the women (National Committee for advancement of Women, Ministry of Agriculture and Food Industries, and FAO, 1995).

A case study in Indonesia showed that land preparation is generally a man's job (Soelbijati S., 1990). This is also true in Binh Dien commune. Land preparation activity for crop production in the region is the men's domain. Nearly 70 percent of respondents answered that land preparation in crop production was performed by the men. Actually, land tillage was carried out only by men and it was often supported by male children. However, in some households (especially in poor households), land preparation was done by hand. In these cases, women participated to prepare the land for crop planting. So, some respondents answered that land preparation activity was implemented by both men and women. Beside land preparation, there were some

other certain gender-specific activities such as weeding and storage that fell under the women's domain. The number of respondents who answered that weeding was the responsibility of women was more than 75 per cent while only about 6 per cent answered that it was done by men and more than 10 per cent reported that it was carried out by both men and women. The farmers in the region explained that because weeding activity requires much care in order to avoid destroying crops and the practice also requires to stoop one's back. Therefore, women often undertake this activity due to their endurance characteristics that are different compared to the men. For storage activity of crop production, nearly 80 percent of people answered that it was carried out by the women and there were only about 3 percent of respondents who reported that this activity was undertaken by the men. This is perhaps because storage activity is implemented at home and it can be combined with housework which is the responsibility of women.

5.1.2 Forestry production

Different from crop production, land preparation activity in forestry production is divided into 2 subactivities which are land clearing, and digging. The land for forestry tree planting has to be cleared before digging because forestry trees are often planted on land which is covered by Imperata and brushes. Although land clearing is part of land preparation activity, but it was not only done by the male farmers but also by the female farmers in the region. The survey showed that land clearance in forestry production was the responsibility of both men and women. More than 60 percent of respondents answered that it was carried out by both (Figure 5.2). The other subactivity of land preparation in forestry production is digging, it was found that this activity was mainly performed by men. Nearly 70 percent of people who were interviewed said that it was the men's work while nobody answered digging to plant the tree was the responsibility of the women and about 20 percent of respondents reported that it was done by both men and women. For tree planting, only 3 percent of the interviewed farmers said that it fell under women's domain. This activity is

often carried out by both women and men (Nearly 55 percent of respondents answered this).

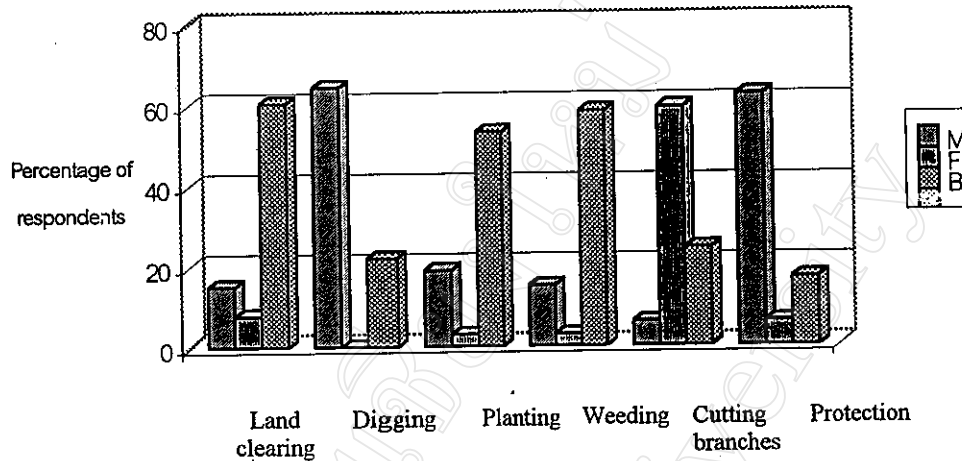


Figure 5.2 Gender participation in forestry production activities
 Source: Survey data, 1998.

Unlike for crop production, weeding in forestry production was done by both men and women. Nearly 60 percent of people who were interviewed said that it was carried out by both men and women, it was about 6 fold compared to that in crop production. The percentage of respondents who answered that weeding in forestry production was performed by women was only about 3 percent while for crop production, it was more than 75 percent (25 fold compared to forestry production). This is because the land areas where forestry trees were planted are often far from the settlement, so weeding in forestry production could not be performed by only the women who often have to do housework. A certain activity in forestry production, which was undertaken by women was cutting branches and that performed by the men was forest protection. Six percent of respondents answered that cutting branches was the responsibility of men whilst 60 percent said that it was responsibility of the women. According to the farmers in the region, the women often prepared fuelwood for cooking so they were the people mainly responsible for cutting branches. For protection activity, nearly 65 percent of respondents answered that it was carried out by the men, and only about 6 percent of farmers who said it was done by women.

5.1.3 Animal production

Figure 5.3 reflects gender-specific tasks in animal production.

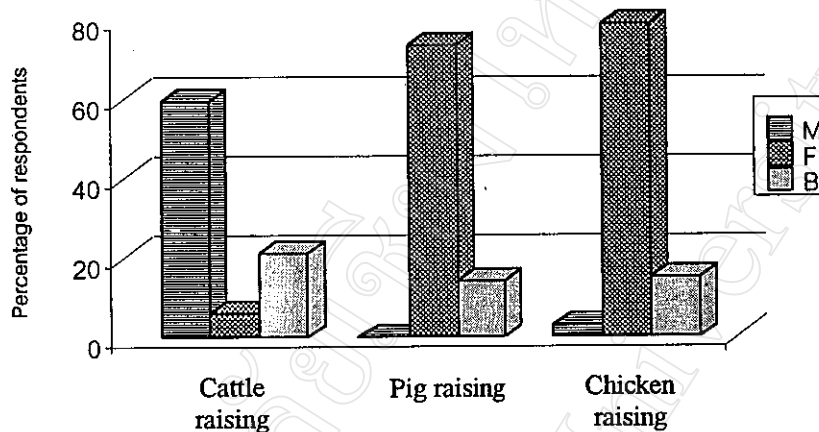


Figure 5.3 Gender participation in animal production

Source: Survey data, 1998.

It was found that cattle raising was a task of men. Sixty percent of people who were interviewed answered that cattle raising was men's work while only 3 percent of respondent said that it was responsibility of the women and 20 percent reported that this activity was done by both. The remaining respondents (about 17 percent) said that cattle raising was performed by all of the family members. This is because this work was often carried out due to subordination of children. A case study in Sta. Barbara, Pangasinan, Philippines also found the same result. The men were generally responsible for large animals (cattle), although women and children helped with feeding, gathering forage, and cleaning the shelter. Poultry management and marketing were predominantly women's tasks (Paris, T. and J. Luis, 1990). This is true in Binh Dien commune. The survey shows that poultry raising was carried out by the women. Nearly 80 percent of respondents said this task was performed by the women while there were only 3 percent of them answered that it was the responsibility of the men. Like in poultry production, it was found that the women were often responsible for pig raising, more than 75 percent of interviewed farmers

said that pig raising fell under the women's domain and nobody answered that it was responsibility of the men. In both pig and poultry raising, there were some percentage of respondents who answered that they were done by both men and women. Actually, this job was a responsibility of the women and female children. However, it is because in some households, the wives sometimes have to go for small business and they do not have daughters, so their husbands had to support the wives to care for pigs and poultry.

5.1.4 Off-farm activities

The off-farm occupation is one of the important components of the system which contributes to generating income for the farmers in the region. Like other components of the agroforestry system in the survey area, there were gender-specific tasks in off-farm jobs. The survey shows that there were some certain activities which were done by men in off-farm occupations and some others were mainly accomplished by women. It was found that logging was carried out by the men (Figure 5.4). About 90 percent of respondents answered that logging was the men's preference while nobody said it was a women's job and only 10 percent of people who were interviewed reported that it was done by both men and women. Actually, although this off-farm activity was the men's occupation, there were a few young girls who participated in this activity. This was because logging related closely to house construction which was a major task of the men. There was another activity in off-farm occupation which was carried out by the men is hunting. One hundred percent of respondents said that hunting was performed by men. According to the farmers in the region, hunting required rather high skills and experiences which had to be learned and practiced for a long time. The men teach these skills and experiences only to sons. Therefore, hunting is a man's job from generation to generation. Besides certain off-farm activities of men, there were some activities which were often carried out by the women such as collecting fuelwood and wild plants and cutting *Imperata*. For collecting fuelwood, more than 75 percent of the respondents answered that it was done by the women. While there were only about 6 and more than 10 percent of

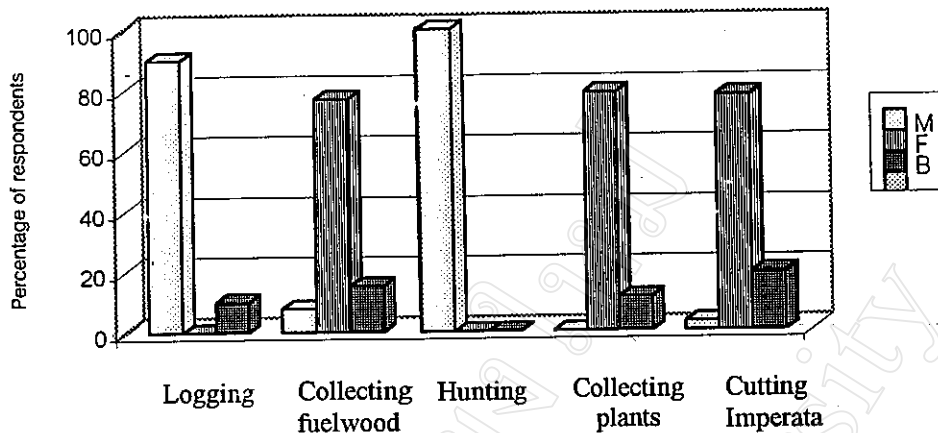


Figure 5.4 Gender participation in off-farm activities
 Source: Survey data, 1998.

interviewed people who said that collecting fuelwood was performed by men, and both men and women respectively. The farmers in the region explained that because cooking is the responsibility of the women so they are predominantly concerned with collecting fuelwood. Collecting wild plants for food and fodder is a common task in the mountainous areas where there is a scarcity of vegetables and fodder especially in dry season because of shortages of water for production. It was found that collecting wild plants fell under the women's domain. Eighty percent of respondents answered that this activity was done by women, while nobody said that it was carried out by the men and only about 10 percent of farmers who were interviewed reported that collecting wild plants was performed by both men and women. This is because women are often responsible for preparing food for their family and for pig raising. The other off-farm occupation which was mainly undertaken by women was cutting Imperata. More than 70 percent of respondents answered that Imperata was often cut by women to cover their houses and to trade for food. There were only 3 percent of respondents who answered that it was done by men and 20 percent of informants said this activity was performed by both men and women. According to the farmers in the region, cutting Imperata is a low profit and it required patience so it was not the preference of the men.

5.2 Labor use pattern on agroforestry activities by gender

The results of labor use pattern of agroforestry activities by gender in this section were obtained from analyzing the data which were also collected in the formal survey. However, the gender roles in labor use pattern of agroforestry activities in this section were quantified and tested by using difference in mean tests to analyze the data. The labor use pattern of agroforestry activities of the system was shown exactly by number of labor days which are contributed by women or men to each activity in crop, forestry, and animal production subsystems, as well as off-farm occupation. Moreover, this section also reported the results of a comparison of gender roles and time allocation of women in each production activity of the agroforestry system among different economic status groups.

5.2.1 Labor use pattern for crop production by gender

The survey shows that there is a difference in the roles of men and women in crop production. However, this difference depends on the kind of activity and crop. This subsection reveals gender roles in each activity and for each kind of crops in the production system of the region.

5.2.1.1 For food crops

Table 5.1 shows the different roles of women and men in some activities such as land preparation, weeding, and post harvesting activity in food crop production among households with a different economic status. Moreover, there was a distinction between gender roles in the same activity but different crops. For land preparation, the involvement of men was higher compared with that of women in almost all food crops (mungbean, cassava, peanut, rice) but in sweet potato production, it was not. Like in the high income households, it was found that the men of the medium income group spent more time than the women in land preparation for production of all crops, except sweet potato cultivation which was a major concern of women. In reality, land

Table 5.1 Labor use pattern for food crop production activities by gender and household groups

Crops	Land preparation		Sowing/ Planting		Weeding/ Nursing		Fertilizer application		Harvesting		Postharvesting		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
High income														
Mungbean	4.88	1.43*	2.37	3.60	0.88	4.50*	1.88	2.35	1.48	5.41*	0.85	2.90*	12.40	20.20*
Cassava	4.06	0.83*	0.61	1.66	0.78	2.40*			2.33	2.28	0.48	1.52*	8.30	8.70
Peanut	5.62	1.96*	3.03	4.24	1.43	6.27*	2.52	3.44	2.67	2.77	1.34	4.12*	16.50	21.60
Rice	2.93	0.60*	1.30	0.66*	0.46	2.50*	1.70	1.43	3.06	2.90	0.80	2.63*	10.30	10.10
Sweet potato	0.40	0.13	0.00	0.26	0.00	0.33			0.16	0.23			0.60	1.00
Medium income														
Mungbean	6.42	3.41*	4.60	5.25	1.76	6.25	2.12	3.90*	2.12	9.05*	0.78	4.88*	17.83	32.70*
Cassava	4.85	2.46*	0.50	2.80*	0.60	4.18*			2.90	4.08	0.28	2.81*	9.20	16.40*
Peanut	5.63	3.16*	3.31	3.65	1.80	4.45*	1.56	6.52*	2.10	2.60	1.40	4.56*	15.10	26.00*
Rice	6.26	2.31*	2.01	0.46*	2.03	4.40*	2.41	3.00	6.60	6.00	1.28	4.33*	20.60	20.50
Sweet potato	1.15	1.03	0.07	1.17*	1.17	1.56*			0.70	1.06			2.00	4.70*
Poor income														
Mungbean	3.90	2.61	2.83	3.41	0.51	4.63*	1.41	2.70*	1.41	6.20*	0.43	3.30*	10.60	23.00*
Cassava	4.40	2.61*	0.18	2.65*	0.16	3.75*			2.85	3.51	1.10	2.71*	7.70	15.30*
Peanut	2.23	1.16*	1.35	1.51	0.30	2.33*	0.91	1.36	0.81	0.95	0.26	2.01*	5.50	9.80*
Rice	1.60	0.88	0.73	0.07*	0.23	1.61*	0.73	0.86	1.78	1.71	0.25	1.26*	5.30	6.40
Sweet potato	2.11	1.70	0.38	1.75*	0.26	2.46*			1.35	1.80			4.10	7.70*

Note: Significance at $P < 0.05$

Source: Survey, 1998.

tillage is mostly done by the men. The women participated only a few days to clear the soil and make the beds. The number of labor days which were spent for land preparation by males in almost all food crops were 3 to 4 fold that spent by females. This is in contrast with the North plain area where the women contributed more time than men to this activity (Binh, D. T., and Lan, L. N., 1996). In poor income households, there was no significant difference in the participation of men and women in land preparation activity in mungbean, rice and sweet potato production. The reason is that almost all poor income households in the commune have no cattle and they also do not have money to rent tillage services, therefore land preparation in poor households is mainly performed by hand. The contribution of poor women to this activity is hence higher than compared with that of high and medium income women. Nevertheless, statistical analysis did not indicate significant difference between poor men and women in this activity.

For sweet potato production in the high income group, it is because cultivated area was too small and this crop was regarded as a women's crop to supply the vegetable for their family and fodder for animal. Therefore the women's involvement in land preparation for this crop was the same compared to that of the men because it was done by hand.

The result of testing the difference of means in table 5.1 also shows that there was no significant difference between males and females in mungbean and peanut sowing in all household groups. The reason is that this activity could not be carried out by only one person. However, the involvement of women in cassava and sweet potato planting in medium and poor income groups was significantly greater when compared with that of the men but in high income group, it was not. This is because cassava and sweet potato were regarded as crops of medium and poor women, so they often undertake almost all activities in the cultivation of these crops.

In the case of rice sowing, the time, which is spent by the female farmers of all economic status was found to be significantly smaller when compared to that of

males. The farmers in Binh Dien explained that rice sowing needs a very large amount of seeds compared to other crops for the same area. When sowing rice, people have to bring heavy basket of seeds, hence this work is not suitable for women. This is different compared to transplanting rice, many studies in Vietnam and in other countries found that the women contributed more time than the men in rice transplanting. For example, U Maung, M. T.(1990) reported that Myanmar women contributed 80 % of the total time for rice transplanting while the men's contribution for that is only 20 %. It is clear that the roles of men and women depend not only on the type of crop and activity, but also on the cultivation method.

For weeding or nursing, the findings also showed that the women in all household groups contributed more time to this activity for almost all food crops in the region than men. U Maung, M. T. (1990) revealed that Myanmar women's contribution to weeding activity in crop production is 4 fold that of men.

Unlike weeding, the testing of differences of mean showed that there was no significant difference between men and women in fertilizer application to almost all food crops in high and poor income groups. However, there was a significant difference between male and female farmers of the medium income group in fertilizer application to mungbean and peanut production. This is because there was a rather high proportion of medium economic status households which have the tendency of husbands to often go away for off-farm activities in the middle of the cropping season, so the wives in these households have to be responsible for fertilizer application.

In crop harvesting, Binh, D. T., and Lan, L. N. (1996) reported that the women in the plain area of Vietnam contributed more time than men to this activity. This is not the same as the finding in Binh Dien commune, where there was no significant difference between men and women of all household groups in harvesting all food crops, except mungbean production. U Maung, M. T. (1990) also reported that Myanmar women and men equally participate and allocate the same amount of time

for rice and peanut harvesting. Unlike the production of other food crops, the involvement of women of all household groups in mungbean harvesting was significantly greater than compared to men. According to the local farmers, this is because mungbean harvesting is implemented many times in one crop and it often takes rather a long time and requires patience, so it was not Binh Dien men's preference. The men often said that mungbean harvesting is a collective action.

For postharvesting activity of all food crops, the result in table 5.1 reflects that the women of all economic status allocated more time than the men. The reason is because this activity is done at the house, so it is very suitable for women who have to be responsible for housework, especially for poor women who often have a lot of children.

Comparing the contribution of men and women in total labor days used for crop production, the T - test result showed that the average total labor days of the high, medium and poor income women in mungbean production are respectively 20.2, 32.7, and 23.0 which are greater than that of men, which are only 12.4, 17.8, and 10.6 respectively. Therefore, although it is a cash crop, mungbean is still regarded as a woman's crop. This is because mungbean is considered a multipurpose crop in the region since it is used not only for food, but also traded for rice and other foods. Unlike in mungbean production, there was no significant difference between total labor days of women and men in rice production in all economic groups. The statistical analysis showed that there is a difference in mungbean production, but there was no significant difference between high income women and men in the contribution of total labor days to cassava and sweet potato cultivation, and the involvement of lower income men and women in this crop was not the same. It was found that the poor and medium income women contributed more total labor days to cassava production than poor and medium income men. This is a result of the tendency of high income women to undertake minor profession and small business and to thus reduce their participation in on-farm activities. In peanut production, the

high income women and men equally allocated the time for production of this crop, but women in poor and medium income households spent more time than men.

It is noticeable that among poor and medium income households, women spent significantly more time in production than men for a total of 4 out of 5 food crops, namely in all crops except rice. In high income households, women spent significantly more time than men only in mungbean production. In rice production, both men's and women's contribution is equal.

5.2.1.2 Fruit trees

The survey showed that the role of men and women in the survey region depends not only on the kinds of food crops, but also on the types of fruit tree and the nature of activities of production processing. Table 5.2 presents the labor contribution of Binh Dien male and female farmers to fruit tree production activities.

The analysis indicated that unlike food crop production, the high income men and women equally participated in weeding of all fruit trees. This was not the same in the medium and poor income groups. It was found that the poor and medium income women work more labor days in weeding bananas and pineapple than men. Like in weeding activity, the involvement of high income women in manual application to all of fruit trees in the region is the same compared to men while the medium and poor income women allocated more labor days for this activity than men. The testing of means showed that women contributed more time than men to fruit harvesting and selling products of fruit trees in all economic groups. The respondents said that because fruit trees are often planted on settlement land, so the women can take care of them due to their housework responsibility.

Unlike cutting Acacia branches, it was also found that cutting branches of jackfruit was accomplished by the men. The statistical means tests reflected that only the high and medium income men contributed to cutting jackfruit branches and

Table 5.2 Labor use pattern for fruit tree production activities by gender and household groups

Fruit tree	Cutting branches		Weeding		Manual application		Harvesting and sale		Total	
	M	F	M	F	M	F	M	F	M	F
High income	--days/year--									
Banana			4.55	5.86	3.31	4.08	3.23	6.46*	11.00	16.50*
Jackfruit	1.73	0.00*					1.01	2.38*	2.80	2.40
Pineapple			0.00	0.33	0.00	0.02	0.10	0.23	0.10	0.80
Others			0.43	0.86	0.41	0.68	0.26	1.10*	1.10	2.70*
Medium income										
Banana			2.81	5.31*	2.16	3.26*	2.21	5.61*	7.20	14.20*
Jackfruit	1.56	0.00*					0.48	2.05*	2.10	2.10
Pineapple			0.11	0.48*	0.83	0.41*	0.06	0.56*	0.30	1.50*
Others			0.66	1.08	0.58	0.95	0.43	1.56*	1.70	3.60*
Poor income										
Banana			2.06	3.56*	1.31	2.11*	1.40	4.03*	4.80	9.70*
Jackfruit	0.45	0.11					0.38	1.23*	0.80	1.40
Pineapple			0.18	0.70*	0.17	0.55*	0.10	0.85*	0.50	2.10*
Others			0.66	0.95	0.48	0.73	0.30	1.00*	1.50	2.70*

Note: Significant difference at $P < 0.05$

Source: Survey, 1998.

their involvement was significantly greater than women in the respective household group. This is different in the poor income group in which both men and women equally participated in cutting jackfruit branches. Actually, this activity was a man's work due to the big size of stem of jackfruit tree. The reason why the poor women joined more in this work may be because of their smaller owned land area. It is also because poor women lack adequate income and employment and are obliged to participate in all farming activities although some are hard works and not suitable for them.

It was found that the female farmers of all household groups contributed to total labor days for production of almost all fruit trees more than male farmers. As the author reported in Chapter IV, banana, pineapple and some others were fruit trees to be planted not only to complement nutrition by using ripe fruits but also to supply household food as vegetables. Therefore, the women were concerned more than men in fruit tree cultivation to satisfy food needs of the family members. Moreover, fruit trees were often planted on settlement land where the house is constructed, so the female farmers can participate more in taking care of these trees because of their domestic responsibility. The only exception was in jackfruit cultivation where it was found that women's contribution was the same as that of men in all household groups. In this case, it was because many interviewed households planted jackfruit on the land where was far from the house, so the women were constrained to participate in production activities of this fruit tree.

5.2.1.3 For industrial crops

The statistical analysis indicated that like in food crop and fruit tree production, there was also gender sensitive division of labor in industrial crop production in the region. However, the participation of male and female farmer depended on the kind of production activities and type of industrial crops, as well as on economic status of the households.

Table 5.3 presents the result of labor contribution of men and women to industrial crop production in Binh Dien commune. It was found that like in food crop production, the high and medium income men spent significantly more time than women in land preparation of sugarcane production. However, there was no significant difference between poor males and female farmers in undertaking this activity (but real number of labor days of men was greater than that of women). The reason is because sugarcane cultivation area of poor households was small and land preparation was done by hand, so the poor women participated more labor days in this activity. Unlike in food crop production in which the women often contributed more labor days than that of male to planting activity, the difference testing of means reflected that high income men allocated significantly more time than women to sugarcane planting. According to the respondents, the reason is because sugarcane seedling is heavy, hence sugarcane planting requires more physical strengths compared to the planting of food crops. Therefore, sugarcane planting was the male farmers' domain. Unlike in the high income group, time allocation of the medium and poor income women and men to sugarcane planting was the same. The interviewed farmers reported that the women of medium and poor status often do all kinds of work if they can to ensure there is enough food for their family members. In contrast, the high income women want to do jobs such as small business, minor profession which can make high profit because they have enough capital and food. Therefore, the women of the medium and poor income groups participated more time in sugarcane planting. The finding showed that like in food crop production, sugarcane weeding was also predominantly activity of women. The women of all household groups contributed more labor days than men to sugarcane weeding. The analysis indicated that in the high income group, the men contributed significantly greater time to sugarcane harvesting than the women, although the difference was not so great. This is also because of rather heavy volume of sugarcane stem compared to food crops, so sugarcane harvesting fell under the male farmers' domain. In contrast, the medium and poor income women's labor contribution was found not significantly different than men to sugarcane harvesting.

Table 5.3 Labor use pattern for industrial crop production activities by gender and household groups

Crops	Activities	L a n d preparation		Digging		Planting		Weeding / Nursing		Harvesting		Drying and storage		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F
High income															
Sugarcane		9.00	2.70*			4.31	3.96*	3.83	8.33*	6.86	5.18*	24.10	20.20		
Cinnamon		2.33	0.16*			1.11	0.38*	2.30	1.10*			5.80	1.70		
Rubber		1.71	1.65	3.03	1.46*	2.00	1.73	2.61	2.78	0.90	1.80*	0.30	1.16*	2.60	3.30
Medium income															
Sugarcane		5.36	2.93*			2.5	2.76	1.38	6.06*	4.58	4.40	13.80	16.20		
Cinnamon		0.43	0.033			0.30	0.03	1.25	0.07			1.10	0.10		
Rubber		3.26	2.16	5.66	2.52*	2.91	2.11	4.26	3.20	0.25	1.45*	0.66	0.75*	16.10	10.00*
Poor income															
Sugarcane		2.06	1.83			0.86	1.40	0.61	2.58*	1.82	2.56	5.40	8.40		
Cinnamon		0.40	0.00			0.17	0.00	0.20	0.00			0.80	0.00		
Rubber		0.27	0.25	0.52	0.16	0.27	0.23	0.46	0.41	0.06	0.13	0.00	0.05	1.50	1.10
Black paper															
								0.17	0.12	0.06	0.13	0.00	0.05	0.20	0.30

Note: Significance at P < 0.05

Source: Survey, 1998.

For cinnamon production in the high income group, the finding also indicated more involvement of men compared to women in all activities of its production process (land preparation, planting and weeding/ nursing). As mentioned before, cinnamon is a new introduced crop in the region. Cinnamon cultivated areas belong mostly to high income households.

According to the interviewed farmers, cinnamon was regarded as the tree of men who have more chance to go out and get new information about new techniques and markets. Moreover, it is a cash crop chosen by the men who want to earn high income. Therefore, all of activities of this crop cultivation (even weeding which was often performed by women) were mainly performed by the men. In contrast of the high income group, there was no significant difference between male and female farmers of the medium and poor income groups in undertaking all activities of cinnamon production. Cinnamon was regarded as men's crop in the survey area, but the t-test did not show significant difference although the men of these groups substantially contributed more than women to all activities. This is because cinnamon cultivated area of the medium and poor income group was small and concentrated in only some households so the statistical analysis did not showed significant difference because of too few samples.

The analysis found that there was no significant difference between men and women in contributing to land preparation for rubber tree production in all income groups. Actually, land preparation activity in rubber tree production was clearing small bushes and weeds on the land before digging. Therefore, the women and men in the survey area equally participated in this activity. It was also found that the men of the high and medium income groups spent significantly more time than women in digging activity of rubber production. Different from the high and medium income groups, the finding also indicated that the poor men and women allocated the same amount of labor days (no significant difference) to digging activity of rubber tree production. This can be a result of small rubber cultivation area in the poor income group. Rubber tree production in the region is supported by 3-2-7 project of

Vietnamese government. The state gives the farmer the loan in term of seedling, fertilizer and some cash to do nursing. Nevertheless, only the farmers who are able to return the loan can take this loan. That is the reason why rubber cultivation area almost belongs to high and medium income farmers. For the remaining activities of rubber tree production which were planting and weeding activities, the men and women in all household groups contributed the same amount of labor days to these activities.

For black pepper production, there are many activities of the production process. However, we could not get the data of all activities because black pepper is one of perennial industrial crops so the respondents could not remember labor days which were spent in some activities. Therefore, this research can report only the contribution of Binh Dien men and women to three annual activities of black pepper production, namely nursing, harvesting, and drying and storage. It was found that there was no significant difference between men and women of all income groups in black pepper nursing, although this industrial crop was planted in the homestead. The reason is that black pepper nursing activity includes weeding and fertilizer application. However, fertilizer which is applied in black pepper production was not only manure but also chemical fertilizers. This activity needs more support from the men who often have more access to extension services. Statistical analysis result indicated that the high and medium income female farmers spent significantly more time than male farmers in black pepper harvesting and storage activities. The respondents reported that unlike harvesting activity of other crops, black pepper harvesting is performed a number of times in one harvesting season. Women often are responsible for this activity due to their patient characteristic compared to men. However, in contrast with two better income groups, there was no significant difference between poor male and female farmers in black pepper harvesting and storage activities which are the women's domain. Actually, the poor income women spent more labor days in these activities than men, but the analysis did not show significant difference. This is perhaps because of too small number of interviewed poor households who have planted black pepper.

The finding reflected that the involvement of women in total labor days in industrial crop production was the same as that of men in almost all crops for all household groups. It was found that there was significant difference between women's and men's total labor days in only black pepper and rubber production of the medium income group. The medium income women spent more labor days than men in black pepper cultivation while they contributed less to rubber production. The reason was that there was women's certain activity in black pepper production such as harvesting and storage but for rubber tree cultivation there was not. The analysis did not show significant difference in total labor days of cinnamon and rubber production between male and female farmers in all income groups, except the medium income group. This may be a result of small cultivated area of these crops. For sugarcane production, although weeding was mainly done by women but the finding was that there was no significant difference between male and female farmers of all income groups in total labor days.

5.2.2 Labor use pattern on planted forest production activities by gender

Similarly to crop production, both men and women in Binh Dien commune participated in planted forest production activities. However, the statistical analysis showed that their contribution depended on economic status of the households, the species of forest trees, and activities of the production process.

The analysis result in Table 5.4 presents labor use pattern for planted forest production by gender and household groups. It was found that like in crop production, there was significant difference between men and women in land preparation in almost all income groups. The men of high and medium income group worked more days than women for land preparation in both *Acacia* and *Eucalyptus* planted forest production. In reality, land preparation for planted forest production in the survey area was mainly digging which was performed by hand (different from crop production where this activity was tilled by cattle) but men still work more days than women. The reason is that forest trees were planted on the soil that was very hard and far from

Table 5.4 Labor use pattern for planted forest production by gender and household groups

Activities	Land preparation		Planting		Nursing		Cutting branches		Protection		Total	
	M	F	M	F	M	F	M	F	M	F	M	F
Trees												
High income	-----days/year-----											
<i>Acacia</i>	8.10	5.80*	2.73	2.31	3.58	3.51	1.90	4.23*	1.88	0.21	18.1	11.8*
<i>Eucalyptus</i>	8.40	2.08*	3.33	2.43	2.67	2.56			1.91	0.52*	16.3	7.60*
Medium income												
<i>Acacia</i>	5.71	2.35*	1.73	1.33	2.13	1.88	0.95	2.00*	1.05	0.52	11.5	8.10*
<i>Eucalyptus</i>	4.41	1.50*	1.16	0.86	0.95	1.08			0.70	0.04	7.20	3.80*
Poor income												
<i>Acacia</i>	0.86	0.60	0.23	0.45	0.35	0.61	0.05	0.76*	0.25	0.10	1.80	2.50
<i>Eucalyptus</i>	0.66	0.16	0.17	0.13	0.11	0.08			0.16	0.00	1.10	0.40

Note: Significance at $P < 0.05$

Source: Survey, 1998.

the settlement area, so women could not spend more time in this work. However, there was no significant difference between the poor men and women in land preparation for both *Acacia* and *Eucalyptus* production. The reason may be that planted forest area in the poor household group was rather small and due to shortage of land resource for production, so the poor women in the region have to join in all kind of works.

Men and women in all income groups equally contributed to *Acacia* and *Eucalyptus* planting. Similarly, there was no significant difference in the time spent by women and men of all income groups in nursing activity of *Acacia* and *Eucalyptus*.

Acacia is one of forest tree species which often divide branches early, so about two years after planting, the farmers have to cut their branches to facilitate growing of wood biomass. Unlike *Acacia*, *Eucalyptus* is one of forestry tree species which have small branches that can break naturally. Therefore, branch cutting activity is only performed in *Acacia* forest production. According to the farmers in the region, *Acacia* branches were used for cooking as they were very good fuelwood, especially when natural forest resources are limited. Table 5.4 showed that different from cutting branches of jack fruit tree, the women in all income groups worked significantly more days than men for *Acacia* branch cutting. This is because fuelwood preparation for cooking is regarded as women's responsibility as *Acacia* branches are small compared to jackfruit tree.

It was also found that there was significant difference between the high income men and women in *Eucalyptus* forest protection, but for the same activity in *Acacia* there was no difference. The reason is that the women were concerned with branch cutting, so they participated more in protection for *Acacia* forests compared to that for *Eucalyptus* forests. Unlike in the high income group, the time allocation to this activity by the medium income men and women of both *Acacia* and *Eucalyptus* production was the same. The reason is because the husbands in the medium income

group often go away for off-farm jobs in the middle of cropping season, so women in this household group have to participate more in protecting planted forest. The finding also reflected that labor share of poor income women for protecting *Acacia* and *Eucalyptus* forest was the same as that of poor men. This may be a result of small area of planted forest in the poor income group.

In term of total labor days spent by high and medium income women in *Acacia* and *Eucalyptus* planting and management was significantly less compared with these spent by men in the respective income group. However, the contribution of poor female farmers to *Acacia* and *Eucalyptus* production was the same compared to men in this group. This was a result of small *Acacia* planted area and a rather high rate of poor interviewed households who are widows.

In summary, except branch cutting activity, it was found that the male farmers in Binh Dien commune had at least the same or greater role compared to female farmers in forest tree production. This is in contrast to Sale village of hilly region of Nepal, the female farmers' contribution was found to be greater than that of men to tree management, except in nursery activity (Bajracharya, B., 1993).

5.2.3 Labor use pattern for animal production activities by gender

The statistical analysis on the surveyed data showed that there was also gender division of labor in animal production in the region. However, labor use for different work by gender was found varying according to the types of animals, and the nature of activities. Table 5.5 presents the involvement of Binh Dien men and women in animal production. The finding reflected that the men of the high and medium income groups allocated significantly more labor hours than women of the same group to cattle feeding and shed cleaning as well as total labor hours. In reality, children participated in feeding activity but cattle production was still the men's domain. Nevertheless, there was no significant difference between poor men and women in all

activities of cattle raising (including total labor hours). This is perhaps because poor farmers have small herds of cattle so men and women spent equal amount of time.

Table 5.5 Labor use pattern for animal production activities by gender and household groups

Activities	Food preparation		Feeding		Shed cleaning		Checking		Total	
	M	F	M	F	M	F	M	F	M	F
Animals										
High income					----- Hours/ month -----					
Cattle			14.10	7.90*	12.4	5.60*			26.50	13.50*
Pig	0.45	25.20*	0.35	15.80*	0.35	9.30*			1.20	50.30*
Chicken			1.60	9.20*			1.70	10.70*	3.30	19.90*
Medium income										
Cattle			6.50	2.30*	6.50	2.30*			13.00	4.60*
Pig	1.00	28.40*	1.00	16.10*	0.50	10.95*			2.50	55.40*
Chicken			1.00	7.50*			1.25	9.30*	2.25	16.80*
Poor income										
Cattle			4.50	1.50	1.00	1.00			5.50	2.50
Pig	0.00	30.10*	0.00	13.80*	0.00	11.80*			0.00	55.40*
Chicken			0.30	10.30*			0.30	12.20*	0.60	22.50*

Note: Significance at $P < 0.05$

Source: Survey, 1998.

The analysis result also showed that there was significant difference between men and women of all household groups in food preparation, feeding, and shed cleaning as well as total labor hours of pig raising. The women contributed more time than men in the same group to pig production. In reality, as other areas of the country, pig raising is quite female farmers' job. According to the farmers in the region, pig production is supported by children but only female child has to share this responsibility. However, high and medium income men spent some time than poor men in pig production. The reason may be that women in high and medium income households sometimes going away for small business doing, so their husband have to

replace the wife for taking this responsibility. The informants in the survey area reported that the men take this work only when their wives and daughters are absent in the house.

It was also found that irrespective of the economic status, women spent significantly more time than men in all activities (including total labor hours) for chicken production. Similarly, Soelbijati (1990) reported that in backyards in Rawa Sragi of the Philippines, keeping chicken is mainly the women's task.

5.2.4. Labor use pattern for off-farm activities by gender

Unlike in the plain area, off-farm occupations were popular and they played important roles in generating income for the farmers in upland areas in general and Binh Dien commune in particular. The survey found that both men and women in this area participated actively in off-farm occupations. However, their involvement was different in different activities. Table 5.6 reports the analysis results of gender role in labor use pattern for off-farm activities in Binh Dien.

It was found that the female farmers of all income groups in Binh Dien commune worked significantly more labor days than male farmers for fuelwood collection. This is because the women had more responsibility than men in cooking. Actually, this off-farm activity was done not only for providing fuelwood but also for trading for rice and food. However, the involvement of men in this activity was still less than women because earnings obtained from this work was very low. Carrying fuelwood from the forest to the house is very hard work because as mentioned before, the terrain in Binh Dien is with many slopes due to strong division of river and stream network. When we asked the respondents why this very hard work is done by women, they said that the men thought that fuelwood collection is a collective action, so men were not concerned with it. The female children had to participate in taking this responsibility while male children had not. This was in contrast to the situation in

Northern Thailand where fuelwood collection is done mainly by the men (Benchaphun, *et al*, 1987).

Table 5.6 Labor use pattern for off-farm activities by economic groups

Activities	Household	High income		Medium income		Poor income	
		M	F	M	F	M	F
				---days/ year---			
Collecting fuelwood		6.90	16.20*	8.80	29.70*	4.60	47.70*
Cutting imperata		0.33	1.80	2.00	13.30*	1.60	16.00*
Cutting broom grass		0.00	0.00	1.30	3.23	3.70	7.30
Collecting bamboo shoot		0.00	0.00	0.00	3.00	0.00	6.10*
Hunting		4.00	0.00	15.50	0.00*	18.70	0.00*
Logging		21.00	0.00	50.80	0.00*	5.00	0.00
Small trading		0.00	21.70*	0.00	8.50*	0.00	0.00

Note: Significance at $P < 0.05$

Source: Survey, 1998.

The analysis result indicated that the involvement of poor and medium income women in cutting imperata was significantly greater than that of poor and medium income men. This is in contrast to high income households in which the husbands and wives spent equally little time in this activity. According to the informants, there were a few high income men and women who cut imperata to cover cattle's shed while this work was more popularly done in two other income groups (especially the poor group), not only to cover the houses but also to trade for rice. Like fuelwood collection, Imperata cutting is also low earning activity, so it attracted only poor women who can work for very low return tasks to provide enough food for their families.

The survey also found that the high income households interviewed did not join in broom grass cutting activity, while it was done in the medium and poor income groups. It was found that the medium and poor income women allocated the same amount of time to broom grass cutting when compared to men in the same group. Broom grass cutting was an off-farm occupation to earn money for buying food and it

was also low earning job but there was no significant difference between women and men in doing this activity. According to the farmers in the region, because broom grass is one of grass species which growth in complex terrain area and its biomass is rather large so it was necessary to have men to cut it.

Like broom grass cutting, there was no bamboo shoot collection activity in high income households interviewed. The statistical analysis reflected that poor women allocated significantly greater labor days than poor men in cutting bamboo shoot. In reality, the men in households interviewed did not participate in this job. According to the farmers in the region, this work relates closely to food preparation and it requires patience, so it is carried out by the women. For the medium income group, the analysis showed that the women contributed more labor days than men to collecting bamboo shoot (but not statistically significant). This may be because there were few interviewed households in this category, therefore the result did not show a significant difference.

The survey found that hunting is the men's job because of the requirement of family tradition and high earnings associated with this occupation. The research team of the Upland Development Project of Hue University of Agriculture and Forestry (1997) found the same result in Van Kieu ethnic community in Xuan Loc commune of Phu Loc district, Thua Thien Hue, Vietnam. The research in Binh Dien commune indicated that poor and medium income men contributed significantly more time than women in respective groups to hunting occupation. However, there was no significant difference between high income women and men in performing this activity although women of interviewed high income households did not participate in hunting. It was perhaps because the small number of high households interviewed who have this job.

It was also found that only the men participate in logging occupation in all income groups. According to the respondents, there were a few young girls who would do this activity in the region but in all households which were interviewed, there was no household which had women who joined in this occupation. However,

the analysis result indicated that only high and medium income male farmers allocated significantly greater than female farmers in logging occupation. The informants in the region reported that logging occupation is the male farmers' domain because the men are often responsible for construction of their houses. Vietnamese people have a saying that "constructing house is men's work, keeping house is women's job". The other reason is that men often like the job which can earn a lot of money although it is more risky. Unlike in high and medium income households, the finding of research reflected that there was no significant difference between poor men and women in logging although the poor women in households interviewed did not contribute any labor day to this work. This was perhaps because the number of poor households which had this occupation was too small, so the statistical analysis did not show significant difference. In reality, the poor men also like logging because they hope that this work can earn more money but they could not do this activity due to their weak health.

For small trading, the analysis result revealed that small business fell under the women's domain. This activity was done in slack periods when there was little on-farm work. The women buy pork or fish in wholesale prices and they sell it in the village for households who could not come to the market. The small trading activity also includes trading of farm products such as banana, jackfruit or mungbean, peanut at the village to be sold at the Hue city. Some female farmers do food processing of farm products such as sweet soup which is made from mungbean, cassava, peanut or "Banh Nam", "Banh Loc" which are made from rice and cassava to be sold in the market or in the village. The reason why this job is carried out by the female farmers is that the women have to be responsible for going the market and cooking meal for their family members since they were young so they were familiar with these kinds of works. In 90 interviewed households, there was no households which had the men doing this small trading. The statistical analysis showed that only high and medium income women contributed more time than men to small business doing. Both poor men and women in the surveyed households did not do this job because of the lack of capital.

In summary, the analysis of labor use pattern reflected that there was significant difference between men and women in their involvement in agroforestry production. The women in all economic groups spent more time than men in cultivating almost all food crops (especially women in medium and poor economic status). In contrast, the male farmers in all income groups allocated more time than female farmers to cultivating industrial crops. Similarly, irrespective of the economic status, the men contributed more labor hours than women in respective income group to cattle raising. However, the time, which spent in pig and chicken raising by female farmers in all income groups was significantly greater than that spent by male farmers. Forestry production fell under the men's domain. The men in all economic status allocated more time than women to planting and managing all forestry trees. For off-farm activities, the women spent more time than men in income generating activities such as fuelwood collection, Imperata cutting and small business, whilst the men allocated more time than women in off-farm occupations such as hunting and logging which can earn fast money but they are more risky.

5.3 Comparing the involvement of women in different economic status

This section reports the result of t-test in the involvement of women in different economic status in agroforestry activities. The finding reflected that their involvement depended on type of crops, trees, animals and kind of off-farm activities.

Table 5.7 presents results of t-test in total labor days used for food crops by women in different income groups. It was found that there was no significant difference between the contribution of high and medium income women to total labor days used for mungbean production. The poor women allocated an average amount of 23 labor days per year which was not significantly different from 20.2 labor days spent by high income women. Mungbean was considered as a cash crop in other regions of the country such as Central high land area where mungbean cultivation area is very large. In Binh Dien, although mungbean cultivation area was rather high compared to other crops but mungbean is considered not only as a cash crop but also

as a food crop. Mungbean seed sales was made to trade for rice and other foods. The female farmers also used mungbean seed for making soup (mix with vegetable) as a meal. Moreover, mungbean seed is used to make sweet soup and cake to complement nutrition for the people. Therefore, mungbean cultivation is important to women of all economic status to supply food for their family members. The t-test result showed that the involvement of medium income women in mungbean production was significantly greater than that of poor women.

Table 5.7 Total labor days for food crop production by women of different income groups.

Food crop	Total labor days per year		
	High income	Medium income	Poor income
Mungbean	20.20	32.75 ^b	22.95 ^b
Rice	10.13	20.52 ^b	6.42 ^b
Cassava	8.67 ^{a,c}	16.35 ^a	15.25 ^c
Peanut	21.63	26.02 ^b	9.75 ^b
Sweet-potato	0.97 ^{a,c}	4.68 ^a	7.72 ^c
Vegetable	2.17 ^c	4.27	7.13 ^c

Note: Figure with the same noted superscript are significantly different at $P < 0.05$

Source: Survey, 1998.

The women of medium income households spent 20.5 labor days per year in rice production, while high income women allocated only 10.1 labor days/year. However, the analysis did not show significant difference. The result in Table 5.7 also indicated that the poor women's involvement in rice cultivation was the same as compared to high income women. Rice cultivation area in Binh Dien was mainly rainfed area, rice yield in the region was not high. In recently years, some high income households stopped rice cultivation because of its low return to labor. Although natural environment is not favorable but medium and poor income households still try to cultivate rice to satisfy food need of their family. However, almost all interviewed poor households were newly married, so they did not have rice cultivation area. Therefore, smaller amount of labor days of poor women compared to

high income women was perhaps result of smaller cultivation area. Although rice cultivation is important to both medium and poor income women, but the analysis showed that the involvement of medium income women in rice production was significantly greater than that of poor women. The reason is because rice areas cultivated by the medium income group was larger than that of the poor income group.

It was found that high income women in Binh Dien spent only 10.1 labor days per year which was significantly smaller than compared to 16.4 and 15.3 labor days of medium and poor income women respectively in cassava production. The t-test result in Table 5.7 reflected that there was no significant difference between the involvement of medium and poor income female farmers in cultivating this crop. Cassava was a crop which can grow in poor fertility soil and in places where there is a lack of water and cassava cultivation does not require big investment. So, cassava cultivation area in Binh Dien was highest compared to other crops in the region (even in poor households). Nevertheless, cassava was a low value crop, the price of 1 kg of cassava equals only 1/3 and 1/10 the price of 1 kg of sweet-potato and rice respectively. Therefore, high income households often plant cassava only to feed pig. In medium and poor income households, food was not enough all year, so cassava roots play an important role in reducing hunger, especially in transition time between two crop seasons. The poor female farmers boiled or made salty or sweet cassava soup to feed their family members when rice was in shortage. That is the reason why although cassava is very low value but it was a major crop for medium and poor income women. Hence, their involvement in cassava production was significantly greater than that of high income women.

For peanut production, the finding was that there was no significant difference between high income women, medium and poor women in total labor days used for cultivating this crop. However, the involvement of poor female farmers in peanut production was significantly less than that of medium income women. In the survey area, peanut is planted on a rather large area under 1 -3 years old rubber forest which

mainly belonged to high and medium income households who were able to return the loan that was supported by the "3-2-7" project of the government. So, distinction in time allocation of poor and medium income women in peanut production was a result of larger peanut cultivation area of the medium income group.

In sweet potato cultivation, the involvement of medium and poor income women was nearly 5 and 6 fold respectively compared to that of high income women. It was also found that total labor days spent by female farmers of the medium and poor income groups in vegetable planting and nursing was significantly greater than that of high income women. Sweet potato and vegetable in the region are mainly planted for family consumption. Clearly, poor and medium income women often pay more attention in cultivating the crops which can satisfy subsistent purpose, while high income women mainly concern with cultivating high value crops.

For industrial crops, it was found that contribution of high-income women to total labor days for cinnamon production was significantly higher than that of medium and poor income women (Table 5.8). Cinnamon is high value and newly introduced crop in the survey area. This crop cultivation requires high investment in both capital and technique. Therefore, high income women concerned more with cinnamon production. T-test also showed that the poor women's total labor days for black-pepper production was significantly less than those of high and medium income women, but there was no significant difference between high and medium income women.

For rubber production, the high income female farmers spent the same amount of time compared to medium and poor female farmers, but the analysis indicated significant difference between the involvement of poor and medium women in cultivating this crop. Sugarcane is an industrial crop that is planted to supply material for a sugar factory. Due to the lack of land and asset to borrow capital to grow sugarcane, the involvement of poor women in sugarcane production was less than that of high income women. The poor women with limited land area, they are

preliminarily concerned with cultivating food crops to satisfy basic needs of their family.

Table 5.8 Total labor days for industrial crop production by women of different income groups.

Industrial crop	Total labor days/ year		
	High income	Medium income	Poor income
Cinnamon	1.65 ^{ac}	0.13 ^a	0.00 ^c
Black pepper	3.30 ^c	2.48 ^b	0.27 ^{cb}
Rubber	7.63	10.02 ^b	1.05 ^b
Sugarcane	20.18 ^c	16.17	8.38 ^c

Note: Figure with the same noted superscript are significantly different at $P < 0.05$
 Source: Survey, 1998.

The comparison of total labor days used for fruit tree production by women of different income groups reflected in Table 5.9.

Table 5.9 Total labor days for fruit tree production by women of different income groups

Fruit trees	Total labor days/ year		
	High income	Medium income	Poor income
Banana	16.52 ^c	14.20 ^b	9.72 ^{cb}
Jackfruit	2.38	2.05	1.35
Pineapple	0.77	1.47	2.10
Other	2.65	3.60	2.68

Note: Figure with the same noted superscript are significantly different at $P < 0.05$
 Source: Survey, 1998.

The finding was that the poor women spent 9.7 labor days which was significantly less than 16.5 and 14.2 labor days of high and medium income women respectively in banana production. Banana is major fruit tree which can be grown rather well in the commune and giving high productivity. Banana is considered a cash crop in the high income group. However, its fruit is used not only as fruits but also as vegetable. Therefore, banana cultivation is concerned by women in all different

economic status. Nevertheless, because of land shortage, the involvement of poor female farmers in banana production was smaller compared to high and medium income female farmers.

The T-test result in Table 5.9 also indicated that there was no significant difference among women of three income groups in jackfruit, pineapple, and other fruit tree production. Actually, poor households who own small land area only planted jackfruit around their homestead. The poor women considered jackfruit as supplementary source of food and vegetable, while high income women considered jackfruit as cash crop. Unlike in the poor income group, high income households planted jackfruit trees on the hill with very large area. However, at present, because of low value of this tree, almost all jackfruit areas of high income households are changed to plant other trees such as *Acacia* or cinnamon. So, although the involvement purpose of different economic status women was not the same, but the t-test result did not show significant difference among them because the difference of cultivated area was not high. It was also found that there was no significant difference in the involvement of women in different economic status in pineapple production.

The t-test result in total labor days which was spent by women of the different household groups in animal production reported in Table 5.10.

Table 5.10 Total labor hours for animal production by women of different income groups.

Animals	Total labor hours/ month		
	High income	Medium income	Poor income
Cattle	13.50 ^{a c}	4.60 ^a	2.50 ^c
Pig	50.30	55.42	55.40
Chicken	19.90	16.83 ^b	22.50 ^b

Note: Figure with the same noted superscript are significantly different at $P < 0.05$

Source: Survey, 1998.

The research found that Binh Dien high income female farmers spent 13.5 labor hours per month which was significantly higher than 4.6 and 2.5 labor hours of

medium and poor income women respectively in cattle management. The reason is because of greater amount of cattle head in the high income group. The total labor hours of medium income women used for cattle raising was nearly two fold compared to poor women (but not significantly different). The finding was that there was no significant difference among the involvement of women in different economic status in pig production. It is clear that, pig raising is concerned by not only for low income women but also for high income women. Women are often responsible for feeding all other family members. Pig raising is a form of saving, so they always try to use all byproducts to generate income for their family even if they are in rich economic status. Hence, the involvement of women in pig production did not depend on economic status. For chicken raising, it was found that Binh Dien high income female farmers allocated 19.9 labor hours per month which was not significantly different compared to 16.8 and 22.5 labor hours of medium and poor income women respectively to chicken raising. However, it was found that there was significant difference between medium and poor women in this work. In reality, chicken raising is important to women in every economic status. The difference between medium and poor income women in time allocation in chicken raising was a result of smaller amount of chicken head in medium income households because some medium income households sold a number of chicken before the time of this study's survey.

Table 5.11 presented the total labor days used for forestry tree production by women in different economic status. The high and medium income female farmers spent 11.8 and 8.1 labor days which were significantly greater than 2.5 labor days per year of poor female farmers in *Acacia* production. Nevertheless, the statistical analysis did not show significant difference between high and medium income women in managing and planting this tree. Almost all *Acacia* forest areas were planted by the support of PAM project and watershed protection forest planting program. However, those who planted forest trees belonged to only high and medium income households who have more chance to contact officials and outsiders. Therefore, the reason of smaller involvement of Binh Dien poor women in *Acacia*

production compared to high and medium income women is also because of too small planted area in poor the income group.

Table 5.11 Total labor days for forestry production by women of different income groups.

Forestry tree	Total labor days/ year		
	High income	Medium income	Poor income
<i>Acacia</i>	11.75 ^c	8.07 ^b	2.53 ^{b c}
<i>Eucalyptus</i>	7.62 ^c	3.80 ^b	0.38 ^{b c}

Note: Figure with the same noted superscript are significantly different at $P < 0.05$
 Source: Survey, 1998.

T-test result indicated that there was no significant difference between the involvement of high and medium women in *Eucalyptus* production. The other finding was that the poor female farmers spent significantly less time than high and medium income women in *Eucalyptus* planting and management. Like *Acacia* production, there was only few poor households who planted *Eucalyptus* on the farm by themselves. Therefore, less involvement of poor women in this forestry tree production was observed compared to higher income women.

The result of the comparison of women's time in different economic status spent in off-farm activities is reported in Table 5.12. The survey found that high income women did not spent any labor day in collecting bamboo shoot, while medium income women allocated 3 labor days per year. However, T-test result did not show significant difference. The involvement of poor women in collecting bamboo shoot was largest (6.1 labor days per year) and there was significant difference between poor and high income women in time allocation to this off-farm activity, but between medium and poor women there was no difference. Bamboo shoot collecting is very hard work, low income women still try to do this activity to earn money to trade for food.

Table 5.12 Total labor days for off-farm activities by women of different income groups.

Off-farm activities	Total labor days/ year		
	High income	Medium income	Poor income
Collecting bamboo shoot	0.00 ^c	3.00	6.10 ^c
Collecting fuelwood	16.17 ^{a c}	29.70 ^{a b}	47.67 ^{c b}
Collecting imperata	1.80 ^{a c}	13.27 ^a	16.03 ^c
Cutting broom grass	0.00 ^{a c}	3.23 ^a	7.33 ^c
Collecting wild plant	4.73 ^{a c}	11.48 ^a	12.60 ^c
Making wine	8.83	8.47	2.67
Small business	21.70 ^c	14.87 ^b	0.00 ^{c b}

Note: Figure with the same noted superscript are significantly different at $P < 0.05$

Source: Survey, 1998.

For cutting imperata, the finding was that Binh Dien high income women spent only 1.8 labor days which was significantly smaller than 13.3 and 16.0 labor days spent by medium and poor income women. There was no significant difference between medium and poor income female farmers in undertaking this activity. Cutting imperata was Binh Dien low income women's domain. There was a few high households who cut imperata to cover the shed, while poor and medium income women beside cutting imperata to cover their house and livestock shed, they also cut it to trade for food. Hence, the involvement of medium and poor income women in cutting imperata were about 7 fold compared to that of high income women.

The testing of means indicated that medium and poor income women allocated an average of 3.2 and 7.3 labor days per year which were significantly greater than that of high income women to cutting broom grass. The reason is because broom grass cutting is low profit job, hence high income women did not spend any labor day in this activity. The lower income women who have limited land area and lack of capital to do high profit job try to do every work to earn money to buy food.

Different from cutting imperata and broom grass, wild plant collecting is not income generating activity but it is carried out to provide vegetable for local people and pig raising. As in other upland areas of the country, vegetable cultivation in Binh Dien is not developed. So, almost all households had to collect wild plants to feed people and pigs. The survey found that this activity was the female farmers' domain. However, some high income women who had a chance to do small business in the market can buy vegetable, so the involvement of high income women in collecting wild plants was significantly less than that of medium and poor income women. However, there was no significant difference between the poor and medium income female farmers in collecting wild plants. This is because both poor and medium income households had not enough food so they tried to reduce buying food by using wild plants.

Making wine is a responsibility of Binh Dien women. However, their total labor days by year used for this job depended on economic status. The poor women spent only 2.7 labor days per year in making wine while the high and medium income women allocated 8.8 and 8.5 labor days which were more than three fold compared to that of poor women, but t-test result did not indicate significant difference. This is because number of households who had wine making job was too small when compared to the total households interviewed, so the statistical analysis did not show significant difference. In reality, the poor women do not have capital to buy the tools to make wine although this activity can bring profit and its byproduct was very good food for pigs. Both high and medium income women can organize this job because the capital which is needed to make wine was not so high. So, the finding was that there was no significant difference between involvement of high and medium income women since they spent the same amount of time in making wine.

Like making wine, small business was also predominantly carried out by women in the study area. The research found that high and medium income female farmers spent 21.7 and 14.9 labor days which were significantly higher than that of poor female farmers in doing small business. It was also found that there was no significant difference between high and medium income women in doing this job although the

total labor days which was performed by high income women was nearly two fold compared to medium income women. It is clear that higher income women often engaged in the jobs which could bring high profit, but that usually required high investment.

To sum up, in Binh Dien, higher income women often involved in high profit jobs, while poorer women who did not have money to make investment, they rather engaged in collective activities to supply food for their family members.

5.4 Gender division in housework by women and men in Binh Dien

In recent years, to evaluate economic potential of family household, many researchers are concerned with studying women's time in housework in rural area (Ha, N. K., 1997). Research on housework is very important to find out constraints to women's productive roles. This section reveals the roles of Binh Dien men and women in housework. However, the quantification of housework is very difficult because in reality the women can do two or three housework simultaneously. For example, they can take care their children and cook dinner at the same time. Hence, this research could only study on selected housework. Table 5.13 presents the contribution of Binh Dien male and female farmers of different economic status to major housework doing. The research found that Binh Dien women of the different income groups spent more time in all housework than men. There was a significant difference between high income men and women in time contribution to cooking and going to the market. The high income female farmers allocated an average of 12.73 and 2.77 hours per week to cooking and going to the market, while the high income male farmers did not contribute any hour to these tasks. For the remaining domestic tasks, the high income men participated in them but their time contribution was very small. Taking children's bath was also mainly carried out by the women. For taking children to school and checking children's studying, the high income men and women contributed equally the time to these works. The survey also found that female farmers of medium and poor income groups allocated more time than men in respective income group to doing almost all housework. Especially in washing task, the medium and poor income men did not join in this.

In brief, the time spent in doing all domestic works by Binh Dien men of all economic groups was much less than that spent by women in the respective income

group. Nozirak B., and Lin M. K. (1990) reported that Malaysian women spent much more time than men in domestic tasks (an average of 22.4 hours per week of the women, while that of men was only 2.8 hours). Benchaphun, et al. (1987) in the research on the roles of women and men in Northern Thailand indicated 11.3 and 35.1 hours per week spent by men and women respectively in doing housework. This is also true in Binh Dien commune, the total of hours spent in housework by women was greater than that spent by men of all economic groups (an average of 29 hours by women and only 2.6 hours by men). It was also found that the women of lower economic status spent more time in doing housework. It is clear that, although in any what kind of economic status, housework took a lot of time of women. This limited their participation in productive work and reduced their welfare on leisure and improving knowledge.

Table 5.13 The average hours spent in housework activities by gender and economic

Housework	HH group	status					
		Rich		Medium		Poor	
		F	M	F	M	F	M
--hours/ week--							
Cooking		12.73	0.00	12.60	0.67	10.50	0.23
Going to the market		2.77	0.00	3.87	0.33	2.17	0.00
Cleaning the house		1.63	0.07	1.63	0.37	2.63	0.00
Fetching water		1.27	0.30	2.50	0.43	2.27	0.30
Collecting fuelwood		0.93	0.00	2.50	0.33	4.00	1.00
Taking children to school		0.77	0.40	0.20	0.37	1.32	0.33
Checking children's studying		0.67	0.50	0.28	0.78	0.50	0.00
Taking children's bath		1.77	0.27	2.13	0.43	4.67	0.50
Washing		2.83	1.17	5.17	0.00	5.83	0.00
Total		25.37	1.70	30.02	3.72	33.88	2.37

Source: Survey, 1998.

5.5 Work routine by women and men

The description of monthly activities is useful to explain daily work routine. The monthly agroforestry production activities by gender are shown in Table 5.14. Both male and female farmers participated in almost all monthly agricultural and forestry production activities and off-farm as well. However, there are some activities that are performed by only men such as hunting or only by women such as gathering bamboo shoot and harvesting mungbean. The kind of monthly activity depends on production seasonal calendar.

Table 5.14 Monthly production activities in Binh Dien commune by gender

Months	Activities by gender	
	Male	Female
January	Rice, cassava, mungbean, peanut land preparation and sowing/ planting	Cassava, mungbean, sweet potato and peanut land preparation and sowing/ planting, collecting fuelwood
February	Mungbean sowing, planted forest protection.	Cassava and sweet potato planting, mungbean weeding and munching, cutting imperata, collecting fuelwood
March	Mungbean and peanut fertilizer applying, logging, hunting	Crop weeding, cutting imperata, and broom grass, crop fertilizer applying, collecting fuelwood
April	Planted forest weeding, hunting, logging, gardening	Cutting imperata and broom grass, collecting fuelwood, planted forest weeding, gardening, mungbean harvesting
May	Rice and peanut harvesting, hunting, logging	Mungbean, peanut, rice, sweet potato, black pepper, sugarcane harvesting and storage
June	crop land preparation and sowing	Participating in land preparation, crop sowing and planting black pepper harvesting and storage, gathering bamboo shoot
July	Logging, hunting, gardening	Crop weeding, gardening, bamboo shoot gathering, collecting fuelwood
August	Fertilizer applying, planted forest weeding, logging, hunting	Crop fertilizer applying, planted forest weeding, mungbean harvesting, collecting fuelwood, gathering bamboo shoot.
September	Gardening, logging, hunting, peanut harvesting	Mungbean, peanut harvesting, gardening.
October	Rice harvesting, forestry land preparation	Rice and sweet potato harvesting, land clearing to plant forestry trees, collecting fuelwood.
November	Forestry tree planting, drinking	forestry planting, fuelwood collecting, doing small business.
December	Forestry tree planting, drinking	Forestry tree planting, fuelwood gathering, doing small business

Source: survey, 1998.

The data about daily work routine by gender and detail activities was gained from the interview and direct observation of three households in different economic status. The survey showed that daily work routine by gender in Binh Dien depends on the season. The daily work routine by gender and detail activities for dry and rainy season are described in Table 5.15 and 5.16.

Table 5.15 Daily work routine by gender for rainy season

Activities	Time taken	
	Women	Men
Cooking breakfast	30 min	-
Sweeping the house (1st)	10 min	-
Feeding pig (1 st)	10 min	-
Cleaning utensils (1st)	10 min	-
Feeding cow (1st)	-	10 min
Working in the field	3 hrs 20 min	4 hrs
Go to the market	27 min	-
Cooking lunch	30 min	-
Feeding chicken (1st)	10 min	-
Feeding pig (2 nd)	10 min	-
Cleaning utensils (2 nd)	15 min	-
Making tea for guest	10 min	-
Discussing with neighbors	15 min	1 hrs
Working in homestead	3 hrs	3 hrs
Fetching water	25 min	4 min
Gathering fuelwood	15 min	-
Cooking dinner	45 min	5 min
Sweeping the house (2 nd)	10 min	-
Feeding pig (3 rd) and cleaning pig shed	20 min	-
Feeding cattle (2 nd) and cleaning cattle shed	-	25 min
Washing clothes	20 min	-
Preparing and cooking feed for pig	30 min	-
Total	12 hrs & 02 min	8 hrs & 44 min

Source: survey, 1998.

Table 5.16 Daily work routine by gender for dry season

Activities	Time taken	
	Women	Men
Cooking breakfast	25 min	4 min
Sweeping the house (1 st)	12 min	-
Feeding pig (1 st)	15 min	-
Cleaning utensils	15 min	-
Feeding cow	-	15 min
Working in the field (1 st)	4 hrs & 20 min	5 hrs
Going to the market	22 min	-
Cooking lunch	35 min	4 min
Feeding chicken (1 st)	10 min	-
Feeding pig (2 nd)	10 min	-
Cleaning utensils (2 nd)	17 min	-
Working in the filed (2 nd)	4 hrs	4 hrs
Fetching water from the spring or well	17 min	4 min
Gathering fuelwood	20 min	4 min
Cooking dinner	30 min	-
Sweeping the house (2 nd)	12 min	-
Feeding chicken (2 nd)	10 min	-
Feeding pig (3 rd) and cleaning pig shed	25 min	-
Cleaning cow shed	-	10 min
Cleaning utensils (3 rd)	15 min	-
Checking chicken	10 min	-
Making tea for guests	10 min	-
Discussing with neighbors	10 min	1 hrs
Washing clothes	30 min	-
Preparing and cooking feed for pig	27 min	-
Total	14 hrs & 37min	10 hrs & 41 min

Source: survey, 1998.

The daily work routine of Binh Dien men and women which is influenced by economic status and the weather condition is described as follows. In the dry season the women often get up at 4 a.m. and they start housework by cooking breakfast for their family. Their housework is finished at about 9 p.m and 30 minutes. The men often get up later than the women about 1 hour and they start a new day by drinking tea which is prepared by their

wife. In the rainy season, because the weather is colder than in dry season, so they get up later to start house work at about 5 a.m and finish earlier (at 9 p.m).

Bajracharya (1993) reported that in agroforestry system in hills of Nepal, on average, women worked in various activities for 12 hours 49 minutes in a day, while men worked for only 8 hours 5 minutes. In Vietnam, according to Monica (1994), Vietnamese women traditionally work longer hours than men. In some cropping seasons, women work for 12-15 hours/ day, whilst the men work for 8-10 hours/ day (Du, et al, 1994). This was also found in Binh Dien commune, an average total working hours per day of female farmer spent in housework and production activities (13 hours 19.5 minutes) was found greater than that of male farmer (9 hours 42.5 minutes) (an average number which was calculated from the total housework doing hours of two seasons). Benchaphun, et al. (1987) found that in Thailand, total time spent in all crop and household activities is higher for women (59 percent) than men (41 percent). The interview and observation in Binh Dien commune also indicated that the daily working time spent in dry season is more than that spent in rainy season (Table 5.15 and 5.16). In total daily working hours of Binh dien farmer, the time spent in talking with neighbors by the male farmers (1 hour per day) is 6 fold when compared to female farmers (only 10 minutes per day). Although the total of hours work on field by Binh Dien women was found to be a little bit less than that of men but their time throughout the day is very heavy due to various responsibilities and they do not have time for any personal hobby.

5.6 Income and personal expenditure

The information on income of the family was obtained from formal survey. It was found that 84.5 percent of men do not keep their income. More than 12 percent of respondents stated that both husband and wife joined in keeping family's income. Actually, in almost all households, the husband often keeps some money for personal expenditure

before giving their income which was earned from wage jobs to their wives. In some other households, the cash income of the husbands and the wives was kept together and they are used by both. The number of households in which the income was kept by only men occupies very small proportion (3.3 percent). However, this finding did not imply that Binh Dien women were people who had authority to decide expenditure of their family including personal expenditure. Therefore, it is necessary to examine personal expenditure of the husbands and wives.

It was found that only the men spent the money for cigarette smoking, while they did not spend in cosmetic buying but the analysis result did not show a significant difference. The reason may be that cosmetic buying expenditure of Binh Dien men equal zero and the number of observed sample was small, so the statistical analysis did not show a significant difference, although this expenditure of the women was greater than that of the men. Cosmetic buying is needed for every woman but actually only high and medium income women spent money in cosmetics. Because of poor situations, the poor women hardly spent their family's income for personal needs. Binh Dien men spent a little more than men in buying clothes. In reality, the high income women often spend more than men in cloth buying, while the poor women often wear second-hand clothes which were obtained from their relatives. However, the data was used for the statistical analysis was obtained from interview of only 3 households in each group. It was also found that there was significant difference between Binh Dien men and women in expenditure of shoes buying. Actually, Binh Dien men did not concern more than women in this kind of expenditure but due to the price of men's shoes is often higher than the price of women's shoes, so this expenditure of men was greater than that of women. Especially, Binh Dien male farmers spent a large amount of family income for drinking beer and whisky. This is rather a popular problem in many rural areas in Vietnam and in every economic status. The finding reflected that although Binh Dien women were keepers of family income but their personal expenditure was smaller than that of spouse (Table 5.17). The total personal expenditure of Binh Dien male farmers was greater than about 2.5 times that of their wives. The women often spend primarily family's income for household's needs. According to Jeanne (1988), really do the

women use their own earnings for personal needs. More than do men, women generally spend all their income for the household and their children's school expenses. The superior status accorded to adult males allows them to spend their income on entertainment while the women must provide social and economic stability for the family (Mark, P., 1990).

Table 5.17 Personal expenditure by gender (VND/ year)

Items	M	F
1. Cigarettes	40,000	0*
2. Clothes	57,222	47,222
3. Cosmetic	0	4,778
4. Shoes	7,556	4,777*
5. Drinking	45,889	0*
6. Hair cutting	13,667	4,222*
Total	164,333	61,000*

Note: Significance at $p < 0.05$

Source: Survey, 1998.

5.7 Income contribution

One the returns to labor are calculated for each category of household member, their contribution to total household income can be evaluated (Ruth, 1985). The income contribution of Binh Dien men and women was calculated from total labor days which was spent by them in crop, animal, forestry production as well as off-farm activities both in cash and in kind. The result indicated that the income contribution of Binh Dien men and women depended on source of incomes and economic status (Table 5.18).

The statistical analysis showed that Binh Dien high income women contributed the same amount of income which comes from crop production. In contrast in the high income group, the income of medium and poor women from crop production was significantly greater than that of medium and poor men. Actually, in poor households where both the wives and husbands participated in crop production, their income from this source was the

same amount or in some households, this income of the husband was higher than that of the wife. However, the analysis showed significant difference but the difference was not large.

Table 5.18 Income contribution by gender and economic status

Income source	High income		Medium income		Poor income	
	M	F	M	F	M	F
	---1000 VND/ year---					
1. Crop production	1,798	1,739	1,239	1,527*	680	897*
2. Animal production	407	790*	178	593*	14	499*
3. Forestry production	414	246*	115	61*	0	0
4. Off-farm activities	662	721	741	714	651	564
5. In kind	103	509*	183	535*	57	706*
Total	3,383	4,004*	2,456	3,430*	1,402	2,666*
% of family's income	36.2	42.9	35.4	49.4	30.4	57.7

Note: Significance at $p < 0.05$

Source: Survey, 1998.

The income from animal production of the women in all economic status was significantly higher than that of men in the respective household group. However, the difference in this income among men and women was greater than in lower economic status. For example, in the high income group, the difference of income from animal production of women and men was smallest. This is because income from cattle production which is the men's domain in high income households was greatest. In reality, income from animal production in all economic groups of the region mainly came from pigs and chicken raising, so income contribution of the women to this income source was higher than men. Nevertheless, the income which come from forestry production of Binh Dien men was significantly greater than that of women in all household groups. It is clear that forestry production was Binh Dien men's domain. With regard to off-farm activities, the women and men in all economic groups contributed the same amount of income. However, there was still a difference in the value of earnings from off-farm activities between men and women.

The high income women contributed more than men to income of small business, while the high income men earned more than high income women in community works such as attending in local authority management. Difference from the high income group, the value of income which come from off-farm activities of Binh Dien medium and poor women was slightly smaller than that of medium and poor men (but not significant). Medium and poor income women often generated income from low-earning off-farm activities such as collecting Imperata and fuelwood, while the medium and poor income men often earned off-farm incomes from high-earning occupations such as logging, hunting and wage employment. In-kind income in this research was calculated from some products of women and men which have been used for family consumption such as fuelwood, wild plants, chicken. The finding was very interesting in that the women in all economic status contributed more than men from these sources in all household groups.

The statistical analysis indicated that the women contributed more than men to total family's income in all economic groups. The high income women generated income not only from on-farm production but also from off-farm activities such as small business and making wine. The women of medium and poor income households, with limit in productive resources, try to generate income for their family by collecting and using natural resource such as fuelwood, imperata, broom grass and wild plants for trading and family's consumption as well. A research in Nepal indicated that there was larger share of total household income accruing from women than men. It was found that the Nepalese women contributed 49.8 percentage of total family income while the men contributed only 44.6 percentages of that (Ruth, 1985). In the same way, although Binh Dien men contributed more than to incomes from wages and salaries but their contribution in total family income was smaller than that of women in all household groups. If income source in kind is included, percent of income contribution to total family income of high, medium and poor income women was 43; 49 and 58 % compared to 36, 35 and 30 % by men in high, medium and poor income group respectively (Table 5.18).