



**GENDER AND THE COMMERCIALIZATION  
OF SUBSISTENCE AGRICULTURE  
IN NEPAL**

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## EXECUTIVE SUMMARY

This report presents findings from the Gender and Farm Commercialization Study (GFCS), an applied research project investigating the role of gender in the adoption of new agricultural technologies by small farms in the Rapti Zone of Nepal. The study is a collaborative effort between the International Center for Research on Women (ICRW), located in Washington, D.C., and New ERA, a research and development training institution based in Kathmandu.

Over the past five to ten years, small farms in the Rapti Zone have been increasing their production of a range of vegetable and fruit cash crops. This increased commercialization of farm production is occurring alongside continued reliance on traditional cereal crops and, for some farms, off-farm sources of income. One of the principal agents of agricultural commercialization in the Rapti Zone is the Vegetable, Fruit and Cash Crop (VFC) Program, which is being implemented under USAID/Nepal's Rapti Development Project. The principal objectives of the VFC program are to increase cash crop productivity through building local capacity, and to raise farm household income. The VFC program seeks to establish "production pockets" of entrepreneurial farmers who will use new technologies to produce high-quality vegetables and fruits for local and national markets. These objectives are consistent with national priorities to diversify small farm production and increase rural incomes.

The goal of the Gender and Farm Commercialization Study is to evaluate, by gender, the production and consumption effects of small farm commercialization in Rapti. Focusing on not only the activities and effects of the VFC program but also incorporating information on changes outside the VFC program, the following objectives were established for the study:

- Documenting differences in cropping patterns, labor use, incomes, expenditures, and nutritional and health status for households identified as adopting the new technologies for producing vegetables, fruits, and other cash crops (VFC households) compared with households that have not (non-VFC households) adopted the new technologies promoted by the VFC program;
- Wherever possible, determining the direct effects, disaggregated by gender, of the VFC program and commercialization on the production (on-farm and off-farm) and consumption patterns of VFC households;
- Identifying the opportunities and constraints for the efficient and equitable participation of women farmers in VFC program activities;

- Evaluating the above changes, effects, opportunities, and constraints in three communities targeted by the VFC program. Each community represents a different agroecological, cultural, and socioeconomic environment; and finally,
- Providing the Office of Agriculture and Rural Development of USAID with recommendations for improving agricultural commercialization in the study area so that both male and female farmers participate and benefit.

The study's design is cross-sectional in its comparison of two groups of farm households. One group consists of households which, based on a set of criteria, were determined to be incorporating the new technologies for vegetables, fruits, and other cash crops promoted by the VFC program. The second group consists of farm households which continue to cultivate vegetables, fruits, and cash crops using traditional technologies and practices. Both groups continue to cultivate staple cereal crops and have off-farm sources of income.

Field research was undertaken in three communities in the Rapti Zone where the VFC program is active. These three communities are Satbariya in the Dang District, and Jinabang and Thabang in the Rolpa District. In each of these communities, forty-four VFC and forty-four non-VFC households were randomly selected. A number of techniques were used to obtain qualitative and quantitative information on VFC and non-VFC household production and consumption. The principal data collection approaches used were survey questionnaires, random spot observations of time allocation, ethnographic techniques, and rapid rural appraisals. Field research was undertaken from February 1991, through January 1992.

The information collected by GFCS is comprehensive. A broad range of socioeconomic information was collected on the gender-disaggregated effects of commercialization on subsistence farm households. The information collected reveals that overall there are pronounced socioeconomic differences between households participating in the VFC program and those households not participating. This is true in terms of cropping patterns, labor use (home and hired), income generation, and expenditure patterns. It was not found to be true with regard to nutrition and morbidity measures, although the analyses of the anthropometric and morbidity data are still preliminary. It is also clear from the data that the VFC program is an important factor contributing to the socioeconomic differences between VFC and non-VFC households. However, many of these differences also arise due to longer-standing socioeconomic differences in wealth and resources among households. Nonetheless, the differences in the characteristics for VFC households compared with non-VFC households are too great to be accounted for exclusively by factors outside the VFC program.

In all three study communities, VFC households have larger farms. Most of these differences in size of landholdings existed prior to the VFC program. The availability of surplus land that can be used to cultivate vegetable, fruit, and cash crops is an important

factor accounting for household participation in the VFC program. With larger landholdings, the VFC households can cultivate a wider range of crops, including vegetable, fruit, and cash crops. In terms of hectares, VFC households in all three communities devote more land to VFC crops than non-VFC households. However, both VFC and non-VFC households continue to devote more land to food crops than to cash crops.

The increased production of VFC crops by VFC households changes the amount of labor allocated to agricultural and livestock activities. At the most aggregated level (time spent in all agricultural and livestock activities combined), an interesting pattern emerges (which is frequently reported in the literature on women in development): Men in VFC households decrease their time in agricultural and livestock activities while women increase their time. Within the agricultural and livestock farming system, differences in men's and women's time allocation in VFC households versus non-VFC households tend to parallel each other, with men's time spent in vegetable and fruit production increasing more than women's time. With few exceptions, both men and women in VFC households in all three communities increase their time spent in cultivating such crops as potatoes, mustard, other vegetables (cauliflower, cabbage, tomatoes, peas and beans), and apples.

Time allocated to cereal crops also differs, again with shifts in men's and women's time tending to parallel each other. The most significant changes occur in paddy and maize production. Men and women in VFC households spend more time in paddy and less time in maize production than their counterparts in non-VFC households. The decreased male and female time allocated to maize by VFC households is particularly noticeable. One of the most significant shifts in cropping and time allocation patterns between VFC and non-VFC households is that the former are reducing maize cultivation and expanding vegetable and fruit production.

What determines how men and women allocate their time to VFC activities? Multiple linear regression analysis was used to determine the effect of various economic and social factors in allocating time. Of particular relevance to the VFC program is the finding that the variable "household participation in VFC program" has a significant effect on both men's and women's time spent in vegetable, fruit, and cash crop production, suggesting that the VFC program has been successful in increasing the time participating farmers are investing in vegetable and fruit cultivation. However, the regression analysis showed that the time women spent processing jams, jellies, noodles, brandy, and carpets reduced the time they spent in fields cultivating VFC crops. Although the negative effect was small, its presence reminds us that the balance between women's home and field work is delicate and needs to be continually monitored as crop commercialization proceeds.

Overall, VFC households hire more labor than non-VFC households. However, the amount of labor purchased is still relatively small. Nonetheless, the expansion of VFC crops is resulting in increased local on-farm employment possibilities.

Taking into account the differences in the amount of land in agricultural production and greater time allocated to VFC crops, VFC households have much higher incomes per capita than non-VFC households in all three communities. VFC households also have consistently higher incomes from VFC crops than do households not participating in the VFC program. Among the VFC crops, potatoes followed by other vegetables such as cauliflower, cabbage, tomatoes, peas, and beans, contribute the most to on-farm income in all communities. Consistent with their higher total income, most of which comes from cereal production (with the exception of Satbariya), VFC households have higher cash incomes than do non-VFC households. However, this cash income comes principally from off-farm sources both within and outside the community, with agricultural loans playing a major role (particularly so for Jinabang). This finding that cereal crops, livestock, and off-farm cash income contribute more to VFC households' total income supports farmers' reports that while income from VFC crops is important, they are still unable to achieve earnings at a level that is greater than that of their other income sources.

Finally in terms of income, there is some evidence that commercialization is bringing about greater income inequality among households. This may be particularly true in the case of VFC households in Satbariya.

Consistent with their higher incomes, VFC households also expend more per capita than non-VFC households in all communities. VFC households spend more on crop inputs than non-VFC households. Of the total per capita investment on crop inputs by VFC households, most is directed toward VFC crops.

However, multiple linear regression analysis of total per capita household expenditures and per capita food expenditures showed no significant difference between VFC and non-VFC households. The most important determining variables for household total and food expenditures were land related, such as size of landholding, amount of land under cultivation, and land tenure status. Income from VFC crops was significantly related to both total expenditures and food expenditures, with a slightly stronger effect on the former. However, the effect of VFC crop income on total or food expenditures did not significantly vary, depending on whether a household participated in the VFC program.

In terms of women's direct involvement in income-earning activities, women participating in the VFC program in Jinabang and Thabang are earning much more income than prior to the program's initiation. These women are producing jams, jellies, chips, apple and potato brandy, and carpets. It is in these two communities farthest from markets that women are able to earn income. It is also in these two communities that women have greater control of their income and more actively participate in household decisions regarding its use. Still, the income earned by women in these two communities is small, and their continued involvement is not independent of the work demands associated with expanded vegetable and fruit production.

The findings presented in this report support three recommendations for the VFC program, which is soon to begin its second phase. These are:

**Use knowledge of gender differences in time allocation to VFC activities to improve program success.** Both men and women in VFC and non-VFC households spend considerable time in the production of VFC crops and products. While it is widely recognized throughout Nepal that women contribute their labor to producing cash crops for the household, the efforts to directly involve women in the training and technical assistance activities targeting cash crops have been minimal. In the case of the VFC program, only a few women reported receiving any training for the VFC crops. It is important to ensure that women who, compared with men spend more time in the communities, are also well trained in the use of the new technologies for vegetable and fruit production. This training would complement the training the VFC program provides these women for their home VFC activities.

**Incorporate women's recommendations for the home VFC activities that earn them the most income.** In each of the study communities, women who have participated in VFC training are enthusiastic about improving their income-earning possibilities from work in and around the home. Many of the home product activities (making jams, jellies, noodles, chips, brandy, and carpets) supported by the VFC program have been adopted by women because they either provide income for women and the household or because they increase household food consumption.

Interviews indicated that the women had sound practical and economic reasons for either continuing or abandoning the processing of VFC products. Moreover, women had a good understanding of the constraints to increased production of successful VFC products as well as how to overcome these constraints.

**Continually monitor the effects of commercialization on intrahousehold income distribution and decision-making.** For the study households, most cash income is pooled and in general men exercise more control over its use. Both men and women earn additional income from the production and processing of vegetables and fruits. Research on women in development (WID) has raised a number of questions regarding what happens to women's status and position in the household with increases in cash cropping. These changes may include loss of status, less involvement in key agricultural production and consumption decision-making, and loss of control over the products of their labor.

The gender-disaggregated information collected by GFCS on intrahousehold income and decision-making provides an excellent base from which to monitor changes in women's access and control over agricultural income as commercialization continues. Such monitoring would help to ensure that timely program actions can be taken to avoid the development of any inequalities that reduce women's status or their equitable participation in agricultural commercialization activities. This monitoring can also be extended to include food and nutrition consequences of increased commercialization.

**These three recommendations for the second phase of the VFC program are in many ways an extension of the concerns that led to undertaking the Gender and Farm Commercialization Study. Adoption of the recommendations, supported by further analysis of the gender-disaggregated data collected by GFCS, would be important in ensuring that USAID/Nepal's "private sector, market-led agricultural strategy" is one that integrates a concern for both equity and efficiency.**

## **1. Gender and the Commercialization of Subsistence Agriculture**

In developing countries worldwide, but particularly in the poorer ones, national development strategies consistently include policies and programs to promote the cultivation of cash crops among subsistence-oriented small farm households. The principal driving forces behind efforts to introduce commercial crops into these farming systems are many. Frequently cited reasons include increased national demand for agricultural products as a result of rapid urbanization; growth of a rural non-agricultural sector, which represents increased demand for crops as well as a supply of labor; technological changes in crops and farming practices (von Braun and Kennedy 1986); rapid population growth in already densely settled agricultural areas (von Braun et al. 1991); and increasing needs of the rural poor for cash incomes to pay, for example, for education and health services.

While market integration of agricultural-based subsistence economies has resulted in positive economic improvements for poor farm households, it has also brought unintended negative economic, social, and environmental consequences. On the positive side, cash cropping provides poor rural farms with new economic opportunities, reduces poverty by raising incomes from on-farm production, increases local employment, and, in the case of export crops, generates foreign exchange earnings and fiscal revenues. In countries where there is an effective agricultural policy, an increase in cash crop production can positively affect staple food supply, which in turn can increase nutritional levels (von Braun and Kennedy 1986). Moreover, where commercialization offers sufficient returns to labor, farmers have increased their flexibility to address problems of declining soil fertility and degradation of the natural resource base (Carson 1992).

Critics, however, have countered that in many cases the economic, health, and environmental benefits expected from commercializing agriculture have not materialized for the subsistence farmers targeted by programs. When land and resources are shifted from local food production to cash crops, local food supply may decrease to a level where it is unable to meet demand, forcing food prices upward and adversely affecting nutritional status

in the poorest households (von Braun and Kennedy 1986). Staple food production also can be adversely affected if the production of cash crops individualizes households in terms of production and consumption, thus disrupting traditional kinship based exchanges of labor and food among families (Paolisso 1985).

Commercialization of subsistence agriculture can lead to reduced access to land for poor farm households (Bouis and Haddad 1990), increased social and class differentiation (Gudeman 1978), disruption of ecological systems and depletion of natural resources (Johnson 1971), and a general cultural disorientation as rural communities lose a certain amount of autonomy and control due to the disruption of traditional subsistence activities (Bodley 1982).

The factors accounting for the success or failure of commercialization of small farm agriculture are complex and interrelated, and in origin can be international, national, and internal to the specific farming system or development program. Within the farming system, the ability of a household to redirect existing productive resources so as to realize immediate and long-term nutrition and economic benefits from the new crop technologies is critical to successful adaptation. In assessing whether subsistence-oriented farm households are able to marshal the adequate productive resources, it has become increasingly recognized that an important consideration involves viewing the changes brought by commercialization from the perspective of gender.

### **Gender Issues in the Commercialization of Subsistence Agriculture**

The fact that commercialization of subsistence agriculture in developing countries leads to different production and consumption changes for men and women has been well established for at least two decades. Anthropological and policy research undertaken by investigators working in the women in development field have clarified the sex-based agricultural division of labor in many developing country societies, and provided insights on how gender-based labor relations change during commercialization (Buvinic and Mehra

1990). This applied research has been critical in increasing the awareness of policymakers and development practitioners of the fact that agricultural commercialization is not gender-neutral, and that without some explicit consideration of gender issues, commercialization policies and programs can have unintended consequences that marginalize women in the production process, underutilize their productive input, and generally lower their social status and economic position—all of which can lead to failure of a project and the loss of potentially important economic and nutritional benefits for subsistence farm households.

The gender issues pertinent to research on the commercialization of subsistence agriculture are many. Five issues, which have been the focus of recent research, are particularly important and provide a background for the discussion of the Gender and Farm Commercialization Study (GFCS) in chapter 2. These five issues are:

**Differential and inequitable increase in workloads for women as a result of the introduction of cash cropping.** It has been widely reported that women's work in agriculture and other household work increases with commercialization. This in turn has led to time conflicts and demand for more children to provide extra labor in the household. For example, in Zaire, the introduction of a high-yielding variety of maize increased the workload of the women who had to provide the additional labor required to meet increased production. The extra demand on time forced these women to cut back on growing food crops for their households (Buvinic and Yudelman 1989).

While perhaps it is generally true that commercialization increases women's work in agriculture, there are important exceptions or conditions that are relevant for policies and programs. A review of studies on how agricultural innovation affects women shows mixed results, depending on the type of technology introduced (Buvinic and Mehra 1990). Projects that have incorporated time-saving technology (for example, pumps, carts) as part of farm commercialization have benefited women, who have used the time saved to engage in, for example, income-generating activities. Also, a disproportionate increase in women's work as a result of commercialization may occur only for the poorest farm households or only

until households achieve a level of production and income that allows them to hire extra labor (von Braun 1989).

**Closely related to the increased time women spend in agriculture is the concern that women lose control of the products of their labor during commercialization. The introduction of cash crops has traditionally increased the economic status of men, while decreasing the autonomy of women, largely because it has been primarily men who have received the training and the new technologies. A focus on training men in the production of introduced cash crops, for which they controlled the income earned, has left women farmers insufficient time to continue their traditional income-earning activities, for which they controlled the income earned (for example, local marketing) (Blumberg 1989).**

Commercialization can also undermine women's traditional control over certain agricultural crops. A project in The Gambia which introduced a new irrigation system for rice production transformed rice from a "woman's crop" to a male-controlled crop (von Braun and Webb 1989). Failure to consider gender roles in income generation and control can lead to project failure. A pyrethrum project in Kenya, which sought to organize a co-op to generate income from the sale of the flowers (used in pesticides), failed when women reduced their participation to protest the fact that men were the only ones who received payment (Blumberg 1989).

**For women and their families, the household and individual health and nutrition consequences of commercialization are related to changes in time and income. Traditionally, women have been the ones who allocated household income for food, child care, health, and to a certain extent, education. When women lose control over income - -as it increasingly becomes cash income from cash cropping--they have less income under their direct control for food, health, and other household essentials. Child health and education as well as the woman's health can suffer (Blumberg 1989). An example of this is an irrigated rice project in Kenya in which the earnings from the crop were given only to the men. As a result, household incomes rose but nutritional levels fell because the women**

were dependent on their husbands for expenditures (Hanger and Morris 1973) Also, the method of payment has an effect on how it is used. Usually, lump sum payments (a common form of wage in cash crop production) are associated with the purchase of consumer durables, whereas continual forms of income are more likely to be spent on food. It has been observed that daily standard of living and nutritional levels depend more on women, who earn small, steady incomes which they tend to spend on small, regular purchases of food (Guyer 1980).

**Recent theoretical and empirical research is exploring the usefulness, in terms of policy and programs, of adopting new models of household behavior.** Commercialization of subsistence agriculture targets the small farm household. While researchers and development practitioners have long recognized the complexity and diversity of household forms and functions, there has been a tendency to avoid--in terms of theory, methods, and actions--the implications of the many gender and social status divisions that occur within households. In recent years, however, research on household resource allocation has begun to more systematically address issues of social divisions within households by focusing on the intrahousehold dynamics that account for different allocation patterns. Rather than seek models that aggregate the operations of households, the emphasis has shifted to identifying the individual differences within the household, offering a more imploded view of the mechanisms that link individual household members (Dwyer and Bruce 1988; Rogers and Schlossman 1990). This intrahousehold perspective, for which gender considerations are critical, conceptually draws attention to the concerns for women raised in the above three points.

**Finally, social and demographic changes worldwide are resulting in women heading more households and being the principal decision-makers.** From a policy and program perspective, it has long been recognized that female-headed households are different than male or joint-headed households (Buvinic, Youssef and von Elm 1978). In part because it was believed that female-headed households were generally not widespread, or were localized in poor urban areas, there was almost no research on the policy and program

significance of female headship for rural areas and agricultural development in particular. However, very recent research is showing that rural households headed by women (de facto and de jure) are much more common than previously believed, and indications are that owing to a number of demographic factors, the prevalence of female-headed households is expected to rise. A study done on targeting female headship found that in certain countries, such as Botswana, the largest proportion of households headed by women is in rural areas (Buvinic and Gupta 1992). Moreover, the number of female farm managers is increasing in the developing world (Youssef and Hetler 1983). For rural areas and agricultural commercialization, the increased presence of women in key decision-making positions and their potentially different priorities, not to mention additional constraints (for example, time), will require that agricultural extension services improve their incorporation of gender considerations in their approaches for reaching farmers.

### **Agricultural Commercialization and Gender in Nepal**

The vast majority of agricultural production in Nepal is semi-subsistence oriented. In the Nepalese farming system, it is widely recognized that the contributions of women are critical. Moreover, in Nepal there has been an active Women in Development (WID) community. In comparison with many other developing countries, women in development and a concern for gender are comparatively well established in Nepal (see for example, Acharya and Bennett 1981).

The Government of Nepal (GON) and international aid agencies working in the country are aware that achieving national development goals, such as economic growth and a reduction in poverty, will require increased commercialization of the rural-based, semi-subsistence economy. The remainder of this chapter presents background information on the national development priorities of Nepal, focusing on how the U.S. Agency for International Development (USAID/Nepal) is supporting government efforts to promote new cash crops among subsistence-oriented farmers. The chapter concludes with a description of two USAID/Nepal program activities (Rapti Development Project and its

Vegetable, Fruit, and Cash Crop [VFC] program), which are supporting farm commercialization efforts in an increasingly gender-sensitive way.

### ***The Government of Nepal's Development Challenge***

One of the greatest challenges to the Government of Nepal is the alleviation of rural poverty. Despite the many development efforts to date, the proportion of the population living in poverty and deprived of basic human needs, such as safe drinking water, health facilities, education, and transportation, has increased to an estimated eight to nine million people (HMG 1991). The overwhelming majority of the poor are concentrated in rural areas, particularly in the middle hills and high mountain regions.

Rural poverty in Nepal is the result of a number of interacting factors: high population densities, low incomes, insufficient food production, and a resource base that is deteriorating as a result of deforestation, soil erosion, and decreasing soil fertility--all of which threaten the life support systems of subsistence farmers. The lack of off-farm employment and income-earning opportunities further compounds the problems of poverty.

Agriculture makes up 60 percent of the nation's gross domestic product (GDP) and employs an estimated 90 percent of the labor force--the highest concentration in the world (HMG 1991). This reliance of a growing labor force on an already inefficient agricultural sector has led to increasingly low productivity and an acceleration of environmental degradation. The imbalance threatens the sustainability of subsistence agriculture, the self-sufficiency of rural households, and the entire village system. Furthermore, the negative effects of such economic instability are not contained within the villages, but spill over to urban areas as outmigration further stresses overpopulated towns and cities.

### ***GON Development Strategy Plans***

In order to achieve its goal of improving rural living standards and providing the basic

needs of food, water, education, and health services, the GON's Seventh Development Plan for 1986 to 1991 emphasized accelerated agricultural production and improved management of the natural resource base through a local development strategy. This strategy evolved over 25 years and became policy subsequent to the Decentralization Act of 1982. Pursuant to this Act, local government offices of each district were placed under the direction of the district government (formerly, District Panchayat, currently the District Development Committee), thereby establishing a framework for the formation of local plans, the mobilization of local resources, and the local coordination of sectoral development programs (USAID 1987). A key role in the coordination of line agency programs is played by the Local Development Office (LDO) under which the Women's Development Office (WDO) implements a budgeted program and assists with integrating women in line agency programs.

In November 1991, the GON's National Planning Commission (NPC) issued the nation's Eighth Plan which outlines the government's basic directions, thrusts, and priorities for the next five years--1992-97. It is the first plan to come out of the newly established democratic government which emerged after a popular struggle in 1990.

The main purpose of the Eighth Plan is to establish a definite direction for the socioeconomic improvement of its citizens by tackling the problems of economic stagnation and poverty, structural deterioration, environmental degradation, and rapid population growth. This goal is to be attained by meeting the three main objectives of (a) achieving sustainable agricultural growth; (b) alleviating poverty (particularly in the rural areas), and (c) establishing regionally balanced rural development (HMG 1991). The GON has stressed commercialization within the agricultural sector as a strategy to attain its goal.

One of ten priority areas discussed in the Eighth Plan is that of agricultural intensification and diversification. In an effort to absorb the rapidly growing labor force in a productive manner, the plan seeks to diversify cash crops, horticultural crops, and livestock to meet urban demands. Priority is to be given to intensified programs along access roads. In order to increase income in the less accessible hill and mountain regions, sericulture,

beekeeping, medicinal herbs, and other high-value/low-weight commodities are to be identified and promoted.

Under such a broad-based plan to integrate subsistence farmers into a market system, it is expected that increased rural incomes will be shared largely among the producers, including small and marginal farmers, because rural demands tend to be for goods and services with high local value-added potential. Furthermore, agricultural growth should increase the rural food supply and labor demand.

Roads and other forms of transportation to rural areas and market centers are planned to enhance the commercialization of the agricultural sector, facilitate the provision of inputs, and improve marketing opportunities. In addition, market-induced commercialism is to be promoted through government support to cooperatives and through private sector involvement.

Concomitant with the focus of the Eighth Plan on the commercialization of subsistence agriculture is the continuation of the government's policy of incorporating women into the economic development of the nation. Strategies to ensure women's participation in commercial agricultural activities include the expansion of women's access to formal and nonformal education; increased access to credit, technological knowledge, entrepreneurial development programs, market facilities, and employment opportunities; and the extension of technologies that reduce the time spent gathering fuel, fodder, and water, and in other domestic work traditionally carried out by women. This strategy of incorporating women into the commercial activities of the productive sector is to be implemented through district line agencies and the WDO under the LDO. It is envisioned that the strategies set forth in the Eighth Plan will promote the new government's philosophy of enhancing mass awareness, fostering civic responsibility, and self-reliance in conjunction with decentralized development initiatives at the community level.

## ***USAID/Nepal's Agriculture Development Strategy***

USAID/Nepal (henceforth USAID) has established three main program objectives. to support the GON's goals. These are to increase incomes, to improve child survival and family planning services, and to increase Nepal's development potential through liberalization of markets (USAID/Nepal Program Objectives n.d).

Two of these objectives directly support the GON's priority area of commercialization in the agricultural sector. At the policy level, USAID seeks to facilitate the development of government economic and trade policies to improve market infrastructures and support competitive markets in the private sector. At the local level, the programs of USAID's Office of Agriculture and Rural Development (ARD) aim to increase household incomes through market-led rural enterprises, expanded market access, increased productivity, and sustainable management of farm and forest resource systems (USAID/Program Objectives n.d.).

The ARD program strategy seeks to capitalize on Nepal's diverse agroecological zones - -which range from alpine to tropical--and its proximity to the substantial markets of India and other South and Southeast Asian nations. For this strategy to succeed, USAID seeks to connect production by small farmers with diverse domestic and external markets through market-led, private sector-driven agroenterprises. Such enterprises are expected to meet the demands and requirements of the market and improve the choice and flow of goods and services (that is, production inputs and crop marketing) crucial to the improved competitiveness of Nepal's crop and livestock products (USAID 1990).

USAID has identified three indicators of success for this strategy. The first indicator --increased market activity by commercially oriented producers, commodity groups, and agroenterprises--will be measured, in part, by percentage increases in cash sales for representative farmers and the number of farmers in "pockets" of the Rapti Zone who are engaged in cash cropping. Other indicators are the improved policy and regulatory

environment for private sector, agro-based production, processing, and marketing; and the increased control of user groups over farm and forest resources. An additional measure of ARD program success is whether farmers achieve sufficient flexibility to address problems of declining soil fertility and degradation of the natural resource base as farm profitability increases. USAID's efforts to expedite private agroenterprise development are based upon its experiences in other developing countries, which demonstrate the positive impact of private agroenterprise on reorienting subsistence agriculture toward increased commercialization.

### ***Rapti Development Project***

Since 1980 USAID has been supporting a major development endeavor in the Rapti Zone of the Mid-Western Development Region. Approximately one million people live in the zone and are representative of the poverty levels found in the rural areas of Nepal. The zone is composed of five districts--Dang, Pyuthan, Salyan, Rolpa, and Rukum. Four of the districts are hill and mountain areas. The southernmost district, Dang, is in the lower altitudes and encompasses two major valleys with large tracts of arable land plus a good road network and favorable market access.

Phase I of the Rapti Development Project (RDP), which was completed in 1987, achieved significant progress in development of infrastructure and institutions, delivery of services, and management of natural resources. The second phase of the RDP, initiated in 1987, was refocused to reduce the range of activities in order to concentrate on productive center activities (that is, agriculture and forestry). The RDP has four major components: (a) diversification of agriculture and livestock, (b) management of forestry and natural resources, (c) development of local groups and private enterprises, and (d) development of district institutions. In order to facilitate the inclusion of women in all RDP productive sector programs and related local group and private sector activities, a WID component was established under the project grant agreement (USAID 1987).

The overall goal of Phase II of the RDP is to improve the balance among population, land, and natural resources, thereby helping the GON to achieve its aim of improving the rural standard of living. The RDP's specific objective, as redefined following the 1990 midterm evaluation, is to raise household incomes and well-being through increased productivity and improved sustainable management of farm and forest resource systems.

The RDP's strategy for enhancing farm and forest productivity is to develop the capacity and responsibility of local resource user groups, private individuals, and district institutions to manage natural resources and activities more productively and profitably through farmer training and the organization and support of local groups. Institution building with the GON line agencies is provided through budgetary support, training, monitoring, technical assistance, and commodity procurement. The specific technical strategy of RDP is to increase the dissemination and adoption of successful production technologies (Devres 1991).

In 1991, the RDP Integrated Technical and Economic Appraisal (ITEA) proposed priority intervention areas in which technical options to increase productivity and income either existed under the RDP or showed significant promise. The priority recommendation of increasing opportunities for improving incomes directly supports the GON priority area of commercialization within the agricultural sector. Many of the income-generating activities recommended for continuation are being implemented under the Vegetable, Fruit and Cash Crop program of the RDP, including potato, vegetable, fruit tree and cash crop production, processing and marketing and seed production and marketing (Devres 1991).

### *Vegetable, Fruit, and Cash Crop (VFC) Program*

The VFC program, initiated under the agriculture production component of the RDP, has been in operation since 1985. It supports USAID agriculture development objectives of market-led, cash crop-based activities aimed at private sector growth. Similarly, the VFC program complies with the GON priority areas of agricultural intensification and

diversification of cash and horticultural crops. Program activities are implemented through the local development office in each district, with technical assistance provided by No-Frills Development Consultants, a Nepal-based private organization.

The principal objective of the VFC program is to increase horticulture and cash crop productivity in the Rapti Zone by building local capacity and thereby raising the household incomes of the targeted farmers. Based on a philosophy of entrepreneurship development, the VFC program focuses on the following objectives:

- Establish VFC enterprises by developing technical and managerial skills in entrepreneurs.
- Make raw materials and inputs locally available.
- Develop market channels and middlemen to handle VFC products.
- Develop local resource centers for VFC-related technological inputs and technical skills.
- Develop local institutions that can link individual farmers and farmer groups with the activities of district-level government and development agencies.
- Strengthen local government participation in planning and implementing VFC activities.

In implementing the VFC program, No-Frills seeks to support entrepreneurs who are engaged in market-led production of vegetables, fruits, and other cash crops, and who do this in order to generate income for further investment (No-Frills 1990a). One component of the support given to farmers in the program is the provision of subsidies. Discounts on equipment, free seeds, and other supplies are given on a temporary basis to motivate

farmers to "share the risk" by investing their time and resources in these activities. As the farmer generates income, the subsidies are progressively reduced and eventually stopped in order to promote self-sufficiency. Since much emphasis has been placed on very small-sized VFC-related activities, the program can also be defined as microenterprise development with the goal being to provide advancement opportunities for the potential entrepreneur.

As of early 1992, the VFC program has been active in 22 Village Development Committee areas in the five RDP districts. Through the use of village-based site coordinators, short-term experts, and farmer training tours, the program (a) provides support directly to farmers and farmer groups involved in VFC crop production, storage, processing and marketing; (b) facilitates the commercialization of small farm agriculture; and (c) promotes appropriate-scale agroprocessing and related rural industries to add value to primary commodities and increase employment opportunities. In addition, the program provides training and support to farmers so they can develop the entrepreneurial skills needed to manage their own VFC-related enterprises.

In all sites, an increasing number of farmers have become entrepreneurs in orchard development, seed and ware potato production, nursery work, vegetable and vegetable seed production, sheep and wool enterprises, and village-level small service industries. They have also become a part of local market networks. It should be noted that the farms are all at different stages of development. The specifics of the production activities of farmers active in the VFC program are discussed in detail in later chapters.

### *The VFC Program and Women Farmers*

The VFC program aims to develop moderately self-reliant male and female entrepreneurs and groups which can skillfully participate in a market economy. The micro-entrepreneurship development activities promoted by No-Frills aim to involve women. The VFC program specifically is seeking to promote a number of home production activities for women, such as making potato chips, apple brandy, and jams and jellies, and weaving carpets. These activities are discussed in greater detail in the next two chapters.

## **2. Gender and Farm Commercialization Study**

The Gender and Farm Commercialization Study (GFCS) is an applied research project focusing on the role of gender in the adoption of new agricultural technologies for cash cropping by semisubsistence farms in the Rapti Zone of Nepal. The project is a collaborative effort between the International Center for Research on Women (ICRW) and New ERA, a Nepali research and development organization. GFCS seeks to evaluate, along gender lines and at the household level, implications or changes related to participation in USAID's Vegetable, Fruit and Cash Crop Project. Particular emphasis is given to changes in cropping patterns, use of time, income, expenditures, and health outcomes for members of households participating in the VFC program. The principal goal of GFCS is to provide policy and program-relevant information disaggregated by gender in order to help USAID's Office of Agriculture and Rural Development assess the household-level effects of an agricultural strategy that is "private sector led, cash crop based and market driven."

### **Conceptual Framework for Disaggregating by Gender**

GFCS builds upon the accepted practice in the applied social sciences of using the farm household as the primary unit of analysis in research on small farm agricultural development. Within the small farm household, particularly those that are predominantly self-sufficient, decisions on resource allocation (land, labor, and capital) are based on internal assessments of production requirements and consumption needs. Understanding a farmer's (male and female) rationality, willingness to assume risks, and degree of innovation requires an understanding of the interrelatedness of production and consumption within the farm household. The construct of "household" facilitates an intermediate level of analysis between the individual and society, and from a practical perspective it is a convenient unit for collecting empirical data.

The farm household, however, should not be conceptualized as a homogeneous entity of individuals with equal skills, influence, and access to resources. In fact, households are systems of resource allocation (Guyer 1980) or, at times, uneasy aggregates of individual strategies that sometimes converge and sometimes compete (Dwyer and Bruce 1988). Along the lines of such factors as gender, age, and status, intrahousehold differences appear in roles, responsibilities, decision-making, and access and control over resources. At the operational level, traditional cultural values and beliefs about appropriate role performance by sex, existing differences in knowledge of and access to an outside world, and the perceived and real opportunity costs of reallocating individual labor within the household combine to define a labor use pattern for a household.

The approach used by GFCS parallels other research on the effects of commercialization of semisubsistence agriculture in its focus on changes in household labor allocation, income availability, expenditure patterns, and individual quality of life--mainly nutritional status and morbidity levels. It is conceptually similar to recent work that includes gender issues in studying the production, income, expenditure, and nutritional and health effects of commercializing subsistence agriculture (von Braun 1989; Bouis and Haddad 1990; Kennedy 1989). However, GFCS assigns priority to addressing gender issues within the household, and at every stage in the research views changes in production and consumption related to production of vegetable, fruit, and cash crops from the perspective of gender. Conceptually and methodologically, GFCS attempts to disaggregate all information collected by gender and social position within the household. The study is particularly concerned with the role of women farmers, which it investigates within the social, economic, and gender context of women's lives. While it is well known that women contribute significantly to small scale agriculture in many developing countries, and in Nepal in particular, there remains a lack of information collected specifically to evaluate the changes in women's economic roles and health brought about by the adoption of new cropping and animal husbandry patterns.

This intrahousehold approach makes it possible to investigate the relevance of a wide range of key household factors in successful commercialization: differential access to and use of resources within the household; multiple enterprises and their interactions; substitutability and specialization of labor in, for example, agricultural activities; marketing outlets and their relationship to differing or conflicting priorities and needs; and how proposed interventions might alter individual power, authority, and status (Poats, Schmink and Spring 1988).

There is a rapidly growing acceptance of the need for an intrahousehold or gender perspective in studying the commercialization of subsistence agriculture. In the past, development models in agriculture assumed that the male head of household was the principal farmer/decision-maker within the household, and that if inputs were directed to this individual, he in turn would integrate, and redistribute to, other household members in an equitable and efficient manner. As briefly indicated in the previous chapter, it is now clear that inequalities and inefficiencies along gender lines can occur if households are conceptualized as "black box," homogeneous units.

The gender analysis of GFCS can capture the similarities and differences in men's and women's roles and responsibilities, and indicate how these change with increasing commercialization. Key areas for investigation include changes in the scheduling and amount of women's agricultural and domestic labor, health and nutrition consequences for women and their families, and income and expenditure decision-making and use.

## **Objectives**

To provide USAID with gender disaggregated information on the effects of agricultural commercialization at the household level, GFCS focused on a number of specific research objectives. These include:

- Documenting differences in cropping patterns, labor use, incomes, expenditures, and nutritional and health status for households identified as adopting the new technologies for vegetable, fruit, and other cash crop production (henceforth referred to as VFC households) compared with households that have not adopted the new technologies promoted by the VFC program (henceforth referred to as non-VFC households).
- Determining, wherever possible, the direct effects, disaggregated by gender, of the VFC program on the production (on-farm and off-farm) and consumption patterns of VFC households;
- Identifying the opportunities and constraints for the efficient and equitable participation of women farmers in VFC program activities;
- Evaluating the above changes, effects, opportunities, and constraints in three communities targeted by the VFC program. Each community represents a different agroecological, cultural, and socioeconomic environment; and finally,
- Providing the Office of Agriculture and Rural Development of USAID with recommendations for improving agricultural commercialization in the study area so that both male and female farmers participate and benefit.

### **Study Design, Sample, and Methods**

Ideally, studies of the effects of agricultural commercialization should be longitudinal, with a baseline of information collected on households before they change production and consumption activities as a result of participating in the program. Unfortunately, this ideal approach is rarely, if ever, feasible: there are no before-and-after dichotomies, but rather continual changes, and the time required for longitudinal studies is prohibitive. The widely accepted alternative is to use cross-sectional comparisons of two groups of farm households.

One group consists of households which are actively involved in commercialization, principally through participation in a structured development program, while the other group is composed of farm households which have elected not to adopt new technologies or to participate in the program. In selecting households for comparison, it is important to choose two groups as similar as possible in terms of their economic resource base and the sociocultural factors that might determine whether households are willing to adopt new technologies. In subsequent analyses of the two groups, any major differences existing before the process of commercialization began must be considered in order to identify those effects resulting from the commercialization program and not due to pre-program differences in household characteristics.

The study design of GFCS is cross-sectional in its comparison of two groups of farm households. One group consists of households which, based on a set of criteria, were determined to be incorporating the new technologies for vegetables, fruits, and other cash crops promoted by the VFC program. The second group consists of farm households that continue to cultivate vegetable, fruit, and cash crops using traditional technologies and practices. Both groups continue to cultivate staple cereal crops and have off-farm sources of income.

The steps undertaken by GFCS to dichotomize study households into two groups--VFC households and non-VFC households--are discussed in more detail below. It is important to note here that some of the production and consumption differences between VFC and non-VFC households captured by GFCS have their origin in preprogram socio-economic differences among households. In fact, some of these preprogram differences may be critical factors in determining whether a household elects to participate in the program. The unavoidable presence of these differences increased the need to use a wide range of qualitative and quantitative research methods in order to (a) identify any preprogram economic or social differences between VFC and non-VFC households whose continuation has a significant effect on current comparisons and (b) "tease out" the influence of these longitudinal factors in the cross-sectional comparison of VFC and non-VFC households. In

the analyses and interpretations presented in this report, attempts have been made to evaluate the effects of any long-standing differences between VFC and non-VFC households. Overall, the use of the comparative approach, supported by ethnographic insights and quantitative analyses, provides valuable information on the household-level changes that result from the commercialization process for small farms in Nepal. This information is essential for donor agencies who are seeking ways to promote growth and improve income in rural areas.

It is also important to make it clear that GFCS is not an evaluation of the VFC program, in terms of what is generally considered to be evaluation or operational research. GFCS did not evaluate the effectiveness of specific VFC program activities in terms of how these activities could be modified in order to reach more farmers, convey information more efficiently, and such. Rather, it investigated the overall effect of specific program activities on the household and its gender relations. The study begins its analysis where program evaluations traditionally end, or at best only provide initial insights. The findings are useful because they provide insights on how households incorporate new cash-producing agricultural technologies and on the status and conditions of households that have not adopted these new agricultural practices.

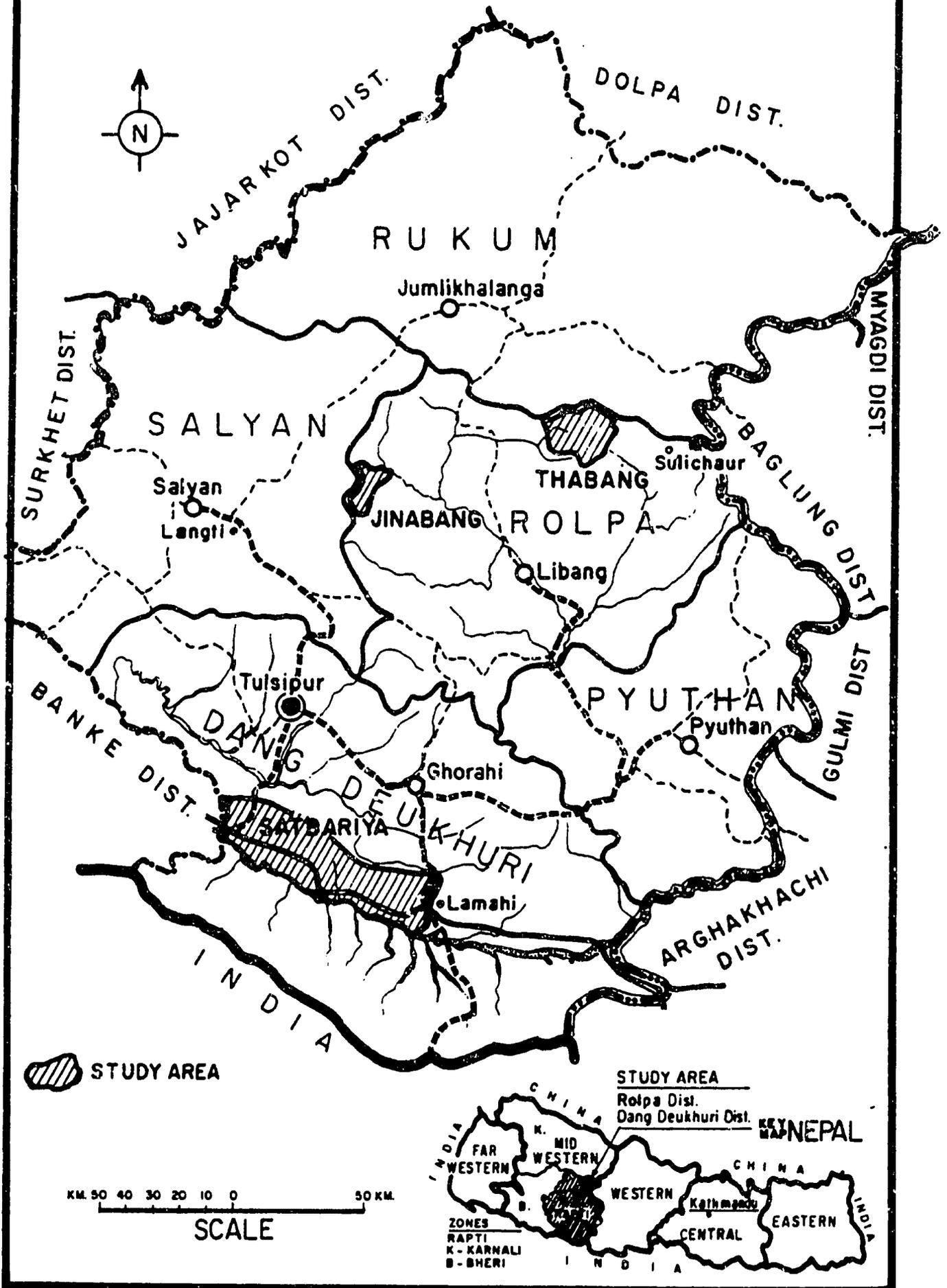
### ***Study Communities***

GFCS was undertaken in three communities in the Rapti Zone where the VFC program is active: Satbariya in the Dang District, and Jinabang and Thabang in the Rolpa District (see figure 2.1). The rationale for selecting these three communities for study was:

- First, these sites represent three different agroclimatic and environment zones: Thabang falls in the higher mountainous region, while Jinabang and Satbariya are in the middle hill and lower plain regions, respectively. Owing to these geographical and agroclimatic differences, the activities of the VFC program vary somewhat, depending on local conditions and the existing farming practices.

FIGURE 2.1

# MAP SHOWING THE LOCATION OF GFCS SITES IN RAPTI ZONE, NEPAL



GFCS was interested in both site-specific changes resulting from commercialization and the VFC program, as well as in identifying changes common to all three communities.

- Second, each study community has a different ethnic composition. Satbariya is made up mainly of the Tharus; Jinabang is dominated by the Chhetris; and Thabang is inhabited by the Kham Magars. These ethnic and cultural differences opened up the possibility of incorporating a wider range of noneconomic variables into the analysis of the household-level effects of VFC.
- Finally, relatively comprehensive longitudinal information on agricultural production in the three study communities is available. The Status of Women in Nepal study (Acharya and Bennett 1981) and previous surveys undertaken by the Rapti Development Project and No-Frills provide good baseline data for comparisons, particularly at the intrahousehold level and by gender.

### *Brief Descriptions of the Communities*

**Satbariya.** Satbariya is located in the lower plains of the Deukhuri Valley, 10 km west of Lamahi Bazaar along the East-West Highway, thus providing the village with easy access to transportation. The village is 100 to 300m above sea level. The total population of Satbariya is 7,505, 28 percent of which is found in wards 5 and 6, the areas selected for study. The predominant ethnic group is Tharu. Another ethnic group is the Chhetris, who migrated from the hilly areas. Both nuclear and extended families are found in Satbariya, with the average household size being 8.7 members. The household settlement pattern is clustered.

Of the four primary and one lower secondary schools in the village, none are located within the study areas. These schools are attended predominantly by boys. In addition to these schools, in the village are a post office, a small farmers' development program, a village development committee, a police office, a forest office, a cotton development

committee, a veterinary office, an agriculture office, and a dairy farm. There are also other social groups in the village which focus on the development of women, livestock, forest and the Tharu people.

Traditionally, paddy and wheat were the base of the village's economy, but they have been replaced by maize, mustard, and local potatoes.

**Jinabang.** Jinabang is located a two- or three-day walk from the Tulsipur, the headquarters for the Rapti Zone, and a two-day walk from Liwang, the Rolpa District headquarters. The nearest vehicle road and market where goods can be bought and sold is located in Langti, in the Salyan District about 32 km to the south. The elevation of Jinabang, which has a dispersed settlement pattern, ranges from 1,800 to 2,200m above sea level. The surrounding area is characterized by cold, snowy winters and warm summers.

Jinabang has a total population of 3,770, of which 31 percent is found in study wards 4, 5, and 6. The ethnic groups in this population are predominantly Chhetri followed by Magar and the artisan castes. A combination of nuclear and extended families can be found, with the average household size being 6.6 persons. The households are dispersed on hillsides surrounding a community center.

There are six primary schools and one secondary school in the village, three of which are in the study wards. Parents generally prefer to educate their sons instead of their daughters. This stems from the belief that the household chores that the daughters perform do not require educational qualifications, while the work sons perform outside the home does require some education.

The village also has a post office, a village development office, a veterinary office, an agriculture office, and an office for the No-Frills site coordinator, who is responsible for implementing the VFC program in Jinabang and Thabang. In addition, there is a vegetable production group formed by the local villagers themselves.

The economy of Jinabang consists predominantly of the cultivation of maize, wheat, barley, and rice, which is limited to the river basin. Potatoes, apples, and vegetables are cultivated in irrigated uplands.

**Thabang.** Thabang is located 2,200m above sea level and is 26 km (two days' walk) from Liwang and a four-day walk from Ghorahi. The climate is temperate, with some snowfall in winter. The nearest vehicle road is in Liwang. The nearest marketing center is Sulichaur in Rolpa, which is about a one- to two-day walk from the village.

The total population of Thabang is 3,810, of which about 31 percent is in study wards 4, 5, and 6. This population is composed of Kham Magar as the dominant ethnic group and occupational castes, including blacksmiths and tailors.

Similar to Satbariya and Jinabang, there is a mix of nuclear and extended families, with the average household size being 5.6 persons. The household settlement pattern is clustered.

There are four primary schools and one secondary school in the village. The secondary school is located in the study ward. In the village are a post office, a village development committee, a small farmers' development program, a police office, and an office for the No-Frills site coordinator when he visits Thabang. The local villagers have also formed a social group for carpet weaving and one for apple production.

The economy is based on the Kham Magars' practice of high-altitude agriculture with maize, wheat, and potato dominating the cropping patterns. Livestock herding is also important, with men being out of the village for long periods of time in order to graze herds in high mountain valleys.

### ***Selection of Sample VFC and Non-VFC Households***

The first stage in identifying a representative sample of VFC and non-VFC households consisted of choosing wards in each community from which to randomly select study households. The study communities are divided into wards--spatially defined sublocations. Involvement in the VFC program varies in each community, tending to be concentrated in particular wards. Based on prestudy visits, interviews with farmers, and discussions with the No-Frills site coordinators, the wards containing both participating and nonparticipating households were identified. Taking into account several additional factors, such as spatial distribution of households in the wards--an important consideration for field enumerators --and number of households in the ward, two to three wards in each community were selected to be the study population from which to draw sample households. Accordingly, wards 5 and 6 in Satbariya, and wards 4, 5, and 6 in each Jinabang and Thabang, were selected. In these wards there are both VFC and non-VFC households.

Prior to deciding on the appropriate sampling procedure and selecting the sample households, it was necessary to complete a sampling frame survey of the population of the study wards. A sampling frame survey was carried out in each study site in November 1990. A two-page questionnaire was administered to all households in the selected wards. Background information collected included family size; age of youngest person; ethnicity; marital status of household head; land tenure; the production level of cereals and vegetable, fruit, and cash crops; and the level of and type of involvement with the VFC program. Altogether the sampling frame survey enumerated 238 households at Satbariya, 176 at Jinabang, and 201 at Thabang, for a total study population of 615 households. Summary findings are presented in table 2.1.

The number of households using the improved agricultural technologies promoted by the VFC program were 44 (out of 238) in Satbariya, 128 (out of 176) in Jinabang, and 88 (out of 201) in Thabang. Great care was taken in classifying households as either VFC or non-VFC. Based on interviews, including those with the No-Frills site coordinators, field

**Table 2.1 Sample Frame Survey Results**

Background Information	Satberiya		Jinabang		Thabang	
	(N=238)	%	(N=176)	%	(N=201)	%
Average household size	8.1	-	6.7	-	5.2	-
Households having children less than 5 years	165	69.3	123	69.9	98	48.8
Ethnicity						
Tharu	195	81.9	-	-	-	-
Chhetri	-	-	168	95.5	-	-
Kham Magar	-	-	-	-	199	99.0
Other	43	18.0	8	4.5	2	1.0
Marital Status of Household Head						
Monogamous	206	86.6	153	86.9	156	77.7
Other	32	13.4	23	13.1	45	22.34
Land Tenure						
Own	56	23.5	175	99.4	171	85.1
Tenant	77	32.4	1	0.6	1	0.5
Other	105	44.1	-	-	29	14.4
Level of Cereal Production						
Meets HH requirements and produces surplus to sell	90	38.8	66	37.5	17	8.5
Meets HH requirements but does not produce surplus to sell	118	50.9	84	47.7	142	70.6
Inadequate production	24	10.3	26	14.8	42	20.9
Level of Vegetable and Fruit Production						
Meets HH requirements and produces surplus to sell	25	10.8	134	76.1	32	15.9
Meets HH requirements but does not produce surplus to sell	179	77.2	31	17.6	137	68.2
Inadequate production	28	12.1	11	6.3	32	15.9
VFC Involvement						
HH using VFC technology (VFC Household)	44	19.0	128	72.7	88	43.8
HH Following traditional Technology (Non-VFC Household)	188	81.0	48	27.3	113	56.2

HH = Household

observations, and testing of different criteria, the field team identified four factors that were thought to be ethnographically accurate in describing levels of involvement with the VFC program:

- received training through the VFC program and are actively using the improved technologies to grow vegetables, fruits, and other cash crops for local markets;
- received training through the VFC program and are actively using the improved technologies to grow vegetables, fruits, and other cash crops for home consumption only;
- received training through the VFC program but are using the improved technologies to grow vegetables, fruits, and other cash crops only to a minimal degree; and
- never received VFC training but have adopted the new technologies from other farmers who have been trained.

If households did not meet any of the above criteria, they were classified as non-VFC households. It is important to reemphasize here that non-VFC households do cultivate vegetables, fruits, and other cash crops. However, they do so by relying almost exclusively on traditional agricultural practices.

As per the above criteria, households in the study wards were divided into two groups: VFC and non-VFC households. Based on the size of the study population and a number of logistic considerations and field constraints, it was decided to randomly select 44 each of VFC and non-VFC households per community. It should be noted that at Satbariya there were only 44 VFC households in the study wards and that all 44 were selected. The sample size (VFC and non-VFC) for Satbariya is 37 percent of the total population, for Jinabang, 50 percent and for Thabang, 44 percent for an overall average of 43 percent.

Table 2.2 presents general sociodemographic information for the study households, disaggregated by gender. Of the 44 VFC and non-VFC households in each community, only one VFC household (2 percent) in Satbariya, only one non-VFC household (2 percent) in Jinabang, and six VFC households (14 percent) and 10 non-VFC households (23 percent) in Thabang are headed by females. The average age of household heads ranges from 37 to 47 years among all households in all communities, with the range for female household heads being slightly broader (25 to 50 years). The average years of education for male household heads is between 5 and 7 among both VFC and non-VFC households in all communities; none of the women who head households have received formal education.

In all communities, the average household size is higher among VFC households (6 in Thabang and 12 in Satbariya) than among non-VFC households (5 in Thabang and 8 in Satbariya). The average size of the VFC households in Satbariya is 50 percent higher than non-VFC households. Interestingly, the size of the female-headed households is only 5 or below. The male-to-female ratio is slightly higher among VFC households in Satbariya and Thabang (1.1 each to 1.0) whereas in Jinabang, it is slightly higher among non-VFC households (1.1 to 1.0). All the female-headed households in Thabang have much lower male-to-female ratios (0.76 for non-VFC to 0.92 for VFC households). Non-VFC households in all communities have slightly higher dependency ratios (0.65 in Thabang to 1.04 in Satbariya) than VFC households (0.61 in Thabang to 0.99 in Satbariya).

### *Data Collection*

A number of techniques were used to obtain qualitative and quantitative information on VFC and non-VFC household production and consumption for the study communities. The principal data collection approaches included survey questionnaires, random spot observations of time allocation, ethnographic techniques, and rapid rural appraisals.

**Survey questionnaires.** Survey questionnaires provided the bulk of the quantitative information on household social, economic, and demographic characteristics; the specific production activities in the farming system, including income, expenditure, and decision-

**Table 2.2 Selected Data for Study Households by Household VFC Status and Community**

Demographic Information	Satbariya (N=88)			Jinabang (N=88)			Thabang (N=88)		
	M	F	A/T	M	F	A/T	M	F	A/T
<b>Number of households</b>									
VFC	43	1	44	44	-	44	38	6	44
Non-VFC	44	-	44	43	1	44	34	10	44
<b>Average age of household heads</b>									
VFC	39.8	25	39.4	40.8	-	40.8	41.2	47.7	44.7
Non-VFC	37.9	-	37.9	36.9	28.0	36.7	46.1	50.0	47.0
<b>Average years of education of household heads</b>									
VFC	7.2 (17)	-	7.2	6.5 (19)	-	6.5	5.5 (11)	-	5.5
Non-VFC	6.9 (15)	-	6.9	5.3 (9)	-	5.3	6.6 (7)	-	6.6
<b>Household size</b>									
VFC	11.3	5.0	11.6	6.9	-	6.9	5.7	4.5	5.6
Non-VFC	7.9	-	7.9	5.8	4.0	5.8	5.2	3.7	4.8
<b>Male to female (M/F) ratio</b>									
VFC	1.13	0.0	1.10	0.96	-	0.96	1.09	0.92	1.07
Non-VFC	1.02	-	1.02	1.09	1.0	1.09	1.12	0.76	1.04
<b>Dependency ratio*</b>									
VFC	0.98	4.0	0.59	0.77	-	0.77	0.65	0.35	0.61
Non-VFC	1.04	-	1.04	0.81	1.0	0.82	0.62	0.76	0.65

Notes : M = Male headed

: F = Female headed

: A/T = Average/Total

: \* Population  $\leq$  14 years + population  $\geq$  60 years/population 15-59 years

making patterns; and the anthropometric and morbidity status of women and children. Four questionnaires were used:

**Household Census.** This questionnaire sought household-level information on ethnicity, residence pattern, and size of the sample households; and sex, age, marital status, and educational level data on the household members. On the basis of sex, age, and relationship to the household head, each individual in the household was assigned an identification number. These identification numbers referred to the same category of individuals across communities.

**Household Socioeconomic Status.** This questionnaire collected socioeconomic information such as landholding size, household assets/wealth, nonfarm household income, and household expenditures. It also collected gender-disaggregated information on whether household members had participated in any training or any meeting, whether they had any special skills, who earned or controlled a particular income, and who made decisions on a given expenditure or household activity, including both on-farm and off-farm activities.

**Farming System.** This questionnaire was used to collect information on crop and livestock production. This included such data as amount of cultivatable land, crop acreage, use of inputs (for example, manure, fertilizers, chemicals, hired labor), and total production and sales or purchases for both cereals and VFC crops. In addition, information on livestock production and its income was also gathered.

**Women's Health and Anthropometry.** This questionnaire was used to collect anthropometric measures of women (15-49 years) and children (6-36 months), and to determine their morbidity and their utilization of health services.

Each of the four survey questionnaires was implemented four times over exactly a one-year period, beginning in February 1991 concluding in January 1992. Each questionnaire was administered to all study households (VFC and non-VFC) once every three months. The schedule was as follows:

<u>Questionnaire</u>	<u>Months Implemented</u>
Household Census	February, May, August, November (1991)
Socioeconomic Status	February, May, August, November (1991)
Farming System	March, June, September, December (1991)
Women's Health and Anthropometry	April, July, October (1991), and January (1992)

**Random spot observations.** Along with the implementation of the survey questionnaires, GFCS also relied heavily on random spot observations of activities to investigate the allocation of household and individual time to work and non-work activities. Under this method, enumerators visited eight randomly selected study households on a daily basis in each community between 6:30 a.m. and 6:30 p.m. to observe and record the activity of all household members at the time of the visit. Almost all in-field agricultural activities are undertaken between 6:00 a.m. to 7:00 p.m. in the study communities. Therefore, the observations made within the 12 hours captured the bulk of household agricultural activities.

All study households were numbered according to geographical proximity and a visit route was developed that minimized walking time between households. In order to cover the full day's activities of the household members, the next-day observation was started at the time the previous day's last observation was completed. Random spot observations of activities were made daily for one year. Approximately 63,000 observations of household members were completed.

**Ethnographic approach.** Given the importance of understanding the effects of agricultural commercialization on women farmers in the study households, GFCS used standard ethnographic field techniques to collect qualitative and small-sample quantitative information on the household roles and responsibilities of women farmers, and on their perspectives and participation in the VFC program. Interviews with key informants, group discussions, and participant observation were used to learn more about the knowledge, attitudes, and practices of male and female farmers. As part of GFCS's ethnographic approach, a short questionnaire was administered to key women informants who had knowledge about the VFC program.

**Rapid rural appraisal (RRA).** A wide range of qualitative information was collected using interview and observation techniques associated with the rapid rural appraisal (RRA) approach. RRA was used to fill in information gaps and to complement the quantitative data from the survey questionnaires. RRA was particularly useful for collecting information from male farmers both active and not active in the VFC program. RRA techniques used included direct observation of key activities, structured interviews with key informants, and individual and group discussions.

**Selection and training of enumerators.** One male and one female enumerator from each community were employed by GFCS to administer the survey questionnaires and make the random spot observations. Educational level, maturity, ability to speak local dialect, commitment to work for entire data collection period, and knowledge about the VFC program were the major factors considered in selecting the field enumerators. Training was conducted for the field enumerators in Tulsipur during January 20-30, 1991, just before the initiation of data collection.

### *Piloting, Pretesting, and Finalization of Research Instruments*

The field team visited the study communities prior to designing the survey questionnaires and the method for implementing the random spot observations. Questionnaires were field tested in the study communities before their finalization. Colleagues in Nepal and Washington, D.C. provided valuable comments on earlier drafts of the questionnaires and the questionnaires were revised and improved upon several times before finalization. They were also fine tuned during the first months of data collection.

A routine working pattern was established for local enumerators in each community. On any particular day, one enumerator would visit four to five households to administer the questionnaire for that month, while the other enumerator visited eight households to observe daily time allocations. The enumerators switched their activities on the following day. However, during the months scheduled for the questionnaires on women and anthropometry, the working pattern was somewhat flexible because the questionnaire had

to be administered by the female enumerator and the male enumerator had to assist in taking anthropometric measurements. The monthly questionnaire was administered from Sunday through Thursday of each week. One enumerator took Friday off, while the other would complete time allocation visits. On Saturday this situation was reversed. The qualitative research instruments (ethnographic research and RRA techniques) were used several times during the course of study by senior staff of New ERA.

### ***Reliability Tests***

To test the reliability of data being collected through questionnaires and observation of time allocation, retests and simultaneous observations were carried out. For questionnaires, the enumerators revisited four randomly selected sample households (typically two VFC and two non-VFC) in each community each month to readminister that month's questionnaire. The revisit was made three to seven days after the original administration of the questionnaire. For any given questionnaire, one enumerator revisited two households (one household visited by himself/herself and one visited by the other enumerator in the first interview). The same respondent answered the questionnaire during the first interview and the revisit.

To retest the time allocation observations, both enumerators for each community visited simultaneously the eight households assigned for the 15th of each month and separately observed and recorded the activities.

### ***Data Checking, Coding, Entry, Editing***

The completed questionnaires were checked at three stages. First, after interviews were completed, the field enumerators reviewed and checked questionnaires for completeness of data. Next, a senior New ERA staff member closely supervised the field work and checked completed questionnaires in the field during regular visits. Finally, the senior data processing supervisor of New ERA thoroughly checked the completed forms before entering them into the computer.

The questionnaires were designed so that the enumerators could complete most of the coding in the field. The questionnaires themselves contained the detailed coding instructions. A separate manual was developed for crop and livestock codes, household member identification codes, and time allocation codes, and was distributed to the enumerators. Coders at New ERA did most of the time allocation coding and checked the coding of field-level questionnaires. All coded forms were entered into the computer by data processing personnel at New ERA. The entered data were edited and verified using frequency tables.

### ***Data Analysis***

All coded data from the time allocation study and survey questionnaires were entered into dBase III and later, as needed, transferred to SPSS/PC+ for statistical analyses. Data have been analyzed using mean, percentage distribution, regression, and t-tests.

### **3. Agricultural Practices**

In this chapter, information is presented on the agricultural practices of farm households in Satbariya, Jinabang, and Thabang. Both the traditional grain crops that households depend upon for their food, and the vegetables, fruits, and other cash crops that are increasingly being produced for market sale are discussed. For these latter, the discussion includes an overview of the technical assistance and training provided to men and women by the VFC program, which includes a few nonagricultural activities.

#### **Hill Agriculture in Nepal**

Surrounded by China in the north and India in the south, east, and west, Nepal has a total land area of 147,181 km<sup>2</sup>. Geographically, Nepal can be divided into three main regions: the plains or Tarai (0 to 300m above sea level), the hills (300 to 3,000m), and the mountains (3,000 to 9,000m).

The three study communities are located in or near the hill region. Out of a total land area of 14 million hectares, the hill region occupies 68 percent. However, the area of arable land in the hills is extremely limited, comprising only 0.6 million hectares, which is less than one-third of the total cropped area (2.3 million ha) in the country (Ong 1981). In contrast, two-thirds of Nepal's total population live in the hill region, which has a density of 1,500 persons per square kilometer of arable land or 12 persons per hectare of cultivated land. Eighty-two percent of the farms are less than 0.67 ha in size; the average size of land holding is less than 0.5 ha compared with 1.7 ha in the Tarai (World Bank 1979, 1981).

The agriculture in the hills of Nepal is limited to small valleys and terraced slopes. Of the total arable hill area, 75 percent is upland terraces. Hill agriculture accounts for about 36 percent of the area under food grain and 38 percent of the total production in the country. Maize is the most important crop, followed by paddy, wheat, and millet. Barley, potatoes and herbs are grown mainly in the higher hills. The dominant cropping patterns are paddy followed by wheat, paddy followed by potatoes, and paddy followed by maize in

the valleys of the lower hills; whereas maize or millet followed by fallow, paddy followed by millet, maize or millet followed by wheat, paddy followed by potatoes, paddy followed by pulse, and maize or millet followed by mustard, are common cropping patterns on the upland slopes.

In the hills, use of chemical fertilizers is extremely low because farmers rely mostly on manure and compost. There is only a limited potential for surface irrigation in upland terraces, and the irrigated areas are confined mainly to lower valleys. Livestock production plays a pivotal role in the hill farming system. Milk, ghee (clarified butter) and animals such as goats, sheep, chickens, and pigs, are not only important sources of cash, but also constitute an important part of the daily diet. Bullocks are used as draft animals and animal dung is used for manure and, in some cases, as cooking or heating fuel.

### **Agricultural Practices of Study Communities**

In the three study communities, the agricultural system includes both the cultivation of cereals for home food consumption and the production of cash crops for sale in local markets. As is the case for Nepal in general, households in Satbariya, Jinabang, and Thabang generally do not sell cereal grains such as maize, paddy, wheat, barley, or millet. These foods are kept almost exclusively for home consumption. The vegetables and fruits produced by households are used both in home consumption and are sold. In each of the three study communities, in addition to cereal grains, households produce a range of vegetables, fruits, and other minor cash crops. Over the past five years in particular, production of VFC crops has expanded considerably, and households have increased their marketing of these crops. The VFC program has been a major impetus for farmers to expand their production of VFC crops. Before presenting information on the implications of a greater involvement in production of vegetables, fruits, and cash crops, for household labor, income, and expenditure, background information is presented on crop and livestock activities for the study communities. Particular emphasis is given to the VFC crops and the activities of the VFC program.

## *Satbariya*

The major crops grown in Satbariya are rice and wheat in irrigated lowland (khet), and maize, lentils, potatoes, and mustard in unirrigated upland (bari). While rice and maize are grown in summer, wheat, lentils, potatoes, and mustard are grown in winter (see figure 3.1). The farmers in Satbariya usually produce two to three crops per year. This cropping practice was recently altered somewhat because of recurrent floods between 1978 and 1983, which destroyed the large traditional irrigation system. Since for most households cultivation is now dependent mainly on rainfall, farmers are being forced to practice an upland (bari) type of agriculture on what was once irrigated lowlands. As a result, rice and wheat are gradually being replaced by maize, mustard, and potatoes. However, a few large and medium farms have acquired shallow tubewells in order to facilitate vegetable cultivation. It is important to note that Satbariya has a hat bazaar (local market) day on the first and sixteenth of every month. Most of the household necessities, including livestock, cereals, fruit, vegetables, and other household necessities are purchased and sold in this local market.

In 1985/86, the VFC program introduced new cropping alternatives in Satbariya. Under the VFC program, farmers in Satbariya are now involved in producing tropical and subtropical fruits (mangoes, bananas, papayas, litchis, limes), regular and off-season fresh vegetables (tomatoes, peas, cauliflower, beans), seed and ware potatoes, and in raising goats. In table 3.1 the types of training the VFC program provides to male farmers are presented. The principal VFC activities for men in Satbariya are production of seed and ware potatoes, vegetables (for example, tomatoes, peas, cauliflower, beans) and, to a lesser degree, nurseries for fruit trees; they also make fried chips from potatoes. A brief description of the cultivation of potatoes and vegetables follows, emphasizing the differences in cultivation practices brought on by the VFC program.



**Seed and ware potato production.** Prior to the VFC program in Satbariya, farmers only planted local potatoes using low inputs--high seeding ratio (an average of 154 kg for one ropani [500m<sup>2</sup>]), little manure, minimal irrigation or none, no fungicides or insecticides, and little plant care--resulting in very low yields ranging from 150 to 400 kg per 100 kg of seed. The VFC program trained farmers to use improved seed potatoes, higher doses of chemical fertilizer, to space plants and rows uniformly to use a lower seeding ratio (100 kg for one ropani), and occasional irrigation, to loosen soil around hills, and in timely weeding and use of fungicides and insecticides. The adoption of this improved technology yields up to 1,200 kg per 100 kg of seed. This higher yield motivated a number of farmers to participate in improved potato production. Those who were interested were provided some subsidies from the program to install shallow tubewells for irrigating their potato fields (Calavan 1990b).

**Table 3.1 Training Provided by the VFC Program to Male Farmers in Each Study Community**

Training Activities	Satbariya	Jinabang	Thabang
Seed and ware potato production	Yes	Yes	Yes
Vegetable production	Yes	Yes	Yes
Apple nursery	No	Yes	Yes
Apple orchard management	No	Yes	Yes
Fruit processing <sup>1</sup>	No	Yes	Yes
Potato processing--chips	Yes	Yes	Yes
Other fruit nursery <sup>2</sup>	Yes	No	No

Notes: 1 Brandy, jam, jelly, squash, and chips

2 Mangoes, limes, guava, and so on.

Following the success of its initial attempts to introduce improved potato production, the VFC program also trained farmers to produce quality seed potatoes according to National Potato Development Program (NPDP) standards. This certification includes three field checks during the growing season to spot virus and insect problems and off-type plants that need to be removed from the field (Calavan 1990b).

**Vegetable production.** Before the VFC program was implemented, vegetable production in Satbariya consisted of a few local varieties of radishes, spinach, bottle gourd, snake gourd, and beans. Production was basically limited to household consumption. The VFC program, however, introduced new and different kinds of vegetables, such as cauliflower, cabbage, tomatoes, peas, and radishes. The farmers were trained in how to grow each of these vegetables so they could produce vegetables not only for home consumption but also for sale. Subsequently, farmers were also trained in producing vegetables and vegetable seeds during the off season.

In interviews, VFC male farmers reported a number of reasons for participating in the VFC program. Frequently reported reasons include:

- to acquire technical information so as to increase the production of potatoes, fruits, and vegetables;
- to obtain, either without costs or at a reduced price, agricultural inputs such as seeds, fertilizer, pesticides, sprayers, and pruning shears;
- to earn more cash income in order to raise their standard of living;
- to have access to irrigation facilities such as polyurethane tubing, boring, and rover pumps, and finally
- to influence, through the increased production of VFC crops, the establishment of local markets for their agricultural products.

Women in Satbariya were trained in preparation of potato chips and pickle (achar) (see table 3.2) approximately two years prior to the start of GFCS. In interviews with women who attended the training, it was learned that most have continued to use their new skills for household consumption, but none have generated any income from the VFC activities in which they had been trained. It was also learned from interviews that in a few

**Table 3.2 Training Provided by the VFC Program to Female Farmers in Each Study Community**

Training Activities	Satbariya	Jinabang	Thabang
1. Carpet weaving	No	No	Yes
2. Potato brandy	No	No	Yes
3. Potato chips	Yes	Yes	Yes
4. Apple brandy	No	No	Yes
5. Dried apples	No	Yes	Yes
6. Jam/jelly	No	Yes	Yes
7. Vegetable gardening (including seed)	No	Yes	Yes
8. Potato production	No	Yes	Yes
9. Potato noodle	No	Yes	Yes
10. Pickle ( <u>achar</u> )	Yes	No	No
11. Squash/juice	No	Yes	No
12. Vegetable preservation	No	Yes	No
13. Apple nursery/grafting	No	Yes	No

cases women have become directly involved in the production of potatoes using VFC program techniques taught to men. They learned these techniques from their husbands.

**Potato chip production.** When introduced, potato chips were a new food item for all of the women attending the training. The process of making potato chips involves cleaning, peeling, and slicing the desired amount of potatoes (5 kg of raw potatoes make 1 kg of chips). The potato slices are then soaked in salt water for one hour before boiling them for five minutes. Next, the parboiled potatoes are sun dried for one or two days, depending upon the season. After the potato slices have been completely dried, they can be stored

for many months. Women prepare the chips for consumption by frying them in mustard oil or in ghee. The raw materials required for potato chip production--potatoes, oil, and salt--are either produced by the household or are locally available.

Most of the women prepare the chips after the potatoes are harvested. Usually, enough chips are processed to fill the household's need for several months. After that time, some women repeat the process if enough potatoes remain in storage and if time permits.

**Pickle production.** Unlike the newly introduced potato chips, pickle, locally called achar, is a traditional Nepali food. The VFC training instructed women in new techniques for making pickle that require less oil and more spices. The women also learned how to make new types of pickle using cauliflower, cabbage, and tomatoes as a way to use the household surpluses.

The actual process for making the pickle is rather simple. The vegetables are sun dried for one or two days and then fried in an oil and ground spice mixture. The pickle can be stored in glass jars for one or two months even without the use of preservatives. Women reported that in following the VFC program methods for making pickle, they used less oil and were able to use the household's surplus of improved vegetables. Most women liked the taste of the new pickles, although some reported that they still preferred the taste of traditional pickle made with citrus, mango, and radish.

Of the two activities in which they had received training, most of the women interviewed reported preferring making potato chips over pickle. They felt that the chips were quick and easy to make at home and that surplus potatoes were readily available. Chips also gained acceptance since they are easily stored for long periods without spoiling and are considered convenient and nutritious snacks for guests and for schoolchildren's lunches. Pickle making was viewed as a way to use surplus vegetables and add variety to diets.

VFC women in Satbariya, as well as in the other two study communities, stated that they participate in VFC program activities to gain knowledge about new agricultural products, to earn additional income, and to learn new skills. Less frequently stated reasons include adding variety to their diet, using surplus potatoes, producing more vegetables for home consumption, and joining friends or becoming involved in an activity that would be appreciated by others.

### *Jinabang*

In Jinabang, rains during the monsoons are the primary form of irrigation. The principal crops are maize and potatoes in summer, and wheat, barley, and mustard in winter. Rice cultivation is limited to river basins. In general, over the year farmers will produce each of the principal crops twice (see figure 3.2). Farmers in Jinabang also rely on raising livestock both for manure and for cash income. Cows and buffalos are raised for milk and ghee, while goats and chickens are raised for meat.

Principally in response to the VFC program, households in Jinabang are changing their traditional cropping practices. A few wealthy farmers have recently started to use polyurethane pipes to irrigate fields during winter. These farmers are expanding their production of seed and ware potatoes; planting orchards of apple, plum, peach, and walnut trees; and growing fruit tree saplings and fresh vegetables.

As was the case in Satbariya, men rather than women in Jinabang are most directly involved in the VFC program. Men in Jinabang have received training on a wider range of activities than men in Satbariya (see table 3.1). The new techniques and technologies used by men in Jinabang to cultivate potatoes and vegetables do not differ significantly from those used by men in Satbariya. The VFC practices for producing apples, processing apples and fruits, and raising fruit tree saplings, the principal VFC activities introduced in Jinabang, are briefly described below.



**Apple production.** The farmers in Jinabang were producing apples before the VFC program, but their production was characterized by a lack of water, no use of fertilizer, no pruning, no plant protection chemicals, a lack of knowledge about correct spacing, and a lack of suitable varieties. All of these characteristics led to low yield and poor quality fruit. The VFC program corrected these limitations by training farmers in the correct mixing of varieties to maximize pollination; correct choice of lowland and upland varieties; wider tree spacing; pruning; use of lime, fertilizer, and compost and proper dosage; and use of copper sulfate, insecticides, and fungicides. These farmers were also taught to water regularly during the fruiting period, to use plastic nets to protect fruit against bats and birds, and to hand pick the fruit just prior to ripeness. In addition, the VFC program provided, at half cost, the new tools necessary to carry out these operations. The program also provided other necessary support for storing and marketing apples to those involved in establishing orchards (Calavan and Cox 1990c).

**Apple and other fruit processing.** As an alternative to storing and marketing fresh apples, the VFC program provided training in fruit processing, which focused on preparation of jam, jelly, juice, and brandy (wine). Further training was provided in making apple slices and chips and brandy from potatoes. The trainee farmers were provided with different kinds of equipment, such as slicers, juicers, bottle sealers, and pasta makers. Also, training was provided in how to use solar driers for drying potato and apple slices. The VFC program has subsidized the cost of this equipment.

**Apple nursery.** Prior to the VFC program, a few farmers in Jinabang had started their own nurseries to market saplings, but they did not have the proper training and skills to effectively manage nurseries. Their saplings were undersized and of poor quality. The VFC program provided these farmers with better quality seeds (free root stock), relevant training, and sprayers and other necessary equipment at a 50 percent subsidy. The program provided farmers with information on plant protection methods, irrigation, use of compost and fertilizer, and grouping and labelling varieties.

The above VFC activities in Jinabang have been enthusiastically accepted. Farmers have been able to raise their apple yield and multiply their apple saplings dramatically. The concern of Jinabang farmers at present is not how to increase their production, but how to market their products.

The reasons men in Jinabang are willing to expand production of crops promoted by the VFC program are similar to those mentioned for Satbariya. They reported one additional important reason: They hope that if increased production of high-quality potatoes, apples and vegetables is achieved, the VFC program will then construct a road to the community that can be used by trucks, thereby reducing the difficulties and costs of transporting apples and potatoes to local and regional markets. Farmers have made substantial long-term investments in apple orchards and are anxiously looking forward to resolving existing marketing bottlenecks and obstacles to selling their produce.

Women farmers in Jinabang also directly participate in the VFC program, receiving training and technical assistance for a number of production and processing activities. As shown in table 3.2, they have received training in making potato chips, jams, jellies, and pickles; drying apples; vegetable gardening; and nursery techniques for apple trees. As was the case in Satbariya, some women reported that although they had not officially participated in men's VFC training, the men in their households had instructed them in such activities as potato and vegetable production. The potatoes are used for home consumption and provide the raw materials needed in other VFC activities (for example, making potato chips and noodles) undertaken predominantly by women. The program's agricultural and food processing techniques adopted by women in Jinabang are described below.

**Vegetable production.** The success of the training in vegetable production is evident from the profusion of kitchen gardens, particularly for the women who participated in GFCS's focused study on women farmers. The primary purpose of this vegetable production is to meet daily domestic needs rather than to generate income. None of the women interviewed were attempting to sell vegetables, saying that existing markets were too

far away and no local market existed since villagers were accustomed to eating what they produced and were not in the habit of buying vegetables.

During the training and later from the site coordinator, the women received a variety of improved seeds, including cauliflower, cabbage, garlic, onion, greens, and tomatoes. Previously, the women had only cultivated local varieties of radishes, potatoes, rayo saag (greens), and taro. The women reported that the improved seeds allowed them to grow more vegetables of a greater variety over a longer season because of early and late varieties. In addition, they have been able to dry vegetables for consumption during winter.

**Vegetable seed production.** The women received training in seed production as part of the VFC program's focus on vegetable gardening for women. In interviews, women rated vegetable seed production as one of the best ways for them to generate income because there was no problem of storing the vegetable seed or with carrying it to sell in other communities. The vegetable seed could also be sold at a higher price, unlike the fresh vegetables, which had no market within the community.

**Potato chips.** The women of Jinabang also use surplus potatoes to make potato chips for home consumption. The process used is the same as described for Satbariya except that women in Jinabang add the preservative potassium metabisulfate, which they purchase from the site coordinator. The reasons given for the popularity of potato chips for home consumption are similar to those in Satbariya--potato chips are relatively quick and easy to prepare; once fried they can be eaten at any time during the day without reheating; they are good for serving to guests and for snacks for the schoolchildren's lunches; and they are easily stored for a long time. The Jinabang women have also purchased cutting machines at a 50 percent discount from the site coordinator and shared the costs (Rs 400) and machines among groups of three women.

**Potato noodles.** Women in Jinabang have been trained to make noodles from potato flour. They learned how to dry and grind their surplus potatoes to make flour, which is then used to make the noodle dough. The noodles are made using machines purchased

through the site coordinator, at a reduction of 50 percent of the market price. The cost of these machines is again shared by groups of three women. After the noodles are dry, they can be stored for later consumption.

**Jam and jelly making.** VFC training is provided to women on how to use surplus apples, plums, and peaches to make jam and jelly. Women are less interested in continuing this as a primary VFC activity because jams are not a preferred food among household members nor are they a product which could be easily sold in the local community.

**Squash or fruit juice.** This activity of using surplus fruit or squash to make juice was the least preferred by the women. There has been no activity in this area since the training. Similar to the situation for jam and jelly, fruit or squash juice is not regularly consumed by household members and there is no local market.

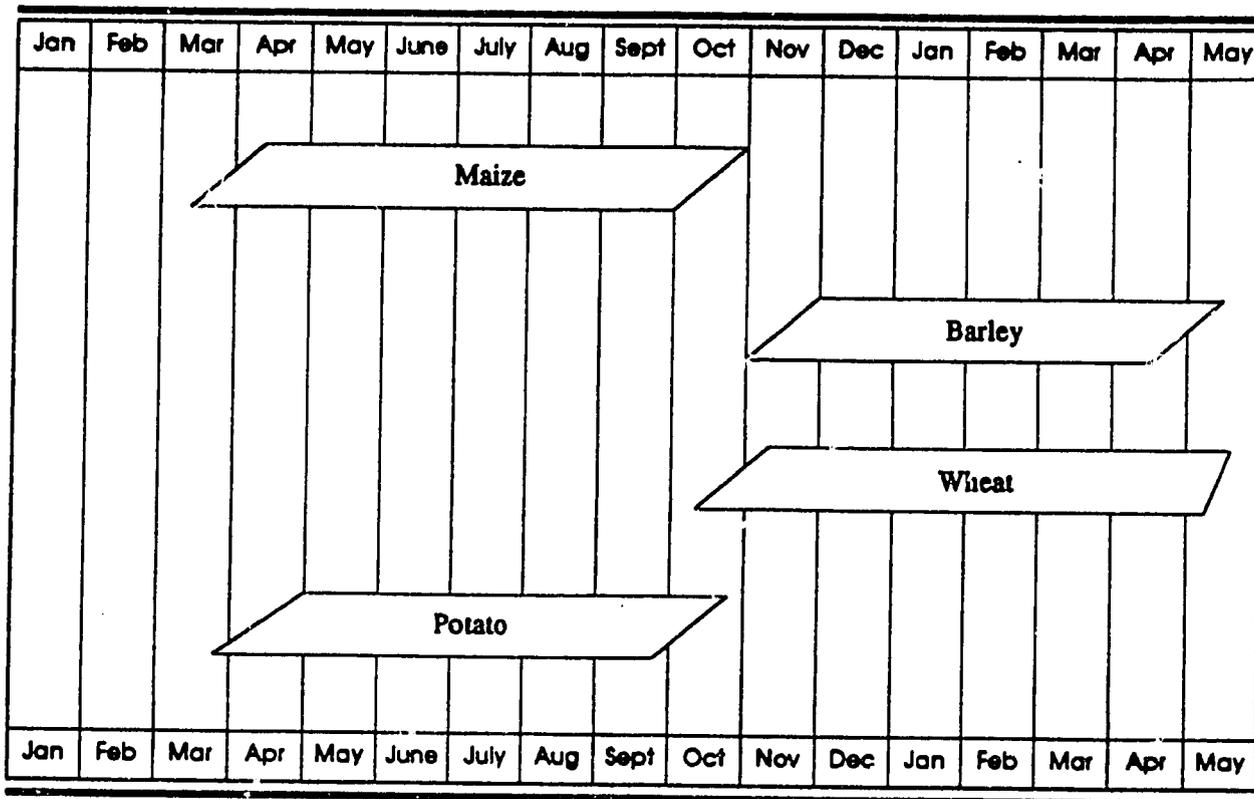
**Apple nursery management and grafting.** Although the training in managing apple orchards, including grafting techniques, targeted men, a few women interviewed reported that they also attended the training in order to support their husbands' efforts. Women do not directly earn income from their participation in apple nursery work, but nonetheless feel that it is important to apply their knowledge in the family-run apple orchard.

Like the women of Satbariya, the women in Jinabang were attracted to the VFC program to gain knowledge and skills in making new products and to increase their incomes. Other reasons given were to use surplus potatoes, to join other women friends involved in VFC activities, and to enhance their own status within the community.

### ***Thabang***

The Kham Magars of Thabang practice a high-altitude agricultural system with maize, wheat, barley, and potatoes dominating the cropping patterns. The summer crops are maize and potatoes whereas the winter crops are barley and wheat (see figure 3.3). Again, the monsoon rains are critical for irrigation. Because of the cold temperature and lack of

**Figure 3.3 Predominant Cropping Patterns in Thabang Village**



Note for each box in figure 3.3:

- The left inclined line indicates the planting period
- The horizontal lines indicate duration of crops in field
- The right inclined line indicates the harvesting period.

irrigation facilities, farmers can produce only one crop a year. This limited agriculture is supplemented by livestock production, especially goats, cattle, and sheep. Livestock is raised in a transhumant pattern, the animals being moved to higher valleys during summer and lower valleys during winter.

As was the case in Jinabang, the VFC program has focused on improving production of seed and ware potatoes, establishing apple orchards and nurseries, producing fresh vegetables, and processing apples and potatoes (table 3.1). The improved agricultural technologies men in Thabang receive from the VFC program are identical to those made available to men in Jinabang. This is not surprising since the VFC site coordinator is the same for the two communities.

**Sheep Husbandry.** The VFC program implemented a multifaceted sheep development program in Thabang which covered the distribution of improved breeds of rams, training in the use of anti-parasitic medicine and drenching, and in the design and marketing of woolen goods. One of the most important consequences of the VFC sheep program has been an increase in the number of sheep and a corresponding decline in their mortality—primarily due to the effectiveness of the training given in sheep drenching and the use of medicine.

Perhaps more than the other two study communities, women in Thabang are more directly participating in the VFC program. In part this reflects a continuation of the traditional entrepreneur orientation of Kham Magar women. The principal VFC program activities for which women in Thabang have received training include weaving carpets; making potato chips, potato and apple brandy, dried apples, jams/jellies; and growing vegetables and potatoes (see table 3.2). Key informants reported that the VFC activities in Thabang best suited for women are carpet weaving and potato brandy production, followed by potato chip and vegetable production. The least practical activities are making potato noodles, jams and jellies, dried apple slices, and apple brandy; to a large degree these have been discontinued.

**Carpet weaving.** Weaving is a traditional activity among the Kham Magar women of Thabang. A natural colored, thick wool fabric, called radi or pa:hi, is woven for household use as floor coverings, blankets, and coats. Occasionally, the radi and pakhi are sold to other households within the village or surrounding areas.

The VFC program introduced new techniques to the weavers to produce carpets of a quality which could be sold outside of the village at a higher price than traditional carpets. The new technology uses the backstrap looms already employed by the women, but entails the increased use of weft (crosswise threads) for more detailed designs. The new carpets are also thicker, and red, black, and yellow dyes are used.

After weaving, the carpets are massaged by hand in order to soften the fibers. Traditionally, this is done using cold water, but in order to set the colors and shrink the fabric to produce a denser carpet material, hot water is now used. This additional task entails cutting firewood and boiling water over open fires.

The completed carpets are stored until a number of them can be taken to local markets. The carpets are occasionally sold in the village to visitors or government workers posted in the district, but most marketing is done outside the community during the winter months. After the wheat and barley have been planted, women have time to travel to the large bazaars of Tulsipur, Ghorahi, Libang, and Tansen to take advantage of the seasonal demand for carpets. Selling trips usually take one week. In order to make the trip profitable, a woman must carry three to four carpets for sale. Porters are not hired because with other travel expenses (that is, food and lodging) women would be unable to make a profit.

**Potato brandy.** To make potato brandy, sugar is added to potatoes and allowed to ferment for four to five days, after which it is distilled. Women make potato brandy according to local demand. More is made in anticipation of local festivals, although an adequate supply is always ready for customers who at any time could come to women's homes to buy brandy. Customers either take their purchase with them or stay at the

women's home to drink, in which case the women are expected to serve them. If the brandy is consumed in their homes, women use this opportunity to sell potato chips to their drinking visitors.

Brandy making is preferred by some women because it is less time consuming than carpet making, the raw materials are locally available, it is easily sold in the village, thus making travel unnecessary, and it generates a quick profit. The main problem is the limited supply and high cost of sugar. Whenever sugar is not available, local sugarcane molasses is used. Another problem, according to one key informant, is having potential customers visiting your home at all hours, and in some cases expecting to be served.

**Potato and potato seed production.** Women in Thabang report that potato and potato seed production are a source of income and provide additional food for the households. The techniques used are similar to those practiced in the other study communities. In many cases in Thabang, potatoes are planted where maize had previously been grown and, as in Jinabang, women are finding potatoes to be more profitable than maize. The women sell potatoes and seed potatoes to buyers from the local village and the surrounding areas. Potato cultivation also provides raw materials for other VFC program products, such as brandy and potato chips.

**Vegetable production.** A few women in Thabang were trained in vegetable production. Although these women recognized the income-generating possibility of growing more vegetables, they had not sold any but instead used the additional vegetables for home consumption. None of the women interviewed were involved in vegetable seed production. The general lack of interest in vegetable production is due in part to the fact that houses in Thabang are clustered together, leaving little conveniently located land for a kitchen garden, and the women, who are the primary agriculturalists since men herd animals for long periods of time, must devote the bulk of their agricultural time to cereal crops. It was observed that in households where men are permanent residents, vegetable farming by women is more common.

**Other activities.** Training in four other activities has been provided to women of Thabang. These include making potato noodles, jam and jelly, dried apple slices, and apple brandy. All of these activities were discontinued shortly after the training because they did not provide any income. As one woman reported, there was no market because the people were not used to eating these foods and therefore making them was only a waste of time and money. In the case of the apple brandy and dried apples, there is a lack of supply to support these activities because apple production is still in the early stages in Thabang.

### **Farming and Crop Production Characteristics for Study Households**

Table 3.3 shows that the mean farm size per hectare for each type of land is higher among VFC households than among non-VFC households in all communities. The mean farm size per hectare for VFC households is higher by 1.52 ha in Satbariya (3.55 to 2.03 ha), 2.11 ha in Jinabang (5.41 to 3.30 ha), and 0.31 ha in Thabang (1.25 to 0.96 ha).

Landholding size is lowest in Thabang and highest in Jinabang. In Jinabang, "other land," which mainly refers to pasture and forest land that can be used for apple cultivation, accounts for a significant amount of land. "Lowland," which refers to the area where paddy can be grown, is found mainly in Satbariya.

As with landholding size, the mean number of crops grown is also higher among VFC households in all communities than non-VFC households--with VFC households in Jinabang having the highest (20 crops per year), and VFC households in Thabang having the lowest (13 crops per year). The mean number of crops grown in a year parallels mean farm size among both VFC and non-VFC households: the community having the highest landholding also has the highest number of crops grown in a year, and vice versa.

The mean area devoted to food crops and cash crops is higher in Satbariya than in the other two communities. Again, as with the mean farm size and mean number of crops grown, the mean area devoted to both food crops and cash crops is higher among VFC households than among non-VFC households in the three communities. While the average

**Table 3.3 General Characteristics of Farming Practices by Household VFC Status and Community**

Characteristics	VFC			Non-VFC		
	Satbariya (N=44)	Jinabang (N=44)	Thabang (N=44)	Satbariya (N=44)	Jinabang (N=44)	Thabang (N=44)
<b>Mean Farm Size (ha)</b>						
Lowland	0.93	0.08	0.00	0.29	0.03	0.00
Upland	2.62	1.75	1.14	1.74	1.28	0.93
Other land	0.00	3.58	0.11	0.00	1.99	0.01
All lands	3.55	5.41	1.25	2.03	3.30	0.94
<b>Mean Number of Crops</b>						
	19.3	19.7	12.6	14.2	17.0	10.7
<b>Mean Area Devoted to:</b>						
Food crops	2.80	1.76	1.27	1.67	1.60	1.01
Cash crops	1.66	0.64	0.31	1.55	0.30	0.08
All crops <sup>1</sup>	4.47	2.40	1.58	3.21	1.89	1.09

Notes :1 The mean area devoted to all crops is usually higher than mean farm size for all lands due to planting two or more crops per year.

food crop area ranges from 1.27 ha in Thabang to 2.80 ha in Satbariya among VFC households, the area among non-VFC households ranges from 1.01 ha in Thabang to 1.67 ha in Satbariya. Similarly, VFC households in Satbariya have the highest average cash crop area (1.66 ha), followed by 0.64 ha and 0.31 ha for VFC households in Jinabang and Thabang, respectively. The cash crop area of the non-VFC households is much lower, accounting for 0.08 ha in Thabang to 1.55 ha in Satbariya.

The above differences among the communities are to be expected given their elevations, climate, access to different physical facilities, and inputs. Satbariya, having more flatland, has more potential for agricultural activities than Thabang, where at times farmers find it difficult to take even one crop a year due to a lack of irrigation, insufficient inputs, snowfall, and landslides.

Table 3.4 presents the production characteristics of different cereal and cash crops grown by both VFC and non-VFC households by community. As can be seen in the table, maize, wheat, potatoes, and mustard are the major crops grown in all communities. In addition, the farmers in Satbariya grow rice, whereas the farmers in Jinabang and Thabang grow barley. A few farmers in Jinabang and Thabang also grow millet and buckwheat. Apples are the only crop grown by a majority of the farmers in Jinabang, followed by a few in Thabang.

Almost all VFC and non-VFC households in the three communities grow maize, a major staple food in the hill regions of Nepal. The VFC households in Satbariya and Jinabang have slightly more yield from maize (1.2 and 0.84 tons per hectare) than the non-VFC households (1.0 and 0.6 tons per hectare) in those communities. In Thabang, both the VFC and non-VFC households have similar yields for maize--0.6 tons per hectare. As with yield, the mean output of maize per household is also higher among VFC households (318 kg in Thabang and 1,958 kg in Satbariya), than among non-VFC households in all communities (261 kg in Thabang and 1,436 kg in Satbariya). VFC households in Satbariya and Jinabang keep slightly more of their maize for home consumption (87 to 92 percent versus 89 to 96 percent). In Thabang, almost all maize that is produced by VFC and non-VFC households is kept for home consumption.

Paddy is grown in Satbariya and Jinabang. Eighty-six percent of VFC households grow paddy in Satbariya and 29 percent in Jinabang, whereas the corresponding figures are 52 percent and 14 percent among non-VFC households, respectively. Both the yield (2.3 tons per hectare) and the mean output per household (1,013 kg) are higher among VFC households in Satbariya, and are very low in Jinabang, with non-VFC households having slightly higher yield and output than VFC households. Paddy is kept entirely for home subsistence, with only 2 percent of the production being sold by non-VFC households in Satbariya.

**Table 3.4 Production Characteristics of Crops by Household VFC Status and Community**

Crop Production Characteristics	VFC			Non-VFC		
	Satbariya	Jinabang	Thabang	Satbariya	Jinabang	Thabang
<b>Cereals</b>						
<u>Maize</u>						
No. of households growing	44	44	44	42	44	41
Yield (T/ha)	1.2	0.8	0.4	1.0	0.6	0.4
Mean area (ha)	1.52	0.96	0.63	1.05	1.09	0.50
Mean household output (kg)	1958	813	318	1436	676	261
Mean amount sold (kg)	234	63	14	194	77	4
Percentage of production kept for home subsistence (a)	89	96	100	87	92	100
<u>Paddy</u>						
No. of households growing	38	13	0	23	6	0
Yield (T/ha)	2.3	0.2	-	2.0	0.4	-
Mean area (ha)	0.38	0.64	0	0.24	0.33	0
Mean household output (kg)	1013	145	0	664	152	0
Mean amount sold (kg)	0	2	0	13	0	0
Percentage of production kept for home subsistence (a)	100	100	0	98	100	0
<u>Wheat</u>						
No. of households growing	43	44	43	37	42	36
Yield (T/ha) (b)	1.6	0.6	0.5	0.4	0.6	0.4
Mean area (ha)	0.96	0.36	0.28	0.63	0.26	0.24
Mean household output (kg) (c)	1336	226	141	602	162	104
Mean amount sold (kg)	434	18	4	96	5	0
Percentage of production kept for home subsistence (a)	67	92	100	85	97	100
<u>Millet</u>						
No. of households growing	4	3	12	4	4	11
Yield (T/ha) (b)	2.4	0.2	1.2	NA	0.3	0.1
Mean area (ha)	0.21	0.12	0.03	0.26	0.04	0.07
Mean household output (kg) (c)	377	17	25	72	11	24
Mean amount sold (kg)	0	0	0	0	0	0
Percentage of production kept for home subsistence (a)	100	100	100	100	100	100

Cont'd... Table 3.4

Crop Production Characteristics	VFC			Non-VFC		
	Satbariya	Jinabang	Thebanj	Satbariya	Jinabang	Thebanj
<u>Barley</u>						
No. of households growing	0	44	43	2	42	42
Yield (T/ha)	-	0.6	0.6	NA	0.6	0.5
Mean area (ha)	0	0.25	0.23	0.33	0.21	0.23
Mean household output (kg)	40	159	133	139	137	123
Mean amount sold (kg)	0	27	13	0	19	8
Percentage of production kept for home subsistence (a)	100	91	95	100	89	100
<u>Buckwheat</u>						
No. of households growing	0	3	17	0	2	17
Yield (T/ha)	-	1.1	0.7	-	NA	0.9
Mean area (ha)	0	0.01	0.01	0	NA	0.02
Mean household output (kg)	0	5	6	0	2	15
Mean amount sold (kg)	0	0	0	0	0	0
Percentage of production kept for home subsistence (a)	0	100	100	0	100	100
<u>Cash Crops</u>						
<u>Potato</u>						
No. of households growing	34	43	42	17	35	38
Yield (T/ha) (b)	NA	NA	NA	NA	NA	NA
Mean area (ha)	0.11	0.11	0.07	0.06	0.04	0.04
Mean household output (kg) (c)	2243	843	496	484	221	259
Mean amount sold (kg)	964	943	13	68	346	1
Percentage of production kept for home subsistence (a)	57	0	97	86	53	100
<u>Apple</u>						
No. of households growing	-	27	7	-	15	3
Yield (T/ha) (b)	-	NA	-	-	NA	-
Mean area (ha)	-	0.14	0.82	-	0.06	0.25
Mean household output (kg) (c)	-	219	-	-	38	-
Mean amount sold (kg)	-	186	-	-	18	-
Percentage of production kept for home subsistence (a)	-	15	-	-	52	-

Cont'd..Table 3.4

Crop Production Characteristics	VFC			Non-VFC		
	Satbariya	Jinabang	Thabang	Satbariya	Jinabang	Thabang
<u>Oilseeds</u>						
No. of households growing	44	44	11	44	39	6
Yield (T/ha) (b)	NA	NA	NA	NA	NA	NA
Mean area (ha)	0.76	0.20	0.04	0.57	0.16	0.06
Mean household output (kg) (c)	389	31	0.1	211	27	1
Mean amount sold (kg)	94	0	0	74	1	6
Percentage of production kept for home subsistence (a)	76	100	100	65	96	100

- Notes : (a)  $\frac{\text{total Production} + \text{total Purchase} - \text{total Sale}}{\text{total Production}} \times 100$
- : (b) yield per hectare for these crops is estimated using area from previous year and harvest from current year.
- : (c) mean yield calculations used number of households growing crop during previous year.
- : NA refers not available/not applicable

The percentage of households growing wheat ranges from 82 among non-VFC households in Thabang, to 100 percent among VFC households in Jinabang. The mean output per household is much higher among VFC than among non-VFC households in all communities, as indicated by 141 kg in Thabang to 1,336 kg in Satbariya for the former, and 104 kg in Thabang to 602 kg in Satbariya for the latter. Unlike paddy and maize, wheat is sold in Satbariya. Nearly one-third of the wheat production is sold by VFC households in Satbariya, compared with only half of that (15 percent) for non-VFC households. The sale is less than 8 percent in Jinabang, with the VFC households selling slightly more. Very little sale of wheat is found in Thabang among both household types. The cultivation of millet is limited to twelve households or fewer in all communities. The mean output is higher among the VFC than among non-VFC households in all communities, with Satbariya having a much higher output. The entire production of millet is kept for home consumption in all communities.

In Jinabang and Thabang, barley is grown by more than 95 percent of the households. The yield is only 0.6 tons per hectare in either household group in the three communities. VFC households have slightly higher mean output than non-VFC households, as indicated by 133 kg in Thabang versus 159 kg in Jinabang for the former, and 123 kg in Thabang versus 137 kg in Jinabang for the latter. The sale of barley product is not more than 11 percent in either household group in any community.

Buckwheat is grown by 39 percent of either household group in Thabang and less than 7 percent in Jinabang for either household group. Both the yield and the mean output are very poor, limited to 0.9 tons per hectare and 15 kg per household in either household type, respectively, with non-VFC households having slightly higher yield and mean output. All products are kept for home consumption.

Potatoes are one of the major cash crops grown in all communities. The proportion of households growing potatoes is higher among VFC than among non-VFC households, as indicated by 77 percent in Satbariya to 98 percent in Jinabang for the former, and 39 percent in Satbariya to 56 percent in Thabang for the latter. The mean output is much higher among VFC households in all communities. While the mean output of VFC households is almost double that of non-VFC households in Thabang (496 kg and 259 kg), it is three and one-half times higher in Satbariya (2,243 kg and 489 kg). The mean output of VFC households in Satbariya is at least 166 percent higher than anywhere else. Unlike the farmers in Thabang (both VFC and non-VFC), who keep almost all of their potato production for home use, the farmers in Satbariya and Jinabang sell a substantial amount of their product. VFC households in Satbariya sell 43 percent of their production, whereas non-VFC households sell only 14 percent. Interestingly, VFC households in Jinabang sold almost all of their potato production this year as opposed to 47 percent for non-VFC households.

Apples are grown by 61 percent of the VFC households and 34 percent of non-VFC households in Jinabang; the corresponding figures are 16 percent and 7 percent in Thabang, respectively. The mean output is 219 kg among the VFC households, which is nearly five

times higher than non-VFC households. VFC households in Jinabang keep only 15 percent of their apple production for home use, while the figure is 52 percent for non-VFC households. Unlike the farmers in Jinabang, VFC households in Thabang have not yet been able to produce apples.

At least 88 percent of households grow oilseeds (principally mustard) in Satbariya and Jinabang, whereas only 25 percent or less do so in Thabang. The mean output per household is much higher in both household groups in Satbariya (389 kg for VFC and 211 kg for non-VFC), compared with the other two communities (31 kg and less). Unlike the case in Satbariya, there is not much difference between the mean output of VFC and non-VFC households in Jinabang and Thabang. VFC households in Satbariya sell 24 percent of their production, whereas non-VFC households sell slightly more (35 percent).

#### **4. Household Time Allocations to Agriculture**

A primary objective of GFCS was to document any gender differences in labor allocations of VFC households compared with non-VFC households. In this chapter, use of labor by VFC and non-VFC households is discussed in terms of the time that adult members allocate to work and non-work activities. The study of time allocation provides important insights on work patterns and decisions within the household: It allows comparisons between home or subsistence (unpaid) and market (paid) activities. Since time is limited, decisions regarding its use reflect preferences and priorities. Finally, findings from previous research have shown that commercialization of agriculture can result in inefficient and inequitable use of women's time, even to the point of threatening program objectives. However, time allocation is only one important aspect of household labor use. Qualitative dimensions and returns to labor are discussed in the next chapter to help interpret the time use patterns recorded for adults in VFC and non-VFC households.

Detailed information on time allocation for all household members for one year was collected by GFCS through random spot observations. Approximately 63,000 individual observations were collected, of which slightly over 29,000 were for adult men and women, aged 15-49 years. In the following sections, adult time allocations are compared for VFC and non-VFC households in each of the three study communities. After an initial general level comparison of the time men and women spend in work and non-work activities, the analysis moves to a more focused look at agricultural labor for both subsistence and cash crops. Disaggregated by gender and considering seasonality as a factor, the more specific analyses seek to answer the following questions:

- Are there significant differences in adult time allocations to agricultural and livestock activities, disaggregated by gender, for VFC households compared with non-VFC households, particularly in terms of the time spent in producing the vegetable, fruit, and cash crops promoted by the VFC program?

- Are there differences in VFC and non-VFC household use of hired labor and, if so, what are the implications for allocation of household adult male and female time to VFC crops?
- Finally, at a general level, what are the possible work (agricultural and non-agricultural) time conflicts for women in VFC households that are related to expanded production of vegetables, fruits, and other cash crops?

### **Adult Time Allocated to Work and Non-work Activities**

The adult time allocation patterns for households in Satbariya, Jinabang, and Thabang, in terms of general-level categories for work and non-work, are similar to those of other rural-based, semisubsistence societies which depend heavily on family labor for agricultural production. In table 4.1, information is presented on the time spent in work and non-work activities by men and women in the sample households in the three study communities.

The information reveals an adult time allocation pattern that is consistent with what is generally accepted to be the sexual division of labor in rural agricultural societies in developing countries. Both men and women spend the largest amount of their time in agricultural and livestock care. In the case of the three study communities, men and women on average spend more than one third of their day in agricultural and livestock activities. After agriculture and livestock, men and women's time allocation patterns diverge in well-known ways. Men spend significantly more time in off-farm labor, out of community, and participating in education and training activities--all activities oriented to the world beyond the household. Women, on the other hand, spend more time than men in activities focused inward on the household. Women are more responsible for food preparation, child care, and household labor tasks such as collecting water, fuelwood, and fodder. This gender-based, inside- versus outside-orientation, with women responsible for daily tasks inside the home and men responsible for activities outside the home, is well documented for Nepal (Acharya and Bennett 1981).

**Table 4.1 Adult Time Allocated to Work and Non-work Activities  
(minutes per 12-hour day)**

General Activities	Male	Female
Eating and drinking	20 (3)	26 (4)
Food preparation	8 (1)	90 (13)
Care of self and others	21 (3)	49 (7)
Household labor <sup>1</sup>	63 (9)	119 (17)
Crop and livestock production	271 (38)	261 (36)
Off-farm labor <sup>2</sup>	96 (13)	10 (1)
Inactive <sup>3</sup>	46 (6)	60 (8)
Out of community	42 (6)	11 (1)
Education and training	39 (5)	9 (1)
Recreation	26 (4)	10 (1)
Social <sup>4</sup>	66 (9)	42 (6)
Other <sup>5</sup>	<u>22 (3)</u>	<u>33 (5)</u>
Total	720 (100)	720 (100)

Notes : Figures in parentheses indicate percentages.

1 manufacture, repair, cleaning, washing, etc.

2 salaried employment, self-employment, processing and marketing

3 inactive, idle, sick and maternity

4 personal, official and political reasons

5 separation, married-out, whereabouts unknown, etc.

The information presented in table 4.1 provides a general, holistic context for more disaggregated analyses of time allocation. Table 4.2 presents time allocation information for the same 12 general activity categories presented in table 4.1 but disaggregated by gender, household VFC status, and community. The data are averages for one annual agricultural cycle.

The information in table 4.2 provides general-level insights on whether the time allocation for men and women in VFC households differs from that of non-VFC households. An obvious first question is whether the fairly similar amounts of adult time (men and women combined) allocated to agriculture and livestock by VFC and non-VFC households, noted in table 4.1, remain after disaggregating the data by gender. The data in table 4.2 reveal a different and more complex pattern. Men in VFC households in all three communities reduced the time spent in agriculture and livestock compared with men in non-VFC households. Over the course of the year of investigation, VFC men in Satbariya spent an average of 44 minutes less per day in on-farm agricultural and livestock activities than non-VFC men; men in VFC households in Jinabang spent 45 minutes less per day in the same activities; and in Thabang, men in VFC households reduced the time allocated to agriculture and livestock by 36 minutes compared with non-VFC households. When the data are aggregated for the entire year, these decreases in men's agricultural and livestock time are the largest observed, for both men and women.

In contrast to the annual pattern for men, women in VFC households did not reduce but increased the time spent in agricultural and livestock activities. Compared with women in non-VFC households, women in VFC households spent more time in agriculture and livestock, with such increases being moderately substantial in Satbariya (18 minutes per day), to insignificantly so in Thabang (3 minutes). Women in VFC households in Jinabang are in between, spending 10 minutes more than women in non-VFC households on agricultural and livestock activities.

**Table 4.2 Adult Time Allocated to Work and Non-work by Gender, Household VFC Status and Community (minutes per 12-hour day)**

Activities	<u>Satbariya</u>				<u>Jinabang</u>				<u>Thabang</u>			
	VFC		Non-VFC		VFC		Non-VFC		VFC		Non-VFC	
	Male	Female										
Eating and drinking	19.4 (2.7)	24.5 (3.4)	23.0 (3.2)	25.2 (3.5)	26.6 (3.7)	28.8 (4.0)	23.0 (3.2)	24.5 (3.4)	13.0 (1.8)	25.2 (3.5)	14.4 (2.0)	25.9 (3.6)
Food preparation	3.6 (0.5)	118.1 (16.4)	4.3 (0.6)	115.2 (16.0)	5.8 (0.8)	85.0 (11.8)	7.2 (1.0)	90.0 (12.5)	11.5 (1.6)	69.1 (9.6)	14.4 (2.0)	59.8 (8.3)
Care of self and other	13.7 (1.9)	54.0 (7.5)	19.4 (2.7)	65.5 (9.1)	18.8 (2.6)	52.6 (7.3)	23.8 (3.3)	66.2 (9.2)	24.5 (3.4)	25.9 (3.6)	28.1 (3.9)	28.1 (3.9)
Household labor <sup>1</sup>	47.5 (6.6)	139.6 (19.4)	64.8 (9.0)	140.4 (19.5)	77.0 (10.7)	103.7 (14.4)	82.8 (11.5)	83.5 (11.6)	49.0 (6.8)	118.8 (16.5)	54.7 (7.6)	129.6 (18.0)
Crop & livestock production	270.0 (37.5)	160.6 (22.3)	316.0 (43.6)	142.5 (19.8)	229.0 (31.8)	320.4 (44.5)	274.3 (38.1)	310.3 (43.1)	252.0 (35.0)	316.8 (44.0)	288.0 (40.0)	313.9 (43.6)
Off-farm labor <sup>2</sup>	44.6 (6.2)	9.4 (1.3)	56.9 (7.9)	7.2 (1.0)	130.3 (18.1)	10.1 (1.4)	124.6 (17.3)	2.9 (0.4)	118.8 (16.5)	12.2 (1.7)	99.4 (13.8)	18.7 (2.6)
Inactive <sup>3</sup>	74.9 (10.4)	112.3 (15.6)	67.7 (9.4)	140.4 (19.5)	42.5 (5.9)	33.1 (4.6)	39.6 (5.5)	33.1 (4.6)	23.0 (3.2)	20.9 (2.9)	30.2 (4.2)	23.0 (3.2)
Out of location	65.5 (9.1)	10.1 (1.4)	54.0 (7.5)	25.9 (3.6)	20.9 (2.9)	0.0 (0.0)	7.2 (1.0)	2.2 (0.3)	69.8 (9.7)	13.0 (1.8)	36.0 (5.0)	13.7 (1.9)
Education & training	66.2 (9.2)	25.2 (3.5)	22.3 (0.3)	2.2 (0.3)	53.4 (7.4)	15.1 (2.1)	20.9 (2.9)	0.7 (0.1)	37.4 (5.2)	7.9 (1.1)	31.0 (4.3)	3.6 (0.5)
Recreation	34.6 (4.8)	10.1 (1.4)	33.8 (4.7)	14.4 (2.0)	13.0 (1.8)	7.9 (1.1)	18.0 (2.5)	6.5 (0.9)	28.1 (3.9)	7.9 (1.1)	31.0 (4.3)	10.8 (1.5)
Social <sup>4</sup>	59.8 (8.3)	28.7 (4.0)	49.0 (6.8)	24.5 (3.4)	94.3 (13.1)	47.5 (6.6)	69.8 (9.7)	76.3 (10.6)	66.3 (9.2)	36.0 (5.0)	55.4 (7.7)	39.6 (5.5)
Other <sup>5</sup>	20.2 (2.8)	27.4 (3.8)	10.8 (1.5)	16.6 (2.3)	8.7 (1.2)	15.8 (2.2)	28.8 (4.0)	23.8 (3.3)	26.6 (3.7)	66.3 (9.2)	37.4 (5.2)	53.3 (7.4)
<b>Total</b>	<b>720</b> <b>(100)</b>											

Notes: Figures in parentheses indicate percentages.

1. includes manufacture, repair, cleaning, washing, etc.
2. salaried employment, self-employment, processing and marketing
3. inactive, idle, sick and maternity
4. personal, official and political reasons
5. separation, married-out, whereabouts, unknown, etc.

In investigating gender differences in time allocated to agricultural and livestock activities, analysis needs to focus on the time men and women spend in particular farming activities, such as planting, weeding, harvesting, and grazing for specific crops (VFC and cereals) and animals. For example, a critical question with program and policy importance, is whether women in VFC households, compared with men in these households and women in non-VFC households, spend more time in agricultural and livestock activities, and, if so, whether there is a pattern to this increase in terms of specific activities or crops along gender lines.

In table 4.3 the time men and women in VFC and non-VFC households allocate to specific agricultural and livestock activities in the three communities is presented. In table 4.4, similar gender-disaggregated information is presented, but with the focus on the time these men and women allocate to specific crops and livestock. The data in table 4.4 are used to focus the discussion of specific agricultural and livestock activities on particular crops (VFC and cereals) and animals.

In addition, a discussion of differences in men and women's time allocated to agricultural and livestock activities must include the factor of seasonality. Time allocation estimates averaged for a year mask seasonal peaks and valleys in time use and hide periods of larger-than-average gender differences in time allocation. GFCS's use of daily random spot observations permits analysis of men and women's time allocated to agriculture by activity and crop or animal for periods of time shorter than one year. In the following discussion of the time allocation patterns observed from the data in tables 4.3 and 4.4, seasonal patterns are also included. Information on seasonal differences in men and women's time allocated to agriculture and livestock activities is presented according to the four rounds of survey questionnaires. These rounds correspond to the following time periods:

Round 1: February, March, April

Round 2: May, June, July

Round 3: August, September, October

Round 4: November, December, January

**Table 4.3 Adult Male and Female Time Allocated to Crop and Livestock Production by Household VFC Status and Community (minutes per 12-hour day)**

Agricultural Activities Under Crop and Livestock Production	Satbariya				Jinabang				Thabang			
	VFC		Non-VFC		VFC		Non-VFC		VFC		Non-VFC	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Crop</b>												
1. Preparing for planting	33.5 (12.5)	1.5 (0.5)	37.1 (11.8)	1.7 (1.2)	28.4 (12.4)	2.4 (0.7)	26.0 (9.5)	2.5 (0.8)	20.9 (8.3)	31.9 (10.1)	31.5 (10.9)	37.5 (12.0)
2. Enriching soil	2.3 (0.9)	11.4 (7.1)	0.8 (0.3)	14.7 (10.3)	3.7 (1.6)	8.3 (2.6)	6.0 (2.2)	10.5 (3.4)	1.1 (0.4)	6.8 (2.1)	1.7 (0.6)	7.9 (2.5)
3. Planting	26.9 (10.0)	15.9 (9.9)	33.7 (10.7)	8.1 (5.7)	15.9 (7.0)	7.7 (2.4)	10.7 (3.9)	5.4 (1.7)	20.9 (8.3)	9.2 (2.9)	25.4 (8.8)	9.2 (2.9)
4. Weeding	32.9 (12.2)	34.7 (21.6)	40.1 (12.8)	24.4 (17.2)	18.0 (7.9)	17.7 (5.5)	21.4 (7.8)	23.1 (7.5)	16.3 (6.5)	57.3 (18.1)	18.8 (6.5)	61.3 (19.5)
5. Irrigating	7.4 (2.7)	0.6 (0.4)	2.2 (0.7)	1.4 (1.0)	3.1 (1.4)	0 (0)	1.8 (0.7)	0 (0)	3.2 (1.3)	1.7 (0.5)	0 (0)	0 (0)
6. Plant care	11.1 (4.1)	2.5 (1.6)	7.2 (2.3)	1.9 (1.3)	12.5 (5.5)	3.5 (1.1)	5.5 (2.0)	3.3 (1.0)	7.8 (3.1)	16.6 (5.2)	9.4 (3.3)	20.8 (6.6)
7. Harvesting	41.0 (15.2)	47.0 (29.2)	47.1 (15.0)	39.0 (27.3)	17.7 (7.7)	35.1 (11.0)	15.0 (5.5)	24.9 (8.0)	18.5 (7.3)	67.4 (21.3)	21.0 (7.3)	65.4 (20.8)
8. Post harvest processing	20.7 (7.6)	24.3 (15.2)	22.3 (7.1)	19.4 (13.6)	5.5 (2.4)	14.8 (4.6)	6.7 (2.4)	17.3 (5.6)	3.2 (1.3)	17.0 (5.3)	4.5 (1.6)	15.0 (4.8)
9. Marketing	6.3 (2.3)	0.4 (0.3)	1.7 (0.5)	0.3 (0.2)	7.3 (3.2)	0.9 (0.3)	3.1 (1.1)	0 (0)	0 (0)	0.3 (0.1)	0 (0)	0 (0)
10. Others	0.5 (0.2)	0.2 (0.1)	0.3 (0.1)	0 (0)	1.8 (0.8)	1.2 (0.4)	4.3 (1.5)	2.2 (0.7)	1.4 (0.6)	2.7 (0.9)	0.8 (0.3)	3.0 (1.0)
<b>Sub Total: (1-10)</b>	<b>82.9 (67.7)</b>	<b>138.5 (86.3)</b>	<b>192.6 (61.3)</b>	<b>110.9 (77.8)</b>	<b>113.9 (49.9)</b>	<b>91.6 (28.6)</b>	<b>100.5 (36.6)</b>	<b>89.2 (28.7)</b>	<b>93.3 (37.1)</b>	<b>210.9 (66.5)</b>	<b>113.1 (39.3)</b>	<b>220.1 (70.1)</b>
<b>Livestock</b>												
11. Feeding	3.1 (1.1)	2.5 (1.6)	7.2 (2.3)	2.2 (1.6)	22.7 (9.9)	28.6 (8.9)	33.9 (12.4)	22.8 (7.3)	4.6 (1.8)	8.8 (2.8)	5.7 (2.0)	8.3 (2.7)
12. Grazing	44.5 (16.5)	6.4 (4.0)	55.7 (17.7)	9.2 (6.4)	36.0 (15.7)	28.9 (9.0)	50.7 (18.5)	21.3 (6.9)	132.4 (52.5)	20.3 (6.4)	150.3 (52.2)	15.0 (4.8)
13. Collecting	32.7 (12.1)	10.2 (6.3)	51.3 (16.3)	17.2 (12.1)	42.8 (18.7)	158.3 (49.4)	66.0 (24.1)	164.4 (53.0)	10.3 (4.1)	69.1 (21.8)	13.2 (4.6)	63.4 (20.2)
14. Carrying	2.0 (0.7)	1.5 (0.9)	1.4 (0.4)	1.1 (0.8)	8.1 (3.5)	8.3 (2.6)	17.4 (6.3)	10.8 (3.5)	9.2 (3.7)	3.0 (1.0)	5.3 (1.8)	4.2 (1.3)
15. Milking/dewooling	0.5 (0.2)	0.2 (0.1)	0.3 (0.1)	0 (0)	4.2 (1.8)	4.7 (1.5)	4.0 (1.4)	1.8 (0.6)	1.8 (0.7)	3.7 (1.2)	0 (0)	2.5 (0.8)
16. Marketing	2.9 (1.1)	0 (0)	0.3 (0.1)	0 (0)	0.5 (0.2)	0 (0)	1.5 (0.6)	0 (0)	0.4 (0.1)	0.7 (0.2)	0 (0)	0 (0)
17. Others	1.4 (0.5)	1.3 (0.8)	5.3 (1.8)	1.9 (1.3)	0.8 (0.3)	0 (0)	0.3 (0.1)	0 (0)	0 (0)	0.3 (0.1)	0.4 (0.1)	0.4 (0.1)
<b>Sub Total: (11-17)</b>	<b>87.1 (32.3)</b>	<b>22.1 (13.7)</b>	<b>121.5 (38.7)</b>	<b>31.6 (22.2)</b>	<b>115.1 (50.1)</b>	<b>228.8 (71.4)</b>	<b>173.8 (63.4)</b>	<b>221.1 (71.3)</b>	<b>158.7 (62.9)</b>	<b>105.9 (33.5)</b>	<b>174.9 (60.7)</b>	<b>93.8 (29.9)</b>
<b>Total:</b>	<b>270.0 (100)</b>	<b>160.6 (100)</b>	<b>314.0 (100)</b>	<b>142.5 (100)</b>	<b>229.0 (100)</b>	<b>320.4 (100)</b>	<b>274.3 (100)</b>	<b>310.3 (100)</b>	<b>252.0 (100)</b>	<b>316.8 (100)</b>	<b>288.0 (100)</b>	<b>313.9 (100)</b>

Note: Figures in parentheses indicate percentages.

**Table 4.4 Adult Male and Female Time Allocated to VFC and Non-VFC Activities by Household VFC Status and Community (minutes per 12-hour day)**

VFC and Non-VFC Activities	Satbariya				Jinabang				Thabang			
	VFC		Non-VFC		VFC		Non-VFC		VFC		Non-VFC	
	Male	Female										
<b>VFC Crops</b>												
Potato	9.9 (3.7)	6.4 (4.0)	6.2 (2.0)	4.1 (2.9)	33.7 (14.7)	9.3 (2.9)	23.0 (8.4)	2.8 (0.9)	5.3 (2.1)	19.6 (6.2)	6.0 (2.1)	9.1 (2.9)
Apple	0 (0)	0 (0)	0 (0)	0 (0)	15.3 (6.7)	1.3 (0.4)	1.1 (0.4)	0 (0)	9.6 (3.8)	7.9 (2.5)	0.9 (0.3)	0 (0)
Oilseeds	18.9 (7.0)	10.1 (6.3)	33.6 (10.7)	10.3 (7.2)	2.5 (1.1)	5.8 (1.8)	2.2 (0.8)	2.5 (0.8)	0 (0)	0 (0)	0 (0)	0 (0)
Other vegetables	35.4 (13.1)	21.2 (13.2)	22.0 (7.0)	17.2 (12.1)	7.3 (3.2)	3.5 (1.1)	6.3 (2.3)	2.2 (0.7)	4.3 (1.7)	6.3 (2.0)	1.2 (0.4)	6.6 (2.1)
Other fruits	0.3 (0.1)	0 (0)	0.3 (0.1)	0.3 (0.2)	0.2 (0.1)	0 (0)	0.3 (0.1)	0 (0)	0.3 (0.1)	0 (0)	0 (0)	0 (0)
Other cash crops	4.1 (1.5)	4.7 (2.9)	1.6 (0.5)	1.4 (1.0)	0.5 (0.2)	0.6 (0.2)	0.3 (0.1)	0.3 (0.1)	0.3 (0.1)	1.3 (0.4)	0 (0)	0.3 (0.1)
<b>Non-VFC Crops</b>												
Paddy	35.6 (13.2)	35.5 (22.1)	23.6 (7.5)	16.7 (11.7)	9.2 (4.0)	6.8 (1.5)	4.7 (1.7)	2.8 (0.9)	0.3 (0.1)	0 (0)	0 (0)	0 (0)
Maize	48.9 (18.1)	38.7 (24.1)	70.3 (22.4)	44.2 (31.0)	24.0 (10.5)	32.7 (10.2)	40.9 (14.9)	46.9 (15.1)	42.6 (16.9)	108.0 (34.1)	64.2 (22.3)	128.7 (41.0)
Wheat	28.4 (10.5)	18.8 (11.7)	33.6 (10.7)	12.8 (9.0)	9.2 (4.0)	18.6 (5.8)	6.9 (2.5)	13.9 (4.5)	16.4 (6.5)	20.0 (6.3)	17.6 (6.1)	20.4 (6.5)
Barley	0 (0)	0 (0)	0 (0)	0 (0)	5.7 (2.5)	11.2 (3.5)	9.1 (3.3)	14.6 (4.7)	11.6 (4.6)	32.3 (10.2)	15.6 (5.4)	33.0 (10.5)
Millet	1.1 (0.4)	1.3 (0.8)	1.3 (0.4)	2.0 (1.4)	0 (0)	0 (0)	0 (0)	0.3 (0.1)	0 (0)	0.3 (0.1)	0 (0)	0 (0)
Buckwheat	0 (0)	0.8 (0.3)	1.0 (0.3)	0 (0)	1.9 (0.3)							
<b>Livestock</b>												
Cattle	50.2 (18.6)	5.1 (3.2)	63.1 (20.1)	10.0 (7.0)	57.7 (25.2)	75.3 (23.5)	90.2 (32.9)	77.9 (25.1)	127.5 (50.6)	69.7 (22.0)	133.1 (46.2)	52.7 (16.8)
Sheep	0 (0)	1.3 (0.8)	0 (0)	0.3 (0.2)	0.2 (0.1)	0.3 (0.1)	0.8 (0.3)	0.3 (0.1)	20.0 (7.9)	3.8 (1.2)	19.3 (6.7)	2.8 (0.9)
Meat animals	4.3 (1.6)	5.9 (3.7)	7.8 (2.5)	5.4 (3.8)	4.4 (1.9)	1.6 (0.5)	4.9 (1.8)	3.7 (1.2)	7.6 (3.0)	17.7 (5.6)	12.4 (4.3)	24.8 (7.9)
Transport animals	0 (0)	0 (0)	0 (0)	0 (0)	7.8 (3.4)	4.8 (1.5)	5.2 (1.9)	2.8 (0.9)	0 (0)	0 (0)	0 (0)	0 (0)
Unidentified crop and livestock	32.9 (12.2)	11.6 (7.2)	50.6 (16.1)	17.8 (12.5)	51.3 (22.4)	150.6 (47.0)	78.4 (28.6)	139.3 (44.9)	5.8 (2.3)	28.8 (9.1)	17.6 (6.1)	34.5 (11.0)
<b>Total:</b>	<b>270.0</b> (100)	<b>160.6</b> (100)	<b>314.0</b> (100)	<b>142.5</b> (100)	<b>229.0</b> (100)	<b>320.4</b> (100)	<b>274.3</b> (100)	<b>310.3</b> (100)	<b>252.0</b> (100)	<b>316.8</b> (100)	<b>288.0</b> (100)	<b>313.9</b> (100)

Note: Figures in parentheses indicate percentages.

In Annex A, three additional tables (one for each community) are presented containing detailed data on agricultural time allocation by household VFC status, season, and gender. The following discussion of seasonality draws from the data contained in these tables. It should be emphasized that the following time allocation figures, whether for round or year, are average minutes per 12-hour day. The 12-hour day is from 6:30 a.m. until 6:30 p.m.

### *Satbariya*

For Satbariya the data in table 4.3 reveal that over the year men in VFC households spend an average of 270 minutes per day in agricultural and livestock activities, which is 44 minutes less than men in non-VFC households. These 44 minutes can be further divided into 10 minutes less for crop and 34 minutes less for livestock activities. On the other hand, averaged over the year, women in VFC households spend 18 minutes more per day in agricultural and livestock activities than women in non-VFC households (161 and 143 minutes, respectively). This increase of 18 minutes comes from spending 28 minutes more in crop activities, and 10 minutes less in livestock activities. Comparing men and women's time allocated to agriculture in VFC households, men spend 44 minutes more in crops and 65 minutes more in livestock activities than women.

In looking at the data in tables 4.3 and 4.4, a number of differences emerge for crop activities disaggregated by household VFC status and gender. Men in both VFC and non-VFC households spend a major portion of their time preparing for planting different cereal and cash crops; this time is substantially higher than women's time allocated to these activities/crops in either household. Over the year, non-VFC men spent an average of 37 minutes per day in this activity, which is slightly higher than the 34 minutes of VFC men's time; this pattern is true for three of four rounds. Only in round 2 (May-July) do VFC men spend more time than non-VFC men (64 and 53 minutes, respectively) in preparing for planting paddy, vegetables, and other cash crops.

Men also spend more time than women in planting, with men in non-VFC households spending more time than men in VFC households. The annual average time per day spent

in planting is 34 minutes for non-VFC men as opposed to 27 minutes for VFC men. Compared with non-VFC men, VFC men have substantially reduced their planting time in rounds 3 (Aug-Oct) and 4 (Nov-Jan) (22 versus 46 minutes and 28 versus 48 minutes, respectively), the time for planting winter crops like wheat, lentils, and mustard, and have increased their time in rounds 1 (Feb-Apr) and 2 (May-July) (8 versus 49 minutes and 0 minutes versus 39 minutes, respectively) for planting different vegetables, potatoes and paddy. Unlike men in VFC households, women in VFC households spend twice as much time in planting as non-VFC women (16 and 8 minutes, respectively). This pattern is true for all rounds except 4 (Nov-Jan). VFC women spend their increased planting time in potatoes, other vegetables, other cash crops and paddy, which are basically grown in rounds 1 (Feb-April), 2 (May-July), and 3 (Aug-Oct).

Men and women in both VFC and non-VFC households spend considerable time weeding. While men in VFC households spend an annual average of 33 minutes weeding compared with 40 minutes for men in non-VFC households, women in VFC households spend more time (35 minutes) weeding than women in non-VFC households (24 minutes). Interestingly, when the data are broken out by rounds, a slightly different pattern emerges. VFC men spend slightly more time weeding than non-VFC men in rounds 1 (Feb-Apr) (12 and 7 minutes) and 4 (Nov-Jan) (15 and 11 minutes). Conversely, men in non-VFC households spend substantially more time (125 minutes) weeding maize in round 2 (May-Jul) than men in VFC households (89 minutes). Similarly, the time women in VFC households allocate to weeding is higher than women in non-VFC households in all rounds; the difference is 2 minutes in round 2 (May-July) (82 versus 80 minutes) to 16 minutes (29 versus 13 minutes) in round 3 (Aug-Oct). Given that men and women in VFC households spend more time on potatoes and other vegetables, it can be safely assumed that the increased time in weeding is basically for these crops since these crops are still in the field during rounds 1 (Feb-April) and 4 (Nov-Jan)--the period when more time is spent weeding.

Men in VFC households spend 4 minutes more on plant care--for example, pruning and spraying--for potatoes and other vegetables than men in non-VFC households. In all rounds except 1 (Feb-April), VFC men spend more time (with a maximum of 16 minutes

in round 4 [Nov-Jan]) on plant care than both men in non-VFC households and women in VFC households. The daily time (2 minutes) that women in VFC households spend on plant care is very low compared to men's time in VFC households.

For harvesting, which is one of the most time-consuming crop activities, men in VFC households spend an annual average of about 6 minutes less than men in non-VFC households, as indicated by the 41 minutes for the former as against 47 minutes for the latter. On the other hand, compared with women in non-VFC households, women in VFC households have increased their harvesting time by 8 minutes (47 versus 39 minutes). When the data are analyzed by rounds, men in non-VFC households spend 8 to 16 minutes per day more harvesting maize in round 3 (Aug-Oct) and harvesting paddy in round 4 (Nov-Jan) than men in VFC households. The reduced time for men in VFC households in harvesting has been partially made up by women in these households, who are spending 6 minutes more than women in non-VFC households. This pattern emerges in all four rounds, which suggests that more of the work harvesting potatoes, vegetables, and the other VFC crops is done by women in VFC households. Regardless of household VFC status, both men and women spend substantial amounts of time--61 to 71 minutes for men and 55 to 73 minutes for women--in rounds 1 (Feb-April) and 3 (Aug-Oct), the period for harvesting wheat and maize, respectively.

A substantial amount of agricultural time is also spent in post-harvest activities. Women spend more time in postharvesting (24 minutes) than men (21 minutes) in VFC households, whereas men spend more time than women in non-VFC households. When the data are broken down by rounds--men in both VFC and non-VFC households spend more time than women, 10 and 12 minutes respectively, during round 1 (Feb-Apr) which is the peak postharvest period. During this period, men in VFC households increase their time in postharvest activities, especially for potatoes, other vegetables, other cash crops, and wheat; men in non-VFC households spend their time on other vegetables and wheat.

Although marketing and irrigating require little of the total crop time, these activities are mostly undertaken by men in both VFC and non-VFC households. Men in VFC households spend much more time on marketing and irrigating (14 minutes) than men in

non-VFC households (4 minutes). The ethnographic finding that men are mostly involved in operating boring pumps for irrigating fields and marketing potatoes and other vegetables has been strongly supported by time allocation data, as this pattern has been observed in all four rounds. The daily average time spent in these activities does not vary much by round.

In looking at the data for livestock activities in tables 4.3 and 4.4 disaggregated by household VFC status and gender, a number of differences become apparent. Grazing animals and collecting grass fodder are the only two major livestock activities occupying a substantial amount of time for farmers in Satbariya. Both grazing animals and collecting grass fodder are usually undertaken by men. Although women spend relatively more time in collecting grass fodder than in grazing animals, their time in this activity is less than one-third of the time men spend in these activities. Men in non-VFC households spend an annual average of 56 minutes grazing animals and 51 minutes collecting grass fodder, which is 11 and 18 minutes more than for men in VFC households, respectively. This pattern is found in all rounds except 4 (Nov-Jan), where men in VFC households spend 36 minutes in grazing activity compared with 33 minutes for men in non-VFC households. In round 4 (Nov-Jan), men in VFC households spend time on meat and other animals (including goats promoted by the VFC program), whereas in other rounds men in both VFC and non-VFC households spend their time on cattle and other animals.

### *Jinabang*

The data presented in table 4.3 show that in Jinabang men in VFC households spend an annual average of 229 minutes per day in agricultural and livestock activities, 45 minutes less than the time men in non-VFC households spend. This 45-minute difference can be broken down into 14 minutes more spent in agriculture and 59 minutes less spent in livestock activities than non-VFC men. On the other hand, women in VFC households spend 10 minutes more in agricultural and livestock activities than women in the non-VFC households, as indicated by 320 minutes and 310 minutes per year per day spent by these

two groups, respectively. Of the 10 minutes more spent in agricultural and livestock activities by women in VFC households, 3 minutes are allocated to crop activities and 7 minutes to livestock activities. In VFC households, men spend 22 minutes more than women on crop activities but 113 minutes less on livestock activities; women spend 92 minutes per day on crop activities and 228 minutes on livestock activities.

Men in both VFC and non-VFC households spend similar amounts of agricultural time in preparing for planting different cereal and cash crops. Men's time in this activity is substantially higher than women's time regardless of household VFC status. Over the year, men in VFC households spent an average of 28 minutes per day on preparation for planting, which is somewhat higher than the 26 minutes of men's time in non-VFC households. This pattern holds true for three of four rounds. Only in round 1 (Feb-Apr) do men in non-VFC households spend slightly more time (49 minutes) than men in VFC households (43 minutes) in preparing for planting maize. Otherwise, men in VFC households spend more time in preparing for planting potatoes, apples, and paddy (although not significantly) in rounds 2 (May-Jul) and 3 (Aug-Oct), and other vegetables in round 4 (Nov-Jan).

Men spend much more time in planting than women, with men in VFC households spending more time than men in non-VFC households. The annual average time per day spent in planting is 16 minutes for men in VFC households compared with 11 minutes for men in non-VFC households. This pattern is true for all four rounds, as men in VFC households are busy planting potatoes in round 1 (Feb-April), paddy and some potatoes in round 2 (May-July), and apples and other vegetables in rounds 3 (Aug-Oct) and 4 (Nov-Jan), respectively. Similarly, women in VFC households also spend slightly more time (8 minutes) in planting than non-VFC women (5 minutes). This is particularly true in the first round (Feb-April) where they allocate almost two to three times as much time as women in non-VFC households for potatoes and other vegetables. In round 1 (Feb-April), which is the peak planting period for all households, men in VFC households spend 50 minutes planting as opposed to 43 minutes for men in non-VFC households, while women in VFC households spend 21 minutes compared with 10 minutes for women in non-VFC households.

Again, men and women in both VFC and non-VFC households spend considerable amounts of time in weeding. Both men and women in non-VFC households spend slightly more time weeding (21 and 23 minutes, respectively) than men and women in VFC households (18 minutes each). When the data are reviewed by rounds, a more complex pattern emerges. In round 2 (May-July), which is the peak period for weeding, men in non-VFC households spend 84 minutes per day, or 24 minutes more than men in VFC households, and women in non-VFC households spend 94 minutes per day, or 27 minutes more than women in VFC households. Men and women in non-VFC households spend this additional time weeding maize. In round 1 (Feb-April), however, men and women in non-VFC households do not spend any time weeding potatoes and apples, in contrast to men and women in VFC households, who spend 8 minutes and 1 minute, respectively.

Men in VFC households spend 7 minutes more on plant care (for example, pruning and spraying) than men in non-VFC households. This pattern is true for all rounds, but is more pronounced in rounds 1 (Feb-April) and 2 (May-July), where the amount of time men in VFC households spend for plant care is higher by 16 minutes (22 versus 6 minutes) and 10 minutes (20 versus 10 minutes), respectively. This increased time is spent on caring for potatoes, apples, and other vegetables. For VFC households, women's time spent on plant care is very low (4 minutes) for all rounds.

In Jinabang, harvesting is a major responsibility for women. The data in table 4.3 show that women in both VFC and non-VFC households spend considerably more time harvesting than men in both VFC and non-VFC households. While women in VFC households spend 35 minutes per day harvesting, women in non-VFC households spend 25 minutes. Compared with men's time, women's time spent in harvesting is 17 minutes greater in VFC households and is higher by 10 minutes in non-VFC households. The gender difference is even higher when the data are analyzed by round. Women in VFC households spend 31 to 39 minutes per day more than VFC men on harvesting in rounds 1 (Feb-April) and 2 (May-July), as indicated by 34 minutes and 53 minutes of their total time spent in this activity, respectively. Similarly, women in non-VFC households spend 21 to 33 minutes more in harvesting than men in these households, who spend only 15 minutes per day in rounds 1 (Feb-April) and 2 (May-July). During these rounds, the winter

crops of barley, mustard, and wheat are harvested. When the time spent in harvesting is compared by VFC status, it is clear from the table that both men and women in VFC households spend more time (18 minutes and 35 minutes) than their counterparts in non-VFC households (15 minutes and 25 minutes). This pattern is even more pronounced in round 3 (Aug-Oct), which is the peak harvesting period for all, when men and women in VFC households spend 37 to 44 minutes per day harvesting potatoes, or 17 to 22 minutes more compared with the 20 to 22 minutes for men and women in non-VFC households.

Postharvest processing is another activity requiring substantial amounts of time from both sexes, but especially from women. As in the case for harvesting, women in both VFC and non-VFC households spend more time in postharvest activities than men in either household type. Women in VFC and non-VFC households spend twice as much time on postharvest activities as the men in these households (15 minutes and 17 minutes respectively). Comparing VFC households' time with non-VFC households' time, it is evident that there is not much difference between men's time (6 and 7 minutes) and women's time (15 and 17 minutes) allocated to postharvest activities. This pattern is more or less the same in all four rounds. Women in VFC households spend their increased postharvest time on paddy, wheat, and maize, whereas women in non-VFC households spend more of their time on wheat and maize, especially in rounds 2 (May-July) and 3 (Aug-Oct).

Marketing and irrigating are mostly carried out by men in both VFC and non-VFC households. Men in VFC households spend proportionally more time marketing and irrigating (10 minutes) than men in non-VFC households (5 minutes). It was observed during the one-year data collection period that irrigation, which requires much physical labor for making canals and ditches and fixing polyurethane pipes, and marketing, which requires much travel outside the community, were basically undertaken by men, especially in VFC households. Men in VFC households allocate their time in irrigation and marketing basically to potatoes and apples. The time allocation data support this pattern, which is true in all four rounds.

For livestock activities, men and women in Jinabang in both VFC and non-VFC households spend significant amounts of their time in feeding animals, mainly cattle. Men in VFC households spend an annual average of 23 minutes per day in feeding livestock, which is 11 minutes less than men in non-VFC households. Women in VFC households spend 29 minutes per day in feeding animals, which is 6 minutes more than women in non-VFC households. Within VFC households, over the year women spend an average of 6 minutes more per day than men in feeding livestock. When the data are analyzed by rounds, an interesting pattern emerges because women spend as much as an additional 16 minutes per day on feeding in round 3 (Aug-Oct) (35 versus 19 minutes for men). This is the time when most men are busy in the apple orchards.

Another important livestock activity for both men and women is grazing animals. Men in both VFC and non-VFC households spend considerably more time grazing animals than women. Over the year, men in non-VFC households spend 51 minutes per day grazing animals, which is 15 minutes greater than men in VFC households. On the other hand, women in VFC households spend on average 29 minutes per day grazing animals, 8 minutes more than time spent by women in non-VFC households. When the data are analyzed by round, non-VFC men spend even more time grazing animals than men in VFC households for all rounds except 4 (Nov-Jan). Men in non-VFC households spend almost 28 minutes more on grazing (73 versus 45 minutes) in round 3 (Aug-Oct), which is the peak period for grazing animals. Similarly, VFC women spend 27 minutes more grazing animals in round 3 (August-October) than women in non-VFC households. With regard to the time spent in grazing livestock by men and women in VFC households, it is evident from the table that men spend an average of 36 minutes per day, or 7 minutes more than women. This difference increases in round 4 (Nov-Jan) where men in VFC households spend 42 minutes grazing animals, or 26 minutes more than women. However, in round 3 (Aug-Oct), women spend 13 minutes more on cattle than men. This is explained by the fact that round 3 is the period when men in VFC households spend more of their time in apple production-pruning, thinning, and spraying trees.

It is apparent from table 4.3 that the most time-consuming livestock activity is collecting grass and fodder. Women in both VFC and non-VFC households spend

It is apparent from table 4.3 that the most time-consuming livestock activity is collecting grass and fodder. Women in both VFC and non-VFC households spend considerably more time collecting grass and fodder than men in both household types. While women in VFC households spend on average 115 minutes per day more than men collecting grass and fodder (158 versus 43 minutes), women in non-VFC households spend 98 minutes more than men in their households (164 versus 66 minutes). This pattern is consistent for all four rounds. It is also clear from the table that both men and women in non-VFC households spend somewhat more time (66 minutes and 164 minutes) collecting grass and fodder than both VFC men and women (43 minutes and 158 minutes). This pattern is found in all rounds except 4 (Nov-Jan), where women in VFC households spend slightly more time (149 minutes) collecting grass and fodder than women in non-VFC households (128 minutes).

Caring for animals, which includes washing and grooming them, requires relatively little time when compared with other livestock activities. Men in non-VFC households spend 17 minutes per day on the care of livestock, which is almost double the amount of time men and women in VFC households spend. This pattern is true for all four rounds.

### *Thabang*

Table 4.3 indicates that men in VFC households spend an annual average of 252 minutes per day in agricultural and livestock activities, which is 36 minutes less than the time men in non-VFC households spend in these activities. These additional 36 minutes consist of 20 minutes spent on crop activities and 16 minutes on livestock activities. On the other hand, women in VFC households spend only 3 minutes more in agricultural and livestock activities than women in non-VFC households. Over the year, women in VFC households spend 65 minutes more than men on agricultural and livestock activities combined. This 65-minute difference consists of 118 minutes more spent on crop activities but 53 minutes less on livestock activities.

Women in both VFC and non-VFC households spend more time than men in either household type in preparing land for planting different cereal and cash crops, which is in

contrast to the patterns evident in Satbariya and Jinabang. While women in VFC households spend 32 minutes per day in preparing for planting, 11 minutes more than men in VFC households, women in non-VFC households allocate 38 minutes per day to preparing for planting, 6 minutes more than men in their households spend. Both men and women in non-VFC households spend slightly more time preparing for planting than their counterparts in VFC households. This pattern is more pronounced in round 1 (Feb-Apr), where men in non-VFC households have increased their time spent in preparing to plant to 48 minutes per day, compared with 25 minutes per day for men in VFC households. Also in round 1 (Feb-Apr), women in non-VFC households allocate 78 minutes per day to pre-planting activities, which is 33 minutes more than women in VFC households. Most of the time spent by both men and women is in preparing to plant maize, the main staple grown in summer.

Men in non-VFC households spend slightly more time (25 minutes) in planting than men in VFC households (21 minutes), whereas women, regardless of household type, spend similar amounts of time (9 minutes each) on this activity. When the data are disaggregated by rounds, an interesting pattern emerges: men in non-VFC households spend more time planting maize than men in VFC households during round 1 (Feb-Apr) (35 and 23 minutes, respectively), and in planting barley in round 3 (Aug-Oct) (46 and 38 minutes). Women in VFC households spend more time (36 minutes being the highest) in round 1 (Feb-Apr) planting potatoes, and men in VFC households spend slightly more time than women in non-VFC households (14 and 12 minutes, respectively) in round 2 (May-Jul) planting apple seedlings.

Weeding, another time-consuming activity, is mostly done by women. While women in VFC households spend an annual average of 57 minutes per day weeding (41 minutes more than the men in their households), women in non-VFC households allocate 61 minutes per day to weeding (42 minutes more than the men). That women spend more time than men in weeding is particularly true during peak periods for this activity. In round 2 (May-Jul), women in VFC households spend most of their agricultural time weeding potatoes, maize, and apples, while women in non-VFC households allocate most of their

agricultural time to weeding maize. During round 2 (May-Jul), women in VFC households spend 210 minutes per day and women in non-VFC households spend 241 minutes per day weeding.

Similar to other crop activities in Thabang, plant care such as spraying and pruning is also undertaken more often by women than by men in both VFC and non-VFC households. While women in VFC households spend 17 minutes, compared to 8 minutes for men, on plant care, women in non-VFC households spend 21 minutes per day, compared to 9 minutes for the men in their household type. This is particularly true in round 3 (Aug-Oct), the peak period for plant care. Women in VFC households spend 55 minutes and women in non-VFC households allocate 84 minutes per day to plant care, whereas men in these households spend 12 and 30 minutes, respectively. Women, especially in VFC households, are busy with such crops as potatoes, maize, and apples.

Women and men's time spent in harvesting does not vary by VFC and non-VFC household. Women in VFC households spend 65 minutes per day per year in harvesting, compared to 67 minutes for women in non-VFC households. Men in VFC households spend 19 minutes per day per year in harvesting, compared to 21 minutes for men in non-VFC households. As these numbers indicate, however, the gender difference in time spent harvesting is quite large for both types of household. Women in VFC households spend 48 minutes more per day in harvesting than men in VFC households; women in non-VFC households spend 44 minutes more than men in these households. This pattern is consistent for all four rounds, but it is even more pronounced in round 3 (Aug-Oct), the peak harvesting period. In this round, women in VFC and non-VFC households allocate 139 and 143 minutes, respectively, to harvesting, which is about 100 minutes more per day than men in their households. In VFC households, women's additional time spent in harvesting during round 3 (Aug-Oct) is dedicated to potatoes and maize, while the additional time for women in non-VFC households is used to harvest maize in round 3 (Aug-Oct) and barley in round 1 (Feb-Apr).

Another important crop activity undertaken by women in Thabang is postharvest processing. Women in VFC and non-VFC households spend similar amounts of time in postharvest activities (17 and 15 minutes, respectively). Men in VFC and non-VFC households allocate only minimal amounts of time to postharvest processing. This pattern is true in all rounds and for all crops.

Given Thabang's distance to markets and emphasis on subsistence production, it is not surprising that almost no time is spent by either men or women on marketing, regardless of household VFC status. Women in VFC households do spend a minimal amount of time on marketing, but average less than one minute per day over the course of a year.

As indicated in table 4.3, grazing animals and collecting grass and fodder are the two major livestock activities carried out in Thabang. Men in both VFC and non-VFC households spend considerably more time grazing livestock (by 132 minutes and 150 minutes per day, respectively) than women in these households. This finding is consistent with the transhumant pattern of grazing in Thabang, in which men travel to the high mountain valleys with herds for long periods of time. Analysis of the data by rounds shows that men in non-VFC households spend slightly more time herding than do men in VFC households, except for round 3 (Aug-Oct), where the latter spend 115 minutes per day compared to 103 minutes for the former. For both household types, women spend less than 20 minutes per day grazing animals. That this pattern is true for all four rounds supports field observations that women rarely join men for extended herding trips to the high valleys. Rather, women stay in Thabang, principally to attend to the household's crop needs.

In contrast to the time spent on grazing, women in both VFC and non-VFC households spend considerably more time (69 minutes and 63 minutes) collecting grass and fodder than do men, who spend less than 14 minutes per day regardless of household VFC status. Women in VFC households spend slightly more time collecting grass and fodder during the two peak periods (rounds 1 and 4: Feb-Apr and Nov-Jan) than women in non-VFC households (76 to 68 minutes and 171 to 161 minutes, respectively). This time is primarily spent collecting grass and fodder for pigs.

## **Use of Hired Labor**

In addition to using household labor to produce staple cereals, vegetables, fruits, and other cash crops, both VFC and non-VFC households hire outside labor. In each study community, there are men and women available to work as daily wage laborers in agricultural activities. Both VFC and non-VFC households also rent bullocks to plow the fields.

An important research question for GFCS is how much of the difference in the time VFC and non-VFC households allocate to agricultural and livestock activities can be accounted for by the use of hired labor. Of particular interest is whether any decreases in time spent by VFC households on specific crops and animals can be attributed to hired labor. The question is particularly relevant because over the course of a year, men in VFC households spend less time in agricultural and livestock activities than men in non-VFC households (see table 4.2 and previous discussion), while women in VFC households, with the exception of Thabang, spend increased amounts of time on agriculture and livestock --although the amounts are less than the reduction in men's time. Moreover, there are particular seasons (and particular VFC crops and cereals) where there are large differences in men's and women's time allocations in VFC households compared with non-VFC households.

This section contains general information on the number of days hired labor was used by the study households for different crop activities. Household expenditures for hired labor are discussed in the next chapter. The discussion is again organized by study community.

### ***Satbariya***

In Satbariya, men in VFC households spend less time in agricultural and livestock activities than men in non-VFC households, although they spend more time than do women in either household. At first, one might be surprised by this finding, assuming that adopting

the VFC technologies (many of which are labor intensive) would increase the time men spend in agriculture. In fact, VFC households in Satbariya do increase allocation of labor to agriculture and livestock activities, although they do so by employing daily wage labor.

The practice of hiring labor for agricultural work is more common among VFC households than non-VFC households in the community. Over the year of fieldwork, VFC households as a group hired a total of 139 days of labor for VFC crops and 42 days of labor for non-VFC crops, compared with only a total of 4 days of hired labor used by all sample non-VFC households (table 4.5). Out of the 139 days of hired labor for VFC crops, women were hired for 125 days, 80 percent of which were used for potato production, and the remainder for other vegetable production. Women were hired for almost all of the 42 days of labor used by VFC households to cultivate non-VFC crops, principally paddy and maize. Hired women's labor not only helps to replace the reduced time women spend in agriculture in VFC households, compared with men's time in agriculture in VFC households, but also helps meet the demand for labor resulting from more land in production and greater involvement in VFC crops (table 3.4).

### *Jinabang*

Men in VFC households spend more time in crop activities than men in non-VFC households, because VFC households have a more diversified crop pattern and more land in production (table 3.4). However, as noted earlier, this difference in time allocation is not as great as one might expect, given the differences in cropping patterns. In part, this is accounted for by the fact that VFC households in Jinabang also hire much more wage labor for agriculture than non-VFC households.

VFC households hired a total of 89 days of labor for VFC crops and 29 days of labor for non-VFC crops. Of the 89 days VFC households hired labor for VFC crops, male laborers spent 97 percent of these days working exclusively in potato and apple fields.

**Table 4.5 Hired Labor by Male, Female and Bullock by Household VFC Status and Community**

VFC and Non-VFC Crops		Satbariya			Jinabang			Thabang			
		Hired Labor in Days			Hired Labor in Days			Hired Labor in Days			
		Male	Female	Bullock	Male	Female	Bullock	Male	Female	Bullock	
<b>A. VFC Crops</b>											
Potato	VFC	1	100	-	43	-	-	58	90	-	
	Non-VFC	-	-	-	4	4	2	7	23	-	
Apple	VFC	-	-	-	43	-	-	112	95	-	
	Non-VFC	-	-	-	16	-	-	15	11	-	
Mustard	VFC	1	-	-	-	-	-	-	-	-	
	Non-VFC	-	-	-	1	-	-	-	-	-	
Other vegetables <sup>1</sup>	VFC	8	25	-	3	-	-	3	11	-	
	Non-VFC	-	-	-	-	-	-	-	-	-	
Other fruits <sup>2</sup>	VFC	4	-	-	-	-	-	-	-	-	
	Non-VFC	-	-	-	-	-	-	-	-	-	
<b>Sub-Total (A)</b>		VFC	14	125	-	89	-	-	173	196	-
	Non-VFC	-	-	-	21	4	2	22	34	-	
<b>B. Non-VFC Crops</b>											
Paddy	VFC	-	28	-	17	5	-	-	-	-	
	Non-VFC	-	4	-	1	5	-	-	-	-	
Maize	VFC	1	13	-	-	-	-	93	348	10	
	Non-VFC	-	-	-	7	-	17	97	107	4	
Wheat	VFC	-	-	-	3	-	-	28	47	4	
	Non-VFC	-	-	-	-	-	-	23	27	2	
Millet	VFC	-	-	-	4	-	-	32	40	4	
	Non-VFC	-	-	-	-	-	-	37	33	1	
Buckwheat	VFC	-	-	-	-	-	-	-	1	-	
	Non-VFC	-	-	-	-	-	-	-	5	-	
<b>Sub-Total (B)</b>		VFC	1	41	-	24	5	-	153	436	18
	Non-VFC	-	4	-	8	5	17	157	172	7	
<b>Grand Total (A+B)</b>		VFC	15	166	-	113	5	-	326	632	18
	Non-VFC	-	4	-	29	9	19	179	206	7	

Notes: 1 includes cauliflower, cabbage, tomato, peas beans etc.  
2 includes peach, walnut, lime, mango, sapota, banana etc.

The 29 days of labor hired by VFC households for non-VFC crops are used to cultivate paddy, wheat, and millet. It is interesting to note that VFC households do not hire labor to cultivate maize, the community's principal staple.

Non-VFC households hired only a total of 38 days of labor and used bullocks for 19 days over the course of the year. For non-VFC households, approximately 42 percent of the total extra labor hired for crop activities was for apple production, and about 18 percent for maize cultivation. The practice of renting bullocks is higher among non-VFC households than VFC households.

For Jinabang, it was noted earlier that over the course of the year both men and women in VFC households spend more time in crop activities than men and women in non-VFC households. Given this fact, it can be safely assumed that the extra labor hired by these VFC households is more in response to the additional labor demands of the expanded VFC crop production. As is the case for Satbariya, the increased production of VFC crops has resulted in more on-farm employment opportunities in the community. However, in contrast to Satbariya, women in Jinabang are rarely hired as wage laborers in agriculture.

### *Thabang*

Men in VFC households in Thabang spend less time in crop activities than men in non-VFC households, while women in both households spend similar amounts of time in crop activities. Given that VFC households have more land in production and a wider range of agricultural activities (table 3.4), these households must hire additional labor. In Thabang, hired labor is used much more than in the other two study communities. VFC households met their increased labor needs for VFC crops by hiring a total of 369 days of extra labor per year. Of the total 369 hired labor days, women were hired 53 percent of the time. Hired laborers are used principally for the production of potatoes and apples, with women being hired mainly for potato production and men primarily for apple production. On the other hand, the use of hired labor among non-VFC households for the VFC crops is only 15 percent of the VFC households' total hired labor days.

VFC households hired a total of 589 days of labor and rented bullocks for an additional 18 days for non-VFC crops, mainly maize, wheat, and millet. Women were hired for 74 percent of these days. Non-VFC households' use of hired labor for cereals such as maize, wheat and millet is also much higher than their use of hired labor for VFC crops. Non-VFC households hired a total of 336 days for cereal production and 56 days for vegetable, fruit and cash crop activities. Nonetheless, non-VFC households' use of hired labor is only 57 percent of VFC households' hired labor for non-VFC crops. The increase in use of hired labor by VFC households is consistent with the objectives of the VFC program.

### **Summary of Findings**

The detailed data presented in this chapter show that men in VFC households in all three communities spend less time on average per year in agricultural and livestock activities combined than men in non-VFC households. Focusing only on crop activities, the data show that men in VFC households in Satbariya and Thabang spend less time on crop activities than men in non-VFC households, whereas men in VFC households in Jinabang spend more time than men in non-VFC households. In all three communities, men in VFC households spend slightly more time (though not significantly so) in irrigation, plant care, and marketing than men in non-VFC households, while men in non-VFC households allocate more time to major livestock activities, grazing, and collecting grass and fodder.

A variation in time use across the communities is to be expected. In Satbariya and Jinabang, preplanting, planting, and plant care are undertaken mainly by men, whereas in Thabang, all crop activities, excluding planting, are done mainly by women. Weeding, harvesting, and postharvest processing are more or less done equally by both men and women in Satbariya, but in Jinabang, harvesting and postharvest processing are predominantly done by women, and weeding is done by both. Men in non-VFC households in both Satbariya and Thabang spend slightly more time than men in VFC households in all major agricultural activities (that is, preparation for planting, weeding, harvesting, and postharvest processing). In Jinabang, men in non-VFC households spend more time in weeding and postharvest processing than men in VFC households.

Women in VFC households in all three communities spend more time in agricultural and livestock activities combined than women in non-VFC households. There are again differences that depend on community. Women in VFC households in Satbariya and Jinabang spend more time in crop activities than women in non-VFC households, while women in VFC households in Thabang spend less time than women in non-VFC households. While women in non-VFC households allocate more time to livestock activities than women in VFC households in Satbariya, this situation is reversed in Thabang. In Jinabang, women in non-VFC households spend more time collecting grass and fodder, and women in VFC households spend more time in grazing. Women in VFC households in all communities allocate either more time than women in non-VFC households to all crop activities such as preparing for planting (except in Thabang), planting, harvesting, and postharvest processing, or similar amounts. It is only for weeding that women in non-VFC households spend slightly more time than women in VFC households, except in Satbariya where women in VFC households allocate more time than women in non-VFC households to all activities.

The gender disaggregation of the agricultural and livestock activities reveals some important differences in time allocation by men and women and household VFC status. Women in VFC households spend more time than the men in these households or equal amounts of time in weeding, harvesting, and postharvest processing combined. However, men in VFC households spend more time in planting and preparation for planting, which is considered a male responsibility in all communities except Thabang. Grazing animals is considered a male activity in all three communities, whereas collecting grass and fodder is predominantly woman's work in all communities except Satbariya, where men are primarily responsible for all livestock activities. Men in VFC households in Satbariya and Thabang spend more time in livestock activities than women in these households while men in VFC households in Satbariya and Jinabang spend more time in crop activities than women in VFC households. In Satbariya, men in VFC households spend more time in livestock activities than women in VFC households, but in Jinabang and Thabang, they spend more time in grazing only and less time collecting grass and fodder.

The detailed data presented in this chapter on annual and seasonal allocations of time to agricultural activities by VFC crops, cereals, and livestock suggest some important overall findings that are relevant to the VFC program. Differences in the time men and women allocate to agricultural activities by household VFC status tend to parallel each other, although they often differ in magnitude. With few exceptions, both men and women in VFC households increase their time spent in VFC crop activities. For some VFC crops, for example potatoes, averaged over the year, the increased time spent is similar for men and women (4 minutes for men and 2 minutes for women per day in Satbariya and 11 minutes for men and 7 minutes for women per day in Jinabang). In other cases, men's time increases much more than women's. Men in VFC households in Satbariya spend 13 minutes more per day in the production of vegetables, while women in these households spend only 4 minutes more per day. In Jinabang, men in VFC households spend 14 minutes more per day in apple production than men in non-VFC households, while women in VFC households spend only 1 minute more per day in apple production than their counterparts in non-VFC households.

Differences in time allocated to non-VFC crops also occur, again with shifts in men's and women's time by VFC household status tending to parallel each other. The most significant changes occur in paddy and maize production. Men and women in VFC households spend more time in paddy and less time in maize production than their counterparts in non-VFC households. Men in VFC households in Satbariya spend 12 minutes more per day in paddy production than men in non-VFC households; women in VFC households in Satbariya spend 19 minutes more in paddy than women in non-VFC households. Men in VFC households in Jinabang spend 5 minutes more in paddy production and women in these households spend 2 more minutes per day, compared with men and women in non-VFC households. Very little paddy is grown in Thabang.

The opposite pattern occurs for maize, where the largest difference in time allocated to an agricultural activity by household VFC status occurs. Men in VFC households reduced their time in maize cultivation by 21 (Satbariya), 17 (Jinabang), and 22 (Thabang)

minutes per day compared with men in non-VFC households; women in VFC households reduced their time in maize cultivation by 6 (Satbariya), 14 (Jinabang), and 21 (Thabang) minutes per day compared with women in non-VFC households. One of GFCS's overall findings is that VFC households are reducing production of maize (and to some extent barley) and shifting to increased production of vegetables, fruits, and other cash crops, as well as paddy in Satbariya and Jinabang. This is true in terms of labor inputs and to some degree in terms of area in cultivation. Some of the land taken out of maize production is being used to cultivate potatoes and vegetables in Satbariya and Thabang, and apples in Jinabang, although in the latter case land that was not in crop production is also being converted into apple orchards.

Finally, as was the case for maize production, adults in VFC households are spending less time in livestock activities, principally raising cattle, than adults in non-VFC households. Men in VFC households spend 13 (Satbariya), 33 (Jinabang), and 6 (Thabang) minutes per day less caring for cattle than their counterparts in non-VFC households. For women in VFC households, the corresponding reduction in time is 5 (Satbariya) and 3 (Jinabang) minutes per day. In Thabang, women in VFC households are not reducing their time spent caring for cattle. Women in these households spend 17 minutes more per day per year in this activity compared with women in non-VFC households.

As discussed above, both VFC and non-VFC households hire daily wage labor to assist with agricultural and livestock activities. For all three communities, VFC households, taken as a group, hire more labor and use this labor more often for VFC crops, although in Thabang large amounts of hired labor are used for cereal production (to substitute for household male labor used in transhumant herding).

There are gender differences in the hiring of labor by community. In Satbariya, more female labor is hired by VFC households and most of that labor is used for potato production. In Jinabang, the pattern for VFC households is to hire male laborers almost exclusively. For VFC crops, this labor is used for the production of apples and potatoes. For non-VFC crops, labor is hired more for paddy, millet, and wheat; no hired labor is used for maize cultivation. In Thabang, where hired labor is used the most, VFC households hire more labor for traditional cereal crops than VFC crops. For the former, the labor is

used for maize, millet, and wheat. Women are hired more than men for these crops. For VFC crops, the labor is for potatoes and apples, with women hired for potatoes and men hired for apples.

Overall, VFC households hire more labor than non-VFC households. On a per capita or individual household basis, the amount of labor hired remains relatively small. Nonetheless, VFC crops are leading to increased use of hired labor, thus creating new local on-farm employment possibilities.

## **5. Household Income and Expenditure**

An important objective of the Government of Nepal and USAID is to increase the incomes of rural farmers. The commercialization of subsistence agriculture is a vital strategy for increasing the incomes of small farm households. This increased income should help households to diversify farming practices, increase productivity and, through increased expenditures, improve their social and economic conditions.

Through its emphasis on developing entrepreneurship among small farmers, the VFC program is leading to changes in the income and expenditure patterns of participating households. An analysis of these changing patterns will provide the government of Nepal and USAID with valuable information to help evaluate the effects of their programs and to see how these changes in income and expenditure affect a range of development outcomes.

By focusing on gender differences and intrahousehold dynamics, the conceptual framework of GFCS provides a level of detail beyond that currently available on household income and expenditures in the study communities. This chapter presents detailed information for on-farm and off-farm sources of income and expenditure for VFC and non-VFC households in an attempt to identify the impact of the cultivation of vegetables, fruits, and other cash crops. Following this household level analysis, the discussion turns to the role of women in income-earning activities and their involvement in household income decisions.

### **Income Sources for VFC and Non-VFC Households**

The study households in the three communities have both on-farm and off-farm income. While on-farm income consists of both cash and in-kind income, off-farm income is almost exclusively cash. In this report, total income includes both on-farm and off-farm income.

Table 5.1 presents the distribution of annual on-farm and off-farm income per capita by household VFC status and community. Given differences in land in agricultural production and greater emphasis on marketable crops, VFC households have much higher incomes per capita than non-VFC households in all three communities. The average annual income per capita of VFC households in Satbariya is Rs 6,370 compared with only Rs 3,239 for non-VFC households. Similarly, VFC households in Jinabang and Thabang have average annual incomes per capita of Rs 7,918 and Rs 3,939 compared with Rs 4,485 and Rs 2,752 for non-VFC households, respectively. Overall, the total per capita income of VFC households is higher than that of non-VFC households by 43 percent in Thabang, 77 percent in Jinabang, and 97 percent in Satbariya.

**Table 5.1 Average Annual Income per Capita from On-farm and Off-farm, by Household VFC Status and Community**

Study Community	On-Farm Income		Off-Farm Income		Total
	Rs	% of Total Income	Rs	% of Total Income	Rs
1. Satbariya					
VFC	5258.27	82.54	1111.73	17.45	6370.00
Non-VFC	2742.29	84.68	496.29	15.32	3238.58
2. Jinabang					
VFC	4816.77	60.84	3100.80	39.16	7917.57
Non-VFC	3539.50	78.91	945.73	21.09	4485.23
3. Thabang					
VFC	2403.30	61.01	1536.18	38.99	3939.48
Non-VFC	1865.01	67.76	887.33	32.24	2752.34

Notes: On-farm income includes cash and in-kind income. In-kind income for home produced foods and crop by-products was calculated using local market price.

Of the total income per capita, the major share comes from on-farm income for both the VFC and the non-VFC households in all communities. This contribution of on-farm income to total income ranges from approximately 61 percent for VFC households in Jinabang and Thabang to a high of 85 percent for non-VFC households in Satbariya. With regard to off-farm income, the 39 percent contribution to total income for VFC households in Jinabang and Thabang is the largest percent contribution of off-farm income. In all communities, the proportion of on-farm income to total per capita income is higher among non-VFC households, whereas the proportion of off-farm income is higher among VFC households.

Table 5.2 contains data on on-farm and off-farm income per capita by source, household VFC status, and community. A number of patterns in the data warrant comment. First, given the priority of agriculture in the study communities, cash and in-kind income from crop production are consistently the largest sources of income for all households. This pattern is most evident in Satbariya, where VFC households and non-VFC households derive 73 and 77 percent, respectively, of their total income from crop production. In Jinabang, the percentage contribution of crop production to VFC and non-VFC households is almost identical, approximately 32 percent. In Thabang, crop production provides 50 percent of total income in non-VFC households, and slightly less in VFC households (43 percent).

The information in table 5.2 also shows that livestock production, while contributing income to all households, is a particularly important income source for VFC and non-VFC households in Jinabang. These households receive similar amounts of income from livestock production, but for non-VFC households the Rs 1,452 per year earned represents 33 percent of total income per capita, while the corresponding rupee figure of 1,438 for VFC households represents only 18 percent of their total income per capita.

Focusing on off-farm income, the information in table 5.2 reveals several interesting differences among households. One striking pattern is that VFC households in Jinabang earn an average of Rs 3,100 in off-farm income or approximately 39 percent of their total

**Table 5.2 Average Annual per Capita Income by Source (On-Farm and Off-farm), Household VFC Status and Community in Rs**

Sources of Income	Satbariva		Jinabang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<b>On-Farm Income</b>						
1. Land sale	-	4.12 (0.13)	233.02 (2.94)	206.25 (4.60)	27.13 (0.69)	-
2. Livestock sale	34.64 (0.54)	11.76 (0.36)	604.85 (7.64)	452.07 (10.08)	107.95 (2.74)	87.10 (3.16)
3. Crop	4647.85 (72.96)	2492.92 (76.98)	2480.30 (31.33)	1417.04 (31.59)	1707.01 (43.33)	1379.08 (50.11)
4. Processed food sale	1.56 (0.03)	2.97 (0.09)	51.04 (0.64)	12.35 (0.28)	131.45 (3.34)	97.95 (3.56)
5. Livestock product	572.38 (8.99)	230.52 (7.12)	1438.26 (18.17)	1451.28 (32.36)	429.76 (10.91)	300.88 (10.93)
6. Crop by-product	1.84 (0.02)	-	9.30 (0.12)	0.51 (0.01)	-	-
Sub-Total (1-6)	5258.27 (82.54)	2742.29 (84.68)	4816.77 (60.84)	3539.50 (78.91)	2403.30 (61.01)	1865.01 (67.76)
<b>On-Farm Income</b>						
7. Salaried Employment	294.92 (4.06)	277.87 (8.58)	400.81 (5.06)	-	358.37 (9.10)	211.98 (7.70)
8. Own Business	6.80 (0.11)	1.37 (0.04)	157.46 (1.99)	19.12 (0.43)	75.00 (1.90)	80.65 (2.93)
9. Knitting/weaving	*	-	-	-	56.41 (1.43)	-
10. Wage labor	8.77 (0.14)	15.10 (0.47)	135.83 (1.72)	161.64 (3.60)	34.21 (0.89)	34.10 (1.24)
11. Remittance	-	-	389.68 (4.92)	451.10 (3.37)	-	-
12. Pension	-	-	-	-	23.26 (0.59)	74.88 (2.72)
13. Interest	-	-	90.94 (1.15)	6.62 (0.15)	5.81 (0.15)	-

Cont'd...Table 5.2

Sources of Income	Satbariva		Jinabang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
14. Fental	-	-	0.95 (0.01)	-	-	-
15. Loans	800.84 (12.57)	210.95 (6.24)	1823.20 (23.03)	601.96 (13.42)	983.12 (24.96)	485.71 (17.65)
16. Other <sup>1</sup>	-	-	101.90 (1.29)	5.29 (0.12)	-	-
Sub Total (7-16)	1111.73 (17.45)	496.29 (15.32)	3100.80 (39.16)	945.73 (21.09)	1536.18 (38.99)	887.33 (32.24)
Average Annual Income Per Capita (1 to 16)	6369.99	3238.56	7917.57	4485.23	3939.48	2752.34

Notes : Figures in parentheses indicate percentages.  
 : \* denotes negligible  
 : 1 includes income from preaching, faith healing, repairing radios, etc.

income from off-farm activities. As mentioned earlier, VFC households in Thabang also receive 39 percent of their income from off-farm sources, but in terms of rupees this amount is only about half of the off-farm income for VFC households in Jinabang.

In terms of specific sources of off-farm income, the major contributors are public and private sector salaried employment (except for non-VFC households in Jinabang), wage labor (particularly in Jinabang for all households), remittances (in the case of Jinabang), and, perhaps most important, loans. VFC households in all three communities are securing loans in amounts that are double or triple the loan amounts for non-VFC households (Rs 800 to 211 for Satbariya; Rs 1,823 to 602 for Jinabang; Rs 983 to 486 for Thabang). VFC households in Satbariya have taken loans for such agricultural activities as the installation of water pumps, vegetable and livestock production, as well as for meeting household needs such as education, health care, and other social activities. Similarly, loans taken in Jinabang were mainly used for apple, crop, and livestock production; household consumption; and other social activities. Unlike in Satbariya and Jinabang, in Thabang loans have been taken principally for household consumption and social activities, and less frequently for

agricultural and livestock activities such as growing apples and raising sheep. What is common in all three communities is that loans taken for agricultural purposes were obtained from local commercial and agriculture banks, whereas the loans taken for other household activities were provided by local merchants. The interest rate charged by merchants can be as high as 36 percent per year, compared with a maximum of 18 percent for the agriculture banks.

Among the different on-farm and off-farm sources of income, it is important to note that processed foods and knitting and weaving are activities undertaken primarily by women. As will be discussed in the following section on intrahousehold income patterns, the income from these activities is higher among the VFC than among the non-VFC households in all communities except Satbariya. The income from knitting and weaving is found only in Thabang, since this is the only community where raising sheep is common.

In table 5.2 the categories of crop, processed food, and knitting and weaving include income-earning activities for which the VFC program has provided financial and technological assistance and training. An important question is the extent to which households participating in the VFC program are obtaining additional income per capita from these promoted activities. The majority of VFC program assistance is focused on on-farm activities, with the exception of carpet making by women in Thabang, which is discussed in the following section. In table 5.3, data are presented on the average annual income per capita earned by VFC and non-VFC households from the production of vegetables, fruits, and other cash crops (VFC crops); jam/jelly, chips and brandy (VFC products); and from cereals, livestock and land sales (non-VFC crops and other).

The data in table 5.3 show that VFC households have consistently higher incomes from VFC crops than do households not participating in the VFC program. Among the VFC crops, potatoes, followed by other vegetables such as cauliflower, cabbage, tomatoes, peas, and beans contribute the most to on-farm income in all communities. Compared with non-VFC households, income from potatoes is higher for VFC households by 78 percent (Rs 444 versus 249) in Thabang, and by 570 percent (Rs 985 versus 147) in

**Table 5.3 Average Annual On-farm Income per Capita by VFC and Non-VFC Crops/Products, Household VFC Status and Community in Rs**

VFC/Non-VFC Crops/Products	Sathberiya		Jineberg		Thaberg	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<b>1. VFC Crops</b>						
Potato	985.40 (18.74)	146.91 (5.35)	1104.61 (22.93)	273.00 (7.71)	443.99 (18.47)	249.17 (13.36)
Apple	-	-	60.14 (1.25)	6.71 (.19)	-	-
Mustard	612.64 (11.65)	459.64 (16.76)	78.85 (1.64)	70.48 (2.0)	0.06 (*)	0.47 (.02)
Other vegetables <sup>1</sup>	1073.62 (20.41)	543.82 (19.83)	207.38 (4.31)	149.54 (6.22)	146.55 (6.1)	124.98 (6.7)
Other fruits <sup>2</sup>	20.30 (.38)	1.33 (.05)	4.41 (.09)	-	-	-
Other cash crops <sup>3</sup>	153.48 (2.92)	54.00 (1.96)	33.59 (.75)	25.92 (.73)	-	-
<b>Sub-Total of (1)</b>	<b>2845.24 (54.1)</b>	<b>1205.75 (43.89)</b>	<b>1488.98 (30.91)</b>	<b>525.65 (14.85)</b>	<b>590.60 (24.57)</b>	<b>374.62 (20.09)</b>
<b>2. VFC Products</b>						
Jam/jelly/squash	-	-	0.63 (.01)	-	-	-
Potato chips/noxile	-	-	5.22 (.11)	-	2.91 (.12)	-
Apple chip	-	-	16.67 (.35)	-	-	-
Brandy	1.56 <sup>a</sup> (.03)	2.97 <sup>a</sup> (.11)	28.52 (.59)	12.35 (.35)	128.54 (5.35)	97.95 (5.25)
<b>Sub-Total of (2)</b>	<b>1.56 (.03)</b>	<b>2.97 (.11)</b>	<b>51.04 (1.1)</b>	<b>12.35 (.35)</b>	<b>131.45 (5.47)</b>	<b>97.95 (5.25)</b>
<b>3. Sub-Total of (1 + 2)</b>	<b>2846.8 (54.16)</b>	<b>1208.72 (44.07)</b>	<b>1540.02 (31.97)</b>	<b>538.00 (15.2)</b>	<b>722.05 (30.04)</b>	<b>472.57 (25.34)</b>
<b>4. Non-VFC Crops</b>						
Paddy	627.41 (11.93)	343.98 (12.54)	72.00 (1.49)	40.15 (1.13)	-	-
Maize	685.24 (13.03)	678.65 (24.75)	585.00 (12.15)	562.77 (15.9)	638.05 (26.55)	580.48 (31.13)
Wheat	479.70 (9.12)	256.98 (9.37)	185.80 (3.86)	147.22 (4.16)	276.14 (11.49)	203.12 (10.89)
Barley	9.15 (.17)	2.43 (.09)	0.51 (.01)	0.48 (.01)	3.57 (.15)	3.78 (.20)
Millet	1.06 (.02)	5.13 (.19)	147.78 (3.07)	140.72 (3.98)	196.78 (8.19)	211.89 (11.36)
Buckwheat	-	-	0.23 (*)	0.04 (*)	1.86 (.08)	5.16 (.28)
<b>Sub-Total of (4)</b>	<b>1802.56 (34.28)</b>	<b>1287.17 (46.93)</b>	<b>991.32 (20.58)</b>	<b>891.38 (25.18)</b>	<b>1116.40 (46.45)</b>	<b>1004.43 (53.86)</b>

Cont'd...Table 5.3

VFC/Non-VFC Crops/Products	Satbariya		Jinabang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
5. <u>Non-VFC Other</u>						
Milk	490.73 (9.33)	167.50 (6.1)	1179.62 (24.49)	1191.03 (33.65)	379.66 (15.8)	229.13 (12.29)
Ghee	25.57 (.47)	12.52 (.46)	208.95 (4.34)	203.38 (5.75)	15.08 (.63)	11.81 (.63)
Egg	56.08 (1.07)	50.50 (1.84)	49.69 (1.03)	56.87 (1.61)	35.02 (1.46)	59.94 (3.21)
Livestock sale	34.64 (.69)	11.76 (.43)	604.85 (12.56)	452.07 (12.77)	107.95 (4.49)	87.10 (4.67)
Land sale	-	4.12 (.15)	233.02 (4.84)	206.25 (5.83)	27.13 (1.13)	-
Crop by-product	1.84 (.03)	-	9.30 (.19)	0.51 (.01)	-	-
Sub-total of (5)	608.86 (11.58)	246.4 (8.99)	2285.43 (47.45)	2110.11 (59.62)	564.84 (23.5)	387.98 (20.80)
6. Sub-total of (4 + 5)	2411.42 (45.86)	1533.57 (55.92)	3276.75 (68.03)	3001.49 (84.80)	1681.24 (69.96)	1392.41 (74.66)
7. Grand Total (3 + 6)	5258.22	2742.29	4816.77	3539.49	2403.29	1864.98

- Notes : Figures in parentheses indicate percentages.  
: \* denotes negligible.  
: 1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
: 2 includes peach, walnut, lime, mango, sapota, banana, etc.  
: 3 includes ginger, sesame, cotton, tobacco, peanut, etc.  
: a denotes there was no VFC training for this product.

Satbariya. Not surprisingly, income from apple production appears only for Jinabang, where VFC households annually earn an average of Rs 60 per capita compared with an average of only Rs 7 per capita for non-VFC households. Income from mustard production, which is highest in Satbariya (Rs 613 for VFC households and Rs 460 for non-VFC households) and lowest in Thabang (less than Rs 1 for both households), shows the least amount of variation in income generation of major VFC crops between household types.

The contribution of on-farm VFC products to total on-farm income per capita is highest in Jinabang and Thabang. In Jinabang, households earn some income from a wide range of processed foods and drink, with apple chips and apple brandy being the greatest contributors. Consistent with previously noted differences in apple cultivation between VFC and non-VFC households, VFC households earn more from apple chips and apple brandy

than do their counterparts. In Thabang, both VFC and non-VFC households earn relatively significant amounts of income from making potato brandy. However, VFC households on average earn slightly more (Rs 129 and 98 per capita).

The percentage contribution of VFC crops and products to total on-farm income per capita is consistently higher for households participating in the VFC program. In Satbariya, on average 54 percent (Rs 2,847) of VFC households' on-farm income is derived from VFC crops and products versus 44 percent (Rs 1,209) for non-VFC households; in Jinabang, 32 percent (Rs 1,540) of VFC households' on-farm income is from VFC crops and products versus 15 percent (Rs 538) for non-VFC households; and in Thabang, 30 percent (Rs 722) of on-farm income of the VFC households is from VFC crops and products versus 25 percent (Rs 473) for nonparticipants.

In terms of the contribution of VFC crops and products to total household income per capita, the pattern for percentage contribution is similar to that noted above for on-farm income: VFC households have higher percentage contributions from VFC crops than non-VFC households, although the differences are less pronounced for Satbariya and Jinabang, and only a very slight difference is found in Thabang. In Satbariya the VFC crop and product income is on average 45 percent of VFC households' total income (versus 37 percent for non-VFC households); for Jinabang the VFC crop and product income is on average 19 percent of VFC households' total income (versus 12 percent for non-VFC households); and for Thabang the VFC crop and product income is on average 18 percent of VFC households' total income (versus 17 percent for non-VFC households) (tables 5.1 and 5.3).

One of the objectives of USAID's agricultural program assistance, through projects such as the VFC program, is to increase cash income which, in turn, would create a multiplier effect in local areas with regard to food and non-food purchases and on-farm wage labor opportunities. Table 5.4 presents information on average per capita and household cash income from the sale of vegetables, fruits, and cash crops (VFC crops) and VFC products for both VFC and non-VFC households. In Satbariya, VFC households are

**Table 5.4 Average Household and per Capita Cash Income per Year from VFC Crops by Household VFC Status and Community in Rs**

VFC Crops	Satbariya		Jinabang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<b>Potato</b>						
Household	2356.66	87.73	2885.57	526.41	81.36	6.82
Per capita	206.2	10.6	403.1	85.2	13.9	1.4
<b>Apple</b>						
Household	-	-	397.79	16.59	-	-
Per capita	-	-	55.6	2.7	-	-
<b>Mustard</b>						
Household	1422.77	1137.84	-	16.02	-	-
Per capita	124.5	137.5	-	2.6	-	-
<b>Other vegetables<sup>1</sup></b>						
Household	5128.57	998.27	64.73 <sup>a</sup>	5.23	-	-
Per capita	448.6	120.7	9.0	0.9	-	-
<b>Other Fruits<sup>2</sup></b>						
Household	55.23	-	728.41 <sup>b</sup>	-	-	-
Per capita	4.8	-	101.8	-	-	-
<b>Other Cash Crops<sup>3</sup></b>						
Household	835.57	19.18	5.11	6.82	-	-
Per capita	73.1	2.3	0.7	1.1	-	-
<b>Other on-farm VFC Products</b>						
Household	18.29	24.82	365.11	76.66	771.07	483.32
Per capita	1.6	3.0	51.0	12.4	131.5	98.0
<b>Total Household Cash income (mean)</b>	<b>9317.09</b>	<b>2267.84</b>	<b>4065.52</b>	<b>647.73</b>	<b>852.43</b>	<b>490.14</b>
<b>Total Per capita Cash income</b>	<b>858.8</b>	<b>274.1</b>	<b>621.2</b>	<b>104.9</b>	<b>145.4</b>	<b>99.4</b>

- Notes : 1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
: 2 includes peach, walnut, lime, mango, sapota, banana, etc.  
: 3 includes ginger, sesame, cotton, tobacco, peanut, etc.  
: a includes Rs 30.00 from the sale of vegetable seeds  
: b includes Rs 722.00 from the sale of apple saplings.

earning significantly more cash income from potatoes and other vegetables (for example, tomatoes, peas, and cauliflower) than non-VFC households (Rs 206 versus Rs 88 per capita). Non-VFC households earn slightly more cash income from mustard (Rs 138 versus Rs 125 per capita). In Jinabang, VFC households earn higher cash incomes from potatoes (Rs 403 versus Rs 85 per capita), apples (Rs 56 versus Rs 3), and apple saplings (Rs 722 versus 0). Unlike the farms of Satbariya and Jinabang, households in Thabang have only one VFC crop (potatoes) providing cash income. Although per capita cash income from

VFC crops in Thabang is low compared with the other communities, it is interesting to note that for both VFC and non-VFC households, over 90 percent of the VFC cash income is derived from VFC products such as potato brandy, which is predominantly made by women. In Jinabang and Satbariya, the reverse situation exists: VFC crops provide a minimum of 90 percent of the VFC cash income for both VFC and non-VFC households.

The comparison of per capita cash income from VFC crops and products between VFC and non-VFC households shows that the former has much higher cash income from each VFC activity (except mustard) than the latter in all communities. Overall, the per capita cash income from VFC crops and products for VFC households is higher by 46 percent, 213 percent, and 492 percent, in Thabang, Satbariya, and Jinabang, respectively.

The cash income data for VFC crops and products presented in table 5.4 quite convincingly, and perhaps not too surprisingly, show that VFC households earn more cash income per capita from their vegetables, fruits, and other cash crops. An additional question is whether this increased cash income from VFC crops represents a greater proportion of the household's total cash income than what is found for non-VFC households. It is thus important to compare VFC crop and product cash income with cash income from other on-farm and off-farm sources.

The data in table 5.5 show average annual cash income per capita from on-farm and off-farm activities for VFC and non-VFC households by community. For all three communities and for VFC and non-VFC households, cash income from VFC crops is higher than cash income from non-VFC crops. The greatest difference occurs for VFC households in Satbariya and Jinabang, where cash income from VFC crops is on average Rs 606 and Rs 499 higher than cash income from non-VFC crops. For non-VFC households in Satbariya, VFC crops provide an average Rs 224 more in per capita cash income, while in Jinabang and Thabang, cash income from VFC crops is only slightly higher than cash income from non-VFC crops. The fact that only in Satbariya are non-VFC households able

**Table 5.5 Average Annual Cash Income per Capita by Source, Household VFC Status and Community in Rs**

Sources of Cash Income	Satbariya		Jinabang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<b>1. On-farm</b>						
Land	-	4.12	233.02	206.25	27.13	-
Livestock	34.64	11.76	604.85	452.07	107.95	87.10
Processed VFC products	1.56	2.97	51.04	12.35	131.45	97.95
Crop by-product	1.84	-	9.30	0.51	-	-
VFC crop	857.15	271.13	570.13	92.38	13.88	1.38
Non-VFC crop	251.19	46.67	70.51	81.28	26.49	12.72
Livestock product	35.22	12.99	122.81	142.36	6.28	0.09
Sub-total of (1)	1181.60 (18.55)	349.64 (10.80)	1661.66 (20.99)	987.20 (22.01)	313.18 (7.95)	199.24 (7.24)
<b>2. Off-farm</b>						
	1111.73 (17.45)	496.29 (15.32)	3100.80 (39.16)	945.73 (21.09)	1536.18 (38.99)	887.33 (32.24)
Sub-total of (2)	1111.73 (17.45)	496.29 (15.32)	3100.80 (39.16)	945.73 (21.09)	1536.18 (38.99)	887.33 (32.24)
<b>3. Total Cash Income (1 + 2)</b>						
	2293.33 (36.00)	845.93 (26.12)	4762.46 (60.15)	1932.93 (43.10)	1849.36 (46.94)	1086.57 (39.48)

Note: Figures in parentheses indicate percentages of annual income per capita.

to earn comparatively more cash income from VFC crops is clearly due to their easier access to markets.

In comparing per capita cash income from VFC crops with off-farm cash income, an overwhelming pattern emerges for all study households whereby off-farm income sources consistently, and often by a large amount, provide more cash income than VFC crops and products (table 5.5). Cash income from VFC crops is higher for VFC households, particularly in Satbariya and Jinabang (an average of Rs 857 and 570 per capita, respectively). Off-farm cash income for these households is also among the highest (an average of Rs 1,112 and 3,100). Of particular interest is the large gap between cash income from VFC crops and off-farm cash income for VFC households in Jinabang (an average of Rs 570 versus 3,100) and Thabang (Rs 14 versus 1,536). For these households, off-farm

cash income is greater than income from VFC crops by an average of Rs 2,530 and Rs 1,522 per capita, respectively. In contrast, for VFC and non-VFC households in Satbariya, a comparatively smaller difference of on average Rs 225 per capita exists between off-farm and VFC crop cash income.

One of the objectives of the VFC program is to create on-farm income opportunities that over time can become sustainable alternatives to seasonal out-migration for employment. It is therefore telling to compare levels of cash income from specific off-farm sources with cash income from VFC crops. A comparison of off-farm cash income, excluding loans, with cash income from VFC crops provides some initial insights on the degree to which cash income from VFC crops competes with cash earned from the major off-farm employment sources. The specific sources of off-farm cash income were presented earlier in table 5.2. Excluding income from loans, in Satbariya VFC households earn an average of Rs 817 per capita from off-farm employment (compared with an average of Rs 857 per capita from VFC crops), while non-VFC households earn an average of Rs 285 per capita from off-farm employment (compared with an average of Rs 271 per capita from VFC crops). In Jinabang, VFC households earn on average Rs 1,277 per capita from off-farm employment (compared with an average of Rs 570 per capita from VFC crops), while non-VFC households earn an average Rs 344 per capita from off-farm employment (compared with an average of Rs 92 per capita from VFC crops). Finally, in Thabang, VFC households earn an average of Rs 553 per capita from off-farm employment (compared with an average of Rs 14 per capita from VFC crops), while non-VFC households earn an average per capita of Rs 401 from off-farm employment (compared with an average per capita of Rs 1 from VFC crops). It is interesting to note for Satbariya that after removing income from loans, the difference between cash from off-farm employment and VFC crops is small. After including loans, cash income from off-farm employment continues to be higher than cash income from VFC crops for households in Jinabang, with VFC households having more off-farm employment income. For Thabang, the very low amounts of VFC cash income result in off-farm employment income continuing to be much higher than cash income from VFC crops.

The above comparisons between off-farm employment income and cash income from VFC crops only indirectly address the original question of the degree to which VFC cash crops compete with out-migration employment. This is true because the two sources of paid work--salaried employment and wage labor--include both in- and out-of-community wage laboring. In future analyses, these two categories need to be disaggregated by in-community and out-of-community. Only then can a more definitive answer be provided regarding VFC crop income substitution for out-migration employment.

The contribution of cash income to annual income ranges from 36 percent in Satbariya to 60 percent in Jinabang among VFC households, and from 26 percent in Satbariya to 43 percent in Jinabang among non-VFC households. Both VFC and non-VFC households of Jinabang have higher cash incomes per capita than their counterparts in the other communities. Among the three communities, VFC and non-VFC households in Satbariya have the lowest contribution of cash income to total household income per capita, in part due to a comparatively lower percentage of off-farm income.

Finally, a critical question is whether efforts to increase cash cropping among subsistence-oriented farmers lead to increasing disparities in household income between those adopting the new crop technologies and those continuing traditional practices. Table 5.6 presents information on the distribution of VFC and non-VFC households for each of the three study communities by income category. A few interesting patterns in terms of VFC and non-VFC household income emerge from the data. First, compared to non-VFC households, a smaller percentage of the VFC households earn less than Rs 19,510 in each of the communities. Conversely, more of the VFC households earn incomes greater than Rs 82,250 than is the case for non-VFC households. This is particularly pronounced in the case of Satbariya where 64 percent of VFC households earn above Rs 82,250 and only about 11 percent of non-VFC households do so. In Thabang, only about 11 percent of VFC households earn above Rs 82,250, while 23 percent earn below Rs 19,510--a reflection of the community's overall poorer economic conditions. Nonetheless, the majority of VFC households earn above Rs 19,510, while the majority of non-VFC households fall into the lowest income category, earning below Rs 19,510. It is only in Jinabang that the

majority of VFC and non-VFC households earn the "middle" range of income, Rs 19,510-82,250, with about half the proportion of VFC versus non-VFC households falling into the lowest income group.

**Table 5.6 Percentage of Households by Income Category**

Community/Household VFC Status	< Rs 19,510	Rs 19,510 - 82,250	> Rs 82,250
<b>Satbariya</b>			
VFC	2.34	33.34	64.32
Non-VFC	22.98	66.10	10.92
<b>Jinabang</b>			
VFC	9.09	72.73	18.18
Non-VFC	18.58	74.04	7.38
<b>Thabang</b>			
VFC	23.25	66.14	10.61
Non-VFC	56.79	43.21	0.00

Row percentages add to 100.

The above distribution of households by income raises the possibility that the promotion of cash cropping among VFC households in Satbariya may be contributing to increased income disparity in that community. In Satbariya, ten times the proportion of non-VFC versus VFC households earn below Rs 19,510, while about six times the proportion of VFC versus non-VFC households earn above Rs 82,250. Of concern is that these income disparities are increasing existing social divisions in the community according to caste and land tenure status. If such a situation is occurring, the VFC program may need to emphasize more activities that assist the poorest of the farm households in this community.

#### **Expenditure Patterns for VFC and Non-VFC Households**

GFCS collected detailed information on the expenditure patterns of VFC and non-

VFC households in the three study communities. This investigation was motivated by a number of interests that directly and indirectly relate to the goals of the VFC program, USAID's agricultural strategy, and the GON's development priorities. Of particular interest are such questions as whether VFC households expend more income on food or non-food purchases; the expenditures on agricultural inputs for VFC and non-VFC households; and, as briefly discussed in chapter 6, whether there are any health and nutrition consequences related to different expenditure patterns in VFC and non-VFC households.

Beginning at a general level, table 5.7 presents a breakdown of average annual expenditures per capita (including home consumption) devoted to food and non-food items by VFC and non-VFC households in each community. The data show that VFC households have much higher expenditures per capita than non-VFC households in all communities. The total expenditures per capita of VFC households in Jinabang are on average 54 percent higher than the expenditure levels for non-VFC households in the community. In Satbariya, VFC households' total expenditures are greater on average by 87 percent, and in Thabang, total expenditures for VFC households are on average 62 percent greater compared with non-VFC households.

Of the total expenditures per capita, the major share is spent on food. As is shown in table 5.7, food expenditures vary by both VFC status and community. Of their total expenditures, VFC households spend 51 percent on food in Jinabang, 68 percent in Satbariya and 58 percent in Thabang, while non-VFC households spend about 64 percent in Jinabang and 75 percent in both Satbariya and Thabang.

Although VFC households in all communities have a lower percentage of their total expenditures allocated to food items, the actual rupee amount spent on food by these households is much higher when compared with non-VFC households. To have a level of rupee expenditure similar to VFC households, non-VFC households would have to increase their food expenditures on average by 22 percent in Jinabang, 25 percent in Thabang, and 68 percent in Satbariya.

**Table 5.7 Average Annual Expenditure per Capita by Food and Non-food, Household VFC Status and Community**

Study Area	Food Expenditure		Non-Food Expenditure		Total
	Rs	% of total Expenditure	Rs	% of total Expenditure	Rs
1. Satbariya					
VFC	4337.18	67.67	2071.86	32.33	6409.04
Non-VFC	2578.33	75.10	854.99	24.90	3433.32
2. Jinabang					
VFC	3743.67	50.62	3651.59	49.38	7395.26
Non-VFC	3058.20	63.56	1753.38	36.44	4811.58
3. Thabang					
VFC	2908.88	58.32	2079.33	41.68	4989.20
Non-VFC	2321.17	75.38	758.06	24.62	3079.23

Note: a) Expenditure includes value of household consumption of non-marketed subsistence crops and products.

A detailed breakdown of food and non-food expenditures per capita by source, VFC status, and community is presented in table 5.8. In terms of food expenditures, the two most important categories are cereals, and meat, eggs, and fish. The information in table 5.8 shows that in Satbariya VFC program participants spend on average 63 percent of their total expenditure on staple cereals such as rice, wheat, and maize, whereas in Jinabang and Thabang, VFC household expenditures on cereals are lower, accounting for an average of 43 and 46 percent, respectively. Although non-VFC households spend a higher proportion of their expenditures on cereals, which is consistent with their lower incomes, their rupee expenditures per capita for cereals are much lower than those of VFC households.

Most expenditures on cereals are for home consumption, although small amounts of cash are used to purchase grains. VFC households in Jinabang and Thabang have slightly higher cash expenditures on cereals than non-VFC households, whereas in Satbariya the situation is reversed. The average cash expenditures per capita for cereals among VFC households account in Satbariya for less than 0.2 percent (Rs 5.0), in Jinabang 6 percent (Rs 210.0), and in Thabang about 10 percent (Rs 238.0) of total expenditures on cereals.

**Table 5.8 : Average Annual Expenditure Per Capita by Source (Food and Non-Food), Household VFC Status and Community**

Detailed Source Food and Non-Food Items)	Community											
	Satbariya				Jinabang				Thabang			
	VFC		Non-VFC		VFC		Non-VFC		VFC		Non-VFC	
	Rs	%										
<b>I. Food Items</b>												
1. Cereals (rice, wheat maize, millet, etc.)	4066.05 <sup>a</sup>	63.44	2387.18 <sup>b</sup>	69.53	3208.07 <sup>c</sup>	43.38	2617.91 <sup>d</sup>	54.41	2304.98 <sup>e</sup>	46.20	1874.59 <sup>f</sup>	60.88
2. Milk/ghee	22.78	0.36	14.69	0.43	23.10	0.31	11.25	0.23	77.52	1.55	40.34	1.31
3. Meat/egg/fish	132.17	2.06	86.65	2.52	190.13	2.57	136.68	2.84	297.10	5.95	226.51	7.36
4. Beverage/liquor	12.60	0.20	17.09	0.50	14.43	0.20	15.92	0.33	57.97	1.16	52.47	1.70
5. Cigarette/tobacco	23.55	0.32	14.52	0.42	61.17	0.83	67.06	1.39	46.73	0.94	48.47	1.57
6. Spices	39.52	0.62	34.30	1.00	79.22	1.07	81.68	1.70	39.52	0.79	35.02	1.14
7. Sugar	40.17	0.63	20.91	0.61	76.69	1.04	51.53	1.07	41.87	0.84	16.04	0.52
8. Cooking oil	3.34	0.05	2.99	0.09	90.86	1.23	76.18	1.58	44.19	0.89	27.73	0.90
<b>Sub-total (1-8)</b>	<b>4337.18</b>	<b>67.67</b>	<b>2578.33</b>	<b>75.10</b>	<b>3743.67</b>	<b>50.62</b>	<b>3058.20</b>	<b>63.56</b>	<b>2909.88</b>	<b>58.32</b>	<b>2321.17</b>	<b>75.38</b>
<b>II. Non-food Items</b>												
9. Fuel	35.99	0.56	32.52	0.95	41.40	0.56	21.99	0.46	70.19	1.41	49.42	1.61
10. Schooling	433.65	6.77	97.59	2.84	138.60	1.87	38.11	0.79	155.22	3.11	23.25	0.76
11. Medical	188.77	2.95	87.62	2.55	107.09	1.45	15.42	0.32	9.78	0.20	25.94	0.84
12. Travelling	117.39	1.83	31.75	0.92	197.13	2.67	63.48	1.32	188.35	3.78	145.25	4.72
13. Clothing	375.23	5.85	262.10	7.63	587.35	7.94	345.51	7.18	127.60	2.56	55.97	1.82
14. Festival	34.91	0.54	31.56	0.92	292.79	3.76	161.01	3.35	160.71	3.22	204.63	6.65
15. Gift/donation	5.96	0.09	1.24	0.04	38.27	0.52	15.74	0.33	43.05	0.86	28.20	0.92
16. house maintenance	736.00	11.48	55.73	1.62	893.51	12.08	312.90	6.65	1200.64	24.06	123.04	4.00
17. Land purchase	117.30	1.83	232.83	6.78	533.97	7.22	121.32	2.52	35.27	0.71	63.59	2.07
18. Livestock purchase	23.67	0.37	22.01	0.64	796.56	10.77	621.48	12.92	86.30	1.73	37.74	1.23
19. Other	2.99	0.05	0.05	*	24.91	0.34	29.41	0.60	2.21	0.04	1.03	0.03
<b>Sub-total (9-19)</b>	<b>2671.86</b>	<b>32.33</b>	<b>854.99</b>	<b>24.90</b>	<b>3651.59</b>	<b>49.38</b>	<b>1753.38</b>	<b>36.44</b>	<b>2079.33</b>	<b>41.68</b>	<b>756.06</b>	<b>24.62</b>
<b>Grand Total</b>	<b>6409.04</b>	<b>100</b>	<b>3433.32</b>	<b>100</b>	<b>7395.26</b>	<b>100</b>	<b>4811.58</b>	<b>100</b>	<b>4989.20</b>	<b>100</b>	<b>3079.23</b>	<b>100</b>

Notes : a, b, c, d, e and f indicate cash expenditure per capita Rs 5.0, Rs 8.0, Rs 210.0, Rs 93.0, Rs 238.0 and Rs 211.0 respectively.

Non-VFC households in Satbariya spend a per capita average of 0.3 percent (Rs 8.0), in Jinabang, 3.6 percent (Rs 93.0), and in Thabang 11 percent (Rs 211.0) of total expenditures on cereals.

Expenditures on meat, eggs, and fish are lowest in Satbariya, slightly higher in Jinabang, and highest in Thabang, regardless of VFC status. For VFC participants in Thabang, expenditures on meat, eggs, and fish are approximately 6 percent of the total annual expenditures--twice the percentage for VFC households in Jinabang and Satbariya. In each community, the average per capita expenditure on meat, eggs, and fish among the VFC households (Rs 132 in Satbariya and Rs 297 in Thabang) is much higher than for non-VFC households (Rs 87 in Satbariya and Rs 226 in Thabang), whereas, as far as the allocation of expenditure is concerned, the latter has allocated on average a higher percentage (3 percent in Satbariya and 7 percent in Thabang) to such items than has the former (2 percent in Satbariya and 6 percent in Thabang).

An interesting expenditure pattern emerges from a comparison of VFC and non-VFC households' purchases of cigarettes/tobacco/beverages/liquor. For these luxury items combined, VFC and non-VFC households spend similar amounts, despite the greater income and overall food expenditures of VFC households. With the exception of Jinabang, there seems not to be a strong preference for expending more on beverages and liquor or on cigarettes and tobacco. However, expenditures for households in Jinabang are much higher for cigarettes and tobacco--more than four times higher than expenditures for beverages and liquor. Perhaps the most important point with regard to expenditures on these luxury items is that although the per capita income of the VFC households is much higher than that of the non-VFC households, VFC households maintain a level of expenditure for these goods comparable to that of lower income, non-VFC households.

The higher incomes for VFC households result in higher expenditures on a wide range of non-food items that improve household human resources (schooling), health (medical and clothing), and physical structure (house maintenance). The largest difference in expenditures for VFC and non-VFC households is for home maintenance, followed by

schooling, medical needs, and clothing. VFC households also expend significantly more on travelling than do non-VFC households. Expenditures for festivals play an important role in Jinabang, where VFC households expend more, and in Thabang, where non-VFC households have average higher expenditures. Land and livestock purchases are highest in Jinabang, with VFC households expending on average Rs 534 per capita for land purchases compared with Rs 124 for non-VFC households, and on average Rs 797 per capita versus Rs 622 for livestock expenditures.

Tables 5.9a, 5.9b, and 5.9c present average expenditures of VFC and non-VFC households on farm inputs by type of crop for each of the three study communities. Farm expenditures principally include costs of agricultural inputs such as seeds, compost, fertilizer, pesticides, and hired labor. Beginning with the information for Satbariya in table 5.9a, the overall pattern that emerges is that for both VFC and non-VFC households, potatoes, mustard, other vegetables, paddy, and wheat are the crops for which households have the greatest expenditures. For these crops, expenditures often differ according to agricultural input and by VFC and non-VFC households. Other vegetables are an important case in point. Both VFC and non-VFC households in Satbariya have average total expenditures for other vegetables higher than for any other crop, with non-VFC households' expenditures being on average Rs 260 per capita compared with an average of Rs 201 for VFC households. Interestingly, the majority of VFC households' expenditures on other vegetables is for seeds, which is on average Rs 185, or 92 percent of the total expenditure for other vegetables. Non-VFC households expend considerably less on seeds (Rs 89, or 34 percent of total expenditure on other vegetables), electing to spend much more on fertilizer (Rs 170 or 65 percent). This strategy of spending more on seeds appears to be a good investment for VFC households, which, as noted in table 5.3, earn on average approximately twice the income from other vegetables than do non-VFC households (Rs 1073 versus 544).

With regard to potato production, the expenditures for VFC households and non-VFC households differ, while for mustard the distribution of expenditures for both households is more similar--albeit higher for VFC households. As one would expect, with

**Table 5.9 (a) Average Annual Per Capita Expenditure of VFC and Non-VFC Households on Farm Inputs by Type of Crops in Satbariya in Rs.**

Crops	Seed	Compost	Fertilizer	Pesticides	Hired Labor	Total Expenses
<b>VFC Crops</b>						
Potato						
VFC	91.50 <sup>a</sup>	2.18	13.24	7.23	5.02	119.17
	(26.4)	(100)	(6.3)	(26.8)	(55.7)	(20.01)
Non-VFC	17.49	-	2.81	2.52	-	22.82
	(11.3)		(1.0)	(26.5)		(5.22)
Mustard						
VFC	11.27	-	74.86	-	0.05	86.18
	(3.3)		(35.5)		(0.6)	(14.47)
Non-VFC	11.27	-	50.06	-	-	61.33
	(7.3)		(18.4)			(14.03)
Other vegetables <sup>1</sup>						
VFC	185.00 <sup>b</sup>	-	6.28	7.71	1.67	200.66
	(53.4)		(3.0)	(28.6)	(18.5)	(33.69)
Non-VFC	88.62 <sup>c</sup>	-	170.03	2.23	-	260.08
	(57.1)		(62.4)	(23.4)		(59.66)
Other Fruits <sup>2</sup>						
VFC	0.44 <sup>*</sup>	-	-	0.22	0.2	0.86
	(0.1)			(0.8)	(2.2)	(0.14)
Non-VFC	0.13 <sup>*</sup>	-	-	0.07	-	0.2
	(0.1)			(0.7)		(0.05)
Other cash crops <sup>3</sup>						
VFC	18.88	-	3.82	3.57	-	26.27
	(5.4)		(1.8)	(13.2)		(4.41)
Non-VFC	6.66	-	-	0.96	-	7.62
	(4.3)			(10.1)		(1.74)
<b>Sub-total of VFC Crops</b>						
VFC	307.09	2.18	98.2	18.73	6.94	433.14
	(88.63)	(100)	(46.54)	(69.42)	(76.94)	(72.72)
Non-VFC	124.17	-	222.9	5.78	-	352.85
	(80.07)		(81.83)	(58.50)		(80.69)
<b>Non-VFC Crops</b>						
Paddy						
VFC	3.09 <sup>*</sup>	-	36.75	8.25	1.39	49.48
	(0.9)		(17.4)	(30.6)	(15.4)	(8.31)
Non-VFC	1.36	-	12.91	3.70	0.27	18.24
	(0.9)		(4.7)	(38.9)	(100)	(14.17)
Maize						
VFC	12.90 <sup>*</sup>	-	-	-	0.69	13.59
	(3.7)				(7.6)	(2.28)
Non-VFC	10.51	-	-	-	-	10.51
	(6.8)					(2.40)

Cont'd...Table 5.9 (a)

Crops	Seed	Compost	Fertilizer	Pesticides	Hired Labor	Total Expenses
Wheat						
VFC	23.33 (6.7)	-	69.73 (33.0)	-	-	93.06 (15.62)
Non-VFC	18.17 (11.7)	-	35.39 (13.1)	-	-	53.76 (12.29)
Barley						
VFC	0.06 (0.02)	-	-	-	-	0.06 (0.01)
Non-VFC	0.08 (0.01)	-	-	-	-	0.08 (0.02)
Millet						
VFC	-	-	-	-	-	-
Non-VFC	0.79 (0.5)	-	-	-	-	0.79 (0.18)
Other cereals						
VFC	-	-	6.32 (3.0)	-	-	6.32 (1.06)
Non-VFC	-	-	1.00 (0.4)	0.04 (0.4)	-	1.04 (0.24)
<hr/>						
Sub-total of Non-VFC Crops						
VFC	39.38 (11.37)	-	112.8 (53.46)	8.25 (30.58)	2.08 (23.06)	162.51 (27.28)
Non-VFC	30.91 (19.93)	-	49.5 (18.17)	4.1 (41.50)	0.27 (100)	84.42 (19.31)
<hr/>						
Grand Total						
VFC Households	346.47	2.18	211.0	26.98	9.02	595.65
Non-VFC Households	155.08	-	272.4	9.88	0.27	437.27

- Notes : Figures in Parentheses indicate percentages.  
: a, b and c indicate cash expenditure per capita Rs 21.0  
Rs 14.0 and Rs 4.0 respectively.  
: 1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
: 2 includes peach, walnut, lime, mango, sapota, banana, etc.  
: 3 includes ginger, sesame, cotton, tobacco, peanut, etc.  
: \* indicates cash expenditure per capita less than Rs.02

**Table 5.9 (b) Average Annual Farm Expenditure of VFC and Non-VFC Households on Farm Inputs by Type of Crops in Jinabang in Rs**

Total Crops	Seed	Compost	Fertilizer	Pesticides	Labor	Expenses
<b>VFC Crops</b>						
Potato VFC	344.63 <sup>a</sup> (65.51)	-	82.39 (79.08)	-	4.10 (35.93)	431.12 (64.44)
Non-VFC	80.19 <sup>b</sup> (35.45)	-	17.79 (69.47)	-	1.32 (18.06)	99.30 (38.29)
Apple VFC	35.00 <sup>c</sup> (6.65)	-	1.00 (95.97)	25.63 (35.93)	4.10 (5.99)	65.73
Non-VFC	8.60 <sup>d</sup> (3.80)	(0.96)	-	0.18 (100)	1.76 (24.08)	10.54 (4.06)
Mustard VFC	7.46 <sup>e</sup> (1.42)	-	3.31 (3.18)	-	-	10.77 (1.61)
Non-VFC	5.93 <sup>e</sup> (2.62)	-	2.86 (11.17)	-	0.11 (1.50)	8.90 (3.43)
Other Vegetables <sup>1</sup> VFC	74.18 <sup>c</sup> (14.10)	0.32 (33.68)	1.00 (0.96)	0.62 (2.35)	0.29 (2.55)	76.41 (11.42)
Non-VFC	58.51 <sup>f</sup> (25.87)	-	0.08 (0.31)	-	-	58.59 (22.59)
Other Fruits <sup>2</sup> VFC	0.62 <sup>g</sup> (0.11)	-	-	-	-	0.62 (0.09)
Non-VFC	0.81 <sup>g</sup> (0.36)	-	-	-	-	0.81 (0.31)
Other cash crops <sup>3</sup> VFC	11.46 <sup>g</sup> (2.18)	-	-	-	-	11.46 (1.71)
Non-VFC	24.01 <sup>g</sup> (10.61)	-	-	-	-	24.01 (9.26)
Others VFC	-	-	0.10	-	-	0.10
Non-VFC	-	(0.10)	-	-	(0.01)	-
<b>Sub-total of VFC Crops</b>						
VFC	473.35 (89.98)	0.32 (33.68)	87.80 (84.28)	26.25 (98.32)	8.49 (74.41)	596.21 (89.11)
Non-VFC	178.05 (78.71)	-	20.73 (80.95)	0.18 (100)	3.91 (43.64)	202.15 (77.95)

Cont'd...Table 5.9 (b)

Total Crops	Seed	Compost	Fertilizer	Pesticides	Labor	Expenses
<b>Non-VFC Crops</b>						
Paddy						
VFC	3.79*	-	0.20	-	2.25	6.24
	(0.72)		(0.19)		(19.72)	(0.93)
Non-VFC	1.08	-	-	-	0.85	1.93
	(0.48)				(11.63)	(0.74)
Maize						
VFC	12.58*	-	12.40	-	-	24.98
	(2.39)		(11.90)			(3.73)
Non-VFC	15.57	-	4.88	-	3.27	23.72
	(16.88)		(19.06)		(44.73)	(9.15)
Wheat						
VFC	20.64	0.63	3.78	0.10	0.29	25.44
	(3.92)	(66.32)	(3.63)	(0.38)	(2.54)	(3.80)
Non-VFC	16.17	-	-	-	-	16.17
	(7.15)					(6.24)
Barley						
VFC	0.03	-	-	0.08	-	0.11
	(**)			(0.30)		(0.02)
Non-VFC	0.02	-	-	-	-	0.02
	(**)					(**)
Millet						
VFC	15.67	-	-	-	0.38	16.05
	(2.98)				(3.33)	(2.40)
Non-VFC	15.04	-	-	-	-	15.04
	(6.65)					(5.80)
Buckwheat						
VFC	0.01	-	-	-	-	0.01
	(**)					(**)
Non-VFC	0.28	-	-	-	-	0.28
	(0.12)					(0.11)
<b>Sub-total of Non-VFC Crops</b>						
VFC	52.72	0.63	16.38	0.18	2.92	72.83
	(10.02)	(66.32)	(15.72)	(0.68)	(25.59)	(10.89)
Non-VFC	48.16	-	4.88	-	4.12	57.16
	(21.29)		(19.06)		(56.36)	(22.04)
<b>Grand Total</b>						
VFC Households	526.07	0.95	104.18	26.43	11.41	669.04
Non-VFC Households	226.21	-	25.51	0.18	7.31	259.31

- Notes :
- : Figures in parentheses indicate percentages.
  - : a, b, c, d, e, f, and g indicate cash expenditure per capita Rs. 46.0, Rs. 6.0, Rs. 20.0, Rs. 5.0, Rs. 2.0, Rs. 1.0, and Rs. 5.0 respectively.
  - : 1 includes cauliflower, cabbage, tomato, peas, beans, etc.
  - : 2 includes peach, walnut, lime, mango, sapota, banana, etc.
  - : 3 includes ginger, sesame, cotton, tobacco, peanut, etc.
  - : \* indicates cash expenditure per capita less than Rs. 1.0.
  - : \*\* indicates negligible.

**Table 5.9(c) Average Annual Farm Expenditure of VFC and Non-VFC Households on Farm Inputs by Type of Crops in Thabang in Rs**

Total Crops	Seed	Compost	Fertilizer	Pesticides	Labor	Expenses
<b>VFC Crops</b>						
Potato VFC	150.01 <sup>a</sup> (46.2)	-	-	1.34 (9.8)	18.62 (14.9)	169.97 (36.00)
Non-VFC	61.96 <sup>b</sup> (38.9)	-	-	-	4.68 (8.1)	66.64 (30.65)
Apple VFC	32.09 <sup>c</sup> (9.9)	0.78 (100)	4.69 (57.27)	8.06 (58.9)	24.97 (20.0)	70.55 (14.94)
Non-VFC	3.84 <sup>d</sup> (2.4)	-	-	-	3.69 (6.4)	7.53 (3.46)
Mustard VFC	0.30 (0.1)	-	-	-	-	0.30 (0.06)
Non-VFC	0.74 (0.5)	-	-	-	-	0.74 (0.34)
Other Vegetables <sup>1</sup> VFC	52.47 <sup>e</sup> (16.2)	-	1.03 (12.7)	2.65 (19.4)	1.84 (1.5)	57.99 (12.28)
Non-VFC	9.11 <sup>f</sup> (5.7)	-	-	-	-	9.11 (4.19)
Other fruits <sup>2</sup> VFC	1.08 <sup>g</sup> (0.3)	-	-	-	-	1.08 (0.23)
Non-VFC	0.06 (0.02)	-	-	-	-	0.06 (0.03)
Other cash crops <sup>3</sup> VFC	0.09 (0.02)	-	-	-	-	0.09 (0.02)
Non-VFC	1.17 (0.7)	-	-	-	-	1.17 (0.54)
<b>Sub-total VFC Crops</b>						
VFC	236.04 (72.72)	0.78 (100)	5.72 (69.97)	12.05 (88.10)	45.43 (36.4)	299.98 (63.52)
Non-VFC	76.88 (48.50)	-	-	-	8.37 (14.5)	85.25 (39.21)

Cont'd...Table 5.9 (c)

Total Crops	Seed	Compost	Fertilizer	Pesticides	Labor	Expenses
<b>Non-VFC Crops</b>						
Maize VFC	25.68 (7.9)	-	0.79 (9.7)	1.42 (10.4)	59.84 (47.9)	87.83 (18.58)
Non-VFC	24.30 (15.3)	-	-	0.36 (100)	30.55 (52.9)	55.21 (25.40)
Wheat VFC	38.74 (11.9)	-	0.65 (8.0)	0.22 (1.6)	10.10 (8.1)	49.71 (10.53)
Non-VFC	30.96 (19.4)	-	-	-	7.70 (13.3)	38.66 (17.78)
Barley VFC	0.03 (**)	-	0.21 (2.6)	-	9.55 (7.6)	9.79 (2.07)
Non-VFC	0.06 (0.04)	-	-	-	10.26 (17.8)	10.32 (4.75)
Millet VFC	23.8 (7.3)	-	0.79 (9.7)	-	-	24.59 (5.21)
Non-VFC	26.79 (16.8)	-	-	-	-	26.79 (12.32)
Buckwheat VFC	0.16 (0.04)	-	-	-	0.13 (0.1)	0.29 (0.06)
Non-VFC	0.35 (0.2)	-	-	-	0.82 (1.4)	1.17 (0.54)
Other cereals VFC	-	-	-	-	-	-
Non-VFC	-	-	-	-	-	-
<b>Sub-total Non-VFC Crops</b>						
VFC	88.41 (27.14)	-	2.44 (30.00)	1.64 (12.00)	79.62 (63.7)	172.11 (36.45)
Non-VFC	82.46 (51.73)	-	8	0.36 (100)	49.33 (85.4)	132.15 (60.79)
<b>Grand Total</b>						
VFC Households	324.45	0.78	8.16	13.69	125.05	472.09
Non-VFC Households	159.34	-	-	0.36	57.70	217.40

- Notes : Figures in parentheses indicate percentages.  
: a, b, c, and d indicate cash expenditure per capita Rs 30.0, Rs 13.0, Rs. 17.0, and Rs 4.0 respectively.  
: 1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
: 2 includes peach, walnut, lime, mango, sapota, banana, etc.  
: 3 includes ginger, sesame, cotton, tobacco, peanut, etc.  
: \* denotes cash expenditure per capita less than Rs 1.0.  
: \*\* indicates negligible

regard to potato production, VFC households expend an average of Rs 92 for seeds, or 77 percent of the total expenditure on potatoes. Non-VFC households follow a parallel pattern for potatoes, but expenditures are overall only 19 percent of those for VFC households.

For mustard, both VFC and non-VFC households invest the bulk of their expenditures on fertilizers, spending identical amounts on seed. For the non-VFC crops of paddy and wheat, the pattern of expenditures is similar, although again higher for VFC households. Both households on average invest similar percentages (65 and 75 percent) of their total expenditure for these crops on fertilizers.

Overall, an average of Rs 596 per capita per annum is spent by VFC households on agricultural inputs compared with Rs 437 of non-VFC households. Of the total farm expenditures of both VFC and non-VFC households, an average of 73 and 81 percent are spent on VFC crops, respectively. Except for expenditures on fertilizer, owing to its use on other vegetables, VFC households have higher expenditures for all other agricultural inputs. Only VFC households hire labor, although the amount spent is small compared with expenditures for seeds and fertilizer.

For Jinabang, the average per capita farm expenditures of VFC households is higher for all crops, except for the category of other fruits and other cash crops, where non-VFC households expend twice the amount of VFC households (Rs 25 versus Rs 12) (table 5.9b). VFC and non-VFC households have the highest expenditures for the same crops--potatoes, apples, and other vegetables--although VFC households spend much more, particularly for potatoes. In terms of differences in farm expenditures for these VFC crops, VFC households have expenses on average of Rs 431 for potatoes (64 percent of the total), Rs 40 for apples (6 percent of the total), and Rs 76 for other vegetables (11 percent of the total). Non-VFC households on average expend Rs 99 for potato production (38 percent of the total), Rs 11 for apples (4 percent of the total), and Rs 59 for other vegetables (23 percent of the total).

With regard to specific crop inputs, the highest expenditures for both VFC and non-VFC households are for seeds for potatoes and other vegetables, and for apples in the case of VFC households. Expenditures on seeds for non-VFC crops are lower, with expenses for maize and wheat being the most important. Fertilizer, which is all cash expenditure, is used primarily by VFC households for potatoes and maize. The only expenditures for non-VFC households for fertilizer are for potatoes. Of note is the fact that neither group of households buys fertilizer for apples. Not surprisingly, VFC households have a much higher pesticide expenditure for apples than non-VFC households. Finally, VFC households expend more on hired labor than non-VFC households although again, as was the case for Satbariya, these expenditures are low compared with expenditures for seed and fertilizer.

Overall, total farm expenditures per capita in Jinabang among VFC households are on average about one and one-half times higher (Rs 669) than the expenditures (Rs 259) of non-VFC households. An average of 78 to 89 percent of farm expenditures for both VFC and non-VFC households are used for VFC crops. Again, as in Satbariya, the per capita investment of VFC households on most of the VFC and the non-VFC crops is much higher than that of the non-VFC households. However, in terms of proportion allocated, non-VFC households expend more for many crops, including mustard, other vegetables, other cash crops, maize and wheat, than VFC households.

At a general level, farm expenditures in Thabang parallel those of Jinabang and Satbariya in that among VFC crops potatoes, apples and other vegetables are the most important (table 5.9c). As is the case for the other communities, VFC households expend on average more on potatoes (Rs 150 and 62 per capita), apples (Rs 32 and 4 per capita), and other vegetables (Rs 52 and 9 per capita). The difference in per capita expenditures between VFC and non-VFC households is less pronounced for non-VFC crops such as maize and wheat, and, in the case of barley, expenditures are almost identical for both VFC and non-VFC households. Average per capita expenditures for millet among non-VFC households are slightly higher.

In Thabang the highest expenditures for agricultural inputs are for seeds. This is true for all VFC crops, although for the non-VFC crops of maize and barley there is an exception where expenditures on hired labor exceed the costs of other inputs. In the case of maize, hired labor expenses for both VFC and non-VFC households (with the former being almost twice as high) are the highest labor expenses among all crops, including potatoes and apples.

Overall for Thabang, VFC households have much greater average per capita expenditures for seeds (Rs 236 versus 77) and hired labor (Rs 45 versus 8) for VFC crops. These same VFC households do not on average spend much more on seeds for non-VFC crops than households not participating in the VFC program (Rs 88 versus 82). VFC households are hiring substantially more labor to work on VFC crops than non-VFC households (an average of Rs 45 and 8 per capita). VFC households also hire more labor for non-VFC crops. For both VFC and non-VFC households, more of the labor expenditures are used for non-VFC crops, on average 64 and 85 percent, respectively.

Overall, the per capita investments of VFC households in major crops such as potatoes, apples, and other vegetables are much higher than those of non-VFC households. Even among the non-VFC crops, the farm expenditures per capita in maize and wheat are higher among VFC households, but the proportion allocated is higher among non-VFC households. Similarly, both the expenditures per capita and the proportion allocated for certain crops such as barley, millet, and buckwheat (the staple foods) are higher among non-VFC households compared with VFC households.

Both VFC and non-VFC households have increased cash expenditures for buying potato and apple seeds. While the cash expenditures per capita are on average Rs 47.0 among VFC households, they are only an average of 17.0 among non-VFC households.

As shown in table 5.9(a-c), VFC households in each of the three study communities expend or invest more on farm inputs to VFC crops than non-VFC households. As shown previously in table 5.3, VFC households earn more income from these VFC crops, due, no

doubt to a large degree, to these higher expenditures on crop inputs. A comparison of income earned with amount expended on farm inputs by VFC crop will show which crops are providing VFC households with a higher net income (or conversely stated a greater return to investment).

Table 5.10 presents information on average net income per capita from VFC crops by household VFC status and community. As seen in the table, with the exception of Thabang, VFC households have higher total net income from VFC crops compared with non-VFC households. In Satbariya, VFC households have an average total net income from VFC crops of Rs 2,412, compared with Rs 853 for non-VFC households; in Jinabang, VFC households have an average total net income from VFC crops of Rs 893, versus Rs 324 for non-VFC households. In Thabang, VFC and non-VFC households have almost identical total net incomes from VFC crops (Rs 291 versus 289 per capita, respectively).

For the different VFC crops, potatoes, mustard (except in Thabang), and other vegetables on average provide much higher net incomes to both VFC and non-VFC households in all communities. In Satbariya, VFC households earn more net income per capita for these crops than non-VFC households--an average of Rs 742 from potatoes, Rs 590 from other vegetables, and Rs 128 from mustard. Similarly in Jinabang, VFC households earn an average of Rs 673 net income per capita (the highest) from potatoes, which is an average of Rs 500 more than the average net income from potatoes for non-VFC households (Rs 174). In Jinabang, VFC households' average net income per capita from other vegetables (Rs 120) is also 33 percent more than the net income for these crops in non-VFC households (Rs 90). It is only for mustard that non-VFC households' average net income per capita is comparable with that of VFC households (Rs 62 versus Rs 68).

In addition to these VFC crops, VFC households in Jinabang receive some income from the sale of apples. In contrast to the other VFC crops, net income from apples is negative for both VFC and non-VFC households, with the deficit being slightly higher for VFC households (average of Rs -5.59 versus -3.83). This deficit results from the relatively high expenditures on crop inputs for apples (table 5.9b) compared with comparably low

**Table 5.10 Net Income Per Capita from VFC Crops by Household VFC Status and Community in Rs**

VFC Crops	Satbariya			Jinabang			Thabang		
	Crop Income	Crop Expenditure	Crop Net Income	Crop Income	Crop Expenditure	Crop Net Income	Crop Income	Crop Expenditure	Crop Net Income
Potato: VFC	985.40	119.17	866.23	1104.61	431.12	673.49	443.99	169.97	274.02
Non-VFC	146.91	22.82	124.09	273.00	99.30	173.70	249.17	66.64	182.53
Apple: VFC	-	-	-	60.14	65.73	-5.59	-	70.55	-70.55
Non-VFC	-	-	-	6.71	10.54	-3.83	-	7.53	-7.53
Mustard: VFC	612.64	86.18	526.46	78.85	10.77	68.08	0.06	0.30	-0.24
Non-VFC	459.64	61.33	398.31	70.48	8.90	61.58	0.47	0.74	-0.27
vegetables: <sup>1</sup>									Other
VFC	1073.42	200.66	872.76	207.38	76.41	130.97	146.55	57.99	88.56
Non-VFC	543.82	260.88	282.94	149.54	58.59	90.95	124.98	9.11	115.87
Other fruits: <sup>2</sup>									Other
VFC	20.3	0.86	19.44	4.41	0.62	3.79	-	1.08	-1.08
n-VFC	1.37	0.2	1.17	-	0.81	-0.81	-	0.06	-0.06
cash crops: <sup>3</sup>									Other
VFC	153.48	26.27	127.21	33.59	11.46	22.13	-	0.09	-0.09
Non-VFC	54.00	7.62	46.38	25.92	24.01	1.91	-	1.17	-1.17
Total: VFC	2845.24	433.14	2412.10	1488.98	596.11	892.87	590.60	299.98	290.62
Non-VFC	1205.74	352.85	852.89	525.65	202.15	323.50	374.62	85.25	289.37

Notes : Crop expenditure does not include value of home labor. Expenditures for seeds include expenditures both in-kind and cash. See tables 5.9 (a-c) for breakdown of cash and in-kind expenditures on seed. These tables also provide the necessary information for calculating net return to labor and capital separately.

: 1 includes cauliflower, cabbage, tomato, peas, beans, etc.

: 2 includes peach, walnut, lime, mango, sapota, banana, etc.

: 3 includes ginger, sesame, cotton, tobacco, peanut, etc.

income returns. The low returns reflect more a lack of accessible markets for apples than low production. Farmers in Jinabang in both VFC and non-VFC households widely report that they are unable to market all their apple harvest.

As is the case for Satbariya and Jinabang, households in Thabang have highest net income per capita from potatoes, with VFC households earning on average Rs 82 more than non-VFC households (Rs 264 to Rs 182). It is only from other vegetables in Thabang that non-VFC households receive more net income per capita (an average of Rs 27) than VFC households (Rs 116 versus 89, respectively).

The above discussion of net income (or net return to investment) for VFC crops reveals that with few exceptions, VFC households receive more net income from their VFC crop activities. Where they do not, it is due more to lack of markets than problems with production (for example, apples in Jinabang and Thabang). Only for other vegetables in Thabang are non-VFC households receiving higher net income.

### **Women and Household Income**

As described in chapters 2 and 3, it is becoming increasingly apparent that investigations into the effects of commercializing subsistence agriculture need to consider whether important differences result in income use and control according to gender. As noted earlier, findings from previous research have raised concerns that increased commercialization of subsistence agriculture can lead to women losing control over traditional income (in-kind and cash). Incomplete participation of women in the benefits received from the new cash income, and their loss of control over income, can result in negative nutritional and health outcomes for the household.

Throughout rural Nepal, a strong cultural tradition exists that assigns men primary and almost exclusive responsibility for the management and control of household cash income. With perhaps few exceptions, primarily in the case of female-headed households and some joint-headed households in Thabang where Kham Magar women generally have

more autonomy, men in both VFC and non-VFC households have much greater access to and control over household income. However, owing to increased commercialization and the efforts of the VFC program, particularly those directly targeting women, new opportunities are arising for women to earn--and in some cases to control--income that, while minimal in comparison to what men earn, is significant in terms of changing cultural attitudes toward women's involvement in household cash income-earning activities.

GFCS employed two approaches in its study of women's access to and use of household income. First, focused interviews and a short farming system questionnaire were administered to 10 key women informants in VFC households and to an equal number of women in non-VFC households in each of the three study communities. A standardized set of open- and closed-ended questions were used which sought information on the types of income-earning activities women perform, the amount they earn, the way they use their earned income, their preferences for particular activities, their attitudes regarding control of income within the households, and suggestions for how to increase their involvement in income-earning fields and home activities.

Second, GFCS collected quantitative information on intrahousehold decision-making. Gender-disaggregated data on decision-making is useful for identifying areas of potential gender conflict and cooperation, according to differing household structures and situations (Kabeer 1991). Examples of the research questions relating to individual decision-making include:

- Do women predominate in making decisions in the ("domestic") domain while men make most of the decisions that involve the household in outside interactions--a pattern reported for other communities in Nepal (Acharya and Bennett 1981)?
- Is the pattern of male and female decision-making changing, particularly for the activities targeted by the VFC program?
- To what degree are women involved in decision-making related to the introduced agricultural technologies? Do women have any control over household decisions in

these areas? Do women influence agricultural decisions related to VFC technologies, depending upon the characteristics of their involvement in the introduced activity?

To produce quantitative profiles of women's involvement in household decision-making, an additional question was added that asked "who made the decision" to undertake each production and consumption activity investigated with the survey questionnaires. In the project's socioeconomic and farming system questionnaire, the production and consumption activities where gender-disaggregated information on the decision-makers was sought included:

- the sale, purchase and rent of land and livestock;
- expenditures on farm (labor, fertilizers, seeds) and non-farm household expenses;
- use of credit;
- farm and off-farm income; and
- crop planting and harvesting.

In the following two sections, results from the more qualitative, ethnographic investigation of women's access to and use of income, and the quantitative documentation of women's involvement in household decision-making related to income generation are presented. The information in the two sections is complementary. For both sections, an emphasis is given to women in VFC households, since the VFC program is supporting these women's new income-earning activities.

### **Ethnographic Study of Women's Income Earning**

The income-earning possibilities and VFC training for women differ according to the study community. The situation for women in each community is described below.

## *Satbariya*

As noted in chapters 3 and 5, women in Satbariya have not been able to earn income from the production of potato chips and pickle. For women, the benefits derived from participation in the VFC activities for potato chip and pickle making have been limited to the addition of a new or improved food item for home consumption, and the use of household surpluses of potatoes and vegetables. The fact that there are only a few very minor exceptions to the general statement that women in Satbariya do not sell VFC products, provides insights into the constraints they face and attitudes they have toward earning income from VFC products.

Only one of the women interviewed during the ethnographic study had been able to sell potato chips, and then only on one occasion at a shop in Lamahi. The transaction was conducted by her husband, who sold 10kg of potato chips for Rs 200. The woman was disappointed with the price she received for the chips because the value of the raw potatoes alone was Rs 25, and additional expenses were incurred for salt, oil, and transportation--plus the time invested by the woman and other household members in production. Consequently, her experience discouraged her from continuing to make and sell potato chips.

Another woman interviewed had also attempted to sell potato chips in the Lamahi bazaar, but without success. After her husband offered to market the potato chips, she took great efforts to make a large quantity (she was unable to identify the exact amount) of chips of different sizes, shapes, and colors to make them more attractive, but she never found a buyer in spite of her efforts. While disappointed, she remains hopeful that opportunities to sell the chips will arise in the future.

The two cases discussed above were exceptions, as it was found that most of the women interviewed had very little interest in selling potato chips. Most of the women were satisfied to use their surplus potatoes to produce potato chips for home consumption.

With regard to pickle production, only one of the women interviewed had been able to sell her pickle on one occasion at a shop in Lamahi. The transaction was conducted by her husband, who sold a jar of pickle for Rs 50.

In general, the ten women who were interviewed and who responded to the questionnaire were satisfied with the VFC activities because they fulfilled the women's desires to learn and use new knowledge and skills. In addition, the women had acquired new food items for home consumption. However, the women felt that potato chips and pickle making were inappropriate activities for generating income.

Suggestions made by the women regarding training in new activities that would be relevant to their interests and concerns with household income included sewing, knitting, and weaving. When it was pointed out that those activities, like potato chip and pickle production, would probably not lead to increased earnings, the women argued that these skills would help to reduce regular household expenses and thereby allow the household's agricultural income to be used in other ways. Most women felt satisfied with their current household income from agricultural sources and preferred to focus their attention on these activities. They calculated that potential income from VFC activities would be insignificant and that marketing efforts on their behalf would be demeaning and result in a loss of prestige.

In addition, it was felt by some women interviewed that lack of demand within the village for their VFC products and unreliable transportation to the larger market, 10km away, were major problems to expanding production of VFC products. However, not all women agreed that transportation was a problem, since the products women would be producing could be transported by bicycle for sale at the local bazaar. Some women also felt the profits from their VFC enterprises would be small in comparison with the income generated through the households' agricultural activities. Consequently, the women did not want to risk a reduction in income from these sources by spending more time on products which have not been successfully marketed in their area and will not compensate for any losses in agricultural income. Some of the women also said that trying to sell products

which are not in demand and which produce minimal profits would be demeaning and cause them to lose status.

Because the women in Satbariya have not earned cash income from their VFC activities, they have had no experience with the issues regarding who handles decisions about any earned income. However, the women presumed that any income they earned would be managed in much the same way as other household income. Five of the women interviewed said that they participated in decision-making regarding large transactions within the household. Four of these women made joint decisions with their husbands while one woman said that decisions were made by the family together. Two other women stated that they did not participate in decision-making in their households. One of these said that her husband alone made all the decisions while the other woman's father was the primary decision-maker.

Most of the women surveyed were able to make regular, small, household purchases without having to consult with their husbands, but did consult them on larger, irregular purchases like their cutting machines for making potato chips. In the wealthiest households, it was found that the women were actually given the household money for safekeeping, but the exact amount was to be turned over to their husbands upon request.

Although most of the women in the community assist in planting, weeding, manuring, and harvesting potatoes, the men usually maintain authority over these activities by telling the women what work to do at the times when their inputs are needed.

### *Jinabang*

In sharp contrast to women in Satbariya, nine of the ten key women informants in VFC households were earning income from one or more of the VFC activities in which they had received training. Most earnings were derived from vegetable seed, potato, and potato chip production. Prior to the VFC program, very few income-earning opportunities existed for the women. The production of vegetables, fruits, and other grain crops was inadequate

even for home consumption.

Seed production has helped these women to maintain their own seed supply and has also been a good source of income for four of the women interviewed. Seed sales have increased with the demand for improved varieties of vegetables, and the women have found that buyers come to them from within their own village and from adjacent areas. An additional benefit is that the price of improved variety seeds is higher than for local varieties.

Potato production, like vegetable seed production, is a good source of income for the majority of the interviewed women in VFC households. Of the nine women active in potato production, three of them received training from a friend or family member rather than through the VFC. At least four of the women were earning income from potato production. Potatoes were sold for consumption and for seed to local people and to others who came from adjacent areas (that is, Thabang, Jajarkot, Pyuthan). In some cases, male members of the household transported potatoes by horse for sale in the bazaars of Sitalpati, Tulsipur, and Langti. The sale price of the potatoes is Rs 2 per kilogram. Additional costs of Rs 3 per kilogram are added when the potatoes are transported, in order to cover the portage fee. The women reported that they have had no problems selling their potatoes.

While four of the nine women active in potato chip making have earned income from their efforts, they reported that this income is irregular and limited. The women have sold their chips occasionally to visitors to the village. The women indicated that they had never sold their product outside of Jinabang. However, one enterprising woman reported that she sold her potato chips at the polls on election day and made a profit of Rs 195. She was able to sell the chips at roughly double the price usually requested and attributed this to the fact that her customers were drinking raksi, the local alcohol. Normally, the chips sell for Rs 60 per kilogram fried, and Rs 50 per kilogram unfried. The election day sales were made at the rate of Rs 100 per kilogram fried and Rs 90 per kilogram unfried.

Many of the women trained in making noodles never made them, and the few who did ended up discontinuing the practice after several tries. None of the women ever sold the noodles. The reasons given for abandoning the practice were that it was a considerable amount of work, the noodles were not a food that they were used to eating, and they could not be sold in the village.

Only two women were able to sell the jam and jelly for Rs 50 per half-kilogram jar, but not on a regular basis. The women also reported that there was little interest in making jam and jelly for home consumption after the first or second try since it was not a preferred food among household members.

Six out of the ten women ranked vegetable and vegetable seed production as their best VFC activities because together they provided nutritious food and income. In addition, the women's involvement in vegetable production has increased their status in the household and the community. Potato chip making was also ranked high by three women because it provided some income, but mostly because the potato chips were good tasting, suited to household needs, and a good way to preserve some of the surplus potatoes produced by the household. One woman ranked potato production as her best suited activity as it provided both food for household consumption and a source of income.

Although the women did not keep records, their annual income was estimated from recall, which after being cross-checked with other data, was found to be fairly accurate. It was found that the average income generated by the sample women from their VFC activities was Rs 500 to 800 per year.

In addition to gaining income, skills, and knowledge, the women of Jinabang felt that their involvement in the VFC program had brought about great changes in their life-style and attitudes. Because of their opportunities to travel and meet with new people during training, the women felt that they have gained self-confidence and lost their hesitation to speak with strangers. They no longer felt that they were compelled to perform only the household and agricultural chores which were held in low regard. In addition, the other

members of their households supported their efforts.

None of the women who had sold their VFC products had made the marketing decision on her own. For half of the women, the decision was made jointly with their husbands and, in one case, with the entire family. In three cases, the women did not participate in the marketing decisions; rather, the head of the household, either a father, husband, or father-in-law, made the decisions alone.

All of the women reported that they did not keep the earned income themselves, but willingly turned it over to the head of the household. It was added that the household head had full authority over their earnings and that the women themselves did not want to bear financial responsibilities--in part due to their lack of experience in handling cash as well as their illiteracy. Only when the head of the household was absent did they hold cash earned until his return. Whenever the women needed money for personal or household purchases, they would get it from the household head.

Most of the women did not participate in decisions regarding how the money was spent. In four cases, the husband alone made the decision; in other households, the father-in-law alone decided or a joint decision was made between the head of the household and his wife (that is, mother and father). In only two of the sample households did the women participate in joint decisions with their husbands.

Because the women did not handle the income or expenses, they could not say exactly how their income was used, but believed that they contributed to general household expenditures, including the purchase of rice, oil, salt, and clothing for the family. Some income was spent by them personally for ornaments, utensils, shoes, and cloth, and a portion went toward the children's education. The women also felt that they contributed to agricultural expenses, including fertilizer and wages for hired labor during the peak season. In a few households, recent expenditures included the purchase of land and the construction of a house.

## ***Thabang***

Eight of the key women informants from VFC households in Thabang earn income from their VFC activities and have increased their household income. The largest profits are generated from carpet weaving, and potato brandy and potato production. Through potato and vegetable production, the women have increased the household food supply and used the surplus potatoes in potato brandy and potato chip production. Other activities --making apple brandy, dried apples, jams and jellies, and potato noodles--have not benefited the women and in most cases the activities have been abandoned.

Carpet weaving is one of the preferred income-earning activities of the women interviewed. Raw wool is available twice a year, at which time the women make heavy cash outlays to purchase wool available in the village before travelling in groups to adjacent areas to purchase more. These expeditions are usually made twice a year and take five to seven days. Each woman buys and carries her own wool.

The raw wool is sold by the *dharni*--a local unit of measure equal to 2.4 kg. The cost of white wool is Rs 120 to 130 per dharni, but natural black wool is more expensive at Rs 200 per dharni. Now that the women have access to chemical dyes through the No-Frills site coordinator, they buy more of the white wool and dye it black for use in the new carpets.

Carpets are priced according to size, with the largest ones (approximately 2 by 3.5 and 2 by 4m) priced at Rs 1,400 to 1,700, respectively, and the smallest (approximately 1 by 1.5m) priced at Rs 500. The women estimate their costs for raw materials (wool, dye and sulfuric acid) for the larger carpets at Rs 1,300 to 1,400. Labor costs are not added to the value of the carpet. Thus, the profit margin is Rs 100 to 300 per large carpet. A woman who sells six carpets a year would earn approximately Rs 600 to 1,800.

Women who weave carpets using the new technologies introduced by the VFC program say that they prefer this activity to others because it is profitable, albeit time consuming.

In addition, carpet weaving is viewed as being more prestigious than the other income-generating opportunities available to them (for example, making potato brandy). Moreover, women did not have the problem of customers arriving at their homes unannounced, wanting to be served brandy.

Making potato brandy is preferred by some of the women interviewed because the supplies are available locally. To make the brandy, sugar is added to potatoes and allowed to ferment for four to five days, after which it is distilled. One lot of brandy fills two and a half 650-ml bottles. The approximate cost to produce one lot is Rs 25 to 30. The sale price of one bottle is Rs 40 to 60, depending upon quality and demand. Thus, profits from one lot range from Rs 70 to 125. Also, as noted earlier, when customers elect to stay in the women's home to drink, women use this time to sell them potato chips as well.

The women interviewed were found to be of two types: those who were young and living in their parents' homes, and those who are heads of households from which the men are frequently absent and who thus have primary responsibility for agricultural and domestic decisions. However, in all cases, the women were involved in the decisions regarding the sale of their VFC products. Half of the women made their decisions on their own. Three women, who worked together as a production group, made their decisions together while two others decided jointly with their families.

All of the women managed and controlled the income earned from the sale of their products. Six of the women were the head (or acting head) of their households and thus handled most of the income and made decisions regarding expenditures. Two others were not household heads, but made their own decisions on the use of their money, which included occasional contributions to the household. One of the women reported that her contributions were repaid by her father at a later date. Only one woman reported that she had not contributed to the household.

All of the women who contributed income to the household said their money was primarily spent on household necessities such as salt, oil, rice, and meat. Six women had

also bought personal items. Four women reported that they had either loaned, saved, or used their money to purchase land. The one who had not contributed to the household spent her money on personal items like ornaments, clothes, and utensils.

While most of the women interviewed reported controlling the use of the income from VFC activities, they also indicated that they consulted other family members regarding how to use the money. One woman reported that she consulted her brother and sister before spending in order to avoid problems of jealousy. The three women making decisions completely on their own were a head of her own household, a daughter who was supporting and caring for a disabled parent, and a daughter who was not required to contribute income to her household.

### **Quantitative Profile of Women's Decision-making Role in Sale of VFC Crops and Products**

The socioeconomic and farming system questionnaires included questions on who made the decisions for all production and consumption decisions. Up to three individuals could be reported as having participated in the decision, for example, to plant, weed, hire labor, purchase land, use pesticides, or pay school fees. The usefulness of this approach is that it directly captures situations where different household members contribute to and agree with a particular decision. For example, if the head of household, spouse, and adult son were reported as making the decision to plant VFC crops, it can be concluded that all three had some input and were in agreement with the decision. There are numerous uses for this type of information. First, gender-disaggregated patterns in decision-making involvement can be correlated with a wide range of behavioral and socioeconomic information: What are the social status characteristics of women most involved in decision-making? What household structures are most supportive of women's involvement in decision-making? For which economic activities do women make the most decisions, and how does that compare with their actual involvement in those activities (plus the converse question)? What social and economic factors best explain women's involvement in decision making? It should also be noted that if an individual is not included in the decision, it does not necessarily follow that they were not in agreement with the decision but rather that they were not involved

in making the actual decision.

Table 5.11 presents the intrahousehold decision-making patterns for sale of VFC and non-VFC crops and products by household VFC status for Satbariya. As can be seen in the table, most of decision-making is made by male household heads alone among both VFC and non-VFC households, with the proportion being much higher among VFC households. In contrast, as described in the previous section, women make very few decisions alone, as indicated by two decisions among the VFC households and five among non-VFC households. These decisions are basically related to VFC products. Women and men making decisions jointly is the second most frequent decision-making arrangement, although it only occurs one-fifth as often as solo decisions made by the male household head in VFC households and two-fifths as often in non-VFC households. When such joint male and female decisions are made, they are generally related to the sale of other vegetables, followed by maize and wheat. Overall, women in VFC households are more involved than non-VFC women in decisions about the sale of different VFC and non-VFC crops and products.

Unlike the situation in Satbariya, most of the crop sale decisions in Jinabang are made jointly by male household heads and their spouses (excluding the "Other" category which aggregates a large number of infrequently occurring decision-making combinations). Women in VFC households are involved in decisions twice as often as women in non-VFC households (table 5.12). Out of the total decisions made jointly, 21 percent were for the sale of ghee, 15 percent were for maize, 9 percent were for millet, and 6 percent were for other vegetables. While women in non-VFC households are more involved with their husbands in decisions regarding non-VFC crops and products, women in VFC households are more involved in making decisions about VFC crops such as potatoes and other vegetables.

The proportion of women involved in decision-making alone is lower than the proportion of men deciding alone, but this is still much higher than in Satbariya. Women in VFC households are more involved in making decisions on their own than women in

**Table 5.11 Decision-Making Pattern on Household Sale of VFC and Non-VFC Crops and Products in Satbariya**

VFC & Non-VFC Crops & Activities	Male HH Head Alone		Male HH Head & Spouses		Spouses of Male HH Heads Alone		Other	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<u>VFC Crops</u>								
Potato	25 (11.74)	6 (9.23)	2 (4.55)	-	-	-	1 (14.29)	-
Apple	-	-	-	-	-	-	-	-
Mustard	13 (6.10)	14 (21.54)	2 (4.55)	2 (7.69)	-	1 (20.0)	1 (14.29)	-
Other vegetables <sup>1</sup>	133 (62.44)	27 (41.54)	21 (47.43)	15 (57.69)	-	1 (20.0)	3 (42.86)	-
Other fruits <sup>2</sup>	3 (1.41)	-	1 (2.27)	-	-	-	-	-
Other <sup>3</sup> cash crops	5 (2.35)	4 (6.15)	1 (2.27)	-	-	-	1 (14.29)	-
<u>VFC Products</u>								
Jam/jelly/squash	-	-	-	-	-	-	-	-
Potato chips/noodles	-	-	-	-	-	1 (20.0)	-	-
Apple chips	-	-	-	-	-	-	-	-
Brandy	-	-	-	-	2 (100.0)	2 (40.0)	-	-
Knitting/weaving	1 (.47)	-	-	-	-	-	-	-
<u>Non-VFC Crops &amp; Products</u>								
Maize	8 (3.76)	5 (7.69)	6 (13.64)	2 (7.69)	-	-	-	-
Paddy	-	1 (1.54)	-	-	-	-	-	-
Wheat	12 (5.63)	5 (7.69)	6 (13.64)	5 (19.23)	-	-	1 (14.29)	-
Barley	-	-	-	-	-	-	-	-
Millet	-	-	-	-	-	-	-	-
Buckwheat	-	-	-	-	-	-	-	-
Animal milk	8 (3.76)	3 (4.62)	4 (9.09)	2 (7.69)	-	-	-	2 (100.0)
Ghee	5 (2.35)	-	1 (2.27)	-	-	-	-	-
Egg	-	-	-	-	-	-	-	-
<b>Total</b>	<b>213</b>	<b>65</b>	<b>44</b>	<b>26</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>2</b>

Notes: Figures in parentheses indicate percentages  
1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
2 includes peach, walnut, lime, mango, sapota, banana, etc.  
3 includes ginger, sesame, cotton, tobacco, peanuts, etc.

**Table 5.12 Decision-Making Pattern on Household Sale of VFC and Non-VFC Crops and Products in Jinabang**

VFC & Non-VFC Crops & Activities	Male HH Head Alone		Male HH Head & Spouses		Spouses of Male HH Heads Alone		Other	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<u>VFC Crops</u>								
Potnto	13 (32.5)	9 (39.13)	31 (38.27)	7 (15.9)	1 (10.0)	-	29 (31.18)	13 (26.53)
Apple	3 (7.5)	-	4 (4.94)	1 (2.27)	-	-	11 (11.83)	1 (2.04)
Mustard	-	-	-	2 (4.55)	-	-	-	1 (2.04)
Other vegetables <sup>1</sup>	1 (2.5)	-	5 (6.17)	-	-	1 (25.0)	6 (6.45)	1 (2.04)
Other fruits <sup>2</sup>	-	1 (4.35)	-	-	-	-	1 (1.08)	-
Other <sup>3</sup> cash crops	-	1	- (4.35)	-	-	-	1	- (1.08)
<u>VFC Products</u>								
Jam/jelly/squash	-	-	-	-	2 (20.0)	-	-	-
Potato chips noodles	2 (5)	-	-	-	4 (40.0)	-	1 (1.08)	-
Apple chips	4 (10.0)	-	-	-	1 (10.0)	-	-	-
Brandy	2 (5.0)	1 (4.35)	-	-	-	1 (25.0)	2 (2.15)	3 (6.12)
Knitting/weaving	-	-	-	-	-	-	-	-
<u>Non-VFC Crops and Products</u>								
Maize	-	-	12 (14.81)	11 (25.0)	1 (10.0)	1 (25.0)	8 (8.6)	10 (20.41)
Paddy	-	-	-	-	-	-	-	-
Wheat	1 (2.5)	-	2 (2.47)	1 (2.27)	-	-	3 (3.23)	2 (4.08)
Barley	-	-	-	-	-	-	-	-
Millet	2 (5.0)	-	7 (8.64)	6 (13.64)	1 (10.0)	-	6 (6.45)	5 (11.36)
Buckwheat	-	-	-	-	-	-	-	-
Animal milk	1 (2.5)	-	3 (3.7)	-	-	-	2 (2.15)	-
Ghee	11 (27.5)	11 (47.83)	17 (20.99)	16 (36.36)	-	1 (25.0)	23 (24.73)	13 (26.53)
Egg	-	-	-	-	-	-	-	-
<b>Total</b>	<b>40</b>	<b>23</b>	<b>81</b>	<b>44</b>	<b>10</b>	<b>4</b>	<b>93</b>	<b>49</b>

Notes: Figures in parentheses indicate percentages  
1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
2 includes peach, walnut, lime, mango, sapota, banana, etc.  
3 includes ginger, sesame, cotton, tobacco, peanuts, etc.

non-VFC households, as indicated by 10 decisions for the former as opposed to only 4 for the latter. The single decisions made by the women in VFC households are all related to VFC crops, such as potatoes, and VFC products, such as jams, jellies, and squash, potato chips, and apple slices.

Table 5.13 shows the intrahousehold decision-making patterns for sales of VFC and non-VFC crops and products by household VFC status in Thabang. Unlike the case in Satbariya and Jinabang, the low number of decisions made by household members is due to the limited sale of VFC and non-VFC crops and products in Thabang. Nonetheless, it is interesting to note that the major decision-makers in Thabang are the spouses of the male household heads. Excluding the "Other" category of decision-making because it includes various subcategories, it is evident from the table that out of the 35 sale decisions made in the VFC households, 71 percent were made by women alone. Even out of the other 10 decisions made, women had participated equally with their husbands. In total, 91 percent of the sale decisions made in VFC households had women's active participation. A similar pattern emerges among non-VFC households, but with a proportion almost less than half that of women in VFC households. Out of the 25 decisions made by spouses of male household heads alone, 56 percent were about the sale of VFC crops and products, mainly brandy and potatoes.

The main reasons for women's higher participation in decision-making in Thabang are that the women are very active, outspoken, and enterprising, as well as permanent residents of the households, whereas men are often gone for long periods herding animals.

### **Summary of Findings**

The findings presented in this chapter support a number of conclusions about the effects of the commercialization and the VFC program on household income and expenditure. Incomes of farmers in VFC households have risen. On-farm incomes have increased as a result of commercialization, which in turn has led to the creation of some new employment opportunities. VFC farmers have also increased their willingness to risk,

**Table 5.13 Decision-Making Pattern on Household Sale of VFC and Non-VFC Crops and Products in Thabang**

VFC & Non-VFC Crops & Activities	Male HH Head Alone		Male HH Head & Spouses		Spouses of Male HH Heads Alone		Other	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<u>VFC Crops</u>								
Potato	1 (33.33)	-	2 (28.57)	-	3 (12.0)	-	4 (10.81)	1 (4.35)
Apple	-	-	-	-	-	-	-	-
Mustard	-	-	-	-	-	-	-	-
Other vegetables <sup>1</sup>	-	-	-	-	-	-	-	-
Other fruits <sup>2</sup>	-	-	-	-	-	-	-	-
Other <sup>3</sup> cash crops	-	-	-	-	-	-	-	-
<u>VFC Products</u>								
Jan/jelly/squash	-	-	-	-	-	-	-	-
Potato chips noodles	-	-	-	-	2 (8.0)	-	2 (5.41)	-
Apple chips	-	-	-	-	-	-	-	-
Brandy	-	-	-	-	9 (36.0)	12 (100.0)	25 (67.57)	22 (95.65)
Knitting/weaving	-	-	-	-	-	-	4 (10.81)	-
<u>Non-VFC Crops and Products</u>								
Maize	-	2 (50.0)	1 (14.29)	1 (100.0)	6 (24.0)	-	2 (5.41)	-
Paddy	-	-	-	-	-	-	-	-
Wheat	-	-	1 (14.29)	-	2 (8.0)	-	-	-
Barley	-	-	-	-	-	-	-	-
Millet	-	1 (25.0)	-	-	2 (8.0)	-	-	-
Buckwheat	-	-	-	-	-	-	-	-
Animal milk	1 (33.33)	1 (25.0)	2 (28.57)	-	-	-	-	-
Ghee	1 (33.33)	-	-	-	-	-	-	-
Egg	-	-	1 (14.29)	-	1 (4.0)	-	-	-
<b>Total</b>	<b>3</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>25</b>	<b>12</b>	<b>37</b>	<b>23</b>

Notes : Figures in parentheses indicate percentages  
: 1 includes cauliflower, cabbage, tomato, peas, beans, etc.  
: 2 includes peach, walnut, lime, mango, sapota, banana, etc.  
: 3 includes ginger, sesame, cotton, tobacco, peanuts, etc.

as is reflected by the substantial difference in the amount of loans taken by VFC households compared with non-VFC households. The VFC program is contributing to raising household income, although this income is not always distributed equally. This inequality is especially apparent in Satbariya.

Among the VFC crops, potatoes have one of the greatest cash crop potentials, producing higher incomes in all communities. Vegetables such as tomatoes, peas, cauliflower, carrots, and beans also generate a large amount of income—even more than potatoes in Satbariya. Apples are important in Jinabang and Thabang in terms of sales from both fruit and brandy. Due to the cash income earned from the sale of VFC crops such as the ones mentioned, farmers from both VFC and non-VFC households invested more on VFC crops. The major expenditure is on seed, followed by fertilizer and hired labor. The farmers of VFC households are investing more than their counterparts on both VFC and non-VFC crops. In turn, their return from these crops is much higher.

As expected, VFC crops had varying success rates in the different communities due to such factors as climate, altitude, and transportation. For example, in Jinabang and Thabang, apples were processed into brandy to facilitate transportation, which is a major problem in both places. In Jinabang, apple and potato production appear to be the most successful VFC activities given the climate, altitude, and accessibility. In Satbariya, tomatoes, peas, and cauliflower are successful VFC crops. In Thabang, brandy making and knitting and weaving yield higher cash incomes than other activities.

VFC women in Jinabang and Thabang are participating to a degree in the program and earning income from the sale of products such as jams, jellies, and squash; potatoes; apple chips; and brandy. However, the market for these products has been declining as the number of producers has increased, causing women to look for other markets outside their communities. Given the constraints of transportation and domestic responsibilities, the women have not been able to sell their products, which in turn has caused a decrease in their level of activity in the VFC program. Unfortunately, the level of participation in Satbariya is still very low.

The gender disaggregated data provide some important insights into women's roles with regard to household income. In Satbariya, women's involvement in VFC activities has not generated cash income nor are these women active participants in the decision-making processes concerning household earnings. On the other hand, a majority of the women in VFC households in Jinabang earn income from program activities--albeit irregularly--but have little authority to handle income or to participate in decision-making. In contrast, women in VFC households in Thabang earn substantial cash income from their VFC activities and have considerable control over income management and household decisions.

## **6. Women's and Children's Nutritional Status and Morbidity**

### **Household-level Welfare Effects of VFC Involvement**

The VFC program was implemented in the five districts of the Rapti Zone with the expectation that commercialization of the agriculture adopted by the creative farmers would result in improved health and nutritional status, particularly for the vulnerable groups: preschool children and women aged 15-49 years. Various studies have shown that higher income populations have fewer problems of morbidity due to poor nourishment, which leads to better nutritional status compared with populations with lower income levels. On the other hand, a number of studies have found that increased cash income has a very small effect on the health and nutritional status of family members, or none, owing to such factors as distribution and control of the income within a household (Garcia and Alderman 1989; von Braun et al. 1991; Kennedy and Cogill 1987; Kennedy 1989).

Different reports on the VFC program have noted that the farmers who adopt commercial agriculture generate greater cash income and farm different varieties of vegetables and fruits compared with the noncommercial farmers. It was also reported in preceding chapters that the farmers adopting commercial agriculture have higher incomes and cultivate more fruits and green leafy vegetables than those who have not adopted commercial agriculture. Accordingly, this chapter examines the nutritional status and morbidity patterns of women aged 15-49 years and children 0-59 (6-36 for anthropometry) months for both VFC and non-VFC households.

### **Descriptive Analysis of Demographic Indicators**

It is always useful to examine the demographic characteristics of the sample women before analyzing their nutritional status. Table 6.1 presents data on some demographic indicators for the sample women of both VFC and non-VFC households of all communities.

**Table 6.1. Demographic Characteristics of Women Aged 15-49 Years by VFC Status and Community**

Characteristics	Satbariya		Jinabang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
Mean age at marriage (years)	16.3	15.6	15.7	16.1	20.4	20.4
Mean number of pregnancies*	6.7	7.6	8.7	9.5	7.1 <sup>a</sup>	3.5 <sup>a</sup>
Mean number of children ever born*	6.7	7.6	8.2	9.5	6.9 <sup>a</sup>	2.9 <sup>a</sup>
Mean number of living children*	5.7	6.0	7.2	7.0	4.6 <sup>a</sup>	2.1 <sup>a</sup>
Proportion of currently pregnant women**	15.1	18.8	25.0	34.0	27.8	12.9
Mean duration of breastfeeding (months)	31.6	28.4	47.1	35.8	39.2	36.1

Notes : \* denotes women aged 45-49 years  
 : \*\* denotes the women who were pregnant at least once during the 12 month period of the study.  
 : a denotes further investigation is required since the analysis is based only on less than ten women.

The mean age at marriage is estimated to be about 16 years in Satbariya and Jinabang and 20 years in Thabang. There does not seem to be any difference in the mean age at marriage by VFC status in Jinabang and Thabang, whereas in Satbariya, VFC women marry slightly later than non-VFC women. The mean number of pregnancies and live births is higher among non-VFC women than among VFC women both in Satbariya and Jinabang. Moreover, figures in table 6.1 show that the loss of living children as well as the rate of current pregnancies is substantially higher among non-VFC than VFC women in both communities.

The situation is just the reverse in Thabang, where VFC women have a higher number of pregnancies, live births, and living children compared with non-VFC women. A partial reason for this difference could be the late marriage (21 years) of non-VFC women aged 45-49 years compared with early marriage at age 19 of VFC women of the same age group. Nevertheless, this difference should be interpreted with caution because the analysis is

based on fewer than ten women available in the 45-49-year age group. With regard to the breastfeeding status in all communities, VFC women breastfed for a longer time (32-47 months) than non-VFC women (28-36 months).

### **Descriptive Analysis of Women's Nutritional Status**

Table 6.2 depicts the average body mass index (BMI) for women aged 15-49 years in both VFC and non-VFC households by age and season in all communities. The average BMI of both VFC and non-VFC women is between 19.1 in Jinabang and 21.8 in Thabang. What is interesting to note is that women in Thabang, despite being somewhat shorter, have higher BMI levels than the women in the other two communities. The women in Thabang are stouter than the women of Satbariya and Jinabang. Figures further show that the average BMI of the sample women does not differ by VFC status and age group in any of the three communities, as indicated by more or less the same BMI for both VFC and non-VFC households.

Average BMI for both VFC and non-VFC women varies somewhat by season. During the spring (round 1) when agricultural activities are minimal, women have less labor-intensive work and thus expend less energy. As a result, the average BMI in the first round was higher among both VFC and non-VFC women, compared with the succeeding rounds in all communities. In general, the average BMI of VFC women in each round was slightly higher than that of non-VFC women in all communities, especially Satbariya and Jinabang.

Overall, the BMI of all the sample women is higher than that of the cutoff point (18.5) that the International Dietary Consultative Groups (James et al. 1988) have identified as indicating chronic energy deficiency in adults.

**Table 6.2. Grading of Body Mass Index (BMI) of Women aged 15-49 Years by Age, Season, VFC Status and Community**

Characteristics	Satbariya		Jinubang		Thabang	
	VFC	Non-VFC	VFC	Non-VFC	VFC	Non-VFC
<b>Age Group</b>						
15-19	19.1 (4)	19.0 (5)	19.8 (3)	19.4 (4)	-	-
20-29	20.3 (13)	20.0 (19)	20.0 (20)	19.0 (18)	22.2 (12)	22.5 (11)
30-39	19.5 (30)	19.5 (10)	19.0 (15)	18.5 (15)	21.8 (8)	21.0 (7)
40-49	20.0 (15)	20.1 (10)	18.1 (12)	20.3 (7)	21.2 (7)	21.6 (6)
<b>Mean</b>	<b>19.8 (62)</b>	<b>19.8 (44)</b>	<b>19.2 (50)</b>	<b>19.1 (44)</b>	<b>21.8 (27)</b>	<b>21.8 (24)</b>
<b>Season</b>						
Round I	20.3 (77)	19.8 (59)	19.7 (59)	19.6 (50)	22.2 (31)	21.8 (27)
II	20.1 (74)	19.9 (60)	19.2 (58)	19.0 (49)	21.8 (34)	21.8 (29)
III	19.7 (73)	19.6 (59)	18.9 (58)	18.7 (47)	21.6 (34)	21.7 (28)
IV	19.4 (65)	19.4 (47)	19.1 (51)	18.9 (46)	21.3 (33)	21.6 (28)
<b>Mean</b>	<b>19.9</b>	<b>19.7</b>	<b>19.2</b>	<b>19.1</b>	<b>21.7</b>	<b>21.7</b>
<b>Average height (cm)</b>	<b>152.8 (62)</b>	<b>153.4 (44)</b>	<b>151.5 (50)</b>	<b>151.6 (44)</b>	<b>150.5 (27)</b>	<b>149.9 (24)</b>
<b>Average weight (kg)</b>	<b>46.1 (63)</b>	<b>46.6 (44)</b>	<b>44.2 (50)</b>	<b>43.8 (44)</b>	<b>49.5 (27)</b>	<b>49.1 (24)</b>

Notes : The age group data is based on the average of those women who were covered in all four rounds.  
: Figures in parentheses indicate the number of women aged 15-49 years.

### Descriptive Analysis of Children's Nutritional Status

Table 6.3 shows the grading of nutritional status of children aged 6-36 months on the basis of length-for-age, weight-for-age, and weight-for-height by season, VFC status, and community.

Waterlow (1972) has labeled the reference population falling below the 90 percent reference median length-for-age as stunted. Stunting refers to chronic malnutrition. As can be noted from the table, the children of VFC households both in Satbariya and Thabang have fewer problems of chronic malnutrition than the children of non-VFC households, as indicated by 6 to 8 percent in the former and 11 to 24 percent in the latter, respectively.

**Table 6.3 Grading of Nutritional Status of Children Aged 6-36 Months by Round, VFC Status and Community**

Study Community and Season	VFC							Non-VFC						
	N	Length-for-Age		Weight-for-Age		Weight-for-Length		N	Length-for-Age		Weight-for-Age		Weight-for-Length	
		<90%	≥90%	<75%	≥75%	<80%	≥80%		<90%	≥90%	<75%	≥75%	<80%	≥80%
<b>Satbariya</b>														
Round: I	42	9.5	90.5	11.9	88.1	2.4	97.6	34	11.8	88.2	29.4	70.6	2.9	97.1
II	39	7.7	92.3	15.4	84.6	0	100.0	30	16.7	83.3	20.0	80.0	13.3	86.7
III	46	6.5	93.5	15.2	84.8	6.5	93.5	49	16.3	83.7	26.5	73.5	10.2	89.8
IV	44	2.3	97.7	11.4	88.6	11.4	88.6	39	0	100.0	0	100.0	0	100.0
Average	43	6.4	93.6	13.5	86.5	5.3	94.7	38	11.2	88.8	19.1	90.9	6.6	93.4
<b>Jinabang</b>														
Round: I	37	20.0	80.0*	24.3	75.7	8.6	91.4*	42	19.0	81.0	26.2	73.8	11.9	88.1
II	37	10.8	89.2	32.4	67.6	8.1	91.9	46	6.7	93.3**	26.1	73.9	2.2	**97.8
III	41	17.1	82.9	17.1	82.9	4.9	95.1	44	20.5	79.5	29.5	70.5	13.6	86.4
IV	34	2.9	97.1	14.7	85.3	0	100.0	43	0	100.0	7.0	93.0	2.3	97.7
Average	37	13.6	87.0	22.1	77.9	5.5	94.5	44	11.5	88.5	22.3	77.7	7.4	92.6
<b>Thabang</b>														
Round: I	22	13.6	86.4	9.1	90.9	0.0	100.0	20	35.0	65.0	30.0	70.0	0.0	100.0
II	23	17.4	82.6	0.0	100.0	0.0	100.0	19	15.8	84.2	26.3	73.7	0.0	100.0
III	27	3.7	96.3	7.4	92.6	7.4	92.6	19	31.6	68.4	26.3	73.7	15.8	84.2
IV	28	0.0	100.0	0.0	100.0	7.1	92.9	20	15.0	85.0	0.0	100.0	10.0	90.0
Average	25	8.0	19.2	4.0	96.0	4.0	96.0	20	24.4	75.6	20.5	79.5	6.4	93.6

Notes : N refers number of children.

Average based on the number of only those children who were available in all four rounds.

\* denotes percentage based on 35 children

\*\* denotes percentage based on 45 children

This pattern does not, however, emerge among VFC households in Jinabang, where the proportion of children suffering from chronic malnutrition is higher (13 percent) compared with the other two communities (6 to 8 percent) as well as non-VFC households (11.5 percent).

The seasonal distribution of length-for-age data does not show any consistent pattern in or across the communities. Nonetheless, it is evident from the table that the proportion of stunted children decreased during the fourth round among both VFC and non-VFC households in all communities. This result is quite natural because the children face fewer problems related to gastrointestinal diseases (which is the number-one killer of children less than 5 years in Asian and African countries) during the winter season, which is the fourth round of the study.

According to Gomez's classification, the reference population falling below the 75 percent reference median weight-for-age can be classified as poorly nourished (second- and third-degree malnutrition) (Gomez et al. n.d.). The annual average weight-for-age data in Table 6.3 show that the children of VFC households of all three communities have better nutritional status than the children of non-VFC households, although the difference is very small in Jinabang compared with the other two communities. The proportion of children suffering from malnutrition is 4 percent in Thabang, about 14 percent in Satbariya, and 22 percent in Jinabang among VFC households, whereas the figures are 21 percent, 19 percent, and 22 percent, respectively, among non-VFC households.

Again, as in the case of the length-for-age data, there is no pattern with regard to the proportion of malnourished children both in and across the communities when the data are broken down by season. However, the proportion of malnourished children decreased among both VFC and non-VFC households in all communities during the winter season (fourth round), as in the case of length-for-age data.

Table 6.3 also presents the distribution of weight-for-height data of the sample children of all study communities. According to Waterlow's classification, the reference population

falling below 80 percent of the reference median weight-for-height can be labeled as wasted, which refers to acute malnutrition (Waterlow 1972). The data reveal that wasting is somewhat more pronounced among the children of non-VFC households compared with the children of VFC households in all communities. While the annual average proportion of the wasted children is about 4 to 6 percent among VFC households, it is about 5 to 7 percent among non-VFC households.

As in the case of length-for-age and weight-for-age data, seasonal variation between the proportion of the wasted children in VFC and non-VFC households shows no clear pattern. However, the more pronounced pattern of chronic malnutrition in the fourth round can also be noticed in this classification among both VFC and non-VFC households of all communities, except Satbariya, where the trend is just the reverse.

#### **Descriptive Analysis of Women's and Children's Morbidity Patterns**

This section presents information on major illnesses among the sample women aged 15 to 49 years and their children aged 0 to 59 months. Also included in this section is information on health treatment patterns of both sample groups. The sources of these information are all the sample women and some individual male and female key informants.

As seen in table 6.4, respiratory diseases, especially colds and coughs, followed by gastrointestinal problems are the major illnesses reported by women in all communities. The prevalence of illness is higher among non-VFC women than among VFC women in Satbariya, whereas this is just the reverse in Jinabang, where the proportion of women ill with any kind of sickness is higher among VFC households than non-VFC households. In Thabang, while gastrointestinal and communicable diseases are reported higher among non-VFC women, respiratory diseases are reported higher among VFC women.

**Table 6.4 Prevalence of Illness Among Currently Married Women Aged 15-49 Years by VFC Status and Community (in %)**

Types of Illness	Satbariya		Jinabang		Thabang	
	VFC N=86	Non-VFC N=64	VFC N=60	Non-VFC N=53	VFC N=36	Non-VFC N=31
Gastro-intestinal	15.1	23.4	30.0	26.4	11.1	22.6
Respiratory	32.6	34.4	73.3	18.9	63.9	43.3
Communicable	2.3	3.1	15.0	11.3	13.9	19.3
Others	10.5	10.9	30.0	11.3	13.9	3.8
Mean duration of sickness (in days)	11.2	9.5	10.9	10.1	11.0	10.3

- Notes : Percentages may add up to more than one hundred due to multiple responses.  
: N denotes the average number of eligible women interviewed in each community in four rounds.

Interestingly, VFC women have a longer duration of sickness compared with non-VFC women in all communities. Because of such varying results within and across the sites, it is very difficult to say whether household involvement in the VFC program is directly related to the prevalence of morbidity at this level of analysis.

Respiratory and gastrointestinal diseases are also the major illnesses experienced by children aged 0-59 months in all communities (table 6.5). While gastrointestinal disease is higher among children of non-VFC households, respiratory diseases are higher among the children of VFC households. Likewise, while communicable disease is reported higher among children in VFC households in Satbariya, it is reported lower among children in VFC households in Jinabang and Thabang.

**Table 6.5 Prevalence of Illness Among Children Aged 0-59 Months by VFC Status and Community (in %)**

Types of Illness	Satbariya		Jinabang		Thabang	
	VFC N=69	Non-VFC N=71	VFC N=60	Non-VFC N=61	VFC N=37	Non-VFC N=26
Gastro-intestinal	5.8	9.9	32.7	32.8	40.5	61.5
Respiratory	39.1	30.9	63.6	54.1	43.2	38.5
Communicable	13.0	12.7	5.5	11.5	10.8	11.5
Others	0	0	0	1.6	5.4	11.5
Mean duration of sickness (in days)	8.3	7.7	8.9	7.7	8.7	10.9

Notes : Percentage may add upto more than hundred due to multiple response.  
: N denotes the average number of children interviewed in four rounds in each community.

With respect to duration, the children in VFC households in Satbariya and Jinabang had a longer duration of illness, whereas in Thabang this is just the reverse. Because of such inconsistent patterns between children in VFC and non-VFC households across communities, further investigation is needed to examine whether the children's morbidity has any link with the household's participation in commercial agriculture.

### **Descriptive Analysis of Women's and Children's Health Treatment Patterns**

Women were asked which sources of health care providers they usually used when they were sick. Table 6.6 shows that the source of a health care provider is entirely different from one community to another, but not by VFC household status. The major sources of health care are: a medical store in Satbariya, a traditional faith healer in Jinabang, and a health post in Thabang. The use of a faith healer is slightly higher among non-VFC women than among VFC women in all communities.

**Table 6.6 Health Treatment Pattern for Currently Married Women Aged 15-49 Years by VFC Status and Community (in %)**

Types of Treatment	Satbariva		Jinabang		Thabang	
	VFC N=86	Non-VFC N=64	VFC N=60	Non-VFC N=53	VFC N=36	Non-VFC N=31
<b>Modern</b>						
Medical store	96.5	95.3	3.3	0	0	0
Hospital	1.20	0	18.3	20.7	0	0
Health post	1.2	1.6	6.7	0	100.0	93.5
Others	0	0	5.0	0	0	0
<b>Traditional</b>						
Faith-healer	1.2	4.7	65.0	69.8	2.8	22.6
Others	0	0	11.7	18.9	0	0

Notes : Percentages may add up to more than one hundred due to multiple responses.  
: N denotes the average number of women interviewed in four rounds.

The mothers of the children who were sick during the study period were asked to name the sources of health care providers they consulted when their children were sick. Table 6.7 shows the distribution of different sources of health care providers used by mothers for their sick children by VFC status and community. As in the case of women seeking health care themselves, the medical store in Satbariya, faith healers in Jinabang, and the health post in Thabang are the sources consulted by mothers when their children are sick. There is no difference in the type of treatment followed by VFC households versus non-VFC households in any community.

**Table 6.7 Health Treatment Pattern for Children <5 Years by VFC Status and Community (in %)**

Type of Treatment	Satbariya		Jinabang		Thabang	
	VFC N=40	Non-VFC N=38	VFC N=56	Non-VFC N=61	VFC N=37	Non-VFC N=32
<b><u>Modern</u></b>						
Medical store	52.5	52.6	8.9	3.3	2.7	3.1
Hospital	0	0	17.9	18.0	8.1	3.1
Health post	2.5	0	0	1.6	54.1	46.9
Others	10.0	2.6	17.8	0	0	0
<b><u>Traditional</u></b>						
Faith-healer	2.5	0	30.4	22.9	8.1	15.6
Others	0	2.6	5.4	13.1	0	15.6

Notes : Percentages may add up to more than one hundred due to multiple responses.  
: N refers the average number of children interviewed in four rounds.

## **7. Determinants of Men's and Women's Time Allocated to VFC Crops, and Household Expenditures**

In chapters 3, 4, and 5, detailed descriptive information was presented on agricultural practices, time allocation, and income and expenditure patterns for VFC and non-VFC households. In this chapter, the analysis moves from description to an attempt to estimate the effect of a number of important socioeconomic factors on four outcomes of interest to USAID and the government of Nepal. Multiple linear regression analysis is used to identify the effect of selected socioeconomic (independent) variables on the following four (dependent) variables:

1. Minutes per 12-hour day men (in both VFC and non-VFC households) spend in the production of vegetables, fruits, and other cash crops (VFC crops);
2. Minutes per 12-hour day women (in both VFC and non-VFC households) spend in the production of vegetables, fruits, and other cash crops (VFC crops);
3. Total per capita expenditure per year in rupees (used here as a proxy for income); and
4. Per capita expenditure on food per year in rupees.

A number of research questions underlie the choice of these dependent variables. With regard to men's and women's time allocated to VFC crops, a central question in analyzing the effects of commercialization along gender lines is whether women and men are allocating their time (to the new cash crops) in response to similar or different socioeconomic factors. Also of importance is the degree to which one gender's time allocation (men's time in the regressions below) influences the other's (women's), and the degree to which time tradeoffs occur for men (for example, time to cereals versus time to cash crops) and women (for example, time to home VFC products versus VFC crops). It is of particular importance in this study to determine how household participation in the

VFC program affects the time men and women spend in VFC crop activities.

In terms of expenditures, the key questions of interest here are how labor allocation to VFC crops and non-VFC crops, disaggregated by gender, affects total and food per capita expenditures; whether VFC household status is a good predictor of these expenditures; and the influence of different sources of income on expenditure patterns. Finally, for both the expenditure and time outcomes, the analysis included the effect of community or location.

In the following multiple linear regressions, the ordinary least squares (OLS) estimation method has been used. In addition to the above four dependent variables, 17 other variables have been used as independent variables. These are:

Age of household head (years)

Education of household head (years)

Gender of household head (1=male, 0=female)

Size of household (No. of individuals)

Household landholding per capita (ha)

Household cultivated land per capita (ha)

Adult women's time in home VFC activities (minutes per 12-hour day)

Adult men's time spent in VFC crop activities (minutes per 12-hour day)

Adult women's time spent in non-VFC crop activities (minutes per 12-hour day)

Annual per capita income from VFC crops (Rs)

Annual total per capita income (Rs)

Annual off-farm income per capita (Rs)

Predominant household land tenure status  
(percentage of land owned)

**Participation in VFC program (1=yes; 0=no)**

**Ownership of radio/cassette (1=yes; 0=no)**

**Satbariya (1 = Satbariya, 0 = otherwise)**

**Jinabang (1 = Jinabang, 0 = otherwise)**

Of the total 21 dependent and independent variables, 16 are continuous and 5 are categorical (that is, gender of household head, participation in VFC program, ownership of radio or cassette [a proxy for high household socioeconomic status], Satbariya and Jinabang). The study community of Thabang, which is excluded as an independent variable, is the reference group against which the effect of community is compared. Multicollinearity was checked using a zero-order correlation matrix; cases of high collinearity were noted and resulted in the exclusion of some variables from one or more of the regressions. Given the earlier stage of data analysis, and for certain logistical reasons, stepwise regression has been used. The following regressions contain the significant independent variables achieved in the final regression step.

### **Determinants of Men's Time Allocated to VFC Crops**

A critical objective of GFCS was to identify the demographic, social, economic, geographic, and gender factors that best determine or explain the time allocated by men in both VFC and non-VFC households to vegetables, fruits, and other cash crops. Of particular interest was the question of whether these factors varied if a household was participating in the VFC program. A stepwise regression was run using all 17 of the above independent variables to explain the dependent variable of minutes per 12-hour day that men spend on VFC crops. Women's time spent on VFC crops was not included as an independent variable, since culturally it is more accurate to predict that men's time on VFC crops affects women's time, and not vice versa (according to the traditional division of labor, women are expected to assist men in the cultivation of crops).

Presented in table 7.1 are the results of the final regression model achieved by the stepwise approach for which all coefficients are statistically significant at or above a 95 percent confidence level. All independent variables presented in table 7.1 have a positive effect on the allocation of men's time to VFC crops. The time that women spend producing home VFC products (jams, jellies, noodles, brandy, carpets) is significantly related to men's time spent on VFC crops. For every one-minute increase in women's time in home VFC activities, men's time in VFC crops increases by approximately one-third of a minute (0.37). It is understandable that women's home VFC activities are positively and significantly related to men's in-field VFC activities given that women reported the use of surplus VFC crops to generate income and improve home food consumption as one of the main reasons for adopting VFC home production. Also, the variable women's time in home VFC activities is most likely capturing unmeasured socioeconomic differences in the household that allow both women and men to simultaneously increase time in the VFC activities for which they have received training.

Annual per capita income from VFC crops does have a significant and positive effect on men's time in VFC crop activities, suggesting that the time men are willing to devote to VFC crops is determined by the income benefits of such labor investment. However, the size of the coefficient for per capita income from VFC crops is very small. An ethnographic interpretation for the small effect of VFC crop income on men's time allocated to VFC crops is that the problems households are encountering in marketing their VFC crops has reduced the income gains from VFC crops. Moreover, VFC crops such as apples require years before they produce fruit to be sold or made into brandy. Men are investing their labor in VFC crops in anticipation of higher income returns in the future, when it can be expected that VFC crop income will have a stronger explanatory effect on the time spent in VFC crop production.

**Table 7.1 Time (minutes per 12-hour day) Men Spend in VFC Crop Activities**

Independent Variables	Coefficient	T-statistic
Adult women's time in home VFC activities	0.37	3.494
Annual per capita income from VFC crops	4.03-03	2.162
Satbariya	46.58	3.676
Jinabang	34.23	2.747
Participation in VFC program	17.71	2.277
(Constant)	2.26	0.194
R2	0.13	
Adjusted R2	0.11	
<b>ANALYSIS OF VARIANCE</b>		
Regression sum of squares	107791.94	
Error sum of squares	722273.41	
F ratio	6.72	
Sig F	0.00	
Number of observations	231	

Notes : T-statistics are significant at .05 probability significance level.  
: Variables excluded are women's time to VFC crop and livestock activities, total expenditure per capita per year and per capita food expenditure per year.

The coefficients for Satbariya and Jinabang suggest that there are important differences in the effect that community location has on men's time in VFC crop activities. As was demonstrated in earlier descriptive findings, men in Satbariya and Jinabang, in both VFC and non-VFC households, spend more time in VFC crop activities than men in Thabang (table 4.4). The regression analysis expands upon that information by showing the size of increase that can be expected, based on community location alone. Holding the other socioeconomic variables constant, compared with Thabang, a 47- and 34-minute per day increase in men's time spent on VFC crops can be predicted for Satbariya and Jinabang, respectively.

Of particular interest is the effect of VFC program participation on men's time allocated to VFC crops. As can be seen from table 7.1, participation in the VFC program (VFC household) is a significant factor in explaining this time allocation. It increases men's time by approximately 18 minutes per day. This finding, which is corroborated by field observations and evaluations of the program, shows that the VFC program has a strong positive effect on farmers' willingness to increase the time spent in VFC crop production.

### **Determinants of Women's Time Allocated to VFC Crops**

Table 7.2 contains the final stepwise regression model for factors explaining women's time allocated to VFC crops. Coefficients for the significant independent variables are both positive and negative. Men's time allocated to VFC crops has a positive effect on women's time spent on these crops. As the previous descriptive time allocation data revealed (table 4.4), men's and women's time increased in a parallel fashion. The regression results suggest that for every minute per day increase in men's time spent in VFC crop activities, women increase their time on these crops by 0.10 minute. Given the gender division of labor in the study households, it is not at all surprising to see that men's time in VFC crops has a "pull" effect on women's time on these crops. That the strength of this pull is not greater reflects a combination of factors: the need for women's labor in other agricultural and home activities, use of hired labor, and the overall scale of production.

In contrast to the regression for determinants of men's time devoted to VFC crops, women's time spent on home VFC activities is negatively correlated with their time on VFC crop activities. If women increase the time spent producing home VFC products by one minute, they reduce their time spent on VFC crop activities by 0.11 minute. Although the size of the coefficient is relatively small, it does suggest that there is some time conflict between women's home and crop VFC activities. In interviews, however, women did not report that they experienced time conflicts between home and in-field VFC activities. They stated a desire to expand the production of home VFC products while recognizing the importance of maintaining household agricultural production. One period when a time conflict may be occurring, which needs to be explored more ethnographically, is when VFC

**Table 7.2 Time (minutes per 12-hour day) Women Spend in VFC Crop Activities**

Independent Variables	Coefficient	T-statistic
Adult men's time spent in VFC crop activities	0.10	3.549
Adult women's time in home VFC activities	-0.11	-2.721
Adult women's time in non-VFC crop activities	0.04	2.515
Participation in VFC program	10.70	3.113
Jinabang	-22.12	-4.727
(Constant)	15.68	3.737
R2	0.18	
Adjusted R2	0.16	
<b>ANALYSIS OF VARIANCE</b>		
Regression sum of squares (RSS)	31972.59	
Error sum of squares (ESS)	148332.58	
F ratio		9.70
Sig F		0.00
Number of observations	231	

Notes: T-statistics are significant at .05 probability level.

: Variables excluded are total expenditure per capita per year and per capita expenditure on food per year.

crops need to be harvested and at the same time women are busy processing the surplus production into jams, noodles, brandy, and so on.

Women's time allocated to non-VFC crop and livestock production is positively related, although at a low level (0.04), to their time spent on VFC crop production. Staple food and traditional livestock production are critical to household subsistence, and the small increase in VFC crop time for women compared with their time in non-VFC activities, reflects both the high value placed on traditional staples and the willingness to begin to expand production of VFC crops.

As in the case of men's time devoted to VFC crops, participation in the VFC program is a significant and positive determinant of the time women spend in VFC crop activities. The coefficient suggests that women in VFC households spend 11 minutes more in VFC crop and livestock activities than women in non-VFC households. In the case of women's time allocated to VFC crops, the size of the coefficient for the variable "participation in VFC program" is smaller for women than the coefficient for the same variable for men (10.70 versus 17.71). This difference in coefficient values is consistent with the time allocation data in table 4.4, where it was shown that in VFC households, women's time spent on VFC crops parallels men's, but at a lower level. The regression analyses supplement that information by providing information on the size of the change (for both men and women) that can be predicted by knowing only whether a household is participating in the VFC program.

Finally, location is also useful in explaining men's time allocated to VFC crops, is negative in explaining women's time spent in VFC crop activities. The regression in table 7.2 reveals that women in Jinabang (compared with women in Satbariya and Thabang) spend 22 minutes less per day in VFC crop activities. Women in Thabang do spend more time in VFC crop activities than women in Jinabang, particularly for apple and potato production (table 4.4). This reflects the overall greater involvement of women in Thabang in household agriculture, owing both to men's long-term absence from the community (herding) and women's greater involvement in income-related production decisions. In the case of Satbariya, women in VFC households spend fairly similar amounts of time on VFC crops compared with women in VFC households in Jinabang, with one major exception: other vegetables (tomatoes, cauliflower, cabbage, peas, beans). Women in VFC households in Satbariya spend on average 35 minutes a day on these vegetables, compared with only 4 minutes for women in VFC households in Jinabang (table 4.4).

## **Determinants of Annual Household Expenditures per Capita**

Table 7.3 contains the findings from the regression explaining household total expenditures per capita per year. Total expenditure per capita is used here as a proxy for income. All final significant coefficients are positive.

Not surprisingly for agricultural-based communities, the amount of landholding is strongly related to expenditures. The coefficient for per capita landholding suggests that an increase in 1 ha of landholding leads to an increase in household total per capita per year expenditures of Rs 1,409. Similarly, the amount of land under cultivation also has a positive effect on total expenditures per capita, with every hectare increase in cultivated land leading to an increase of Rs 2,440 in total expenditures per capita. The proportion of owned land also has a positive effect (although of less magnitude) on total expenditures per capita: every percent increase in owned land results in an increase of Rs 13.0 in total expenditures per capita. The above land-related variables (with the possible exception of land under cultivation) capture socioeconomic characteristics or differences among households that most likely were present in the study communities before the VFC program began.

Per capita income earned from VFC crops has a positive effect on household total expenditures per capita. An increase of Rs 1 in income from VFC crops leads to a similar increase in total expenditures. Similarly, off-farm income per capita also has a small positive effect on total expenditure per capita. An increase of Rs 1 in off-farm income per capita leads to a 0.4-rupee increase in a household's total expenditure per capita.

Location in Jinabang is also positively related to annual expenditures per capita. The positive coefficient for Jinabang implies that households in this community have a higher total per capita expenditure of Rs 973 compared with households in the other two communities. That Jinabang households have such an overall higher expenditure than the other two communities is supported by the data in table 5.8.

**Table 7.3 Total Expenditure per Capita per Year in Rs**

Independent Variables	Coefficient	T-statistic
Household landholding per capita	1408.76	3.464
Household cultivated land per capita	2439.72	2.054
Annual income per capita from VFC crops	0.99	9.912
Predominant household land tenure status (Percentage of land owned)	12.99	1.970
Annual off-farm income per capita	0.35	3.639
Jinabang	972.90	2.183
(Constant)	552.41	0.844
R2	0.57	
Adjusted R2	0.56	
<b>ANALYSIS OF VARIANCE</b>		
Regression sum of squares	2372679376.92	
Error sum of squares	1767469151.97	
F ratio		50.12
Sig F		0.00
Number of observations	231	

Notes : T-statistics are significant at .05 probability level.  
: Variables excluded are annual total income per capita and per capita food expenditure per year.

Finally, the independent variables of time allocated by men and women to VFC and non-VFC activities, and household participation in the VFC program, are noticeably absent from the final statistically significant explanatory variables for household total expenditure per capita. The fact that these variables are not statistically related to total and food expenditures lends additional support to the assertion that to date households have not been able to fully realize both income and expenditure benefits of participation in the VFC program.

## Determinants of Household Food Expenditures per Capita

The final regression analysis seeks to determine the socioeconomic factors that account for household food expenditures. It was of particular interest to determine whether there were differences in food expenditures that could be explained by VFC-related characteristics (such as income from VFC crops, time spent by men and women in VFC activities, and VFC program participation). Underlying these interests was the general concern of whether increased cash cropping was negatively affecting food security by reducing production of staple cereals. The final statistically significant explanatory variables for household food expenditures are presented in table 7.4.

**Table 7.4 Annual per Capita Food Expenditure in Rs**

Independent Variables	Coefficient	T-statistic
Age of household head	-15.05	-2.446
Household cultivated land per capita	2747.75	6.086
Annual per capita income from VFC crops	0.70	18.540
Household landholding per capita	419.82	2.917
Adult men's time spent in VFC crops	-2.56	-2.098
Predominant household land tenure status (Percentage of land owned)	9.67	4.044
(Constant)	1267.75	3.414
R <sup>2</sup>		0.78
Adjusted R <sup>2</sup>	0.77	
<b>ANALYSIS OF VARIANCE</b>		
Regression sum of squares	896639432.44	
Error sum of squares	251608246.98	
F ratio	133.04	
Sig F		0.00
Number of observations	231	

Notes : T-statistics are significant at .05 probability level.  
: Variables excluded are annual total income per capita and annual total expenditure per capita.

The age of the household head is inversely related to annual food expenditures per capita. A one-year increase in the age of the household head leads to a decrease of Rs 15 on food expenditure per capita. One possible explanation for this negative relationship is that in Nepal, family size tends to increase with the age of the household head, which leads to a reduction in per capita food expenditure.

On the other hand, as was the case with annual expenditures per capita, landholding per capita and cultivated land per capita positively explain annual food expenditures per capita: a 1-ha increase in landholding per capita and in cultivated land per capita results in an increase of Rs 420 and 1,237 in per capita food expenditures, respectively. Moreover, the proportion of owned land is also positively related to food expenditures. A household will increase annual food expenditures per capita by Rs 10 when the proportion of owned land increases by 1 percent. It is to be expected in agricultural-based societies that food expenditures can be predicted by increase in landholding and amount of land in cultivation.

Similarly, per capita income from VFC crops also has a positive effect on annual food expenditure per capita. The positive coefficient implies that 1-rupee increase in per capita income from VFC crops leads to a 0.70-rupee increase in annual food expenditures per capita. This finding suggests that income from VFC crops is being used to increase food expenditures, although not as much as non-food expenditures (table 7.3). What is important to note is that the absence of the variable for VFC program participation suggests that the effect of VFC crop income on food expenditures does not vary significantly according to household VFC status. Participation in the VFC program has not (as yet) led to an increase in the effect of VFC crop income on food expenditures.

Given that food expenditures are positively related to income from VFC crops, one could expect that increased time allocated by men to VFC crops would also be positively related to household food expenditures. However, the coefficient for men's time allocated to VFC crops has a negative effect on household food expenditures. A one-minute increase in men's time spent on VFC crops leads to a decrease of approximately Rs 3 in food expenditures. There are several possible explanations that warrant further analysis, both

in terms of refinement of regression models and ethnographically. Households that devote time to VFC crops may be unable to sell their crops, resulting in reduced food expenditures. Alternatively, the analysis may have not captured the effect of any lagged response. Food expenditure, for example, may be related to time spent on VFC crops for the previous year.

### **Summary of Findings**

The multiple linear regression analyses presented in this chapter have sought to identify the independent effect of a number of socioeconomic variables on men's and women's time allocated to VFC crops, household total expenditures, and food expenditures. In terms of explaining time allocated to VFC crops, it was found that household participation in the VFC program has a significant and positive effect on time spent by men and women on VFC crops. It was also found that location (Jinabang and Sathariya), is also a positive and significant predictor of time spent on VFC crops. In terms of men's time versus women's time, VFC program participation has a somewhat stronger effect on men's time, although the coefficient for women's time is also significant. This is consistent with previous descriptive information on time allocation and with ethnographic observations.

The regression explaining women's time devoted to VFC crops shows that women's time in home VFC activities has a negative effect, although the size of the coefficient is relatively small. Nonetheless, this raises the question of possible time conflicts between women's home VFC product activities (jams, jellies, noodles, brandy, carpets) and their work with men on VFC crops. This possible conflict needs to be explored more fully with ethnographic data and further refinement of the regression models.

It will no doubt be noticed that the  $R^2$  values for the regressions of men's and women's time allocated to VFC crops are low. There are a number of reasons for this, including the large "natural" variability in men's and women's time spent on VFC crops, which varies by specific VFC crop and season, all of which is aggregated in these regressions as VFC crops. Also, cross-sectional data generally tend to have more variability than longitudinal data.

Although the  $R^2$  for these models is low, both the independent variables and the model overall (F ratio) are statistically significant. Moreover, the results are consistent with descriptive and ethnographic findings.

One of the most interesting and important findings about total and food expenditures is that land-related variables were consistently significant. Size of landholding, land under cultivation, and percent of land owned had overall strong and significant effects on both total expenditures and food expenditures. To a certain degree, these variables are capturing differences among households that were present prior to the VFC program. As one would expect, VFC crop income does affect expenditures, although participation in the VFC program was not found significant in explaining household total or food expenditures. This suggests that VFC households have not been able to significantly increase their expenditures (a proxy for income) relative to the increased time they are spending in VFC crop activities; this was noted in descriptive information and the two regressions of adult time allocated to VFC crops. This is also somewhat corroborated by the negative relationship between men's time allocated to VFC crops and household food expenditures.

One overall conclusion highlighted by the multiple linear regression analyses is that the VFC program is having a strong and positive effect on the time men and women devote to VFC crops. However, the income and expenditure benefits for participating farmers, compared with those who are not participating in the program, are to date not significantly higher. As mentioned earlier, this is due to marketing problems, the fact that farmers are at different stages in production, and because some VFC crops take years to mature and produce marketable products (for example, apples). Differences in expenditures are more explainable in terms of land-related factors. Again, this is consistent with the findings in the earlier chapters, where it was shown that although VFC households receive more income from VFC crops and products than non-VFC households, both types of households receive more of their total income from traditional cereal production and off-farm labor.

## **8. Conclusions and Recommendations**

The Gender and Farm Commercialization Study used both qualitative and quantitative research approaches to collect a broad range of socioeconomic information on how commercialization is affecting subsistence farm households. Central to every aspect of the data collection and analysis has been a concern for determining gender differences in production and consumption. GFCS is not only a comparative study of households adopting and not adopting the new agricultural technologies for the commercial production of vegetables, fruits, and other cash crops, but also an investigation into the household-level effects of commercialization across three communities with different sociocultural, economic, and geographical characteristics.

This report has presented the first analyses of the information collected by GFCS. Because of the broad scope of the study's research objectives and because analysis of the data has only just begun, this report presents descriptive analyses for each of the main data collection areas: crop and livestock patterns, time allocation, income, expenditures, women's income and decision-making, and nutrition and morbidity. First-level multiple linear regression analyses were used to estimate the effects of a number of socioeconomic factors on men's and women's time allocated to VFC crop production, and on household total and food expenditures per capita. Having completed these initial descriptive and multivariate analyses for all of the study's major data sets, future analyses will target specific topics of program and policy relevance within these broad areas. As was the case for this report, future analyses will use both ethnographic and quantitative information.

The preceding chapters contain a large number of specific findings and conclusions. Overall findings have been summarized at the end of the chapters on time allocation, income and expenditure, determinants of men's and women's time allocated to VFC crops, and household total per capita and food expenditures. Given the amount of information collected, it is impossible in a concluding chapter to do justice to all the production and consumption differences observed. Future analyses will expand upon many of the detailed differences resulting from commercialization and the VFC program.

## **Overall Findings and Conclusions**

Two general-level findings are noteworthy and set the stage for a more focused discussion of the production and consumption differences resulting from commercialization. First, the data show that overall there are pronounced socioeconomic differences between households identified as participating in the VFC program (VFC households) and households not participating in the program (non-VFC households). This is true in terms of cropping patterns, labor use (home and hired), income generation, and expenditure patterns. It was not found to be true with regard to nutrition and morbidity measures, although the analyses of the anthropometric and morbidity data are still preliminary. And second, it is clear from the data that the VFC program is an important factor contributing to socioeconomic differences between VFC and non-VFC households. However, many of these differences also arise from longer term socioeconomic differences among households in the study communities. Nonetheless, the differences in the characteristics for VFC households compared with non-VFC households are too great to be accounted for exclusively by factors outside the VFC program. The following findings and conclusions support two general assertions.

### ***Cropping Patterns***

In all three communities, VFC households have larger farms, with the difference being most pronounced for Satbariya and less pronounced for Thabang. These differences in size of landholding were present prior to the VFC program. The availability of surplus land that can be used for vegetable, fruit, and cash crop cultivation is without doubt an important factor accounting for household participation in the VFC program. With larger landholdings, the VFC households can cultivate a wider range of crops, including VFC cash crops.

Both VFC and non-VFC households in all three communities still devote more land to food crops than cash crops. In terms of hectares, VFC households in all three

communities devote more land to VFC crops than non-VFC households. As a percentage of area in crop production, this remains true for VFC households in Jinabang and Thabang, while non-VFC households in Satbariya allocate a greater percentage of their annual crop land to VFC crops.

With one exception (barley in Satbariya), VFC households have higher yields for both VFC crops--potatoes, apples, oilseed (mainly mustard) and traditional cereals (maize, paddy, wheat, millet, and barley).

Information collected in interviews with farmers about cropping patterns prior to the VFC program supports the assertion that most of the current differences in cropping patterns between VFC and non-VFC households (excluding size of landholding) result principally from participation in the VFC program.

#### *Time Allocation*

The increased production of VFC crops by VFC households results in changes in time allocated to agricultural and livestock activities. At the most aggregated level (time spent in all agricultural and livestock activities combined), an interesting pattern emerges: men in VFC households decrease their time in agricultural and livestock activities while women increase their time (this pattern has been frequently mentioned in the literature on women in development). Men in VFC households in Satbariya spend an average of 44 minutes less per day in on-farm agricultural and livestock activities; men in VFC households in Jinabang spend 45 minutes less per day in the same activities; and in Thabang, men in VFC households reduce their time allocated to agriculture and livestock by 36 minutes, compared with men in non-VFC households in these communities.

In contrast to the pattern for men, women in VFC households spend more time in agricultural and livestock activities, taken as an aggregate, than women in non-VFC households. Such differences are moderately substantial in Satbariya (18 minutes per day), to insignificant in Thabang (3 minutes). Women in VFC households in Jinabang are in

between, spending 10 minutes more in agricultural and livestock activities.

How are these changes in the time men and women spend in agriculture and livestock affecting the time they spend in non-agricultural activities? In comparing VFC and non-VFC households, a very consistent pattern emerges for men and women. Men spend their extra free time predominantly in either social or out-of-community activities, which includes attending VFC training and other market-related activities. Women in VFC households (compared with women in non-VFC households), on the other hand, spend less time in child care, household work, and out-of-community training or study. This pattern is most pronounced in Satbariya and is less noticeable for Thabang. However, these differences are overall quite small. Future analysis of time allocation data is necessary to determine whether this reduced time has negative health and social consequences. Ethnographic insights also suggest that women are not perceiving any major conflicts between home production work and any increased agricultural work resulting from VFC program participation.

Within the agricultural and livestock farming system (in contrast to the above comparison which aggregates specific crop and livestock activities), differences in the way men and women allocate time in VFC versus in non-VFC households tend to parallel each other. With few exceptions, both men and women in VFC versus non-VFC households in all three communities spend more time on VFC crops such as potatoes, mustard, other vegetables (cauliflower, cabbage, tomatoes, peas, and beans), and apples.

There are also differences in time allocated to non-VFC crops, again with shifts in men's and women's time by VFC household status tending to parallel each other. The most significant differences occur in paddy and maize production. Men and women in VFC households spend more time in paddy and less time in maize production than their counterparts in non-VFC households. The decrease in male and female time allocated to maize by VFC households is particularly noticeable. One of the most significant differences in cropping and time allocation patterns between VFC and non-VFC households is that the former cultivate less maize and more VFC crop.

Finally, in terms of livestock care, as was the case for maize production, adults in VFC households spend less time in livestock activities, principally raising cattle, than men and women in non-VFC households. One exception to this finding is for women in VFC households in Thabang, who spend more time in caring for cattle than women in non-VFC households.

What determines how men and women allocate time to VFC activities? Multiple linear regression analysis was used to determine the effect of various economic and social factors on time allocated to VFC crop activities. The significant independent variables explaining men's time in VFC crop activities included participation in the VFC program and residence in Satbariya and Jinabang. Variables explaining women's time included men's time allocated to VFC crop activities, women's time allocated to home VFC activities (negative relationship), household participation in the VFC program, and residence in Jinabang (negative relationship). The fact that participation in the VFC program is significant in explaining time allocated to VFC crops by both men and women suggests that the activities of the VFC program have been successful in increasing the time participant farmers are investing in VFC crop production. It is also important to note that the results of the regression explaining women's time included a negative relationship with time spent in home VFC product activities (making jams, jellies, noodles, brandy, and carpets), suggesting a possible conflict between women's home and in-field VFC work. Although the negative effect was small, its presence reminds us that the balance between women's home and field work is delicate and needs to be continually monitored as crop commercialization proceeds.

In addition to using household labor for crop and livestock activities, both VFC and non-VFC households hire daily wage labor to assist with these activities. For all three communities, VFC households hire more labor and use this labor more often for VFC crops, although in Thabang large amounts of hired labor are used for cereal production. There are gender differences in the hiring of labor by community. In Satbariya, more female labor is hired by VFC households and most of that labor is used for potato

production. In Jinabang, the pattern for VFC households is to hire male laborers almost exclusively. For VFC crops, this labor is used to produce apples and potatoes. For non-VFC crops, labor is hired more for paddy, millet, and wheat. In Jinabang, no hired labor is used for maize cultivation. In Thabang, where hired labor is used the most, VFC households hire more labor for traditional cereal crops than for VFC crops. For the former, the labor is used for maize, millet, and wheat. Women are hired for these crops more than men. For VFC crops, the labor is for potatoes and apples, with women hired for potatoes and men hired for apples.

Overall, VFC households hire more labor than non-VFC households. On a per capita or individual household basis, the amount of labor hired is still relatively small. Nonetheless, the expansion of VFC crops is resulting in increased local on-farm employment possibilities, which is contributing to the VFC program objective of increasing such opportunities.

### *Income*

Taking into account the differences in land in agricultural production and greater time allocated to VFC crops, VFC households have much higher incomes per capita than non-VFC households in all three communities. The annual income per capita of VFC households in Satbariya is Rs 6,370 compared with only Rs 3,239 for non-VFC households. Similarly, VFC households in Jinabang and Thabang have annual incomes per capita of Rs 7,918 and Rs 3,939 compared with Rs 4,485 and Rs 2,752 for non-VFC households, respectively.

VFC households have consistently higher incomes from VFC crops than do households not participating in the VFC program. Among the VFC crops, potatoes followed by other vegetables such as cauliflower, cabbage, tomatoes, peas, and beans, contribute the most to on-farm income in all communities. Compared with non-VFC households, income from potatoes is higher for VFC households by 78 percent (Rs 444 and 249) in Thabang, and by 670 percent (Rs 985 and 147) in Satbariya.

Consistent with their higher total income, most of which comes from on-farm, non-VFC crops (with the exception of Satbariya), VFC households have higher cash incomes than do non-VFC households. However, the principal sources of this cash income are off-farm sources both within and outside the community, with loans playing a major role (particularly so for Jinabang). This finding that non-VFC crop and livestock income and off-farm cash income contribute more to VFC households' total income supports farmers' reports that while the income from VFC crops is important, they are still unable to achieve earnings at a level that is greater than that of their other income sources.

Finally in terms of income, there is some evidence that commercialization is bringing about greater income inequality among households. This may be particularly true in the case of VFC households in Satbariya. In the analyses completed to date, however, it is difficult to distinguish between the effects of commercialization through the VFC program, and longer standing socioeconomic differences that result in income inequality.

### *Expenditures*

VFC households have higher expenditures per capita than non-VFC households in all communities. The total expenditures per capita of VFC households in Jinabang are 54 percent higher than expenditures by non-VFC households in the community. In Satbariya, total expenditures by VFC households are greater by 37 percent, and in Thabang, total expenditures by VFC households are 62 percent greater than those by non-VFC households.

Of the total expenditures per capita, the major share is spent on food. Food expenditures vary by both VFC status and community. Of their total expenditures, VFC households spend 51 percent on food in Jinabang, 68 percent in Satbariya, and 58 percent in Thabang, while non-VFC households spend about 64 percent in Jinabang, and 75 percent in both Satbariya and Thabang. Although VFC households in all communities have a lower percentage of their total expenditures allocated to food items, the actual rupee amount spent on food by these households is much higher compared with non-VFC households.

VFC households spend more on crop inputs than non-VFC households. VFC households in Satbariya spend Rs 596 per capita per year on crop inputs (compared with Rs 437 for non-VFC households); in Jinabang VFC households spend Rs 669 on crop inputs (compared with Rs 259 for non-VFC households); and in Thabang VFC households spend Rs 472 (compared with Rs 217 for non-VFC households). Of the total per capita investment on crop inputs by VFC households, most is directed toward VFC crops. In Satbariya, VFC households spend 73 percent of their crop expenditure on VFC crops; VFC households in Jinabang spend 91 percent on VFC crops; and in Thabang, VFC households spend 64 percent of their total crop expenditures on VFC crops.

Multiple linear regression analysis of total and food expenditures showed no significant difference between VFC and non-VFC households. The most important determining variables for household total and food expenditures were land-related, such as size of landholding, amount of land under cultivation, and land tenure status. Income from VFC crops was significantly related to both total expenditures and food expenditures, with a slightly stronger effect on the former. However, the effect of VFC crop income on expenditures did not vary significantly according to household VFC status.

### *Women's Income and Decision-making*

In terms of women's direct involvement in income earning activities, the VFC program is resulting in participating women in Jinabang and Thabang earning much more income than prior to the program's initiation. These women are producing jams, jellies, chips, apple and potato brandy, and carpets. It is interesting to note that it is within the two communities farthest from markets that women are able to earn income. It is also in these two communities that women have greater control of their income and more actively participate in household decisions regarding income use. Still, the level of income earned by women in these two communities is small, and continuation of their involvement is not independent of the work required for VFC crop production.

The situation of women in Satbariya with regard to earning income requires special attention. Close access to markets, high vegetable production, and interest in VFC activities in Satbariya suggest that there would be more income-earning opportunities than for women in Jinabang and Satbariya. Any efforts to promote income-earning activities among women in Satbariya should consider the implications (not necessarily all negative) of their lack of control over income use and their minimal participation in income decisions.

### **Program and Policy Recommendations**

The commercialization of small farm agriculture in the three study communities is resulting in a number of positive benefits in terms of diversifying agricultural production; creating income-earning opportunities for men and women farmers; increasing income from vegetables, fruits, and cash crops that until recently were only produced by traditional methods that limited their market potential; and creating a small though important amount of local on-farm employment. The commercialization process is also raising a number of concerns, such as whether it is increasing or exacerbating income and resource inequalities, whether it is resulting in increased workloads for women, and the market constraints that are limiting income from VFC crops. The main impetus driving commercialization in the study communities is the Vegetable, Fruit and Cash Crop program being implemented under USAID's Rapti Development Project. However, long-standing socioeconomic differences in households participating in the VFC program also play an important role in the commercialization process.

In the future, the VFC program will continue to be an important mechanism to support farm commercialization efforts in the study communities and in other locations in the Rapti Zone of Nepal. Evaluations of the VFC program and the experience of the implementors have resulted in a number of improvements, which will be incorporated into the VFC program during its second phase, scheduled to begin in September 1992 and to continue for 34 months. Drawing from the data presented in this report, the following recommended actions are made in the hope that future VFC program efforts can take advantage of the better gender-disaggregated information now available on household-

level effects of commercialization.

**Use knowledge of gender differences in time allocated to VFC activities to improve program success.** Both men and women in VFC and non-VFC households spend time in the production of VFC crops and products. While it is widely recognized throughout Nepal that women contribute their labor to producing cash crops for the household, efforts to directly involve women in the training and technical assistance activities for cash crops have been minimal. In the case of the VFC program, only a few women reported receiving any training for the VFC crops. In these cases, they either received instructions from their husbands (who had attended formal training sessions) or they were able to accompany their husbands to the training sessions. Given that the time allocation data show that men in VFC households are increasing the time spent outside of the community, it is important to ensure that women who spend more time in the communities are also well trained in the use of the new technologies for VFC crops. This training would complement the training the program provides women for their home VFC activities.

Over the past decade there has been significant progress in developing agricultural extension programs that are able to reach women farmers. Common to all these programs is a primary concern to adapt the training programs to the needs of women farmers. Techniques and materials have been developed to ensure that women farmers participate in designing the training activities. This participation has made it possible to transfer information about new agricultural technologies to women, who in general may be less literate than men and face more social and economic constraints to their involvement in activities that are outside the community.

Although the primary focus of the second stage of the VFC program will be on facilitating the marketing of VFC crops, attention also needs to be focused on providing better training for women in VFC crop production. The Rapti Project WID Officer could play a key role in assisting the organization implementing the VFC program in this area. She could also link the efforts of the VFC program with the Women in Development Officers of the government line agencies. Training modules and materials are widely

available in Nepal and other countries that could be adopted to the situation of women farmers in the communities targeted by the VFC program.

**Incorporate women's recommendations for the home VFC activities that earn them the most income.** In each of the study communities, women who have participated in VFC training are enthusiastic about improving their income-earning possibilities from work in and around the home. Many of the home product activities (making jams, jellies, noodles, chips, brandy, and carpets) supported by the VFC program have been adopted by women because they either provide income for women and the household or because they allow an increase in household food consumption.

Interviews with women found that they had sound practical and economic reasons for either continuing or abandoning the production of VFC products. Moreover, women had a good understanding of the constraints to increased production of successful VFC products as well as how to overcome these constraints. The qualitative information presented earlier in this report provides many examples of women's recommendations for improving home VFC activities.

Recognizing that women have limited time, and that their VFC crop activities are also a vital component of their work, the VFC program could make an important contribution to improving women's income-earning opportunities by expanding its support of women's home VFC products. This support should be integrated into the agricultural assistance efforts provided to women for VFC crop activities. Integrating program assistance for home VFC products with VFC crop training would help to ensure that expectations of women's involvement are realistic, given women's overall household work responsibilities.

**Continually monitor the effects of commercialization on intrahousehold income distribution and decision-making.** For households in Satbariya, Jinabang, and Thabang, most cash income is pooled and in general men exercise more control over its use. Both men and women earn additional income from the production of VFC crops and products.

Research on women in development has raised a number of questions regarding what can happen to women's position in the household with increases in cash cropping. These may include loss of status, less involvement in key agricultural production and consumption decision-making, and loss of control over the products of their labor.

The gender-disaggregated information collected by GFCS on intrahousehold income and decision-making provides an excellent base from which to monitor changes in women's access and control over agricultural income as commercialization continues. Such monitoring would help to ensure that timely program actions can be taken to avoid the development of any gender inequalities that reduce women's status or their equitable participation in the benefits of agricultural commercialization. This monitoring can also be extended, without too great a cost, to include the food and nutrition consequences of increased commercialization. Because women are the household members primarily responsible for food preparation and family health, they are excellent sources of information on any negative food consequences of increased reliance on cash crops.

The above three recommendations for the second phase of the VFC program are an extension of the concerns that led to undertaking the Gender and Farm Commercialization Study. Adoption of these recommendations, supported by further analysis of the gender-disaggregated data collected by GFCS, would be an important step in ensuring that USAID's "private sector, market-led agricultural strategy" is one that integrates a concern for both equity and efficiency.

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## ANNEX A

**Table 1: Agricultural Time Allocation Data of Population 15-49 Years by Round, VFC Status and Sex in Satbariya Village**

Agricultural Activities Under Crop and Livestock Production		(Minute)															
		First Round				Second Round				Third Round				Fourth Round			
		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC	
		Male	Female	Male	Female												
<b>Crop</b>																	
1.	Preparing for Planting	3.5 (3.1)	0.9 (0.5)	21.0 (7.0)	1.2 (0.8)	63.5 (20.4)	2.5 (1.4)	55.4 (15.3)	0	52.1 (17.9)	2.4 (1.4)	53.8 (14.9)	3.2 (1.9)	7.8 (3.8)	0	17.4 (7.4)	2.1 (2.4)
2.	Enriching soil	0.8 (3.3)	9.2 (5.0)	1.2 (0.4)	23.1 (15.1)	1.4 (0.5)	12.5 (7.1)	1.2 (0.3)	12.7 (7.7)	1.5 (0.5)	2.4 (1.4)	0	11.3 (6.8)	5.8 (2.8)	21.4 (17.9)	1.2 (0.5)	12.8 (14.8)
3.	Planting	7.8 (2.9)	2.8 (1.5)	0	0	48.5 (15.8)	48.2 (28.1)	38.1 (10.5)	24.2 (14.7)	22.1 (7.7)	9.6 (5.9)	46.2 (12.8)	4.2 (2.3)	27.8 (13.5)	4.1 (3.4)	48.1 (20.5)	4.3 (4.9)
4.	Weeding	11.6 (4.3)	11.1 (6.1)	7.0 (2.3)	2.4 (1.8)	89.2 (28.7)	82.1 (48.4)	124.6 (34.8)	80.5 (48.9)	14.9 (5.5)	28.8 (17.8)	20.9 (5.8)	13.3 (8.0)	15.0 (7.3)	14.8 (12.4)	11.0 (4.7)	3.2 (3.7)
5.	Irrigating	5.4 (2.0)	0	0	0	8.6 (2.8)	0	1.2 (0.3)	2.3 (1.4)	2.6 (0.9)	0	0	0	12.9 (6.3)	2.5 (2.1)	7.7 (3.3)	3.2 (3.7)
6.	Plant care	3.1 (1.1)	1.8 (1.0)	4.7 (1.8)	0	12.1 (3.9)	0.9 (0.5)	5.8 (1.8)	1.2 (0.7)	12.8 (4.2)	7.2 (4.4)	12.6 (3.5)	6.1 (3.7)	15.8 (7.8)	0	5.4 (2.3)	0
7.	Harvesting	70.5 (26.0)	72.8 (39.9)	69.9 (23.4)	54.8 (35.7)	1.4 (0.5)	3.4 (1.9)	0	1.1 (0.7)	81.1 (21.0)	72.7 (44.4)	68.6 (19.0)	64.7 (38.9)	32.1 (15.8)	39.8 (33.1)	48.1 (20.5)	33.2 (37.8)
8.	Post harvest processing	63.6 (23.4)	54.4 (29.8)	66.4 (22.9)	43.7 (28.6)	1.4 (0.5)	11.7 (6.6)	3.5 (1.0)	4.6 (2.8)	2.0 (0.7)	12.8 (7.8)	7.2 (2.0)	20.4 (12.3)	20.0 (9.7)	21.4 (17.9)	14.1 (6.0)	10.8 (12.2)
9.	Marketing	9.3 (3.4)	0	2.3 (0.8)	0	10.0 (3.2)	0.9 (0.5)	4.6 (1.3)	1.1 (0.7)	2.0 (0.7)	0	0	0	4.2 (2.1)	0.8 (0.7)	0	0
10.	Others	1.4 (0.5)	0.9 (0.5)	1.2 (0.4)	0	0	0	0	0	0.8 (0.2)	0	0	0	0.7 (0.4)	0	0	0
<b>Sub Total (1-10):</b>		182.0 (67.1)	153.9 (84.3)	173.7 (58.2)	125.0 (81.8)	238.1 (75.9)	160.2 (90.5)	234.4 (34.9)	127.7 (77.8)	172.0 (59.1)	135.9 (83.0)	209.3 (58.0)	123.2 (74.1)	141.9 (68.9)	104.6 (87.5)	153.0 (65.3)	69.8 (79.4)

(Minutes)

Agricultural /Activities Under Crop and Livestock Production	First Round		Second Round				Third Round				Fourth Round					
	VFC		n-VFC		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Livestock</b>																
11. Feeding	10.1 (3.7)	3.8 (2.1)	12.8 (4.3)	4.9 (3.2)	0.7 (0.2)	1.8 (1.0)	6.9 (1.9)	1.1 (0.7)	0	2.4 (1.5)	4.3 (1.2)	2.0 (1.2)	2.1 (1.0)	2.5 (2.1)	5.4 (2.3)	1.1 (1.2)
12. Grazing	49.5 (18.2)	12.9 (7.1)	71.1 (23.9)	10.9 (7.1)	49.2 (15.8)	4.2 (2.4)	69.2 (19.2)	4.6 (2.8)	43.4 (14.9)	4.8 (2.9)	51.6 (14.3)	16.5 (9.9)	36.4 (17.7)	4.1 (3.4)	32.8 (14.0)	4.3 (4.9)
13. Collecting	19.4 (7.2)	8.3 (4.5)	38.5 (12.9)	8.5 (5.6)	20.0 (6.4)	5.8 (3.3)	34.5 (9.6)	24.2 (14.7)	69.9 (24.0)	19.9 (12.2)	91.7 (25.4)	22.5 (13.6)	18.5 (9.0)	5.9 (4.9)	36.8 (15.7)	12.8 (14.6)
14. Carrying	5.4 (2.0)	1.8 (1.0)	0	1.2 (0.8)	0.7 (0.2)	3.4 (1.9)	1.2 (0.3)	2.3 (1.4)	1.5 (0.5)	0	1.0 (0.3)	1.0 (0.6)	0.7 (0.4)	0.8 (0.7)	5.3 (1.4)	0
15. Milking / dewooling	1.8 (0.6)	0	0	0	0	0	0	0	0	0.8 (0.5)	0	0	0.7 (0.4)	0	1.2 (0.5)	0
16. Marketing	2.3 (0.8)	0	0	0	0.8 (0.3)	0	0	0	3.5 (1.2)	0	1.0 (0.3)	0	4.9 (2.4)	0	0	0
17. Others	0.9 (0.4)	1.8 (1.0)	2.2 (0.7)	2.4 (1.5)	3.6 (1.2)	1.6 (0.9)	15.0 (4.1)	4.6 (2.8)	0.8 (0.2)	0	2.2 (0.6)	1.0 (0.6)	0.7 (0.4)	1.6 (1.4)	2.0 (0.9)	0
<b>Sub Total (11-17):</b>	<b>89.2 (32.9)</b>	<b>28.6 (15.7)</b>	<b>124.6 (41.8)</b>	<b>27.9 (18.2)</b>	<b>75.0 (24.1)</b>	<b>16.8 (9.5)</b>	<b>126.8 (35.1)</b>	<b>36.8 (22.4)</b>	<b>119.1 (40.9)</b>	<b>27.9 (17.0)</b>	<b>151.8 (42.0)</b>	<b>43.0 (25.9)</b>	<b>64.0 (31.1)</b>	<b>14.9 (12.5)</b>	<b>61.5 (34.7)</b>	<b>18.2 (20.6)</b>
<b>Grand Total:</b>	<b>271.2 (100)</b>	<b>182.5 (100)</b>	<b>298.3 (100)</b>	<b>152.9 (100)</b>	<b>311.1 (100)</b>	<b>177.0 (100)</b>	<b>361.2 (100)</b>	<b>164.5 (100)</b>	<b>291.1 (100)</b>	<b>163.8 (100)</b>	<b>361.1 (100)</b>	<b>166.2 (100)</b>	<b>205.9 (100)</b>	<b>119.5 (100)</b>	<b>234.5 (100)</b>	<b>87.8 (100)</b>

Note: Figures in parentheses indicate percentages

Table 2: Agriculture Time Allocation Data of Population 15-49 Years by Round, VFC Status and Sex in Jinabang Village

Agricultural Activities Under Crop and Livestock Production		(Minutes)															
		First Round				Second Round				Third Round				Fourth Round			
		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Crop																	
1.	Preparing for planting	42.6 (17.3)	0	48.7 (15.4)	1.8 (0.5)	22.7 (8.8)	0	19.9 (5.6)	0	39.5 (16.7)	9.8 (2.6)	30.8 (11.8)	6.9 (2.1)	11.3 (6.2)	0	8.0 (4.5)	1.4 (0.7)
2.	Enriching Soil	4.7 (1.9)	22.3 (6.9)	15.2 (4.8)	23.7 (6.5)	1.0 (0.4)	6.0 (1.7)	8.5 (2.4)	14.7 (4.0)	2.1 (0.9)	4.9 (1.3)	1.0 (0.4)	3.9 (1.2)	6.5 (3.6)	2.2 (0.9)	1.1 (0.6)	2.6 (1.3)
3.	Planting	49.7 (20.2)	21.0 (6.5)	43.0 (13.6)	10.2 (2.8)	7.2 (2.8)	9.2 (2.6)	3.5 (1.0)	10.3 (2.8)	9.7 (4.1)	1.1 (0.3)	1.0 (0.4)	2.6 (0.8)	1.8 (1.0)	1.0 (0.4)	0	0
4.	Weeding	8.1 (3.3)	1.3 (0.4)	0	0	59.6 (23.2)	66.7 (18.9)	84.0 (23.7)	93.5 (25.5)	3.3 (1.4)	2.3 (0.6)	1.0 (0.4)	0	0.9 (0.5)	0	1.1 (0.6)	0
5.	Irrigating	3.4 (1.4)	0	1.3 (0.4)	0	9.3 (3.6)	0	6.0 (1.7)	0	0	0	0	0	0	0	0	0
6.	Plant care	21.9 (8.9)	1.3 (0.4)	5.7 (1.6)	0	19.5 (7.6)	7.1 (2.0)	9.9 (2.8)	7.3 (2.0)	8.5 (3.6)	6.0 (1.6)	6.8 (2.6)	5.6 (1.7)	1.8 (1.0)	0	0	0
7.	Harvesting	3.4 (1.4)	33.9 (10.5)	15.2 (4.8)	48.4 (13.3)	14.4 (5.6)	52.6 (14.9)	15.9 (4.5)	36.7 (10.0)	37.4 (5.8)	44.1 (11.7)	21.6 (8.3)	20.4 (6.2)	14.9 (8.2)	12.8 (5.3)	6.9 (3.9)	0
8.	Post harvest processing	8.1 (3.3)	7.7 (2.4)	6.9 (2.2)	14.9 (4.1)	5.1 (2.0)	25.8 (7.3)	12.4 (3.5)	26.4 (7.2)	3.3 (1.4)	13.6 (3.6)	6.8 (2.6)	13.5 (4.1)	5.6 (3.1)	11.6 (4.8)	1.1 (0.6)	14.1 (7.3)
9.	Marketing	3.4 (1.4)	0	0	0	0	0	0	0	10.6 (4.5)	1.1 (0.3)	5.7 (2.2)	0	14.0 (7.7)	2.2 (0.9)	5.7 (3.2)	0
10.	Others	1.2 (0.5)	0	1.3 (0.4)	0	3.1 (1.2)	3.5 (1.0)	12.4 (3.5)	7.3 (2.0)	2.4 (1.0)	0	3.4 (1.3)	1.3 (0.4)	0.9 (0.5)	1.0 (0.4)	0	0
Sub Total (1-10):		146.5 (59.6)	87.5 (27.1)	137.3 (43.4)	99.0 (27.2)	141.9 (55.2)	170.9 (48.4)	172.5 (48.7)	196.2 (53.5)	118.8 (49.4)	82.9 (22.0)	78.1 (30.0)	54.2 (16.5)	57.7 (31.7)	30.8 (12.8)	23.9 (13.4)	16.5 (9.3)

(Minutes)

Agricultural Activities Under Crop and Livestock Production	First Round		Second Round		Third Round		Fourth Round											
	VFC		n-VFC		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Livestock</b>																		
11. Feeding	28.8 (11.7)	27.4 (8.5)	38.9 (12.3)	24.8 (6.8)	18.5 (7.2)	18.7 (5.3)	34.7 (9.8)	14.7 (4.0)	19.1 (8.1)	35.4 (9.4)	32.1 (12.3)	31.2 (9.5)	26.2 (14.4)	32.0 (13.6)	31.0 (17.4)	19.9 (10.0)		
12. Grazing	19.7 (8.0)	12.9 (4.0)	43.0 (13.8)	18.8 (5.1)	35.0 (13.6)	30.4 (8.5)	52.1 (14.7)	18.3 (5.0)	44.9 (19.0)	57.8 (15.5)	73.2 (28.1)	30.6 (9.3)	42.2 (23.2)	15.9 (6.6)	33.7 (18.9)	17.3 (8.7)		
13. Collecting	33.4 (13.6)	183.3 (56.8)	79.1 (25.0)	214.9 (59.0)	51.4 (20.0)	123.4 (34.9)	75.5 (21.3)	130.1 (35.5)	41.6 (17.8)	182.8 (48.5)	48.4 (17.8)	193.8 (58.9)	43.5 (23.9)	148.9 (61.8)	66.8 (37.5)	127.8 (54.0)		
14. Carrying	4.7 (1.9)	5.2 (1.8)	13.9 (4.4)	5.1 (1.4)	8.2 (3.2)	7.1 (2.0)	13.5 (3.8)	7.3 (2.0)	9.7 (4.1)	12.0 (3.2)	20.8 (7.9)	16.4 (5.0)	9.8 (5.4)	8.4 (3.5)	20.7 (11.8)	13.4 (6.7)		
15. Milking / dewooling	8.1 (3.3)	6.4 (2.0)	2.8 (0.9)	1.8 (0.5)	2.1 (0.8)	2.5 (0.7)	5.0 (1.4)	0	4.3 (1.8)	6.0 (1.6)	6.8 (2.6)	2.6 (0.8)	2.7 (1.5)	4.3 (1.8)	1.1 (0.8)	2.6 (1.3)		
16. Marketing	1.2 (0.5)	0	0	0	0	0	1.1 (0.3)	0	0	0	3.4 (1.3)	0	0	0	1.1 (0.6)	0		
17. Others	3.4 (1.4)	0	1.3 (0.4)	0	0	0	0	0	0	0	0	0	0	0	0	0		
<b>Sub Total (11-17):</b>	<b>99.3 (40.4)</b>	<b>235.2 (72.8)</b>	<b>179.0 (56.4)</b>	<b>265.2 (72.8)</b>	<b>115.2 (44.8)</b>	<b>182.1 (51.6)</b>	<b>181.9 (51.3)</b>	<b>170.4 (46.5)</b>	<b>119.6 (50.6)</b>	<b>293.6 (78.0)</b>	<b>182.5 (70.0)</b>	<b>274.4 (83.5)</b>	<b>124.4 (68.3)</b>	<b>210.3 (87.2)</b>	<b>154.4 (86.6)</b>	<b>190.8 (90.7)</b>		
<b>Grand Total:</b>	<b>245.8 (100)</b>	<b>322.7 (100)</b>	<b>316.3 (100)</b>	<b>384.2 (100)</b>	<b>257.1 (100)</b>	<b>353.0 (100)</b>	<b>354.4 (100)</b>	<b>366.6 (100)</b>	<b>236.4 (100)</b>	<b>376.5 (100)</b>	<b>260.8 (100)</b>	<b>328.6 (100)</b>	<b>182.1 (100)</b>	<b>241.1 (100)</b>	<b>178.3 (100)</b>	<b>199.3 (100)</b>		

Note: Figures in parentheses indicate percentages

Table 3: Agriculture Time Allocation Data of Populatio. i5-49 Years by Round, VFC Status and Sex inThabang Village

(Minutes)

Agricultural Activities Under Crop and Livestock Production	First Round		Second Round				Third Round				Fourth Round					
	VFC		n-VFC		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Crop</b>																
1. Preparing for planting	25.0 (9.8)	45.3 (15.0)	48.1 (15.2)	77.7 (25.0)	0	12.4 (3.2)	10.0 (3.5)	5.1 (1.4)	42.1 (14.8)	59.0 (18.0)	50.9 (16.5)	52.0 (15.0)	18.3 (8.0)	15.8 (6.1)	20.1 (8.1)	21.9 (8.9)
2. Enriching Soil	1.5 (0.6)	21.1 (7.0)	5.7 (1.8)	24.5 (2.9)	0	2.7 (0.7)	1.7 (0.6)	5.1 (1.4)					2.5 (1.1)	5.7 (2.2)	0	4.4 (1.8)
3. Planting	23.2 (9.1)	35.8 (11.8)	35.1 (11.1)	30.4 (9.8)	14.3 (5.8)	4.2 (1.1)	11.8 (4.1)	3.3 (0.9)	37.6 (13.3)	2.6 (0.8)	45.9 (14.9)	6.6 (1.9)	11.0 (4.8)	0	11.4 (4.6)	0
4. Weeding	1.5 (0.6)	6.3 (2.1)	0	1.9 (0.6)	61.3 (24.3)	210.0 (54.4)	73.5 (25.6)	240.6 (85.9)	1.4 (0.5)	16.4 (5.0)	3.4 (1.1)	8.3 (2.4)	1.1 (0.5)	0	0	0
5. Irrigating	4.8 (1.9)	4.8 (1.6)	0	0	4.2 (1.2)	0	0	0	1.4 (0.5)	0	0	0	2.5 (1.1)	2.3 (0.9)	0	0
6. Plant care	8.4 (3.3)	0	5.7 (1.8)	0	3.0 (1.2)	10.8 (2.8)	1.7 (0.6)	0	11.7 (4.1)	54.7 (16.7)	29.6 (9.6)	83.9 (24.2)	8.4 (3.7)	1.0 (0.4)	1.5 (0.5)	0
7. Harvesting	8.4 (3.3)	33.8 (11.2)	13.0 (4.1)	49.4 (15.9)	25.8 (10.4)	96.1 (24.9)	25.3 (8.8)	75.2 (20.6)	37.9 (13.3)	138.7 (42.3)	47.8 (15.5)	142.5 (41.1)	3.6 (1.8)	8.1 (3.1)	0	3.0 (1.2)
8. Post harvest processing	0	13.0 (4.3)	5.7 (1.8)	7.5 (2.4)	11.2 (4.6)	26.3 (6.8)	10.0 (3.5)	22.3 (6.1)	0	6.9 (2.1)	0	11.8 (3.4)	1.1 (0.5)	20.5 (7.9)	3.0 (1.2)	17.5 (7.1)
9. Marketing	0	1.5 (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10. Others	0	3.3 (1.3)	0	0	0	0	0	0	4.3 (1.5)	8.2 (2.5)	1.5 (0.5)	8.3 (2.4)	1.1 (0.5)	0	1.5 (0.6)	3.0 (1.2)
<b>Sub Total (1-10):</b>	<b>72.8 (28.6)</b>	<b>164.7 (54.6)</b>	<b>113.3 (35.8)</b>	<b>191.4 (61.6)</b>	<b>119.7 (48.6)</b>	<b>362.7 (93.9)</b>	<b>134.0 (46.7)</b>	<b>351.6 (96.3)</b>	<b>136.6 (48.0)</b>	<b>286.5 (87.4)</b>	<b>170.1 (50.1)</b>	<b>313.4 (90.4)</b>	<b>49.7 (21.8)</b>	<b>53.4 (20.6)</b>	<b>37.5 (15.1)</b>	<b>49.8 (20.2)</b>

(Minutes)

Agricultural Activities Under Crop and Livestock Production	First Round		Second Round		Third Round		Fourth Round									
	VFC		n-VFC		VFC		n-VFC		VFC		n-VFC		VFC		n-VFC	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Livestock																
11. Feeding	8.4 (3.3)	21.1 (7.0)	13.0 (4.1)	7.5 (2.4)	0	4.2 (1.1)	5.2 (1.8)	8.4 (2.3)	0	4.3 (1.3)	1.5 (0.5)	6.5 (1.9)	9.8 (4.3)	8.1 (3.1)	4.2 (1.7)	10.3 (4.2)
12. Grazing	162.3 (62.6)	21.1 (7.0)	171.8 (54.3)	26.4 (8.5)	126.5 (51.4)	14.7 (3.8)	146.1 (50.9)	3.3 (0.9)	114.7 (40.3)	19.3 (5.9)	103.4 (33.5)	8.3 (2.4)	131.1 (57.4)	24.9 (9.6)	177.9 (71.7)	21.9 (8.9)
13. Collecting	9.9 (3.9)	75.5 (25.0)	18.9 (5.8)	68.3 (22.0)	0	1.5 (0.4)	1.7 (0.6)	1.8 (0.5)	4.3 (1.5)	8.2 (2.5)	6.5 (2.1)	8.3 (2.4)	24.4 (10.7)	171.0 (65.8)	24.3 (9.8)	161.4 (65.5)
14. Carrying	0	3.3 (1.1)	0	3.7 (1.2)	0	0	0	0	23.3 (8.2)	6.9 (2.1)	16.3 (5.3)	10.1 (2.9)	12.1 (5.3)	2.3 (0.9)	4.2 (1.7)	3.0 (1.2)
15. Milking / dewooling	1.5 (0.6)	14.7 (4.8)	0	11.5 (3.7)	0	1.5 (0.4)	0	0	5.7 (2.0)	1.3 (0.4)	0	0	0	0	0	0
16. Marketing	0	0	0	0	0	1.5 (0.4)	0	0	0	1.3 (0.4)	0	0	1.1 (0.5)	0	0	0
17. Others	0	1.5 (0.5)	0	1.9 (0.6)	0	0	0	0	0	0	1.5 (0.5)	0	0	0	0	0
Sub Total (11-17):	182.1 (71.4)	137.2 (45.4)	203.1 (64.2)	119.3 (38.4)	126.5 (51.4)	23.4 (6.1)	153.0 (53.3)	13.5 (3.7)	148.0 (52.0)	41.2 (12.6)	129.2 (41.9)	33.2 (9.8)	176.5 (78.2)	206.3 (79.4)	210.6 (84.9)	196.6 (79.8)
Grand Total:	254.9 (100)	301.9 (100)	316.4 (100)	310.7 (100)	246.2 (100)	386.1 (100)	287.0 (100)	365.1 (100)	294.6 (100)	327.8 (100)	308.3 (100)	346.6 (100)	226.2 (100)	259.7 (100)	246.1 (100)	246.4 (100)

Note: Figures in parentheses indicate percentages