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The Role of Off-farm Income in Sustaining Households in Rural Nepal

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requirements for the degree of Master of Applied Science
in Rural Development at Massey University

ABSTRACT

Stagnant agricultural productivity and low returns in farming have led rural residents to look for opportunities to earn income from off-farm sources. This research examined the role of off-farm income in sustaining households in rural Nepal, and identified factors associated with off-farm employment and income. One Village Development Committee (VDC) from two ecologically distinct districts (Dhankuta in the Hill and Morang in the Terai) of eastern Nepal were selected for the study. A participatory rural appraisal (PRA) workshop (n=6), a household survey (n=150) and key informant interviews (n=6) were conducted to gather data for the study.

The average income of the households was Rs 33,963 (approximately US\$500) per annum. The most prominent sources of income were agriculture in the Hill households, and off-farm activities in the Terai households. Off-farm income, especially wages, was a major source of household income for the poor households in both agro-ecological zones. Income from business/enterprises in the Terai, and remittances in the Hill, were the primary sources of off-farm income for the non-poor households. They were also the main source of cash income for these rural households.

Average expenditure in the rural households was Rs 25,797 (US\$380) per annum. Off-farm income contributed nearly half of household expenditure. It contributed especially to the purchase of agricultural inputs and materials. The contribution of off-farm income to a household's expenditure decreased as its area of landholding increased.

Both farm and off-farm activities were seasonal and counter-cyclic in rural eastern Nepal. Males and females participated on an equal number of days in cropping activities, but females spent more hours per day in caring for livestock. However, males worked more days off-farm than did females, especially in the Hill. Most of the off-farm activities of females were related to agriculture in both agro-ecological zones. Off-farm employment in the Hill was mainly service-related, whereas that in the Terai comprised a mix of service and trade occupations. Low farm incomes in the Hill and the lack of arable land in the Terai

were the primary reasons, respectively, why off-farm employment was sought in the study VDCs.

Household landholding, household size, ethnicity and the agro-ecological position of the households were established to be the key determinants of household off-farm income and employment. Characteristics of individuals such as gender, education level and ethnicity affected the type of employment taken up. The more educated, males and those belonging to the Chhetri/Brahmin/Newar ethnic group dominated off-farm employment.

Policy intervention measures such as the provision of irrigation and skill-based training are recommended to improve the well being of rural women, disadvantaged people's sub-groups and those located away from major employment centres. Market development and roading are also important elements in increasing off-farm income opportunities, and thus household income.

Key words: Nepal, off-farm employment, off-farm income, households' sustainability, labour market, and participatory research.

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CHAPTER ONE - INTRODUCTION

Nepal is a landlocked country situated between India and China. It lies between latitude 26° 22' and 30° 27' north and longitude 80° 4' and 88° 12' east. The total area of the country is 147,181 km² (CBS, 1997a). Nepal has diverse physical characteristics. The landscape runs from the south plain, where the elevation in some places is less than 100 m above sea level (asl), to the north where the high mountains are located. Broadly, the physical settings of Nepal can be divided into three regions running east to west: the Terai, the Hill and the Mountain.

Natural setting

The southern plain, covering about 14% of the total land of Nepal, constitutes the Terai (Carson, 1992). It is home to about 47% of the country's population (CBS, 1997a). The region has a humid tropical climate, with summer temperatures rising above 37° C (ADB & ICIMOD, 1992). The winter is relatively cool, with a mean temperature of 13° C. The average annual rainfall is 1700 mm. This decreases from east to west, and is dependant on the monsoon rain (*ibid.*). The Terai is primarily the "bread basket" of Nepal (Carson, 1992), accounting for "53% of the country's gross cropped area, 48% of the area under food crops and 85% of the area under cash crops" (Thapa & Rosegrant, 1995, p.1). The primary crops produced in the region are rice, wheat, maize, tobacco and sugarcane.

With a relatively well-developed infrastructure, and access to markets in India, the Terai is economically better off than other parts of the country. It is, therefore, not surprising to see a number of Nepal's major urban centres in the Terai. With the majority of the industries established here, local off-farm employment opportunities are relatively better than in other parts of the country. However, competition for off-farm employment is very strong (*ibid.*).

Between the high hills and the flat Terai, lies a range of small hills between 300 and 1000 asl and constituting approximately 12.7 per cent of the total land of Nepal (Carson, 1992). Most of these hills are steep and barren, but some parts have formed valleys called 'dun', which have fertile land.

The Hills of Nepal, generally known as the 'Mahabharat', run east-west with an elevation of 1,000 to 3,000 m asl and constitute 48.5 per cent of the total land of Nepal (Carson, 1992). About 45% of the country's population live scattered throughout the Hill, with the exception of the three cities of Kathmandu valley, and some prominent urban centres such as the cities of Illam, Dhankuta, Pokhara, Palpa, Surkhet and Baglung (CBS, 1997a).

The climate of the Hill region varies from moist sub-tropical to temperate, with rainfall depending on the monsoon. This region accounts for 50 per cent of the cultivated land of the country (Thapa & Rosegrant, 1995), where the main agricultural crops produced are rice in the lower part of the Hill, and maize, millet and potato in the upper Hills. With difficult terrain, people have little access to the outer world and primarily depend upon subsistence agriculture. However, with the construction and extension of motorable roads, more Hill people are becoming mobile, and have slowly been taking advantage of the opportunities which provide to work off-farm.

The northern part of the high Hills is referred to as "the Mountains", or the Himalayas, which include some of the highest peaks in the world. It constitutes 23.7 per cent of the total land area of Nepal and lies above 3,000 m asl (Carson, 1992). Population distribution is sparse, and as the climate is alpine and arctic, agricultural land is virtually non-existent (ADB & ICIMOD, 1992).

Of the total land mass of Nepal, 42% is covered by forest, 14.6% is covered by meadows and pastures, and 17.2% is agricultural and under permanent cultivation. The remaining 26.2% is natural landscape (http://www.PanAsia.org.sg/Nepalnet/facts_fig.htm).

1.2 Population characteristics

The total population of Nepal is approximately 21 million, of which 90 % live in rural areas and 49% are male (CBS, 1997a). Nepal's population tends to be young, with 43.5% aged less than 15 years. Of the total population, 54% are economically active (15-64 years of age), of which 28% are women. If the participation rate is based on 10 years and above, the percentage rises to 57% of which 45% are female. Older people (65 and above) account for

2.5% of the total population (Shrestha & Pant, 1995). With the current population growth rate of 2.1% per annum, the dependency ratio is high in Nepal (CBS, 1997a).

Ethnically, people are divided into 40 groups. These are dominated by the Chhetri and Brahmins (28.97%). Other main ethnic groups are Magar (7.24%), Tharu (6.46%), Newar (5.63%), Tamang (5.51%), Kami (5.21%), Yadav-Ahir (4.14%), Moslem (3.53%), Rai-Kirati (2.84%), Gurung (2.43%) and Damai (1.99%). Various other minor ethnic groups are distributed throughout Nepal.

1.3 Economic context

Nepal has an agrarian economy, and had a per capita income of around US\$ 200 per annum in 1995. Agriculture contributed about two-fifths of the national GDP, which has steadily decreased in recent years (NESAC, 1998). The contribution of the service sector, especially in tourism and trade, however, has increased. In 1975, this was 3.9% of GDP: by 1997, it had grown to 11.7%. (NESAC, 1998). The service sector in Nepal is mostly concentrated in urban areas, with a relatively small impact on rural areas. In 1997, industry contributed about one-fifth of the national GDP. Cottage industries such as grain milling, handicrafts, and paper manufacturing play an important role in the growth of both rural and urban employment.

Agriculture is the dominant feature of Nepal. Although the contribution of agriculture to the national GDP has fallen, agriculture still contributes more than half of the household income in Nepal, and employs over 80% of the population (NESAC, 1998). The main crops grown in Nepal are rice, wheat, maize in Terai and rice, maize, millet and potatoes in the Hills. Livestock rearing is an integral part of Nepalese farm households, and, on average, most of the rural households keep 1-2 cows or buffaloes, 2-3 goats and a few poultry birds. Crop production in Nepal has steadily increased in quantity but production has not kept pace with population growth (ADB & ICIMOD, 1992; Thapa & Rosegrant, 1995). As a result, Nepal, once self-sufficient in food production, began to import foodgrains in the 1980s (Thapa & Rosegrant, 1995).

India is the major trading partner of Nepal - in 1994/95, 18% of total exports were to India, with the major commodities exported being jute products, timber and live animals (CBS, 1997a). The main exports to other countries were carpets, garments and handicrafts, which went mostly to Germany, US, India and Switzerland. In the same year, 30% of the imports to Nepal were from India, with the major items imported being chemicals and drugs, household goods and machinery and transport goods.

Nepal's overall economic performance has been poor (ADB & ICIMOD, 1992). Real growth in GDP increased by only 4.9% between 1985-97, due mainly to high population growth, which by 2010 is expected to reach around 29 million (*ibid.*). The poor performance of the national economy has escalated household poverty in Nepal whereas in 1977 this was 33.7% (34.3% in rural and 19.9% in urban areas); twenty years later it had increased to 40.3% (42.2% in rural and 22.1% in urban areas; NESAC, 1998). Besides this high population growth, other factors contributing to increased poverty are unbalanced income distribution, high unemployment and recurrent indebtedness of the poor (*ibid.*). Therefore, the major developmental challenge for Nepal is to increase the standard of living for her poor population.

1.3.1 The Rural Economy

Rural Nepal consists of around 28,000 villages, which have been organised into 4048 local administrative units known as Village Development Committees (VDCs) (ADB & ICIMOD, 1992). Most of the people in rural Nepal are engaged in subsistence agriculture where the households produce their own food, primarily through basic cereal crops (World Bank, 1991). Table 1.1 gives an overall picture of rural households in Nepal. In 1996, the average rural household size was 5.7 persons, the same as the national average. Household size was greater in the Terai than in the Hill. Rural households tend to be resource-poor - nearly half of the houses have a thatch roof, and only 18.4% of the households have toilet facilities (CBS, 1997b).

The literacy rate is also low in rural, compared to urban areas, and is also lower in rural Terai compared to the rural Hills, but primary schools and health posts are relatively more accessible in rural Terai than in the Hills. Similarly, agricultural extension service centres are

less accessible in rural areas, and in the rural Hills in particular, than in the Terai. Due to the better transport network in the Terai, its households enjoy better access to market centres.

Table 1.1: Characteristics of rural households in Nepal.

Characteristic	Nepal	Rural Nepal	Rural eastern Hill/Mountain	Rural eastern Terai
Average household size	5.7	5.7	5.4	5.7
Dependency ratio	115	117	111	111
Households having thatch/straw construction material for the roof (% households)	51	54	56	61
Literacy rate (%)	36	33	37	30
% households requiring more than one hour to reach nearest ¹ :				
• Primary school	3.7	3.9	15.5	1.6
• Health post	30.3	33.0	44.3	16.9
• Agricultural centre	55.2	59.6	73.6	70.6
• Market centre	57.7	62.2	71.6	44.7

¹Time taken by foot.

Source: Central Bureau of Statistics (CBS), 1997b.

1.3.2 Household income and expenditure

In 1996 the average rural household and per capita incomes in Nepal were estimated to be Rs 40,400 (US\$641) and Rs 7,050 (US\$112), respectively (Table 1.2). Rural Terai households had somewhat higher incomes than did rural Hill/Mountain households. Of the total income, two-thirds was earned from farming activities, and on average, a quarter of household income was earned from wages. However, the rural poor often had a higher percentage of income from wages - but the World Bank (1991) cautioned that "The importance of off-farm income among poor (about 40%) does not reflect their active participation in a robust informal sector. Instead it seems to be generated mostly from a range of distress activities and very low paying employment" (p. 12). The contribution of wages to total household income was much higher in the Terai than in the Hill demonstrating that the opportunity for wage income has been greater in the Terai than in the Hill. A comparison of the remittances received by the households in the two regions (26.8% in rural Nepal vs. 30% in the Hills and 23% in Terai) highlights the importance of contributions made by household members residing outside the homestead, particularly in the Hills.

Table 1.2: Nominal household and per-capita income in Nepal (1995/96 Rs).

Income	Nepal	Rural Nepal	Rural eastern Hill/Mountain	Rural eastern Terai
Average household income	43,732	40,400	41,084	45,284
Average per capita income	7,690	7,075	7,609	7,876
Share of farm income	61	65	66	64
Share of non-farm income	22	20	20	22
Share of other income ¹	16	15	14	14
Share of wage income	28	27	25	35
Share of self-employed income	54	56	64	48
Share of other income ¹	18	17	11	17

¹Other income included interest from saving accounts, fixed accounts, treasury bills, stocks, provident fund, pensions and commission fees.

Source: Central Bureau of Statistics (CBS), 1997b.

Among the off-farm enterprises in rural Nepal, trade dominates in both the Hill and Terai regions. Trade accounted for half of the off-farm enterprises in both regions (CBS, 1997b), with income disparity being relatively greater in rural Nepal. The top 10% of the population in the rural area shared 29% of the total income, while the bottom 40% shared only 18% (*ibid.*).

In 1986 (Table 1.3) rural households in Nepal spent nearly two-thirds of their consumption expenditure on food items, with about three-fifths of food expenditure being on grain and cereal products alone. Only a small proportion of household expenditure was allocated to health and education, with the allocation to housing and clothing comprising 16.2% and 11.9% of household expenditure, respectively. Comparative figures for the whole country are provided in the same table.

As most households in the rural area have low savings, borrowing is a common feature of rural Nepal. A national survey in 1996 showed 63% of the sampled households had some form of a loan (CBS, 1997a). The major sources of loans for rural households were relatives and local moneylenders, while only a few households (16%) borrowed from formal institutions. In the same study (CBS, 1997a), half of the loans taken by the rural households were for consumption purposes, one-fifth were for personal use and only about one-third were for business or farm purposes. However, rural households (36%) in Terai borrowed more than rural Hill households (23%) for business or farm activities (*ibid.*).

Table 1.3: Distribution of household consumption expenditure (percent).

Expenditure Item	Rural	Nepal
<i>Food and Beverage</i>	62.3	61.2
Grain/cereal products	38.3	36.9
Others ¹	21.4	21.7
Alcohol and tobacco	2.6	2.6
<i>Other goods and services</i>	37.7	37.7
Housing	16.2	17.3
Clothing	11.9	11.7
Medical and personal care	3.7	3.7
Education	2.7	2.9
Others	3.2	3.2

¹ Others include pulse, vegetables, milk, spices, meat, fish, fruits and nuts.

Source: Nepal Rastra Bank, 1988 cited in NSAC, 1998.

1.3.3 Resource Endowment

Land is the single most income-producing asset in rural Nepal and therefore the distribution of land is very important for the rural economy (World Bank, 1991). Rural household income is positively associated with land size. Table 1.4 shows the pattern of land size and income level for rural households. On average, households with large farms had nearly three times more income than the marginal farms. In all groups of farms, household income in Terai was greater than both the national average and the income of Hill households. The disparity in household income was also greater in the Terai than in the Hills. For example, the income difference between the marginal and large farms in Terai was four times, whereas in the Hills it was only three times.

Table 1.4: Distribution of household income by land holding size (Rs/year in 1985).

Farm size ¹	Rural Nepal	Rural Hill	Rural Terai
Large	24,288	22,584	40,560
Medium	15,792	14,616	21,864
Small	12,336	11,076	14,520
Marginal	8,832	8,088	9,444
Landless	8,196	9,168	7,596

¹ Farm size is defined as: large farm size = holding of more than 5.4 ha in Terai and 1.04 in the Hill; medium farm size = 2.73 to 5.4 ha in Terai and 0.52 to 1.04 ha in the Hills; small farm size = 1.03 to 2.73 in Terai and 0.21 to 0.52 ha in the Hills; and marginal farm size = up to 1.02 ha in Terai and up to 0.21 ha in the Hills.

Source: Nepal Rastra Bank, 1988 cited in NSAC, 1998, p.117.

The average agricultural land size in rural Terai tended to be larger than the rural Hill area (1.3 ha and 0.9 ha, respectively CBS, 1997b). Of the total households sampled for the 1996 Nepal Living Standard Survey (NLSS), 40% had less than 0.5 hectares of agricultural land, 47% had between 0.5-2.0 hectares, and only 13% had more than 2.0 hectares.

Based on the NLSS (1996) report, 68.8% of the total economically-active rural population were employed, 3.2% were unemployed and 28.0% were inactive (were not engaged in, or did not expect to have, any kind of job). Women comprised 52% of the total rural labour force. However, the work force participation rate was higher for males than females, although more of the former were unemployed. Although the employment rate was higher in rural Nepal, within the employed, 79.5% were self-employed (of which 91% were self-employed in agriculture), and the rest, 20.5%, had waged employment (of which 61% were in the agricultural sector). Thus, agriculture clearly dominates the labour market in rural Nepal.

The dominance of agriculture is apparent in the occupations of rural residents (Table 1.5). Except for agriculture, males dominated the occupations - which may be attributed to their poorer education, as well as to the local social norms.

Table 1.5: Distribution of rural population by major occupational group (1991).

Major occupational group	Both sexes	Male	Female
Professional and technician	1.49	2.28	0.37
Administrative and related	0.10	0.16	0.02
Clerical	0.63	1.02	0.08
Sales	1.98	2.51	1.24
Services	5.33	6.79	3.29
Agricultural	85.42	80.20	92.73
Production	3.16	4.41	1.41
Others	1.63	2.34	0.62
Not stated	0.26	0.27	0.24

Source: CBS, 1993, Vol. I Part XIII, cited from Shrestha and Pant, 1995.

1.4 Problem Statement

Rural households in the past have enjoyed a subsistence economy, in which they have had surplus food, few aspirations, and little challenge from the outside world. However, with the rising population, degradation of the land and environment due to cultivation of marginal areas and encroachment by the outer world economy, rural households in Nepal now face huge challenges to gain a better livelihood. Further, with difficult geographical settings, traditional social systems and poor economic conditions, Nepalese rural households face 'boundless' social and economic problems. In recent times, the economic situation of rural households has worsened due to the causes outlined below.

Low farm income

Three factors have induced low farm income amongst rural households in Nepal: (i) low farm productivity, (ii) slow agricultural growth and (iii) small farm size. Although total national crop productions in succeeding years have increased in Nepal, recent studies (ADB & ICIMOD, 1992; Thapa & Rosegrant, 1995) have shown that the per hectare yields of most cereal crops have decreased. Carlson (1992) attributed this to low and inefficient application of organic matter to the soil, and the unavailability of chemical fertilisers. The decline in farm productivity has slowed agricultural growth, and led to reduced rural household earnings from farming. This has resulted in poor savings and investment in farming, and increased off-farm work, especially in waged labour activities, by members of rural households (Thapa & Rosegrant, 1995; ICIMOD, 1996). Thus, a combination of low incomes and low employment growth in rural areas has aggravated rural poverty.

Seasonal agriculture

Agriculture in Nepal is highly seasonal, and is influenced by monsoon rains from June to September, when nearly 80% of the annual rainfall occurs. Rice, one of the main staple/food of households in Terai and in the Hill, is grown during the monsoon season. Rice cultivation is highly labour intensive (Oshima, 1986). During planting, weeding and harvesting there is a deficit in the labour market, which puts pressure on every family member to be engaged in these activities. Therefore, the notion of "employed" and "unemployed" in rural Nepal is seasonal (World Bank, 1991). In the agricultural season, most household members are

employed in farm activities - whereas, during the other seasons, they are underemployed. Underemployment of the rural population is a major problem (Pant & Jain, 1980; World Bank, 1991; ILO-SAAT, 1997 cited in NSAC, 1998), and was estimated in 1996 to be 47.5% of the total labour force (ILO-SAAT, 1997 cited in NSAC, 1998). The same study found that, at a regional level, underemployment was higher in the Terai than in the Hill (50.8% and 45.1%, respectively).

The phenomenon of employment and underemployment in subsistence agriculture in rural Nepal has caused a dilemma for rural farmers seeking seasonal off-farm employment. Although seasonal off-farm employment is very limited, it is necessary to enable farmers to earn cash to purchase non-farm goods such as shoes, salt, and stationery for their children. However, with increasing number of new entrants to the labour force every year, opportunities for off-farm employment and income opportunities available to farmers are decreasing.

Increase in labour force

The population growth rate, at 2.1% per annum, is one of the highest in the world. Furthermore, the population of Nepal is dominated by young people, who enter the labour force annually, thus exacerbating the already-saturated labour market. The World Bank (1991) warned that:

The labour force will double over the next twenty years (from 6.7 million in 1985 to 13.6 million by 2010). In the past the economy has absorbed marginal population growth through a combination of smaller farms, the opening of the Terai, and labour market expansion. With the saturation of arable land almost all of these new entrants will have to be absorbed in off-farm employment activities - a prospect of staggering proportion (p. 32).

Therefore off-farm employment and income have to play a very important role in rural households in Nepal. Off-farm income provides not only the vehicle for improving rural livelihoods, but also the mechanism with which to solve Nepal's wide range of social and economic development problems.

The notion of off-farm income in Nepal is not new. Nepalese farmers have worked as porters, and carried mountaineers' gear, salt and cloth bundles for hill merchants and kerosene drums for construction engineers. Such opportunities have provided extra income for resource-poor farmers. However, over the years, with changes in the political, social and economic environment, opportunities for generating off-farm income have also undergone tremendous change in Nepal. Rural electrification in particular has increased the opportunity for cottage industries. Similarly, the extension of motorable roads has increased the mobility of rural people. These, and other factors, have contributed to off-farm income's gaining a prominent role in the household economy.

A number of studies have examined labour market dynamics in Nepal, but very few studies have addressed the role of off-farm employment and income in sustaining rural households. The roles played by rural industries and business in increasing employment and off-farm income in Nepal have not been adequately examined. The focus of the research reported in this thesis on off-farm income and household sustainability linkages will assist policy-makers in formulating policies and strategies to improve the social and economic well-being of rural households.

1.5 Research hypotheses and objectives

The research hypotheses investigated were:

- 1) Off-farm employment is a dominant contributor to total household and off-farm income in Nepal.
- 2) Households with a landholding size of less than 0.5 hectares have proportionately more off-farm income than households with a larger land holding.
- 3) Off-farm income assists rural households by allowing them to afford better access to health and education compared to households which rely exclusively on farm income.
- 4) Investment in agricultural production by small households is driven by off-farm income.

The associated objectives of the research were to:

- 1) Examine the contribution of farm and off-farm activities to household income;
- 2) Identify household activities and requirements which are critically dependant on off-farm income;
- 3) Identify factors associated with off-farm employment and income decisions; and
- 4) Draw policy implications for government and non-government sectors in generating off-farm opportunities which contribute to the overall household well-being and sustainable economic development.

1.6 Thesis Outline

The first chapter of this thesis introduces Nepal and her socio-economic condition. It also provides the context for the thesis. Chapter Two reviews literature related to the subject of the research. In Chapter Three, the conceptual framework of the study is explained. The sites for the study are described, and the procedures for data collection by PRA techniques, face-to-face interview and key informant interviews also are explained in this chapter. In addition, the methods for analysing and computing household income are outlined in Chapter Three.

The results from field work are presented in Chapter Four. First, the PRA results are presented, followed by the household survey findings. The household survey is presented as a sequence of univariate, bivariate and multivariate analyses. These are each discussed in turn.

In the final chapter, the thesis is concluded, policy recommendations are made and topics for further research is suggested.

CHAPTER TWO - LITERATURE REVIEW

2.1 Definition

The definition of off-farm income is ambiguous (World Bank, 1978) and, as Saith (1992) has pointed out, researchers pursuing this subject have often created their own definitions. Oshima (1985) defined off-farm employment/income as "all work done or income earned outside one's own farm, including work on a neighbour's farm and a plantation growing crops" (p. 3). A similar definition was used by Morrison, (1993) but he emphasised that off-farm work refers only to situations where the household is working on-farm as well as off-farm. He referred to off-farm work as "non-agricultural work undertaken off the household's own farm by one or more, but not all, the members of the farm household. The explicit and crucial assumption throughout is that the household continues to farm while off-farm work is being undertaken by one or more members" (p. 60). Likewise, other authors have used off-farm income activities synonymously with non-farm income (Haggblade *et al.*, 1989; Stokke *et al.*, 1991; Olfert, 1992). For example, Haggblade *et al.*, (1989) defined non-farm activities as "all economic activity other than crop and livestock production, encompassing services, construction, mining, commerce and manufacturing" (p. 1174).

In some cases, the definition of off-farm employment has included also cash income from agricultural activities. An international workshop on mountain off-farm employment, for example, defined off-farm income as "all employment and income derived from outside traditional agriculture" (ICIMOD, 1992, p. 32). This definition included livestock, poultry, horticulture, vegetable farming, apiculture, fisheries and all the non-agricultural products produced on-farm.

The developed countries include income from outside the farm when computing off-farm income, as for example, in the surveys conducted on off-farm income in New Zealand (Rhodes & Joureaux, 1992) and Pennsylvania and Massachusetts (Hallberg *et al.*, 1987). Both studies defined off-farm income as income earned outside one's farm.

In summary, the World Bank (1978), in defining rural non-farm employment, stated:

It is difficult to measure and analyse non-farm rural activities because of the lack of any well-established and consistent set of definitions. In large part, these activities lie on, or between, the boundaries of the usual rural-urban and agricultural-nonagricultural categories. These classifications inevitably involve a degree of arbitrariness in imposing a single dividing line on what is, in fact, a continuous spectrum (p. 13).

This is illustrated diagrammatically in Figure 1.

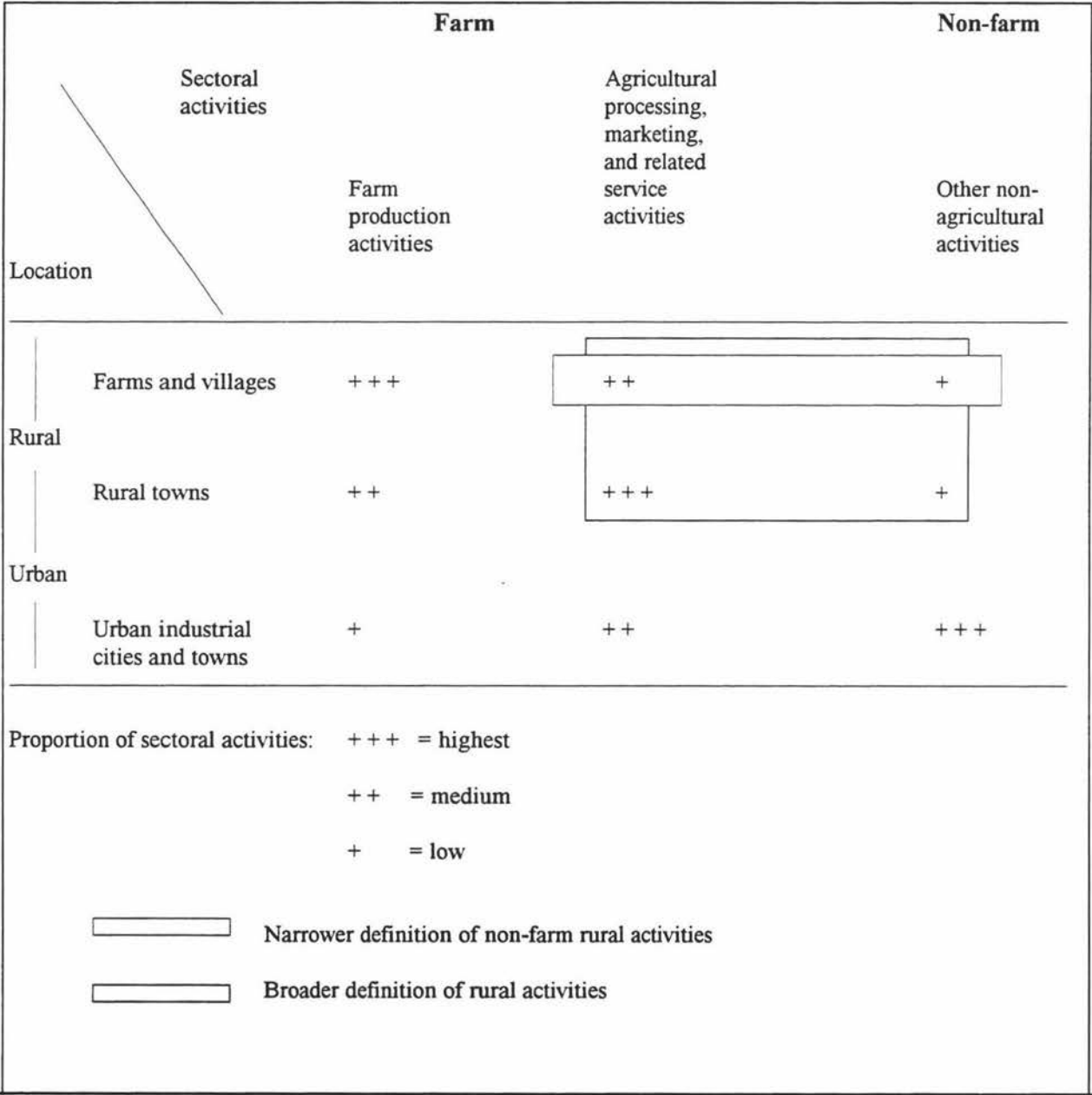


Figure 2.1: Schematic illustration of farm and non-farm activities in the rural-urban spectrum.

Source: World Bank, 1978, p. 14.

For the purpose of this research, the definition of off-farm income is:

All income of the household except income from agricultural activities i.e. income from crop, livestock, fruits and vegetables grown on either their own, or a rented, farm. Off-farm income includes household income earned from household enterprises, wages earned working for others (both in farming and other sectors) as well as income from rents, bonds, remittances and returns from long-term investments.

2.2 Theoretical framework for examining rural household off-farm income

Off-farm income of rural farmers has been a subject of interest from early times, especially in developed countries (Shand, 1987), and various models have been developed to examine the off-farm income and expenditure of rural households. The simplest and earliest approach to a household decision as to whether or not to seek farm versus off-farm income was determined theoretically by the simple calculation of the marginal rate of return from farm labour (Smit, 1978; Robinson *et al.*, 1982). These studies postulated that, if the marginal rate of return from on-farm labour was lower than market wages, farmers would move to off-farm works (Simpson & Kapitan, 1983). However, these frameworks lack the farmer's time constraint on undertaking farm and off-farm work, and leisure activity.

Off-farm employment decisions were then studied within the framework of the farmer's time constraint. In theory, farmers should allocate their time between work and leisure to maximise their utility function for these variables (Robinson *et al.*, 1982). Sumner (1982) stated that "A criterion for participation in off-farm work and for optimal time allocation given participation, may be developed from the value of time in each sector [(a) non-work activities, (b) work off the farms, and (c) work in their own farms]" (p. 498). The classical literature on this subject, according to Robinson *et al.* (1982), includes Lee (1965), Sexton (1975) and Kerachsky (1977) (for full citations please see Robinson *et al.* (1982)). Further, Gronau (1977) and, Kooreman and Kapteyn (1987) studied the allocation time for labour by household members to household work, work in the market and leisure.

Bollman (1979) captured both the above theories (marginal rate of return of labour and the time constraint between farm, off-farm and leisure) in his research. He applied a “kinked” demand curve to determine whether a farmer should work on- or off-farm. The kinked demand curve for labour (farm operator) is “composed of downward-sloping demand for labour in farm work ... and a horizontal demand for labour in off-farm work” (Bollman, 1979, p. 40). He postulated that the cost of commuting, the farm operator’s job skills, wage level, the price of consumption goods, and the price of the operator’s leisure determined off-farm employment.

Most of the literature noted above has presumed that the decision to undertake off-farm employment applies only to a single farm operator. However, major household decisions in rural households, especially in developing countries, are made collectively (Harbison, 1981; Gabriel & Cornfield, 1995). The rural household tries to maximise its overall utility function. Change toward this approach was proposed by Huffman (1980) and was further strengthened by Singh *et al.* (1986). Huffman further added human capital as a determinant in his on- and off-farm analysis, providing a new dimension to the theory of off-farm income. Huffman (1980) stated:

Household members are assumed to receive utility from a vector of members’ leisure (L), a vector of purchased goods (Y1), and vector of factors exogenous to current household consumption decisions (Y2)- members’ age and education and household size (p. 14).

In 1986, Huffman separated the time available for individual household members (husband and wife) in the model of decision-making concerning on- and off-farm income.

Robinson *et al.* (1982) argued that the off-farm work decision was governed not by the wage rate of the market but by the expected wage rate of an individual. They stated also that the expected wage rate of an individual is determined by the individual’s skill. Moreover, they added the life cycle stage of the household and institutional constraints as independent variables in the off-farm employment decision. Gunter & McNamara (1990) explicitly analysed the effect of local labour market conditions on the off-farm income earnings of farmers.

A theory related to off-farm employment as a response to underemployment in agriculture, was forwarded by Olfert (1992, 1993). He argued that the marginal productivity of labour could not be the same throughout the year because agricultural activities are seasonal. The marginal productivity of labour is highest during peak work periods. Thus in his view, it is off-farm income which determines the characteristics of farm and off-farm income, although he qualified this by stating "The type, size and structure of the farm may also be modified to accommodate the time and priority requirements of the off-farm employment" (p. 494).

Almost all of these theories were developed in relation to developed countries. However, rural households in developing countries face different constraints, which prevent them from behaving in a manner similar to farmers in developed countries. The rural market in developing countries is imperfect i.e. there is no perfect competition, there is usually no insurance or formal credit market and the cost of information acquisition is high (Hoff *et al.*, 1993). Consequently, rural households in developing countries face greater agricultural risk than do farmers in developed countries. Therefore, the off-farm income decision for rural households in developing countries, besides being related to the wage difference in the agricultural and non-agricultural markets, and the desire to optimise the use of household time (i.e. use surplus labour) is also a risk-averting strategy. However, the essence of the risk-averse nature of rural households has been captured very little in the theory on off-farm income. Reardon *et al.* (1992) and, Tschirley and Webber (1994) gathered some empirical evidence. Their results showed that off-farm participation was a strategy to compensate for the short-fall in the crop harvest of the previous year (Reardon *et al.*, 1992, Reardon, 1997) and in the absence of off-farm income opportunities, rural households depended mostly on their farm-based production (Tschirley & Webber, 1994). Stark (1982) and, Stark and Levhari (1982) postulated a theory on risk and migration in developing countries. This theory accounted for the migration of household members to seek off-farm jobs in urban centres as a strategy of avoiding risk from "... traditional agriculture, to stochastic variability in rainfall and weather conditions, plant disease, attacks by pest etc. all affecting both growth and stored crops" (Stark & Levhari, 1982, p. 195).

iii) Value added	- all income derived from cottage activity such as production of mats, baskets, brooms, handicrafts and pickle.
B) Off-farm income	
i) Cottage industries	- includes food-processing, handicrafts hand made paper production.
ii) Services	- includes small businesses, carpentry, blacksmith and other skilled jobs.
iii) Employment	- includes self and waged employment.
iv) Rentals	- includes bonds, interests, dividends.
v) Remittances	- income transfer by household members.
vi) Pension	- allowance after retirements from service.

The agro-climate, infrastructure development and village location typically govern the income opportunities of rural households. Table 2.1 gives the percentage of rural households' income from farm and non-farm sources in some developing countries. In Asian countries, rural household agricultural income is higher than non-farm income, whereas in South American countries non-farm income is much higher than agricultural income. In Northern African and Africa, non-agricultural income varied between countries. Haggblade and Hazell (1989) estimated that the proportion of non-farm income in total household income in Asian and Latin American countries varied from 30-40% and in Africa from 25-30%. However, Reardon (1997) estimated that non-farm income contributed 45% of the total household income in 25 African countries.

Off-farm income is an important element in the household survival of the rural poor (Khuda, 1986; Onchan & Chalamwong 1986, Adam, Jr. 1994). Most rural poor earn their income from wage labour: this accounts for around 60% of their total income (Adam, Jr. & He, 1995; Chada, 1986). The absolute level of non-farm income was greater for rich farmers in Punjab (India), but the percentage of non-farm income to total household income was low compared to that of the poor (Chada, 1986).

Table 2.1: Rural household income by sector for various countries.

Country	Agriculture	Non-agriculture	
		Total	Wage
Africa			
Botswana	20	80	-
Burkina Faso	80	20	3
Ghana	71	29	14
Kenya	57	43	-
Nigeria	30	70	10
South America			
Chile	36	64	48
Guatemala	33	67	55
Mexico	31	69	58
Peru	23	77	50
Northern Africa			
Egypt	39	61	46
Sudan	50	50	6
Asia			
Indonesia	73	27	-
Philippines, The	61	39	8
Nepal	80	20	-
Indonesia	73	27	-
Thailand	50	50	-
Pakistan	73	27	5
Sri Lanka	60	40	10

Source: Jazairy *et al.*, 1992.

2.3.2 Consumption pattern of rural households

Household income guides the quantity and composition of consumption expenditure. Anderson and Leiserson (1980) estimated that rural households spent 30-40% of their income on non-food items, 10-15% on food requiring processing and 15-30% of their income on clothing and other wear, furniture and the dwelling. The rest, around 25-45%, was allocated to food items. This is illustrated in Table 2.2 for villages in three countries.

Table 2.2 shows that food, alcohol and tobacco occupied a significant portion of rural household expenditure: 66% in Malaysia, 80% in Nigeria and 50% in Mozambique. In a further breakdown of expenditure on food items, Hazell and Röell (1983) found that one third of expenditure was on cereals. In Malaysia, the share of income spent on meat and fish was significant compared to Nigeria and Mozambique, while vegetables and fruits dominated rural household food expenditure in African countries.

Table 2.2: Rural household expenditure pattern (average budget share, % total) for villages in Malaysia, Nigeria and Mozambique.

Commodity group	Malaysia ^a	Nigeria ^a	Mozambique ^b
Food, alcohol, tobacco	66.7	80.7	49.6
Clothing, footwear	5.8	7.2	27.6
Consumer expendable	3.4	4.3	20.1
Housing	4.1	0.3	-
Transport	1.8	1.9	0.2
Durable	2.1	1.1	-
Education, health	2.9	1.1	0.5
Personal services, entertainment	1.5	0.9	-
Social obligation	11.5	2.4	-
Taxes	-	-	2.2

Sources: ^a Hazell & Röell, 1983, p. 28; ^b Tschirley & Webber, 1994.

Hazell and Röell (1983) indicated that income and expenditure varied with household characteristics, income group and farm size. In a similar study, Stokke *et al.* (1991) found that income and expenditure varied according to household attributes, farm size and the occupations of family members. For those households with income from farming only, farm size did not make much difference to the pattern of expenditure. There was, however, a marked difference between the households which earned only off-farm income. The landless labourers were the poorest, whereas households with employment in the services sector (teacher, government employee) had a higher income and expenditure pattern. Household expenditure varies according to income. Anderson and Leiserson (1980) pointed out that those on low incomes (landless and near landless) spend a significant amount of their budget on food items. Expenditure on non-food items increased with household income. However, there is conflicting evidence concerning household expenditure on local products by rich and poor farmers. Stokke *et al.* (1991) found that low income groups in Sri Lanka, consumed more locally-produced products such as milk, dairy, meat, clothing and other simple household goods, and Haggblade *et al.* (1989) found that in Africa, households with larger farms and/or higher-incomes spent more on locally produced products. The higher income group spent more on education and health in rural households than those with lower incomes (Stokke *et al.*, 1991). Hazell and Röell (1983) obtained similar results from their study of villages in Malaysia and Africa.

In summary, the income sources of rural households vary by geographical location. In most of Asia, agricultural income dominates rural household incomes - whereas in Africa, South America and in most of the developed countries, non-farm income dominates rural household incomes. A household's total income determines its consumption and expenditure pattern. Households with higher incomes spend more on non-food items whereas poor households spend most of their income on food items. The income, consumption and expenditure patterns of rural households affect the rural economy, which further determines the economic behaviour of rural households through, for example, the generation of employment opportunities and infrastructure development.

2.4 Sources of off-farm income

The sources of off-income for rural households vary with their geographic proximity to local markets and the characteristic of its members. They can be broadly classified as: (a) employment (income from all waged employment); (b) services (income from small business, carpentry, blacksmith and other skilled jobs); (c) cottage industries (income from food-processing, handicrafts paper making rice mills); and (d) others (income from bonds, interests, remittances, return on fixed investments).

2.4.1 Rural off-farm employment

Off-farm employment accounts for the major share of rural economic activity and is the primary source of off-farm income for rural households. Overall off-farm activities provide 20 to 45% of full-time employment in rural areas (Haggblade & Liedholm, 1992). In Asia and South America, off-farm employment accounted for 26% and 28% of the rural economic activity, respectively, whereas in rural Africa it accounted for only 14% (Haggblade & Hazell, 1989).

Table 2.3: Share of the rural labour force primarily employed in non-farm activities.^a

	Africa	Asia	Latin America
Percent of total employment			
Rural settlements ^b	14	26	28
Rural towns ^c	59	81	85
Rural settlements plus rural towns			
Total	19	36	47
Male	16	37	47
Female	19	34	79
Employment density per 1000 per population			
Rural settlements	50	83	79
Rural towns	187	238	245
Rural settlements plus rural towns			
Total	65	121	129
Male	35	90	87
Female	30	31	42

^a Includes all non-agricultural activity except mining.

^b Rural settlement in Asia and Africa are below 5000 and in Latin America, the cut-off normally lies at 2,500. ^c Rural towns do not exceed 250, 000.

Source: Haggblade & Hazell, 1989, p. 347.

Table 2.3 highlights the significance of off-farm employment in the rural economies of Asia, Africa and Latin America. The primary sources of off-farm employment in these countries are in the rural towns rather than in the rural settlements. At the time of the study (1989) proportionately more of the female population than men were engaged in off-farm activities in Latin America and Africa than in Asia. Similarly, Jazairy *et al.* (1991) and Turnham (1993) estimated the share of non-farm activities in rural employment in some of the Asian countries as shown in Table 2.4.

Table 2.4: Share of non-farm activity in rural employment in selected Asian countries. (Percentages of total employment).

Country	Year ^a	Non-farm activity (%)	Year ^b	Non-farm activity (%)
Bangladesh	1983-84	33.5	1985	35
India	1981	19.0	1988	26
Indonesia (Java)	1980	37.9	(All) 1986	34
Malaysia	1980	49.3	1986	60
Pakistan	1982-83	32.3	1987	35
Philippines, The	1983	31.9	1988	35
Sri Lanka	1981	45.8	1986	42
Thailand	1983	N/A	1986	21
Taiwan	-	-	1980	67

Sources: ^a Jazairy, 1991, p. 165; ^b Turnham, 1993, p. 142.

Off-farm employment is relatively more important for rural areas of developed countries. A comparative analysis would indicate that off-farm employment in selected OECD countries account for substantially higher share of total employment (Table 2.5).

Table 2.5: Sectoral employment shares in predominantly rural regions of developed countries.

Country	Agriculture ^a	Industry ^b	Services ^c
Australia	15	20	65
Canada	11	23	66
Finland	16	30	54
France	11	32	57
Germany	2	52	46
Japan	14	31	55
United States	6	26	68
New Zealand	11	25	65

^a Agriculture, hunting, forestry and fishing.

^b Mining, quarrying, manufacturing, electricity, gas, water and construction.

^c Trade, transport, finances, consumer and producer services.

Source: OECD, 1995, p. 16.

The level of participation of rural people in different employment sectors depends on the dominant economic activity of the rural area. Anderson and Leiserson (1980) reported that non-farm employment in developing countries accounted for 20-30%, 20-35%, 15-30%, 5-15%, 5% in manufacturing, services, commerce, construction, and transport respectively. The country specific sectoral compositions of rural employment in some of the Asian countries are shown in Table 2.6, which indicates that the greatest percentage (2-11%) of rural people are employed in the manufacturing sector, followed by services (4-10%) and trade (1-13%).

Anderson and Leiserson (1980) identified four important manufacturing activities in the rural areas: (i) food processing; (ii) textiles and wearing apparel; (iv) wood (including sawmilling, furniture making, and general carpentry); and (iv) metalworking (including blacksmithing, welding, fabrication and assembly work). In terms of construction, the authors found that half of the rural people were engaged in building farmhouses: the rest were involved in road and civil work. In commerce, retailers employed three-fourths of the workers, while the rest were involved in trade and financial services. Half of those working

in the service sector were employed in business, repairs and other similar work, and the rest in the health and education sectors.

Table 2.6: Distribution of the rural employed labour force by industry in selected Asian countries.

Industry	South Korea ^a (1980)	India ^b (1988)	Pakistan ^c (1985)	Nepal ^d (1991)	Rural Java, Indonesia ^e (1982)
Agriculture	81.63	78.30	66.69	81.20	59.70
Mining	0.72	0.60	0.16	0.03	0.70
Manufacturing	5.97	7.20	9.48	2.00	10.9
Electricity, water and gas	0.12	0.20	0.38	0.20	-
Construction	1.45	4.00	5.17	0.50	3.70
Trades, commerce	4.41	1.30	6.40	3.49	13.90
Transportation	1.16	5.10	3.42	0.69	2.30 ^f
Finance and business	0.25	-	0.24	0.28	-
Service	4.30	5.10	7.49	10.25	8.80
Not classified	-	-	0.57	1.34	-
Total	100	100	100	100	100

Sources: ^aPark, 1986; ^bVisaria, 1995; ^cHoda, 1987; ^dRana, 1995; ^eAhamad *et al.*, 1987.

^f includes utilities.

Occupationally, the rural population were mostly engaged in agriculture followed by production-related work, as illustrated in Table 2.7 for selected Asian countries during the 1980s. A very small proportion of workers had occupations related to administration, clerical, technical and services in rural areas. Gender differences also were found in the occupational composition. Only a small percentage (11%) of rural women were employed in agriculture. Most rural women were employed in the service (43%) and production (35%) sectors. However, in Thailand, Onchan & Chalamwong (1986) found that, while males and female participated equally in agricultural activities, males participated more than females in non-farm employment. The participation of males was greater than that of females due to their greater mobility to nearby towns. Fabella (1986) reported similar results for the Philippines. Overall, Fabella (1986) found that "Non-agricultural pursuits as a whole employed 41 per cent of all females as against 28 per cent of all employed males" (p. 74).

Table 2.7: Distribution of the rural employed labour force by major occupational groups in selected Asian countries.

Major occupational groups	Percentage distribution			
	Pakistan (1985) ^a	Bangladesh (1984) ^b	South Korea (1980) ^c	
		Male	Female	
Professional, technical and related workers	2.30	2.1	2.5	1.59
Administrative and managerial workers	0.27	0.20	-	0.11
Clerical and related workers	1.72	1.50	1.10	2.58
Sales worker	5.54	9.30	5.40	3.29
Service workers	3.37	2.80	43.30	2.21
Agricultural, animal husbandry and forestry workers and fisherman and hunters	65.99	71.50	10.60	81.42
Production and related workers, transport equipment operators and labours	20.64	11.60	34.70	8.80
Workers not classified	0.17	0.90	2.40	-
Total	100.00	100.00	100.00	100.00

Sources: ^aHoda, 1987; ^bAhamad *et al.*, 1987; ^cPark, 1986.

Self-employment, rather than working for a wage or salary (Fabella, 1986; Park, 1986), primarily dominates rural employment in developing countries. Fabella (1986), for example, showed that, in the rural areas of the Philippines, wage and salary workers constituted only 24% of the total rural labour force, the majority (41%) being employed in the non-farm activities of the agricultural sector. The rest were in manufacturing (16%), government (14%), transport (7.8%), domestic services (6.7%) and commerce (4.3%). Fabella (1986) found also that, of the total labour force, 68% of females and 55% of males were engaged in wage-earning jobs. The greatest gender difference was in the manufacturing sector (13% male vs. 23% female). In South Korea, Park (1986) reported that 84% of the rural workers were engaged in household employment compared to 15% in waged employment.

Off-farm employment is the major source of income for rural poor households in developing countries (Onchan & Chalamwong, 1986; Adams Jr. and He, 1995). Poor farmers earned more off-farm income from employment than from other sources, while larger farmers generated more off-farm income from investment in businesses than from off-farm employment (Saith, 1992). In a study of Pakistani villages, Adams Jr. and He (1995) found that landless and "poor" farmers earned 24-32% of their non-farm income by working on

construction sites, while the “rich” farmers earned more from government employment and self-employment. In Thailand, Onchan and Chalamwong (1986) found that landless and poor farmers earned half of their total income from wages. Similar results were obtained in the Philippines (Kikuchi, 1986), and in developed countries where off-farm employment is the principal source of off-farm income (Hallberg *et al.*, 1987; Rhodes & Journeaux, 1995).

2.4.2 Cottage and small-scale industries

Small enterprises, often called *cottage industries* in rural areas, are central to rural life in many developing countries. These small enterprises provide employment, income and cheap products to the rural poor (Davies *et al.*, 1992). In Africa, Mead and Liedholm (1998) estimated that these small enterprises absorb nearly 17 to 25% of the rural work force. In the preceding discussion on non-farm employment in rural areas, most self-employed were noted to be engaged in small enterprises. It is reasonable to presume that in rural Asia similar percentages to those in Africa would apply.

Characteristic of rural small enterprises

Rural small enterprises (RSE) have distinct characteristics which distinguish them from other industries. They are small, often run by one family member of the household, and their product is limited to within the local market. Although rural employment is generally concentrated in rural towns, significant proportions of rural enterprises are located in rural areas (Table 2.8). Mead & Liedholm (1998) found that more than half of the small enterprises in African nations were located in rural areas. These enterprises were often located within the operator’s house (Davies *et al.*, 1992).

The labour force of RSEs comprises rural people, often with a limited skill base. Most enterprises are run by a single-family member (Charsombut, 1986; Davies *et al.*, 1992; CBS, 1997; Mead & Liedholm, 1998). Females often run RSE, but this depends also on the nature of the enterprise (Haggblade & Liedholm, 1992). In Africa, females dominate both the ownership and work force of RSEs (Table 2.8). Even, in Egypt, Davies *et al.* (1992) found that, except for mat production, RSEs, were in the hands of women. Most had little

formal education. In Thailand, Charsombut (1986) found that females dominated RSEs except those requiring heavy labour, such as blacksmithing.

Table 2.8: Characteristics of micro-enterprises (MSEs) in rural areas of African countries.

Characteristics	Botswana	Kenya	Swaziland	Zimbabwe	Dominican Republic
MSE employment/population age 15-64 (%)	17	18	26	27	19
MSE employment over 1,000 persons in the population	71	83	118	127	109
Share of all MSEs that are one-person enterprise (%)	65	47	69	69	22
Locational breakdown of MSE employment (%)					
Urban areas	24	15	25	30	46
Rural towns	28	7	10	6	18
Rural areas	48	78	65	64	36
Sectoral breakdown of enterprise: Rural areas only (%)					
Manufacturing	34	27	70	75	15
Commerce	64	66	24	16	75
Share of enterprise owned by female (%)	75	46	84	66	46
Share of all workers that are females (%)	67	40	78	57	38

Source: Mead & Liedholm, 1998.

The marketing patterns of rural household enterprises are diverse (Davies *et al.*, 1992). Some produce on order, while others produce for direct sale in the local markets - which often serve the poor rural population (Charsombut, 1986). Most RSEs depend upon local raw material for their production, and therefore the nature of RSEs varies with the local economy. However, RSEs in developing countries are often dominated by manufacturing enterprises (Mead & Liedholm, 1998). The important enterprises in Africa are textiles and wearing apparel, wood and forest product, and food and beverages. Charsombut (1986) reported similar results for rural Thailand.

Most RSEs require very little capital. This is both a virtue and vice for the RSEs. The limited capital required to establish the enterprise makes it relatively easy for the rural poor

to set up an RSE. Easy access creates strong competition in markets for the products, resulting in very low profit margins for the poor (Davies *et al.*, 1992). Mead & Liedholm (1998) calculated an entrance rate of RSEs in Africa of 20-30% per annum and a closure rate which varied from 20% in the Dominican Republic to 12.9% in other countries. These rates indicate the dynamic nature of RSEs. The technology required for RSEs tends to be simple. Often this is traditional and based on simple tools (Charsombut, 1986). The trades are generally inherited from the family business (Prügl & Tinker, 1997).

The RSEs play an important role in generating off-farm income for rural households, especially for rural women - for whom they are often credited as being the only source of income.

2.5 Migration and off-farm income

An important source of off-farm income for rural households is employment either in urban areas or in other economically-active rural areas. In developing countries, rural people frequently migrate to urban areas for better economic opportunities (De Jongand and Facett, 1981; Speare & Harris, 1986; Chant & Radcliffe, 1991; O'Connor & Farsakh, 1996). The migration of rural household members is dependant on individual and household characteristics, the agro-climate and the local labour market conditions. Similarly, migration from rural areas can be seasonal, circular or permanent.

Agricultural activity in most developing countries, especially in Asia, is seasonal. Household members are mostly engaged in agriculture during the rainy season, whereas at other times of the year they are laid off from the farm. This phenomenon creates farm and off-farm employment as a central strategy for rural households (Oshima, 1986b). In such situations, farmers seek seasonal migration opportunities for off-farm employment.

With respect to circular or temporary migration, household members usually leave their farm for a year or two and then return. African migrants working in mines are a good example of this kind of migration (Elkan, 1980; Lucas, 1987). Circular migration is popular because it optimises household income (Elkan, 1980), since it allows the farm and wage

income of the migrants to be earned simultaneously, thereby increasing total household income.

The socio-economic characteristics of migrants varies according to those of the migrant household, origin, and the market (Table 2.9). Households often make permanent migration either in financial distress, or where a child has married and separated from his/her parents.

Table 2.9: Socio-economic characteristic of non-migrants, internal migrants and external migrant households in rural Pakistan and Mexico.

Items	Pakistan ^a			Mexico ^b		
	Non-migrants	Internal migrants	External migrants	Non-migrants	Internal migrants	External migrants
Family size (only adults in Mexico)	9.06	9.15	10.84	7.84	8.47	9.11
Landholdings (ha)	2.74	3.79	2.31	4.75	6.78	7.14
Sex	-	-	-	0.43	0.49	0.63
Age	-	-	-	33.04	28.48	28.70
Years of schooling	2.30	2.30	2.80	3.93	6.50	4.06
Sample size	181	487	146	273	80	70

Sources: ^aAdams Jr. 1996; ^bStark, 1991a.

2.5.1 Individual Characteristics of migrants

Age

Most literature indicates that migrants are single and young (Speare & Harris, 1986; Larson & Mundlak, 1997). It is assumed that the net present value of a younger person is greater than that of an older person, which motivates the former group to migrate (Larson & Mundlak, 1997). The migration pattern in Indonesia and Mexico supports this view. Speare & Harris (1986) found migrants were much younger than non-migrants in Indonesia. Similar results were found by Stark (1991a) in Mexico. However, Gross & Paul (1986) argued that the skill of an individual should also be considered along with age. They pointed out that higher premiums for a skilled job can compensate for fewer years of work, and that this factor, therefore, motivates older skilled workers to migrate.

Gender

Both males and females migrate from rural to urban area for economic reasons, but this differs by country and culture. Shah & Smith (1981) reported that in countries like Malaysia, Thailand and Korea, the female migration rate was similar to that of males - but in countries like Indonesia and Pakistan, female migration was much lower than that for males. Most rural migrant women, like their male counterparts, are single and young (Shah & Smith, 1981; Chant & Radcliffe, 1992).

Education

Educated rural people tend to migrate more for off-farm employment than do uneducated rural people. However, in a study of migration in two Mexican villages, Stake (1991a) found that, although the migrants' education level was higher than that of non-migrants, the education level of internal migrants was greater than that of migrants who left for the United States (US). Migrants to the US entered unskilled jobs, whereas internal migrants took up skilled jobs. In contrast, in Pakistan, Adams Jr. (1996) found that while education did not affect internal migrants, it did affect external migrants. The cause of this was in contrast to the situation reported by Adams Jr. (1996). Education, therefore, is related to the migrants' job characteristics. Education influences also the age at which an individual migrates. In their study, Speare & Harris (1986) concluded that uneducated rural youth migrated to urban areas at 15-19 years of age: otherwise they stayed at their place of origin for life.

Birth number of siblings

In developing countries, Harbison (1981) found that the birth number of siblings impacted upon the migration decision: usually the eldest son assumed responsibilities for household farming, and younger children were encouraged to migrate and seek off-farm employment.

2.5.2 Household characteristics of migrants

Household size

Migrants from both Mexican and Pakistani villages came from large families. Both Stark (1991a) and Adams Jr. (1996) found that the household size of non-migrants was smaller than that of migrant households and that those with external migrants were larger than those

with internal migrants. Likewise, Habison (1981) stated that “With respect to family size, in general, migrants from rural villages tend to come from relatively large families” (p. 232). Excess labour capacity in a large household may be a reason for this, as well as the greater income need to support the household as it becomes larger.

Landholding

It is generally assumed that migrants to urban areas in developing countries are from households which are either landless, or have a relatively small land area. However, Stark (1991a) found that migrants had a larger landholding than the non-migrants. Similar results were obtained by Adams Jr. (1996), who reported that the landholding of external migrants was less than that of others, but produced the highest household income. Similarly, Spear and Harris (1986) that noted a significant number of migrants from Javan cities came from rural households with a larger-than-average landholding. In Nairobi, House (1984) reported that 57% of the migrants were landowners, and 15% possessed a significant amount of land. These results signify that the cost of migration to urban areas is high in developing countries, and explains why rural poor often adopt a rural-rural migration pattern.

Networking

Another important factor for migration in developing countries is networking amongst rural households and urban relatives or urban village folk. Kannappan (1985) commented that, in developing countries:

Migration patterns tend to be stable and selective. Migration is generally repetitive, reinforcing grooves established by prior migration; the migrant streams consist of the same villages, communities and ethnic groups and this seems to be the case for specific occupations and trades as well (p. 714).

This highlights the importance of informal channels for urban employment in developing countries. Stark (1991b), in his analysis of migration patterns of Mexican villagers, found that migration experience and contacts needed for Mexico-US migration were three times greater than those required for internal migration.

2.5.3 Rural labour migrant participation in urban market

Rural migrants constitute a significant percentage of urban labour markets in developing countries (Larson & Mundlak, 1997). While rural migrants were found in both the formal and informal sectors in the urban labour market, most were in the informal sectors (House, 1984; Oberai & Singh, 1984; Kannappan, 1985; Blau, 1986). In developing countries, Kannappan (1985) found that rural migrants were most commonly involved in the services and construction sectors. Oberai & Singh (1984) found that rural migrants in Punjab (India) were engaged in the production and transport sectors, whereas urban migrants were mostly engaged in professional, administrative and sales occupations. In Peninsular Malaysia, Blau (1986) found that the "great majority of rural-urban migrants start out as employees in their new locations, and many of them eventually switch to self-employment" (p. 840). Oberai & Singh (1984) reported similar findings from their research, and likewise, Shah & Smiths (1981) in their study of women migrants in Asian countries, found that migrants were concentrated in the service workers' category, primarily as household cooks and maids.

2.5.4 Effect of migration on rural household

Two opposite theories have been proposed concerning the effect of migration on rural households (Oberai & Singh, 1982; Black, 1993). One hypothesis states that the rural household will be worse off because of the migration of young, educated and skilled individuals. The other hypothesis states that the rural household will be better off because of the migrants' remittances and the skills they gain.

Effect on agriculture

In testing these hypotheses, Oberai and Singh (1982) concluded "migration plays a positive role in agricultural development since it brings about improvements in productive forces such as human skills, implements and technology" (p. 341). However, Black (1993) found no such evidence in Northern Portugal. Rather, the shortage of agricultural labour forced farmers to abandon certain agricultural practices - which lowered production. Consequently, farmers had to reduce livestock numbers on their farms. Moreover, the rural wage rate increased because of the labour shortage, and this affected the marginal and middle class farmers most seriously. Elkan (1980) and Lucas (1987) reported similar findings for Africa.

However, Lucas argued that agricultural production was reduced for a short time only. In the long run, rural families invested the remittances to increase agricultural production, and accumulated cattle.

The rural population density, therefore, appears to have different impacts on rural migration. In countries such as India, where the population density is high, rural migration makes a positive impact on agriculture - but in countries like Portugal, where the population density is low, rural migration can negatively affect agriculture.

Remittances

The importance of remittances has been fully documented by Stark & Lucas (1988). Their significance to rural development is related to the volume of rural-urban migration, the amount of the remittances sent to rural areas, the equity issues they create, the utilisation of the remittances and the role they play in human resource development in rural areas.

Different authors have postulated different theories of remittances. Why do migrants remit? How much do they remit? How do they remit? How is the remittances utilised in rural areas? Such questions have been central to remittances studies. Ahlburg (1991) suggested that remittances is pure altruism between the migrant and recipient. However, Stark and Lucas (1988) argued from their results for Botswana that it is repayment for childcare and education costs, and can be compensated by the tendency for remitters to inherit the ancestral property. Further, they suggest that remittances are a contractual arrangement which insures both the migrant and rural household against adverse situations.

Determinants of remittances

Russell (1986) suggested ten determinants of remittances: (i) income of the migrant (ii) economic activity in the place of origin; (iii) economic activity in the migrant region; (iv) relative interest rate; (v) facilities to transfer the funds; (vi) years since out-migration; (vii) household income in the area of origin; (viii) marital status; (ix) education level; and (x) occupational level of migrants. Stark & Lucas (1988) calculated that migrants send 10-30% of their income to rural households. The absolute amount of remittances increased with the increase in migrant income, but the proportion of remittances to income earned decreased over time (Adams Jr., 1991). Oberai & Singh (1980) found similar results in India. Further,

they found that other social characteristics of the migrants influenced the propensity to send remittances to the place of origin. Households with a higher income, or those involved in agricultural activity in the place of origin, received the lowest remittances from migrant members. Household heads or married out-migrants sent higher remittances than did their siblings. Artisan and lower-caste individuals also sent higher remittances than did those from higher castes. Remittances increased as the migrants' stay increased, however Ahlburg (1991) found that this was true only for the first generation.

Use of remittances in the place of origin

The impact of remittances can be measured if the rural household uses it for further productive investment. However, a number of studies of remittances to rural areas in developing countries show that it is used mostly for consumption rather than productive investment (Oberai & Singh, 1980; Russel, 1986; Ahlburg, 1991; Black, 1993). Table 2.10 illustrates the use of remittances by rural households in three countries.

A significant part of the remittances went on basic needs: food, clothing and housing. Only a small amount was used for further investment, especially in India and Egypt. However, Adams Jr. (1991) is sceptical of the classification of investment in housing as "consumption". He argues that "...from the standpoint of the individual, housing expenses should be classified as an investment, since new improved housing offers possible future economic returns to the individual" (p. 59).

Thus, at the micro-level it is hard to determine whether remittances are a production or consumption investment. However, at the macro-level many authors credit remittances with having a significant effect on the rural economy. The effect of house construction and changes in consumption patterns associated with increased rural migrant household income can positively affect the rural economy (Brown, 1991). Oberai & Singh (1980) and Brown (1991) showed that remittances contributed significantly to reducing the disparity in income between poor and rich rural households. However, Adams Jr. (1991) noted a contrasting scenario in Egypt, where international remittances increased income inequality between rural households. He found similar results in Pakistan - but stated that only the external remittances increased inequality, whereas internal remittances reduced income inequality between rural households.

Table 2.10: Major items on which the remittances were spent by rural households in India, Turkey and Egypt.

Items of expenditure	*India (Punjab) ^a	Turkey ^b	Egypt ^c
Productive investment	6.1	-	-
Children education	1.0	5.0	-
Debt repayment	3.8	-	-
Ceremonies (including marriage)	9.6	-	10.8
Foods and clothing	75.9	-	-
Housing and household goods	25.1	49.0	67.0
Purchase agricultural land	-	9.0	11.2
Purchase car or taxi	-	5.0	4.7
Farm machinery	-	2.0	-
Small factories and shop	-	23.0	3.0
Family business	-	6.0	-

Sources: ^aOberai & Singh, 1980; ^bRussell, 1993; ^cAdams Jr., 1991.

* Authors note: The figures are the percentage distribution of households which receive remittances. They are not additive since some households spent remittances on more than one item.

To summarise, migration is an important strategy for rural household survival. It contributes significantly to household income, and is an important source of off-farm income. However, rural migration depends on household, individual, local and international market characteristics. Younger, and educated, household members are more likely to migrate than older, less educated, family members. Similarly, “well-off” households with well-developed networks have a greater chance of securing an urban formal job. If not, most end up in the informal sector from which they hope to progress to self-employed work.

Remittances are an important part of household earnings. They influence both rural households and the local economy. Married household heads with a low income in the household of origin remit more than for other groups. However, rural households tend to use more of the remittances for consumption than productive investment. The impact of remittances on income equality in rural areas is very much context-specific and is tied to its source (external vs. internal). Internal remittances equalise rural households, but international income may have a negative effect in this regard. Overall, remittances increase household well-being and boost the rural economy.

2.6 Determinants of off-farm income

Four broad characteristics determine the off-farm income of a rural household: (a) household, (b) farm, (c) individual and (d) the local market. Each set of characteristics is discussed separately below.

2.6.1 Household characteristics

In most rural settings, households are an important decision-making unit for economic activities (Kada, 1980). It is in this context that household characteristics play an important role in the decision to allocate labour to on- and off-farm activity. Household resources which govern this allocation are: size, composition and stage of life cycle.

Household size plays a decisive role in the allocation of labour to on- and off-farm activities. It determines the income needed for household survival, which further dictates the division of household labour and working days for its members between on- and off-farm activities. Rief & Cochrane (1990) reported that off-farm employment in Thailand increased with family size. However, family size indicates only the need for family income; the actual distribution of labour is determined by the household's composition.

A large number of adults in a household means more labour is available to be allocated to both farm and off-farm activities. Chalamwong (1986) found a significant and negative relationship of the farm operator with other adult household members for workdays in off-farm employment, indicating that other adult members substituted the farm operator for off-farm income. However, Chalamwong (1986) in Thailand and Sumner (1982) in the USA, noted no effect of off-farm employment on the husband when the number of children in the household increased.

The stage of household life cycle is an important determinant of off-farm employment for both the husband and wife. Younger children are associated with greater household expenditure, and mean more household work for the couple. Leinbach & Smith (1994), in their study for South Sumatra (Indonesia), found that the household head worked more off-

farm than the spouse. However, in the near-landless class, both the husband and spouse were involved in off-farm work, but within a shorter distance of the household. Other characteristics of the household that influence the balance of farm and off-farm income are household debt, and income from fixed investments. Income from other sources, such as rent and fixed assets, was negatively associated with off-farm employment in the studies of Sumner (1982) and, Gunter and McNamara (1990). However, households with high debt had members involved in more days of off-farm employment (Simpson & Kapitan, 1983).

2.6.2 Farm characteristics

Farm characteristics determine the extent and nature of work for household labour and the income necessary to sustain the household. According to Gunter and McNamara (1990):

Farm characteristics directly affect the allocation of operator time to off-farm work in two major ways. Farm income influences the marginal utilities of time spent in off-farm work and leisure, affecting the allocation of the operator's time between these two activities. ... Farm characteristics also influence off-farm work through their effect on the relative marginal utilities of time spent in farm and off-farm work (p. 159).

Hence, both the income and physical characteristics of the farm affect the decision to participate in off-farm work. The most important farm characteristics influencing this decision are land area, income and cropping intensity.

The land area of the rural household in both developed and developing countries is inversely related to household off-farm income. For example, Olfert (1992) in Canada and Robinson *et al.* (1982) in Australia found that all farm households had off-farm employment, but that the proportion of off-farm to total household income decreased with increased farm size. In developing countries, especially in Asia, the relationship between farm size and off-farm income is strongly negative. Islam (1986) argued, "The percentage contribution of non-farm employment varies inversely with the size of operational holdings. On the whole, this relationship appears to be fairly strong for the villages of Bangladesh, India and Pakistan" (p. 159). Table 2.11 shows the relationship between household land size and income from farm and non-farm sectors in different countries.

Table 2.11: Sources of household income (%) of total ranked by different land holding areas in Korea, Pakistan and India.

Country	Year	Farm size	Agricultural income	Non-farm income
Korea ^a	1981	< 0.5 ha	36.0	64.0
		0.5-1.0 ha	63.4	36.6
		1.0-1.5 ha	73.9	26.1
		1.5-2.0 ha	79.1	20.9
		> 2.0 ha	82.1	17.8
Pakistan ^b	1986-89	0 ha	12.7	87.3
		< 0.4 ha	13.7	86.3
		0.4 - < 2 ha	30.7	69.3
		2- < 4 ha	50.4	49.6
		<= 4 ha	60.6	39.4
India ^c (Tamil Nadu)	?	0 ha	8.65	91.35
		0-0.4 ha	38.18	61.82
		0.4-0.8 ha	50.05	49.95
		0.8-2.4 ha	66.84	33.16
		2.4-4 ha	77.88	22.12
		> 4 ha	73.01	26.99

Sources: ^a Park, 1986; ^b Adams Jr., 1994; ^c Saleth, 1997.

Table 2.11 shows that farmers with smaller land holdings relied more on off-farm income than farmers with larger holdings. In contrast, Verma & Verma (1995) found that rural household land size in India was positively associated with off-farm income. They found that, in a traditional state like Bihar, farmers with larger landholdings had greater access to non-farm income. They reasoned:

The more remunerative self-employed enterprise in the rural areas or in nearby towns tend to need relatively large amounts of capital. With easy access to capital owned or borrowed and generally higher level of formal education and skill formation, the larger farmers in traditional agrarian society of these states probably enjoy much better access to remunerative self-employed ventures and regular jobs (p. 423).

In Nepal, Amatya (1982) noted that, in relative terms, off-farm income for small landholding farmers was a larger proportion of total household income than for farmers with larger landholdings. However, the absolute amount of off-farm income was greater for households with larger, rather than smaller landholdings. The small landholding farmers were generally involved in low paying jobs such as portering and agricultural labour, whereas farmers with larger farms were engaged in teaching, trade and businesses.

Farm size influences the farm income as well as decisions concerning the allocation of labour between different sexes in the household. Khuda (1986), in Bangladesh, found that the male and female contribution to off-farm work varied with landholding areas. As land size increased, the household male worked less in off-farm activities, and the female members' off-farm work increased. Similar results were reported for the US and Japan by Kada (1980), but off-farm employment of the wife was the same for all farm sizes. Reardon *et al.* (1992) found that "Both land and non-land assets have an empirically and theoretically ambiguous effect on the household's desire and capacity to diversify" (p. 269). They argued that, with a sufficient land holding, the household becomes less risk-averse and hence should be able to invest more on uncertain returns from new off-farm activities. On the other hand, they argued that, with fewer farm resources such as land and livestock, the poorer household becomes more risk-averse and hence seeks to diversify their income, such as through non-farm activities. Saleth's (1997) results for Tamil Nadu (India) agree with this perspective (see Table 2.11). In his study, non-farm income decreased only to a certain land size, and then increased with land size. Similar results were obtained by Eapen (1994) in Kerala, India and who found that 61% of landless rural households were employed in the non-farm sector, compared with 11% for landholders of one to four hectares, and 14% for those with larger properties. These results indicate that off-farm income decreases to a certain threshold farm size before increasing again.

The level of farm income directly affects the household decision to seek off-farm income. Robinson *et al.* (1982), based on their study of Australian farmers, suggested that the "supply of farm operator's labour to off-farm work is decreased if returns from farming increase" (p. 34). Further, they concluded that more wealthy farmers, with a larger investment on-farm, were unlikely to seek off-farm employment. Gunter and McNamara (1990) found the same applied to Georgian (US) farmers. They reported a strong relationship between farm income and off-farm work ($r = 0.87$ for zero net farm income to $r = 0.42$ when the absolute value of net farm income was \$40,000).

Cropping intensity is the third factor which influences the level of off-farm activity because it determines the off-peak season labour utilisation for the household. Cropping intensity is directly related to the water available to the farm. Rief & Cochrane (1990) in Thailand, for

example, found that multiple cropping, made possible by irrigation, reduced off-farm activity by household members.

2.6.3 Individual characteristics

Although the household is an important decision-making unit in rural areas, the ultimate decision for farm or off-farm work depends also on the characteristics of individual members of the household. These characteristics include age, gender, education and skill.

Age

The age of an individual is one of the most important determinants of off-farm employment. Younger farmers work more time off-farm than do older farmers, however, the relationship between age and off-farm work is an inverted U shaped (Robinson *et al.*, 1982; Sumner, 1982; Gunter & McNamara, 1990; Huffman, 1991; Morrison, 1993), although the peak age for off-farm work varies by location. Robinson *et al.* (1990), in their study of Australian farmers, found 29 years to be the peak age for off-farm work. Sumner (1982), in his study of American farmers, found 43 years to be the peak age. Gunter and McNamara (1990), in their Georgian study, obtained similar results. In Malaysia, Morrison (1993) found 20 to 30 years to be the peak age range for rural farmers to seek off-farm work. However, Morrison (1993) questioned whether it was the farmer's age or the life cycle of the farmer's household which determined the decision to seek off-farm employment. Khuda (1986) found the inverted U shape relationship between age and off-farm work to be related only to males. The participation of female members of the household in off-farm work increased with age.

Education

The education level of an individual is another important determinant of off-farm work. Eapen (1994) commented that education "... is attributed primarily to the rising levels of literacy which raises income/job/status aspirations of the younger job-seekers and also the increases in wage rates of certain types of non-agricultural work" (p. 1293). Educated young farm family members are more likely to seek off-farm job than are non-educated farm members (Huffman, 1980; Simpson & Kapitany, 1983; Gunter & McNamara, 1990; Rief & Cochrane, 1990; Vijverberg, 1995). In Kerela (India), Eapen (1994) found that the majority

of educated workers, especially those with qualifications higher than the secondary level, were involved in non-farm work. The primary reason for this was the opportunity for higher wage rates in non-farm jobs than in farm work for educated individuals. Rief and Cochrane (1990) in Thailand found that “a year in school added about 10% to the daily wage” (p. 692). Similarly, Huffman (1991), in the US noted that an additional year of schooling increased the off-farm wage by 4.0 to 5.5%.

However, Trzcinski and Randolph (1991) argued that skill rather than formal education - determined increases in off-farm wages, at least for poor farmers. They contended that occupational skill assists the rural individual to move from traditional work to more technical and higher paying enterprises. Sumner (1982) reported that men with more training and experience in non-farm jobs were more likely to work off-farm. However, market opportunities for such trained persons, and products, must be available. Amartya (1982) pointed out that in Nepal, although the government sector had trained rural people in off-farm skills such as weaving traditional cloth, trained people were out of business due to intense competition from imported textiles.

The individual's education level plays an important role in determining the kind of off-farm activity s/he enters. Based on his research in Nepal, Amartya (1982) identified that individuals with a medium level of education tended to choose domestic production (cottage industry) as their off-farm activity. Individuals with higher education entered into higher-paying work such as teaching, government services, business and trades, and those without an (or low) education entered into jobs as porters, labourers and carpentry. Adams Jr. (1994) in Pakistan, claimed that, in certain forms of off-farm work such as the government and private sector, education was a barrier for the rural poor.

Education also plays an important role in off-farm employment for both male and female household members. Eapen (1994) in Kerela (India), found that educated women worked more off-farm than on-farm. However, the education level of the wife hindered the husband's off-farm work. Huffman (1991) stated that “... an additional year of schooling of the farmer's wife tend to reduce the probability of him working off-farm” (p. 104). Similar results were obtained by Sumner (1982) in his study of Illinois farmers.

Gender

Gender differences significantly influence the type of off-farm job taken, the location of the job and the age at which work commences. Rief and Cochrane (1990) found that women were more likely to take up an off-farm job as a primary occupation than were males. However, they found that Thai rural households were more likely to send a male child than a female child. One of the reasons for this was the wage difference between male and female labour. Further, female off-farm workers worked closer to home. In Bangladesh, Khuda (1986) found that first the household head, then the son and the youngest daughter of workable age worked off-farm.

Huffman (1991) summarised the “human factor” which determines the decision to seek off-farm employment as follows:

An additional year of age (or work experience) has a positive but diminishing effect on wage. The percentage increment first increases with as increment to age (experience); at some age the maximum effect of age (experience) is reached; and for additional increments to age (experience), wage is reduced. The inverted U shaped is typical $\log_e$ (wage)-age relationship. Thus, the evidence is that human capital variables-farmers' schooling and work experience - are important determinants of the wage that farmers receive when they work off-farm (p. 104).

Factors such as marital status, ethnicity, caste and the primary occupation of the individual also affect an individual's decision to work off-farm. In rural Nepal and India, certain off-farm activities, such as blacksmithing, tailoring and shoe-making, are performed by a specific caste (World Bank, 1991).

2.6.4 Local market characteristics

Local market characteristics determine the wages paid for labour and the opportunities for off-farm income and employment. Rural households near the local market where off-farm wage rates and opportunities for off-farm activity are high, are positively affected in terms of off-farm income. A greater distance from the farm to the nearest town reduces the opportunity for off-farm income (Sumner, 1982, Chalamwong, 1986, Rief & Cochrane,

1990, Olfert, 1992; ICIMOD, 1992). Local towns, with an industrial infrastructure which offers employment in the slack agricultural season, have a strong positive affect on off-farm employment (Gunter & McNamara, 1990), whereas areas with a large labour force in the agricultural sector tend to offer fewer opportunities for earning off-farm income (Robinson *et al.*, 1982). Similarly, off-farm employment opportunities decline as the unemployment rate increases (Gunter & McNamara, 1990).

The geographical setting of the farm determines the type of off-farm employment and activities available. Rao (1995), found that, in the Indian plains, manufacturing, transport, storage and communication dominated off-farm activities, while in the hills, trade, commerce and construction work were more common.

Local market determines not only the demand for labour availability but also the availability of other essentials, especially food, required by local people. The workshop ICIMOD (1992) on "Off-farm employment and Mountain Development" has concluded that "Availability and affordability of food grain was an important pre-condition for growth of off-farm employment" (p. 37). Therefore, for rural households in most developing countries, food security is the most essential requirement.

2.6.5 Seasonality

Agricultural and non-agricultural activities are highly seasonal in Southeast and South Asian countries, and in Africa (Oshima, 1986a; Shand, 1986; Islam, 1986; Tshibaka, 1992). Agriculture based on monsoon paddy production demands high labour inputs for activities such as planting, transplanting and harvesting, and this influences household decisions concerning the allocation of labour. In Asia, therefore, off-farm activity is highly seasonal and counter-cyclical to farm work (Anderson & Leiserson, 1980). Khuda (1986), in Bangladesh, noted that off-farm activity was greater in the agricultural slack season. Charsombut (1986) reported similar results for Thailand. However, Fabella (1986), in the Philippines, found that the percentage of rural labour employed in non-farm activities was similar throughout the year.

In the Zairian basin, Tshibaka (1992) noted that “ the allocation of labour time has different seasonal patterns for men and women” (p. 28). The relationship between men and women for farm and non-farm activities was inverse in nature. Further, Fabella (1986) reported that certain off-farm activities were cyclical, while others were counter-cyclical, to farming in the Philippines - and that they were different for males and females. Table 2.12 shows that the seasonal variation of non-farm activities for males and females depends on the type of off-farm activity in which they are engaged. Increased farm activity will increase men’s non-farm activity, except in the government and domestic service sectors. However, the off-farm activity of women decreases in most sectors if farm activity increases.

Table 2.12: Cyclical and counter-cyclical character of selected rural non-farm activities.

Activities	Male	Female
Manufacturing	Cyclical	Counter-cyclical
Construction	Cyclical	Not clear
Commerce	Cyclical	Counter-cyclical
Transport	Cyclical	Neutral
Government	Counter-cyclical	Counter-cyclical
Domestic service	Counter-cyclical	Counter-cyclical

Source: Fabella, 1986, p. 90.

In summary, a rural household’s decision to seek off-farm income is determined by factors such as household attributes, farm and individual characteristics, and market location. Households with a small landholding, and with larger families, are most likely to seek off-farm income. Similarly young, educated individuals with off-farm work experience are more likely to take up off-farm work. Local market characteristics determine the extent and nature of opportunities for off-farm activities.

2.7 The roles of off-farm income

Off-farm income has received a lot of attention with respect to the socio-economic development of rural areas in both developing, and developed, countries in recent years (Rao, 1995). Saith (1992) identified that off-farm income is important for rural households in developing countries because of unbalanced employment growth; limited employment absorption capacity in the agricultural sector; unsuccessful land reform programmes; new

strategies of developed economies and international agencies for structural adjustment; and the failure of rural development programmes. The author concluded that:

... at the present juncture, there would to be a favourable coincidence of interests of international agencies, national government and NGOs' [Non-government organizations], of MNEs [multinational enterprises], national industrialists and rural propertied classes in promoting employment and income generation through programmes of rural industrialization and non-farm activities (p. 9).

According to Saith (1992), better off-farm income opportunities in developing countries would assist in checking the out-migration from rural areas; control food prices and wages for labour; check the outflow of rural skills to towns; utilise "slack" resources in rural areas; create regional and sectional equality and decentralisation; and develop agriculture due to the multiplier effect. Further, Rao (1996) pointed out that " the non-farm sector plays a positive role in the removal of poverty, generation of employment and decentralization of urbanization" (p. 86).

Research conducted in different countries on off-farm income has shown a significant relationship between off-farm income and farm families. Müller (1996) in his research on Thai farmers' income distribution concluded, " ... off-farm income can be considered as the income source having in relative terms the highest significance for the total income level of both, farmers and non-farmers" (p. 144). In China, Side & Guojie (1992), showed off-farm income to be the principal source of household income. They found that 75% of the total households' income and 92% of the cash income was from off-farm sources. Similar conclusions were drawn by Reardon *et al.* (1994) and Reardon (1997) in Africa. Research in Nepal (World Bank, 1991; Khatri-Chettri *et al.*, 1992; Khatri-Chettri and Yadav, 1992) also has indicated a strong link between off-farm income and household sustainability.

In the rural economy, off-farm income is a primary source of investment capital (Reardon *et al.*, 1994). In Africa, rural households in favourable agro-climatic zones invested more in farm capital than did those in risk-prone zones (*ibid.*). Reardon *et al.* (1994) identified that the failure of the capital market, the labour market and the supply of reliable staple food encouraged households to invest more capital on farm. Further, intra-household resource

allocation plays an important role in the investment of off-farm income. Reardon *et al.* (1994) noticed that:

If women have important non-farm income but are not allocated much land, they are more likely to concentrate on capitalizing non-farm activities rather than channelling capital to crop production activities. If women invest in cropping, they may invest in land-augmenting inputs (e.g., fertilizer) rather than labour-augmenting technologies, because they usually control only small fields (p. 1175).

Off-farm income is important not only for rural households in developing countries but also for rural households in developed countries (Huffman, 1977; Simpson & Kapitany, 1983; Gasson, 1986; Olfert, 1992). Olfert (1992) commented that "Empirical studies reveal that non-farm employment and its importance is increasing in most developed countries, including Canada and USA" (p. 446). Rhodes & Journeaux (1995), in New Zealand, showed that of the farm families earning off-farm income, 47% considered off-farm income to be important or essential for household activities, while 37% found it important or essential for their farm business. Likewise, farmers in Pennsylvania and Massachusetts indicated that off-income played an important role in sustaining their farm operation (Hallberg *et al.*, 1987). In a comparative analysis of off-farm income and farm household income in countries such as Japan, South Korea and Taiwan, Oshima (1988) established a strong positive relationship between off-farm income and agricultural development.

Off-farm activities diversify household income in both developing and developed countries and this has an important role in reducing the risks associated with farming (Stark, 1982; Olfert, 1993; Reardon, 1997). Reardon (1997) identified their importance to rural households as follows:

... to reduce income risk by diversifying *ex ante*; to maintain food security (income and consumption) in face of low farm productivity and income shocks as droughts, by diversifying *ex post*, in the face of insurance market failure; and to earn cash income to finance farm investment, in the face of credit market failure (p. 735).

Most studies on off-farm income, especially in developing countries, indicate that this has reduced inequality in rural areas. In a review on the role of off-farm income, ICIMOD

(1996) stated, "Off-farm work tends to bring more benefit to those groups with limited or no assets of their own and when effective is an important mechanism for distributing incomes" (p. 2). Results from research conducted by Khuda (1986) in Bangladesh and Adam Jr. (1994) confirm this statement. Adam Jr. (1994) reported, "non-farm income and livestock represent inequality decreasing source of income whereas agricultural transfer and rental represent inequality increasing sources of income" (p. 121). Hearth (1986) and Stokke (1991) obtained similar results in Sri Lanka.

However, in some rural areas, off-farm income has been identified as increasing rural inequality. Shand (1987) reported that in the dynamic rural sector of Malaysia, increases in off-farm income did not decrease income inequality. Similarly, Reardon *et al.* (1992) in rural Burkina Faso (Africa) found that non-farm income raised inequality. They stated that "... in the rural Burkina context household income and share of non-farm income are strongly positively correlated, as opposed to related in a 'J' or 'U' shaped function, as found in areas with more plentiful labour-intensive off-farm opportunities for poor households" (p. 282). In rural Mozambique, Tschirely and Webber (1994) obtained similar results. Off-farm income in both developing and developed countries has been credited with diversifying household income and hence the sustainability of rural households (Doss, 1996; Olfert, 1992).

2.8 Conclusion

Rural households have diverse sources of income and different expenditure patterns. In most of the Asian countries, agricultural income dominates household income, whereas in South America and most of the developed countries, off-farm income forms a greater percentage of household income. The household's income determines its expenditure and consumption pattern. Households with higher incomes tend to spend more of their income on non-farm goods and services, whereas poor households spend much of their income on food items.

Most rural households are dependant on various off-farm jobs for cash income. However, in most countries, the principal source of off-farm income is off-farm employment. Rural

poor households depend most on the manufacturing and service sectors for off-farm employment.

Several elements of household characteristics, such as the farm, individual attributes and the village location influence the decision of rural households to seek off-farm income. Households with small farms and large families tend to have more members involved in off-farm employment than those on large farms with small families. Young, educated members of the household with off-farm skills tend to seek off-farm work more than do other members of the household. Local market characteristics influence the opportunity for off-farm activities.

Off-farm income has contributed positively to farm households in both developed and developing countries. It is a survival strategy, and a means for increasing farm household purchasing power. This can improve agriculture, as well as contribute to the well-being of farm households. Thus, off-farm income is credited with reducing income inequality, alleviating poverty and creating employment in rural areas in many countries.

CHAPTER THREE - METHODOLOGY

3.1 Conceptual framework

A conceptual framework for household off-farm income, based on the review of literature and the researcher's personal experience and knowledge, is presented in Figure 3.1. Physical attributes such as the agro-ecological location of households, proximity to input, output and employment centres, and the available "bundle of technology" in conjunction with demographic characteristics of the households, are assumed to be the background variables for off-farm income. The framework illustrates that a household generates off-farm income from various sources -- wages, remittances, enterprise/business and the return on household investment. Functional relationships also exist between off-farm income and farm income as well as the household's resource endowment (land, labour and capital).

In this study, it was assumed that the level of off-farm income is determined by relevant background variables and income derived from farming. It was hypothesised that four broad groups of factors would influence off-farm income in rural Nepal as indicated by equation (1):

$$Y_i = f(X_{i1}, X_{i2}, X_{i3}, X_{i4}) \quad \text{-----} \quad (1)$$

Where,

Y_i = level of off-farm income from all sources for the i^{th} household;

X_{i1} = a vector of household and demographic characteristics;

X_{i2} = a vector of resource endowment possessed by i^{th} household;

X_{i3} = a vector of income derived from the production of farm commodities by the i^{th} household; and

X_{i4} = a vector of spatial attributes relevant to the i^{th} household.

Off-farm employment tends to have a strong influence on off-farm income. Thus, conceptually it is expected that off-farm employment can also be explained by a similar set of relationships demonstrated in equation (1), as presented in equation (2):

$$P_{\text{off}i} = g (X_{i1}, X_{i2}, X_{i3}, X_{i4}) \quad \text{-----} \quad (2)$$

Where,

$P_{\text{off}i}$ = probability that a member of the i^{th} household is employed off-farm.

A conceptual framework of determinants of off-farm employment at the household level is presented in Figure 3.2.

Similarly, the off-farm employment of j^{th} member in the i^{th} household is expected to be determined by equation (3):

$$P_{\text{off}ij} = h (K_{ij1}, K_{ij2}, K_{ij3}, K_{ij4}) \quad \text{-----} \quad (3)$$

$P_{\text{off}ij}$ = probability that the j^{th} member in i^{th} household is employed off-farm;

K_{ij1} = a vector of household physical characteristics of j^{th} member in the i^{th} household;

K_{ij2} = a vector of individual characteristics of j^{th} member in i^{th} household;

K_{ij3} = a vector of resource endowment of i^{th} household belonging to j^{th} member; and

K_{ij4} = a vector of spatial attributes of i^{th} household belonging to j^{th} member.

A conceptual framework of off-farm employment at individual level is presented in Figure 3.3.

3.2 Empirical models

Empirical models were developed for two major aspects of the study: (a) off-farm employment and (b) off-farm income. Before all modelling exercises, collinearity diagnostics were performed and only analytically appropriate variables were included in the estimation procedure. Consequently, some conceptual variables were not included in the estimation procedure.

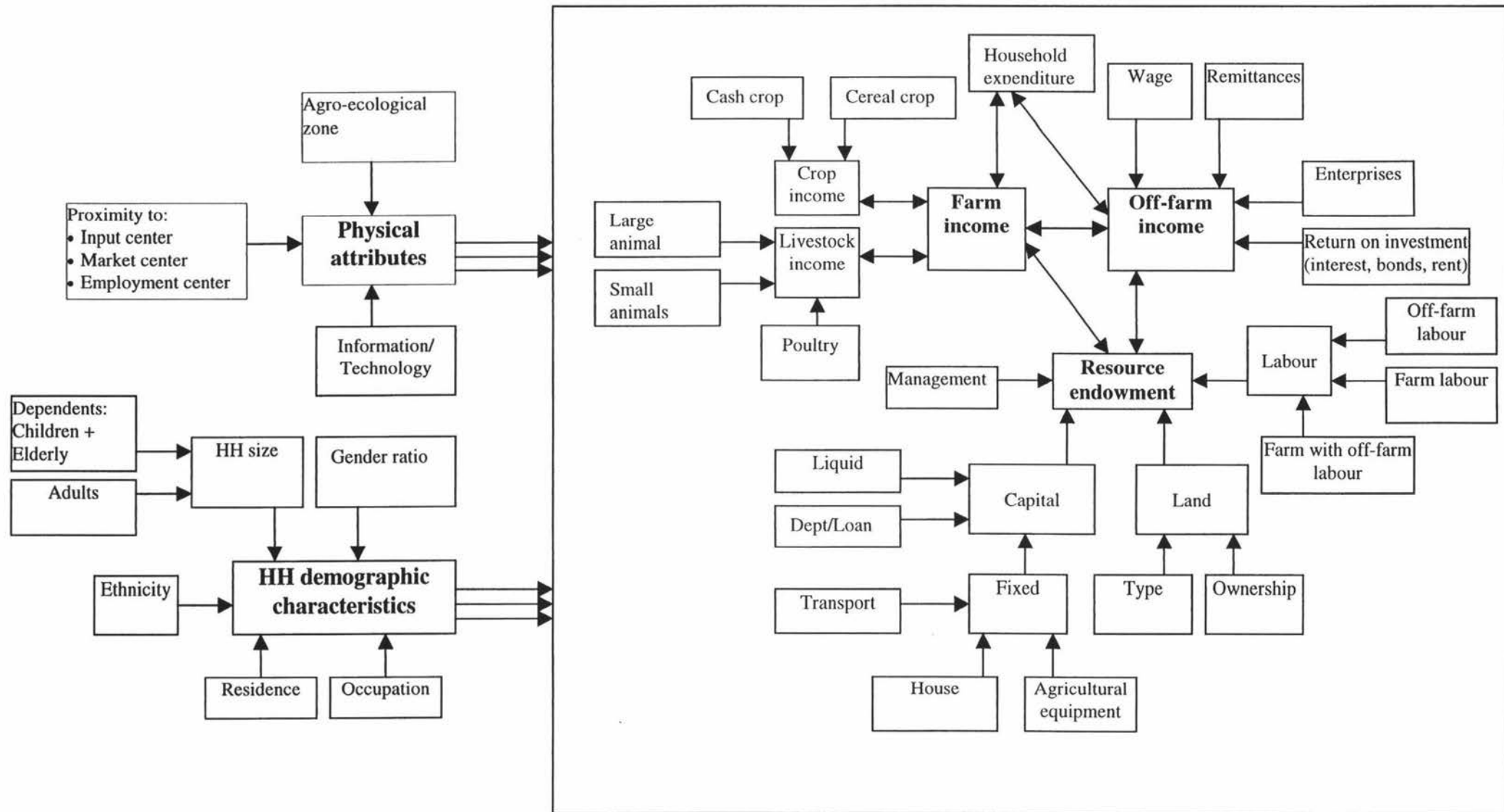


Figure3.1: A conceptual framework of off-farm income determinants at the household level.

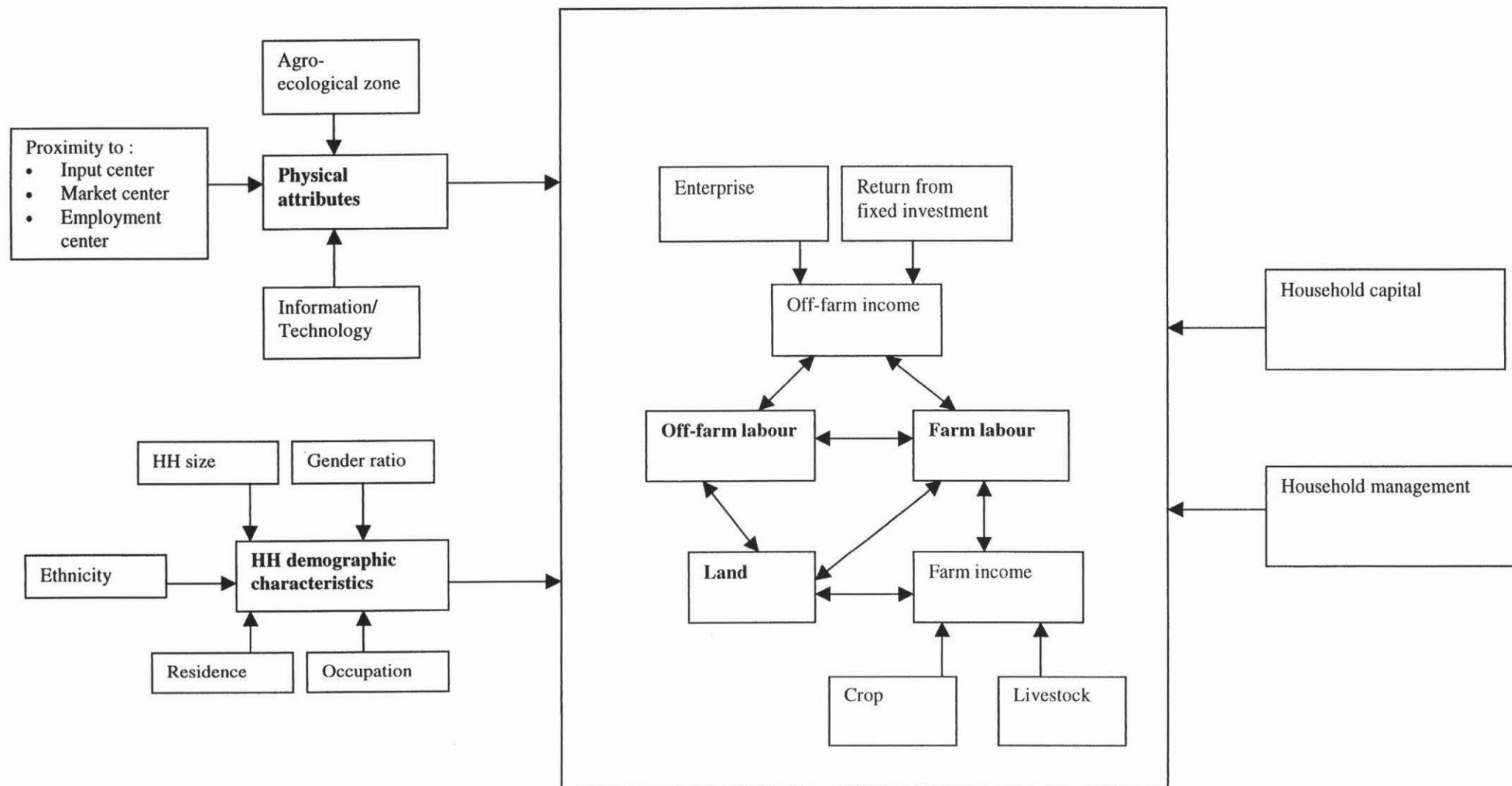


Figure 3.2: A conceptual framework of off-farm employment determinants at the household level.

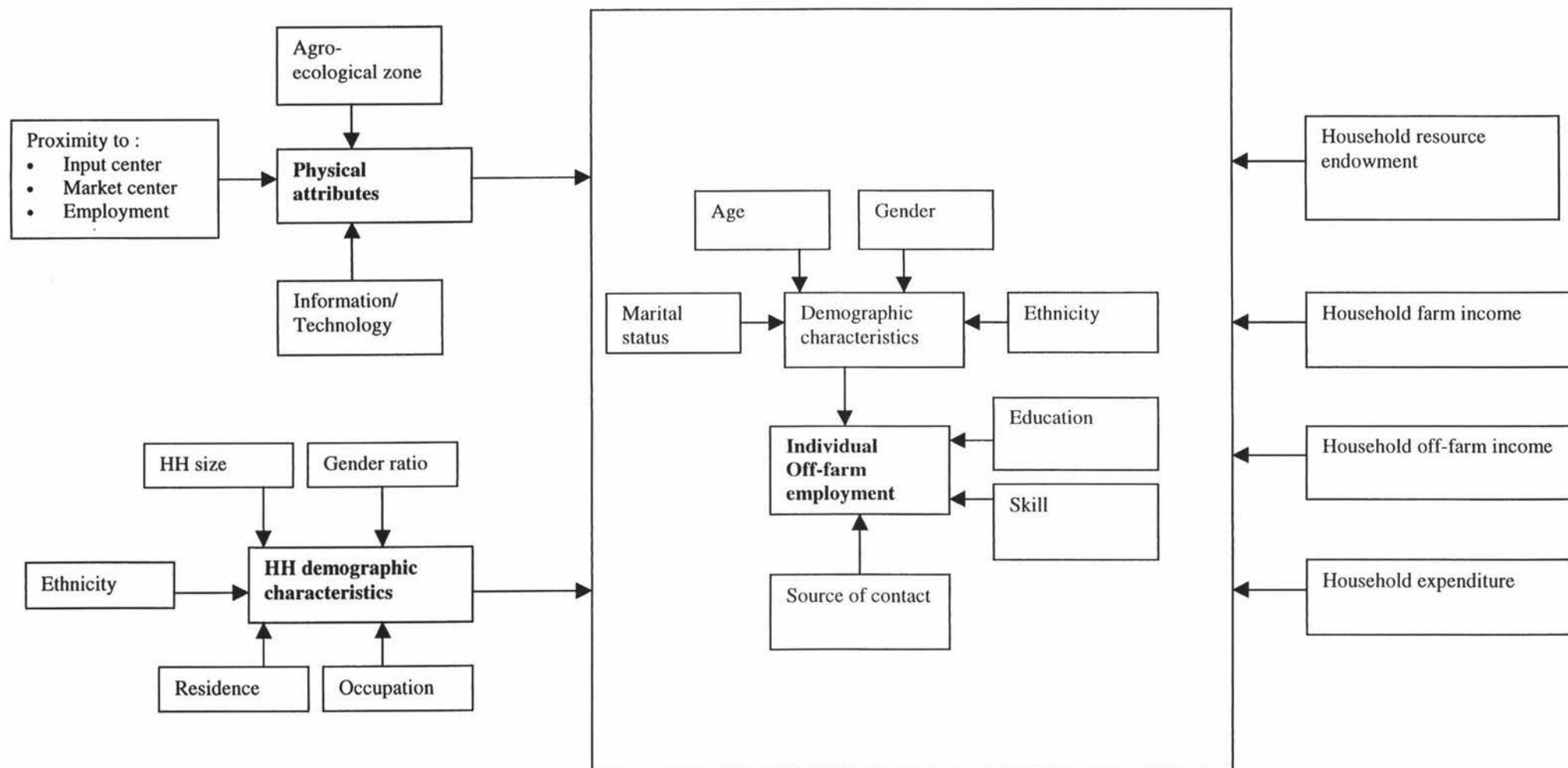


Figure 3.3: A conceptual framework of off-farm employment determinants at the individual level.

Off-farm employment

The models to estimate off-farm employment included two levels of analysis: household and individual. At the household level (Figure 3.2), the main focus of the study was to identify the attributes associated with households engaged in farm, off-farm and both farm and off-farm activities.

The models specified for the estimation were:

$$P_i = \beta_0 + \beta_1 AGE_i + \beta_2 ETHNIC_i + \beta_3 HHSIZE_i + \beta_4 DEPRAT_i + \beta_5 IRRPCT_i + \beta_6 AGROECO_i + \beta_7 LOAN_i + \beta_8 LVSTINC_i + \beta_9 SOCEXP_i + \mu_i$$

where,

P_i = probability associated with i^{th} household that it would have only agricultural labour ($P_i = 1$ in model 1, 0 otherwise: Table 3.1), only off-farm labour ($P_i = 1$ in model 2, 0 otherwise: Table 3.1), both agricultural and off-farm labour ($P_i = 1$ in model 3, 0 if household had only agricultural labour: Table 3.1) and both agricultural and off-farm labour ($P_i = 1$ in model 4, 0 if household had only off-farm labour: Table 3.1).

AGE_i = respondent age of i^{th} household, $ETHNIC_i$ = ethnicity of i^{th} household, $HHSIZE$ = household size of i^{th} household, $DEPRAT_i$ = dependant ratio of i^{th} household, $IRRPCT_i$ = percentage of irrigated land of i^{th} household, $AGROECO_i$ = agro-ecological position of i^{th} household, $LOAN_i$ = amount owned to financial institution of i^{th} household + $LVSTINC_i$ = livestock income of i^{th} household, $SOCEXP_i$ = social expenditure of i^{th} household and μ_i = error term associated with i^{th} household.

The values of P for each of the models were estimated from the survey data collected from 148 households, using logit regression.

In Table 3.1, Model 1 differentiates households with only agricultural labour from all other households and Model 2 differentiates households with only off-farm labour from all other households. Similarly, Model 3 identifies factors that differentiate households with both agricultural and off-farm labour from those with only agricultural labour and Model 4 identifies factors differentiating households with both agricultural and off-farm labour from those with only off-farm labour.

The expected sign of the variables included in the four models are shown in Table 3.1.

Respondents to the face-to-face interview were mostly the household heads, therefore respondent age was taken as a proxy for the household's life cycle. Households with younger household heads tend to have more dependants to support. On the other hand, they need more income to support their dependants, but cannot leave their homestead for long because of the needs and responsibility associated with the care of children and the elderly. Therefore, households with young household heads are more likely to have both farm- and off-farm labour in the household than those with only farm, or only off-farm labour.

Ethnicity has a major influence in resource endowment in rural Nepal. The Chhetri/Brahmin /Newar tend to have more resources, such as the area of cultivable and irrigated land. Hence, these ethnic groups were expected to be farming rather than only "off-farm" households.

The number of members per household determines the labour force available. Households with more members tend to have a surplus of agricultural labour, and these members are often engaged in off-farm activities. Therefore, larger households are likely to have more members working off-farm than on farm. In contrast, households with a higher dependency ratio may be farming households, or have both farm and off-farm labour rather than off-farm labour only.

Irrigated land facilitates multiple cropping - thus increasing farm income for the household. Further, it also involves more household members in farming activities, thereby reducing the opportunity for off-farm activities. Therefore, households with a higher percentage of irrigated land are more likely to be "farm households" than off-farm households.

The agro-ecological location of households plays a major role in determining their access to off-farm employment. A household situated in the Hill tends to have fewer opportunity for off-farm activities than does one situated in Terai. Access to income and employment opportunities is better in the Terai than in the Hills. Hence, households situated in the Terai will be more likely to be in the "off-farm" category than those in the Hill. Livestock income is assumed be a proxy for the number of household animals, which determines the time spent by household members on livestock care, processing raw products (like milk) into

value added products (like ghee) and the marketing of milk and live animals. Therefore, households with more livestock income are less likely to have a high level of off-farm work. Similarly, households which spend more on social events are more likely to have a higher income than those who spend a small amount, or none, and may be in either the farm, or off-farm, category. Households owing more to financial institutions may belong to any one of the categories.

Table 3.1: Expected signs of the variables in the models of household level off-farm employment at the household level.

Explanatory variables	Model 1 Households with agricultural labour only vs. other households	Model 2 Households with off-farm labour only vs. other households	Model 3 Households with both agricultural and off-farm labour vs. agricultural households	Model 4 Households with both agricultural and off-farm labour vs. off-farm households
Respondent age (years)	+	-	-	+
Ethnicity (Brahmin/Chhetri/Newar)	-	+	-	+
Members per household	-	+	+	-
Dependant ratio ¹	+	-	-	+
Percentage irrigated land	+	-	-	+
Agro-ecological position of the household (Terai = 1, Hill = 0)	-	+	+	-
Amount owed to financial institutions ('00 Rs)	?	?	?	?
Income from livestock ('00 Rs)	+	-	-	+
Amount spent on social events ('00 Rs)	?	?	?	?

¹ Dependant ratio is defined as a proportion of total number of households who are under 15 and over 64 years of age.

In the individual level analysis of off-farm employment, the focus was to identify the factors in the study area which differentiated three major types of off-farm employment (waged labour, skilled labour and "trade"). The analysis therefore included only two categories of labour at a time. For example, in the first model, all the traders and their relevant data were

deleted from the data set, to only included skilled and wage labour, and their relevant records. This process gave a more distinct comparison between the two (skilled and waged) categories of labour. Similarly, the second model included only skilled labour and trades, and the third model included only traders and waged labour.

The models specified for the estimation were:

$$P_{ij} = \beta_0 + \beta_1 AGE_{ij} + \beta_2 AGESQ_{ij} + \beta_3 EDU_{ij} + \beta_4 ETHNIC_{ij} + \beta_5 SPOCC_{ij} + \beta_6 HHSIZE_{ij} + \beta_7 DEPTAT_{ij} + \beta_8 HOROOF_{ij} + \beta_9 AGROECO_{ij} + \beta_{10} SICEXP_{ij} + \mu_{ij}$$

where,

P_{ij} = probability associated with of j^{th} off-farm employee of i^{th} household that it would skilled labour ($P_i = 1$ in model 1, 0 if off-farm employee was waged labour), skilled labour ($P_i = 1$ in model 2, 0 if off-farm employee was trader), trader ($P_i = 1$ in model 3, 0 if off-farm employee was waged labour), AGE_i = age of the of j^{th} off-farm employee of i^{th} household, $AGESQ_{ij}$ = age squared of j^{th} off-farm employee of i^{th} household, EDU_{ij} = education of the of j^{th} off-farm employee of i^{th} household, $ETHNIC_i$ = ethnicity of the of j^{th} off-farm employee of i^{th} household, $HHSIZE$ = household size of the of j^{th} off-farm employee of i^{th} household, $DEPTAT_{ij}$ = dependant ratio of j^{th} off-farm employee of i^{th} household, $HOROOF_{ij}$ = household roof of the of j^{th} off-farm employee of i^{th} household, $AGROECO_{ij}$ = agro-ecological position of i^{th} household of j^{th} off-farm employee, $SICEXP_{ij}$ = social expenditure of i^{th} household of j^{th} off-farm employee and μ_i = error term associated with of j^{th} off-farm employee of i^{th} household.

The expected signs of the variables included in the models are given in Table 3.2. Age and age squared express the maturity and experience of an individual. Older individuals may work in more skilled jobs than their younger counterparts. Young individuals may start work as a waged labourer rather than an older person. Similarly, with more experience, maturity and cash savings, older individuals may enter a trade than other types of work. With more opportunity for education and vocational training in Nepal, males rather than female are likely to undertake skilled jobs. On the other hand, as a trade is more likely to be a household enterprise in rural Nepal, females are more likely to be involved in trading. Education and the nature of the job are directly related: more educated individuals are likely to secure skilled jobs, whereas less educated individuals are likely to be in either waged labour or a trade. Ethnically, the “superior” group (Chhetri/Brahmin/Newar) is more likely

to be engaged in skilled jobs or trades rather than in the waged labour group. The occupation of the spouse is related to the time she has available for other work. This may be in a trade, rather than time-bound work such as skilled and waged labour.

Table 3.2: Expected signs of the variables in the models at the individual level for off-farm employment.

Variable	Skilled labour vs. wage labourer	Skilled labourer vs. trader	Trader vs. wage labourer
Age (years)	+	-	+
Age squared (years)	+	-	+
Gender (male = 1, female = 0)	+	-	-
Years of schooling	+	+	?
Ethnicity (Brahmin/Chhetri/Newar = 1, others = 0)	+	+	-
Spouse's occupation (agriculture = 1, others = 0)	-	-	+
Number of members in the households	-	?	-
Dependant ratio ¹	-	?	-
House roofing material (galvanised, tile = 1, others = 0)	+	?	+
Agro-ecological location of the households (Terai = 1, Hill = 0)	+	+	+
Amount spent on social events (Rs)	+	?	+

¹ Dependant ratio is defined as a proportion of total number of households who are under 15 and over 64 years of age.

In Nepal, poor households tend to be larger and have a higher dependant ratio than more wealthy households; therefore, individuals from households with more members and a higher dependant ratio may have a low paying job such as waged labour rather than other work. Household roof type indicates the level of household wealth, therefore individuals from households with roof of a higher quality material, such as tiles or galvanised iron, are likely to have a skilled job rather than be traders or waged labourers. The agro-ecological location of the household determines the opportunity for individuals to take up either trading or skilled labour. Individuals in the Hills have less opportunity to enter either trade or skilled labour, whereas those in the Terai have more opportunities for both of these job types. Households with higher expenditure on social events are expected to have higher income, and therefore to have individuals involved in either a trade or skilled labour.

Off-farm income

The next focus was to identify the factors associated with a household's off-farm income and its percentage contribution to total household income. Ordinary least square regression models were estimated for this purpose.

Total amount of off-farm income

The range of off-farm income within the households was high (Rs 500 to Rs 120000). Therefore the sample was divided into two sub-samples of: (a) households with less than 50% total income from off-farm sources and (b) households with more than 50% off-farm income. This permitted better estimates and limited the influence of the variability in the data set. The model specified for estimation took the form:

$$Y_i = \beta_0 + \beta_1 \text{ AGE}_i + \beta_2 \text{ ETHNIC}_i + \beta_3 \text{ HH SIZE}_i + \beta_4 \text{ DEPRAT}_i + \beta_5 \text{ IRRPCT}_i + \beta_6 \text{ OFAGLAB}_i + \beta_7 \text{ LANDLESS}_i + \beta_8 \text{ LVSTINC}_i + \beta_9 \text{ HOROOF}_i + \mu_i$$

where, Y_i = Off-farm income of i^{th} household with more than 50% off-farm income (model 1: Table 3.3), off-farm income of i^{th} households with less than 50% off-farm income (model 2: Table 3.3), AGE_i = respondent age of i^{th} household, ETHNIC_i = ethnicity of i^{th} household, HH SIZE = household size of i^{th} household, DEPRAT_i = dependant ratio of i^{th} household, IRRPCT_i = percentage of irrigated land of i^{th} household, OFAGLAB_i = household members in both farm and off-farm activities i^{th} household, LANDLESS_i = i^{th} household without cultivable land, LVSTINC_i = livestock income of i^{th} household, HOROOF_i = i^{th} household roof and μ_i = error term associated with i^{th} household.

The expected signs of the variables in the model are shown in Table 3.3. The rationale for assigning a particular sign to a variable are similar to those described previously for the household and individual-level models.

Table 3.3: Expected signs of the variables in the model of off-farm income and percentage of off-farm income in total household income.

Explanatory variables	Model 1 Households' with more than 50% off-farm income	Model 1 Households' with less than 50% off- farm income	Model 3 Percentage of off-farm income
Respondent age (years)	+	+	+
Gender (Male = 1, female = 0)	NA*	NA	+
Ethnicity (Brahmin/Chhetri/ Newar)	+	+	-
Members per household	-	-	+
Dependant ratio ¹	-	-	-
Percentage irrigated land	-	-	-
Household own land	NA	-	-
Household members working off- farm	NA	+	+
Household member working both on farm and off-farm	+	NA	NA
Income from business/enterprise	NA	+	NA
Income from livestock	-	-	-
Agro-ecological position of the household (Terai = 1, Hill = 0)	NA	NA	+
Landless households (Landless = 1; others = 0)	+	NA	NA
House roofing material (galvanised, tile = 1, others = 0)	+	NA	NA
Amount owed to financial institutions	NA	-	-
Amount spent on social events	NA	-	+

*NA is not applicable.

Percentage of off-farm income in the total household income

In addition to determining factors associated with the level of off-farm income, an additional focus in this research was to identify factors which explained the percentage share of household income earned off-farm. Accordingly, a final model was estimated using OLS procedures in the form of:

$$Y_i^{pct} = \beta_0 + \beta_1 AGE_i + \beta_2 RESGEN_i + \beta_3 ETHNIC_i + \beta_4 HHSIZE_i + \beta_5 DEPRAT_i + \beta_6 IRRPCT_i + \beta_6 HOLAND_i + \beta_7 OFAGLAB_i + \beta_8 AGROECO_i + \beta_7 LOAN_i + \beta_8 LVSTINC_i + \beta_9 SICEXP_i + \mu_i$$

where, Y_i^{pct} = percentage of off-farm income of i^{th} household with only agricultural labour (model 3: Table 3.3), AGE_i = respondent age of i^{th} household, $RESGEN_i$ = respondent gender of i^{th} household, $ETHNIC_i$ = ethnicity of i^{th} household, $HHSIZE$ = household size of i^{th} household, $DEPRAT_i$ = dependant ratio of i^{th} household, $IRRPCT_i$ = percentage of

irrigated land of i^{th} household, HOLAND_i = household own land of i^{th} household, OFAGLAB_i = members working in both agricultural and off-farm activities of i^{th} household, AGROECO_i = agro-ecological position of i^{th} household, LOAN_i = amount owned to financial institution of i^{th} household + LVSTINC_i = livestock income of i^{th} household, SICEXP_i = social expenditure of i^{th} household and μ_i = error term associated with i^{th} household.

The expected signs of the variables appear in Table 3.3. The justifications for these signs are consistent with earlier discussion and thus are not repeated here.

3.2.1 Research design

The study was based on primary data collected through participatory rural appraisal (PRA) workshops and a household survey. Data collection was carried out in three steps. First a PRA exercise was conducted in six communities to identify the village resources, households with off-farm income, and agricultural and off-farm activities in the village. Key informant interviews were conducted with nine individuals representing the spectra of society. The study was undertaken in two districts -- Morang (Terai) and Dhankuta (hills). The districts were purposively selected to represent the diversity of activities, ethnicity and spatial attributes of eastern rural Nepal.

The PRA workshops were conducted in the field with rural residents and provided an operational framework for the household survey. Key informant interviews were conducted to understand the policy issues relevant to off-farm activities. The questionnaire was designed to obtain data on household characteristics, sources and amounts of off-farm income, and factors influencing decisions to take up off-farm work. The fieldwork for the survey was conducted from April to June of 1998.

3.2.2 Rationale of survey method for the research

Considering the nature of the data required for the research, a face-to-face survey was deemed appropriate for following reasons:

1. The survey method is considered to be most effective when the research is exploratory, descriptive and explanatory (Neuman, 1997; Babbie, 1998). This research was

exploratory, as it sought to explore the role of off-farm income in sustaining households in rural Nepal; descriptive, as it sought to describe household and individual characteristics associated with off-farm activities; and explanatory, as it sought to explain the nature of off-farm activity undertaken by different households and individuals.

2. The survey method provided a quick way to collect data from a large population which is difficult to observe directly (Babbie, 1998). The time and resource limitations for data collection, and the location of the research meant the survey method was appropriate.
3. The method is appropriate for collecting data on the characteristics, behaviour and attitudes of individuals (Creswell, 1994; Neuman, 1997; Babbie, 1998). The research required information at both the household- and individual-level. Face-to-face interviews with household members provided these data.

3.2.3 Selection of study area

One VDC in each of the two districts was selected for the study based on three criteria: (a) being in close proximity to an industrial or urban centre; (b) having at least one dominant ethnic community in the VDC; and (c) having a reasonable range of occupational diversity. From the 52 VDCs in the Morang, Haraicha was selected and from the 32 VDCs in the Dhankuta district, the Hathikharka VDC was identified as meeting these criteria.

A VDC in Nepal comprises nine wards. They are usually separated, based on population, by physical boundaries such as a river, rivulet and roads. Considering the sample size and time constraints, three wards from each VDC were selected. The selection criteria for the wards of the VDC were as follows: (a) ethnic diversity; (b) different agro-ecological belts; and (c) population size.

3.2.4 Survey location

The districts

Both the Dhankuta and Morang districts are in eastern Nepal (Figure 3.4). The Dhankuta district lies between 26.53° N-27.19° N (latitude) and 87.33° E-87.80° E (longitude) and the Morang district lies between 26.20° N-22.53° N (latitude) and 87.16° E-87.41° E

(longitude). The Dhankuta district ranges from 639-2239 m asl with a few hilly ranges in the North and the Morang district is a plain (70 - 100 m asl.).

The Dhankuta municipality is the district's headquarters as well as the regional headquarters for eastern Nepal. It is, therefore, served by many public offices. It is one of the largest commercial towns in the eastern Hills. A highway running from Jogbani (a border town of Nepal and India) links Dhankuta through Biratnagar, Dharan and Dhankuta to Basantapur.

The Biratnagar municipality is one of the largest industrial towns, and is the second largest city in Nepal. It is the district's headquarters and has a number of public offices. Fair weather roads link many different parts of the country to the district as well as to India.

Hathikharka VDC

The Hathikharka VDC lies in the north-west of Dhankuta town, and runs through the foothills to the top of the Mahabharat hills. The VDC has an area of 1,095 hectares, of which 69, 24 and 7% are occupied by agricultural land, forest land and grass land, respectively (Shrestha, 1994). The eastern border of the VDC touches the Dhankuta highway and is 19 km from Dhankuta town. The VDC has 891 households and 4883 people (District Agricultural Development Office [DADO], Dhankuta, 1997). The population is divided into various ethnic groups, but is dominated by the Magar, Limbus, Chhetries, Tamangs and Brahmins. Like most of the villages in Nepal, most households depend on farming, although a number have, or have had, members in the British and Indian armies.

There is no electricity, telephone or health post in the VDC, but it is served by community-owned drinking water pipelines, and five pre-primary and one primary school. The main market centres for the VDC are Heele and Jorpati on the Dharan-Basantapur Highway. The Heele market (hat bazaar), which sits every Thursday, has a major influence on the VDC's socio-economic activities. Even the village schools close on Thursday and open on Saturday.



Figure 3.4: Map of Nepal showing the study areas.

Wards

Ward 4 lies in the foothills and is about 4 hours' walk from the Dhankuta highway (Heele). The ward is on the south face of the Hill and crosses two rivulets, Mahamaya and Okra Khola. The physical layout of the ward is shown in the PRA resource map (Figure 4.1). Due to the well-developed irrigation system, the households harvest two crops annually. Goats and buffaloes are plentiful in the area. There are 83 households in the ward, most of which are involved in farming. About half are partly engaged in off-farm activities. The ward is dominated by Limbu, Brahmin and Chhetries.

Ward 2 lies in the middle part of the Hill, and is adjacent to Wards 4 and 3 of the VDC. It is crossed by the Okra Khola and Bajeni Khola (rivulets) and has an efficient irrigation system. The physical map developed by the PRA exercise is shown in Figure 4.2. The main crops are rice, wheat and millet. There are 97 households in the ward and most have at least one member engaged in an off-farm activity, although agriculture tends to be the dominant off-farm employment provider. The ward is dominated by Limbus, and Brahmins, but there are a few households of Tamangs.

Ward 7 is the largest ward of the Hathikharka VDC with 131 households. It lies on the eastern part of the VDC and touches the eastern border by the Dhankuta highway. However, a community forest demarcates the village from the road. The ward lies on the top of the Hill at about 1500-1900 m asl, and has no rivulets. The physical outline of the ward is shown in Figure 4.3. The main crops are potato and millet, but the ward is famous for its vegetables such as cabbage, radish and potatoes, which are sold as far afield as India. The villagers are also actively engaged in dairying, and there is one milk collection centre in the ward. Nearly half of the households are engaged in an off-farm activity. Magars are the dominant ethnic group in the ward.

Haraicha VDC

The Haraicha VDC is an historical place of Nepal and lies in the centre of the Morang district. It has an area of 4989 hectares of which 31% is occupied by cultivable land (District Development Committee [DDC] (Morang), 1996), and 966 households, and 5067 people (*ibid.*). The population is divided into various ethnic groups and is dominated by the local tribes -- Tharu and Khawas. There are also other ethnic groups, such as Brahmin,

Chhetri and a few households of Newar. A small number of households in the VDC are recent migrants from the Hills.

The VDC has a relatively well-developed infrastructure: it is served by one health post, four primary schools and one intermediate school. There is also a post office, a police station, and a telephone office. The village centre is supplied with electricity, and almost all households have a tubewell for drinking water. A Village Development Bank provides loans to women's groups for small enterprises. Most households are farm families and depend upon agriculture for their livelihood. However, small and landless farmers depend upon waged labour, and selling firewood collected from the nearby forest. A few small enterprises, such as rice mills, are located in the VDC. Retailers of different kinds, ranging from a shoe shop to a sweet shop, dominate the village centre. Every Thursday an open market takes place where local farmers sell their products.

Wards

Ward 7 lies on the north side of the VDC. Households are situated on both sides of the road, which links Biratnagar to the main national highway. It is one of the largest wards of the VDC, with 163 households. The local ethnic tribe -- the Khawas - are dominant, and there is also a 'Sukumbasi tole (landless community)' in the ward. Two irrigation ditches run across the ward, the physical layout of which is shown in Figure 4.4. Most households are involved in farming, the main crops being rice and wheat. Most households have at least one member engaged in an off-farm activity. Wage labour and firewood retailers dominate the off-farm activity of the ward.

Ward 5 is one of the smallest wards of the VDC with 71 households. It lies in the northwest of the VDC and a road runs from Ward 7 of the same VDC to it. The physical layout of the ward is shown in Figure 4.4. The VDC has a rich network of irrigation canals, which supply water throughout the year. Though the main crops of the ward are rice and maize, farmers also cultivate different kinds of vegetables such as cabbage, potato and cucumber. Most households are engaged in farming, while some are partly engaged in off-farm activities. Brahmin and Chhetri dominate the ward: there are few local tribes.

Ward 1 is the central market place of the Haraicha VDC. It is situated southwest of the VDC and the road running to Biratnagar from the national highway passes through it. There are 98 households in the ward, which has a heterogeneous population consisting different castes such as Khawas, Brahmin, Chhetries and Newars. It has a market place, a private school, police station, health post and two rice mills. Retail shops are located along the roadsides. The physical map of the ward, developed by the PRA exercise, is presented in Figure 4.5. Almost all of the households are engaged in some kind of off-farm activity.

3.3 Participatory Rural Appraisal (PRA) exercise

The PRA exercises comprised several techniques to enable the local people to participate in explaining and analysing their village resources, and social and economic conditions. They also helped to formulate actions/plans to improve themselves. The Institute of Development Studies (IDS: 1996) defined PRA as "... a family of approaches, methods and behaviours that enable people to express and analyse the realities of their lives and conditions, to plan themselves what action to take, and to monitor and evaluate the results" (p.1).

The exercise was undertaken to gather community levels data, i.e. those related to a village's resources and its socio-economic condition. Data such as a village physical map, and total household numbers in the village were scarce at the survey sites. Similarly, information related to developmental structures was not available. A second purpose of the exercise was to assess the socio-economic condition of the community through the local residents themselves. However, before using the PRA tools, each community was briefed that the exercise was primarily for research purposes, rather than for project development. In each ward, the following PRA exercises were conducted: (a) resource mapping, (b) wealth ranking, (c) matrix ranking, (d) time line and record of development structures, and (e) a crop calendar. The formats used for these exercises are shown in Appendix I.

3.3.1 Resource mapping

A resource map is a diagrammatic layout of the community and its resources. The purpose of the map was to provide a reference point for community-level data collection. As a starting point, the local people were requested to draw a simple map of their ward on the

ground. This map consisted of the ward's physical boundaries, and key landmarks such as the school, police station, temples and shops. It included also the physical resources such as rivers, irrigation ditches, canals, roads and trails. On the same map, house clusters in the ward also were located. The map was later copied to paper. Sticks, stones, pebbles, plant parts, wood and straw were used by the locals to "draw" the map. Five to ten local people participated in developing the resource map. On average, the exercise took one hour.

Resource mapping was useful in that it (a) provided a clear picture of the ward in terms of what was there and what was not; (b) related the community's access to natural resources such as rivers, irrigation ditches and forests; (c) facilitated the collection of the names of households heads as it was easy to move from one cluster of households to another; and (d) served as a link and guide for the household surveys. While marking the household clusters, in two incidences, some local people tried to hide the households of lower caste people on the resource map in order to show the superiority of the ward. Encouraging all the participants, especially the women and poor, to open up helped to avoid such pitfalls.

In this exercise, a list of off-farm opportunities within the ward was also drawn up, which served as a forum to communicate the purposes of the research. It took an additional 20-30 minutes to complete, and involved 5-10 community members of the ward.

The household listing at the ward level proved to be quite accurate and was used as a sampling frame to randomly select households for the face-to-face interviews, as well as carrying out the wealth ranking exercise.



Figure 3.5: Resource mapping in the Hill VDC.



Figure 3.6: Resource mapping in the Terai VDC.

3.3.2 Wealth ranking

Wealth ranking is a process of sorting the households of the village according to a set of criteria of wealth, as perceived by the villagers. The purpose of this exercise was to evaluate the economic status of individual households, as well as of the village as a whole. After completion of a “household heads” list, the name of each household was copied onto a 7cm x 12cm card. Two cards were then randomly chosen from the pack. The participants were then asked to identify the wealthier of the two household heads. Criteria used to distinguish the two households were then identified. These criteria were used to rank other households in the village. In the same manner, another card (with the household head name) was drawn from the pack and ranked with others.

After completing the ranking process, the households were grouped according to their food availability for a year, along with their present level of production or income. The question was put as follows: “With the present level of wealth or food production of the households, which households can afford to eat two meals a day through the year?” The households were grouped according to the same question for 9 months, 6 months and fewer than 6 months. The households who had no difficulty in providing two meals a day for the whole year with their present level of wealth were ranked as the non-poor group, those who could provide two meals for 9 months were grouped in the poor, and those who could afford to have two meals a day for six months or less were grouped as poorest. This exercise took 1.5 to 2 hours to complete and involved 5-10 local key informants. It provided a vivid picture of the ward by ranking households based on food availability (a shadow indicator of property). It further served as a basis for matrix ranking. Although it was a time-consuming exercise and, on odd occasions, caused conflict in the ranking of some households, especially when someone perceived himself or herself as poor or wealthy, it provided valuable insights into the socio-economic characteristics of the ward. When disagreements occurred, the “mass” decision was considered final.



Figure 3.7: Wealth ranking exercise in the Hill VDC.



Figure 3.8: Wealth ranking exercise in the Terai VDC.

3.3.3 Matrix ranking

Matrix ranking is a process of establishing the relative importance of an issue. In this research the issues were (a) income, (b) expenditure pattern and (c) constraints to income generation of the wealthiest, middle and poorest households in the ward. The process was initiated by randomly selecting three persons from each group (wealthiest, middle and poorest), identified through the wealth ranking exercise. Each individual was then given an equal number of pebbles or maize grains (according to their availability), and asked to put the pebbles or the grain within respective boxes on a matrix sheet. For example, on the income matrix, a member from the wealthiest group for his/her household income would put the pebbles or grains on the title from which the household earned income. The pebbles or the grain were placed according to the ratio of the household's income: higher income sources had more pebbles than lower income sources. Nine people (three from each of the wealthiest, middle and poorest households) participated in the exercise. The process took 1.5 to 2 hours.

The matrix gave a spontaneous and easily readable result on the three issues investigated. For example, the pattern of household income for the wealthiest, middle and the poorest categories were readily observable when the process was completed. The researcher faced two major problems. First, the poor members were unable to read the words on the sheets and second, the participants hesitated to disclose income and expenditure in public. Explaining each written word to all participants mitigated the former problem and convinced the group that the matrix required only the proportional distribution of income and expenditure rather than actual amount earned. This helped to allay the concern about disclosing actual income.



Figure 3.9: Matrix exercises in the Hill VDC.



Figure 3.10: Matrix exercises in the Hill VDC.

3.3.4 Time line and record of the development structures

A time line is a record of past events. It gave a record of major occurrences in the village. In this exercise, development achievements, and natural disasters and their effects in the survey area were noted for the past 10 years. Further, development structures such as roads, schools, hospitals, post office, banks, and shops were also recorded. If the structures were not in the ward, then their nearest location to the ward was recorded.

3.3.5 Seasonal crop calendar

A seasonal crop calendar is a time profile for the different crops grown in the area. It gives a general picture of the time frame of different crops from planting to harvesting and therefore the pattern of local agricultural activities. Three to five local people participated in the exercise, which took about an hour to complete.

3.3.6 Advantages and limitation of the PRA tools in study

The importance of PRA was recognised not only in the methods used but also in the opportunity which it provided for the survey team to interact with different people in the ward. The survey team was able to become familiar with the ward people and their physical environment. It acted as an excellent medium through which to disseminate the survey objectives and purpose to households. This saved precious time for the enumerators: they did not need to explain their purpose for visiting a household. The PRA enabled rapport to be established, and provided the basis for building trust between the interviewer and interviewee in the survey.

The foremost constraint to using PRA methods in this research was the gathering of the local people - because the time of the survey (April-May), coincided with the peak agricultural season in the Hill. Local people were requested at least two days in advance to gather at a pre-determined location. The timing of the gatherings was important, and varied according to the agro-zone. In the Terai (plain) around eight in the morning, just before people went to the fields, was the best time. In the Hills, around nine to ten in the morning, when people returned from the field to have their morning meal, or after five in the evening when people had returned from their day's work, were the best times. Time was a constraint

especially for those who had to go to a different ward to earn daily wages. On these occasions, gatherings were set mostly for the evenings. The use of written language when conducting the matrix exercise was a great barrier for some participants, who could not read. One-to-one guidance was provided to overcome this problem. Participation by women in some wards was quite difficult, especially for ethnic groups whose women did not wish to come forward in a male crowd because of local norms. The role of the facilitator cannot be underestimated when using PRA methods - skills such as being unbiased, having tact in tackling conflicts and the ability to express authority are some of the prerequisites for a successful PRA facilitator.

3.4 Key informant interviews

The researcher conducted face-to-face interviews with selected local, district and national key informants concerning off-farm income in Nepal. At the local level, the key informants were the chairpersons of the VDCs and ward development committees, local carpenters, retailers and wholesalers. At the district level, the key informants were officials from the District Development Committee (DDC), District Agricultural Development Office (DADO), District Livestock Development Office (DLSO) and Regional Small Enterprise Development Board. National informants were a professor, researchers and a director of various organisations. The aim of the interviews was to understand current and future policies with respect to off-farm activities in rural Nepal. However, the interview information was sought on the availability of, and constraints to, off-farm income and employment in local areas. Most interviews were informal, and only key points were taken down in note form. A set of questions was used to guide the interview to ensure all points were covered. Nine interviews were completed in different locations (Appendix V).

3.5 Household survey

3.5.1 Questionnaire design

A questionnaire was designed to collect data on the farm and off-farm activities of households over a 12-month period. The questionnaire comprised 12 sections. The first section asked respondents for their age, gender and primary occupation. The second section

sought data on household size and primary occupations within the household. The third section inquired about household resources and assets like labour, land and the house. The fourth section was devoted to the agricultural and livestock production activities of the household. Details of household enterprises were asked in the fifth section. The sixth part asked details of individuals who were involved in off-farm activities. In the seventh section, data to construct a monthly labour time profile for farm and off-farm activities for each household member were sought. In the subsequent sections, questions to determine household expenditure, income received and debt were asked. In the concluding section, a brief comment was asked about the role of off-farm activities in the household. Initially, the questionnaire was designed in English (Appendix II), but for the field survey, it was translated into the Nepali language.

3.5.2 Questionnaire pre-testing

The questionnaire was designed in New Zealand using the researcher's prior knowledge of the area, the literature review and guidance from supervisors, and was pre-tested prior to implementation in the field. It was first translated in Nepali and applied in the Khani Gaon (Ward 4) of the Raiko VDC in the Kavera district. A foot trail linked the village and Godavari (Kathmandu), which is three hours' walk away. The local ethnic tribe, Tamang, dominated the village. Most of the households were farmers and had at least one member working in the Kathmandu valley. The village was typical of the study area in the Hills. The questionnaire was tested with five randomly selected households, and the following changes were made to the questionnaire after the pre-test.

1. Respondent's education level was pre-coded, whereas it was previously left open.
2. In the second part of the questionnaire, numbers of household members residing at home were sought. However, in some households a few members worked off-farm and returned home in the agricultural season or when they could not find any work. To avoid confusion, members who resided in the homestead for more than 15 days were classified as household residents.
3. Whether a house had electricity or not was added to the housing section of the questionnaire.
4. Share cropped land was added to the household's land classification.

5. Provision was made to include the number of goat kids, calves and chicks in the questionnaire.
6. For the households with no business/enterprise, reasons for not having this were sought.
7. Provision was made to include crops received from share cropping or as rent, in the section dealing with crop production.
8. Reasons why household members were not engaged in off-farm employment, were asked. Possible reasons were pre-coded.
9. Parma (exchange labour) occupies a significant part of labour time for households involved in the Hills agriculture. This was included in the labour time profile sheet for both males and females.
10. Similarly, a separate row was added to include an individual's time engagement in livestock activities.
11. Expenditure on agricultural labour, on food for agricultural labour and running costs for household enterprises were added to the original list.

After the final revision and proof-reading in Nepali, 150 copies of the questionnaire were produced to implement the survey.

3.5.3 Sampling procedure

The number of households for each ward selected was obtained from secondary sources and was verified by key informants in the field. This was further cross-verified with household listings obtained from the PRA exercise. To be consistent, lists of heads of households from the PRA exercise were adopted as the sampling frame for the household survey. The total population for each ward was divided into two groups: households with at least some off-farm income and households with only farm income. The weighted ratio of the two groups to be surveyed was then calculated to determine the sample proportions. Participants in the PRA were then requested to randomly pull the names of household heads from the pack prepared for the survey. For the wards with less than 5 % of households without off-farm income, the total population was used for the randomisation process. Households surveyed in each ward are given in Table 3.4.

Table 3.4: Number of households surveyed in each ward and VDC.

Name of the VDC and ward	Total number of households	Households		Sample size	Sample size	
		with some off-farm income	with no off-farm income		with some off-farm income	with no off-farm income
Hathikharka VDC (Hill)						
Ward 2	97	97	0	23	23	0
Ward 4	83	46	37	22	12	10
Ward 7	131	76	55	30	18	12
Subtotal	311	219	92	75	53	22
	(100)			(24)	(17)	(7)
Haraicha VDC (Terai)						
Ward 1	98	98	0	25	25	0
Ward 5	71	35	36	20	10	10
Ward 7	163	163	0	30	30	0
Subtotal	332	296	36	75	65	10
	(100)			(23)	(20)	(3)
Total	643	515	128	150	118	32
	(100)			(23)	(18)	(5)

Figures in parenthesis indicate the percentage of the total population within respective rows.

3.5.4 Household survey procedure

Two local enumerators were recruited to help conduct the survey, and one day's training given to them before fieldwork commenced. Dummy interviews were conducted to familiarise the enumerators with the questionnaire. Household surveys began about 8 am in the Terai and at 7 am in the Hill. Before starting with the questionnaire in a household, the objectives of the survey were explained to the respondent and verbal consent was sought. Options were provided to either not, or partially, answer the questionnaire. No-one refused to complete the questionnaire. An enumerator completed four to five questionnaires in a day. In the evening of each day, the researcher collected the completed questionnaires from the enumerators and verified and checked them for consistency. Households with inconsistent data were revisited to confirm the entries. On average, each household survey took an hour to complete in both the Hills and the Terai.

The face-to-face interviews gave in-depth data on households, which were used to meet the research objectives and test the research hypothesis. Visiting houses to conduct the survey provided the opportunity to visualise the actual situation for different households: their

housing, life style, working environment and the different crops, livestock and enterprises in which they were engaged.

The face-to-face interview, however, was time-consuming and required careful recall of the respondent's answers. In addition, finding a responsible person from each household in the Hill to complete the interview was a major constraint due to its coinciding with the peak agricultural season. In one village in the Hill, an outbreak of a contagious disease hindered the household survey; it prompted a rapid survey, which was physically exhausting for both the enumerators and the researcher.

3.6 Data editing, coding and entry

At the completion of the field survey, all the materials were brought to New Zealand, and the PRA results were stored in a computer database. The local units in the household questionnaire were converted into standard units such as ropani to hectares and mana to kilograms. Once again, the questionnaire was checked for consistency. Inconsistent data were cross-checked with other information from the questionnaire and edited. Data from the edited questionnaire were entered into an Excel spreadsheet, in preparation for analyses using the SAS package (SAS 1998, v. 6.12). The recorded interviews with the key informants were transcribed into English for content analysis.

3.7 Calculation of household income

Rural farmers in Nepal produce farm products, which they mostly consume themselves, however surpluses are sold in the market. Therefore, a household's income could not be obtained directly from the questionnaire. The research sought to capture the total resource flow of the household. Information on farm production and other income for the 12 months prior to the interview were recorded to calculate household income, as explained next.

Total household income for the i^{th} household (THI_i) = Farm income (FI_i) + Off-farm income (OFF_i)

where,

$$FI_i = \text{Crop income (CI}_i\text{)} + \text{Livestock income (LI}_i\text{)} + \text{Horticultural income (HI}_i\text{)} + \text{Other cash crop income (OCI}_i\text{)}$$

$$\text{and crop income (CI}_i\text{)} = \sum_{j=1}^J P_{ij} \cdot Q_{ij} - \sum_{k=1}^K R_{ik} \cdot X_{ik}$$

where,

P_{ij} = Price of the j^{th} farm commodity produced in i^{th} household;

Q_{ij} = Quantity of the j^{th} farm commodity in i^{th} household;

R_{ik} = Price of the k^{th} farm input purchased by i^{th} household;

X_{ik} = Quantity of the k^{th} farm input purchased by i^{th} household;

Similarly,

$$\text{Livestock income (LI}_i\text{)} = \sum_{j=1}^J P_{ij} \cdot Q_{ij} - \sum_{k=1}^K R_{ik} \cdot X_{ik}$$

where,

$P_{ij} \cdot Q_{ij}$ = value of j^{th} livestock and/or j^{th} livestock product sold in the market by i^{th} household;

$R_{ik} \cdot X_{ik}$ = value of j^{th} livestock input purchased by i^{th} household.

$$\text{Horticultural income (HI}_i\text{)} = \sum_{j=1}^J P_{ij} \cdot Q_{ij} - \sum_{k=1}^K R_{ik} \cdot X_{ik}$$

where,

$P_{ij} \cdot Q_{ij}$ = value of j^{th} horticultural product produced by i^{th} household,

$R_{ik} \cdot X_{ik}$ = value of j^{th} horticultural input purchased by i^{th} household

$$\text{Other cash crop income (OCI}_i\text{)} = \sum_{j=1}^J P_{ij} \cdot Q_{ij} - \sum_{k=1}^K R_{ik} \cdot X_{ik}$$

where,

$P_{ij} \cdot Q_{ij}$ = value of j^{th} cash crop produced by i^{th} household;

$R_{ik} \cdot X_{ik}$ = value of j^{th} cash crop input purchased by i^{th} household.

Similarly, the off-farm income of the i^{th} household was calculated as:

$$\text{Off-farm income (OFFI}_i\text{)} = \text{Wage income (WI}_i\text{)} + \text{Business/enterprises income (BI}_i\text{)} + \\ \text{Remittances (RI}_i\text{)} + \text{Pensions (PI}_i\text{)} + \text{Rents/interest/bonds (RBI}_i\text{)}$$

where,

$$\text{Wage income (WI}_i\text{)} = \sum_{j=1}^j W_{ij}$$

where, W_{ij} = Wage of j^{th} member of i^{th} household

In a similar fashion values of other off-farm income were also calculated.

Calculation of household expenditure

Details of household expenditure for various items such as food, clothe, medicine, education etc. were directly asked from the household representative and recorded in section I of the questionnaire. However, only cash expenditure on these various items was recorded. For food, one month's expenditure for the household was recorded and later converted to a 12 month basis, while for the rest of the items, expenditure for the 12 months prior to the interview date was recorded.

3.8 Data analysis

Data analysis was carried out in three steps. First the PRA results were analysed diagrammatically. The key informant interview was transcribed while the household survey data were analysed, using the SAS software package (SAS Institute, 1998, v. 6.12). Initially, univariate and bivariate analyses were conducted. The multivariate relationships were then analysed using logistic regression models for off-farm employment models and ordinary least squares regression for off-farm income as outlined in Section 4.2.

CHAPTER FOUR - RESULTS

In this chapter, the results from the study are presented. The first section discusses the major findings of the PRA exercise conducted in the two agro-ecological zones. The second section deals with the findings from the face-to-face interviews with 150 households.

4.1 Participatory Rural Appraisal (PRA)

Five different participatory rural appraisals (PRA) techniques were used in each ward of the two VDCs studied, and results from each approach are summarised in eight sub-sections. These findings provide a community perspective of resources, infrastructure and employment activities.

4.1.1 Resource mapping

The resource maps of three wards in each of the Hathikharka (Hill) and Haraicha (Terai) VDCs, are presented in Figures 4.1 to 4.3 and Figures 4.4 to 4.6 respectively. Ward 7 of the Hathikharka VDC in the Hill district was better resourced than other two wards of the VDC (Figure 4.1). The ward is connected to a highway which links the VDC to Dhankuta town (the district headquarters), which serves as a medium for exporting farm produce, particularly potatoes, radish and cabbage to the Terai and India. The milk collection centre, based in the ward, is operated by a semi-government agency, and this has relieved farmers of a long walk (about 1.5 hours) to sell milk. The primary school in the ward also provides education to the surrounding wards. The climate and the soils of the ward are good for vegetable production and the local people are able to take advantage of the improved roading infrastructure. The ward also has a community forest owned by the local people.

Two small rice mills, and shops render service to Ward 2 and its surrounding wards (Figure 4.2). Two rivulets (khola in Nepali) on its boundary facilitate a network of small irrigation channels throughout the ward. This provides water throughout the year and allows farmers to grow cereal crops in the summer and vegetables in the winter. However, because of the lack of transportation, farmers cannot take full economic advantage of their crops.

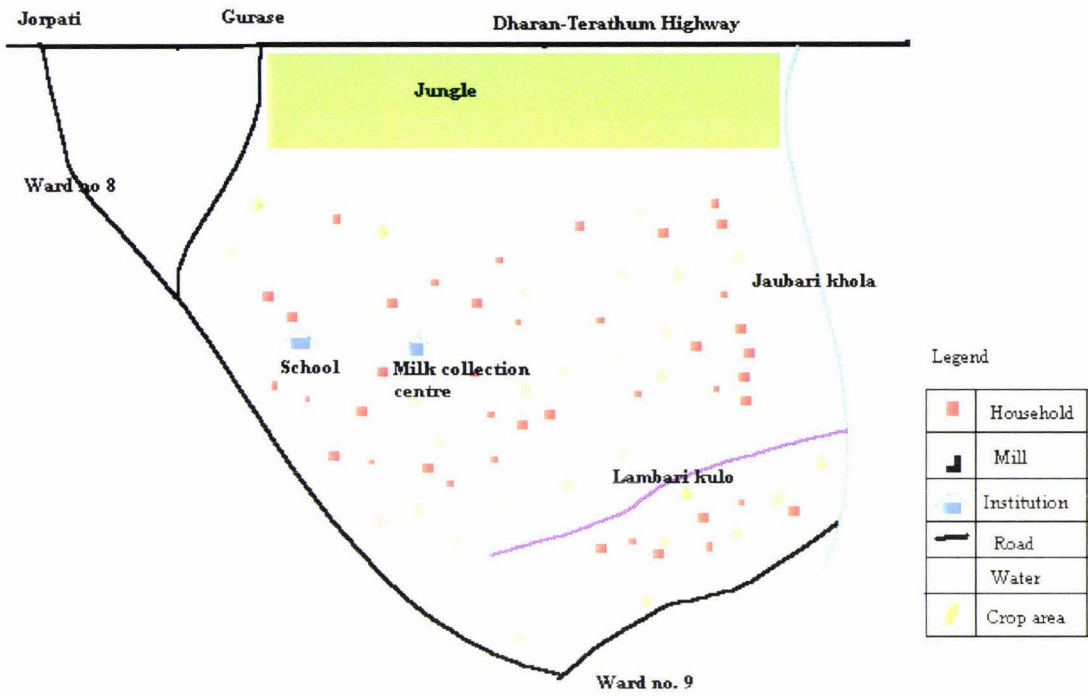


Figure 4.1: A resource map of Hathikharka ward 7 in the Hill.

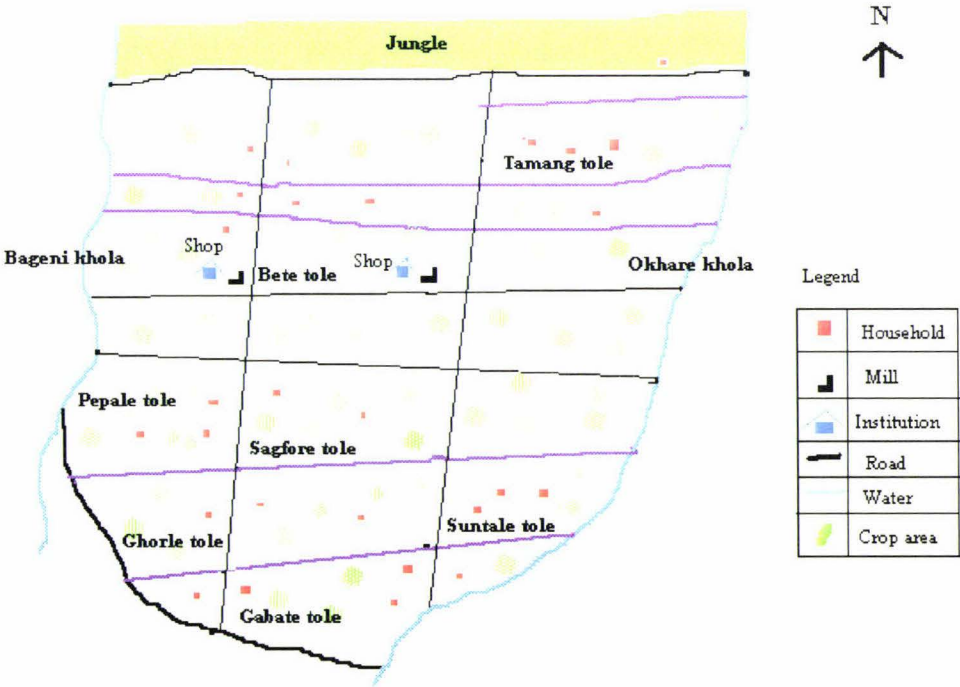


Figure 4.2: A resource map of Hathikharka ward 2 in the Hill.

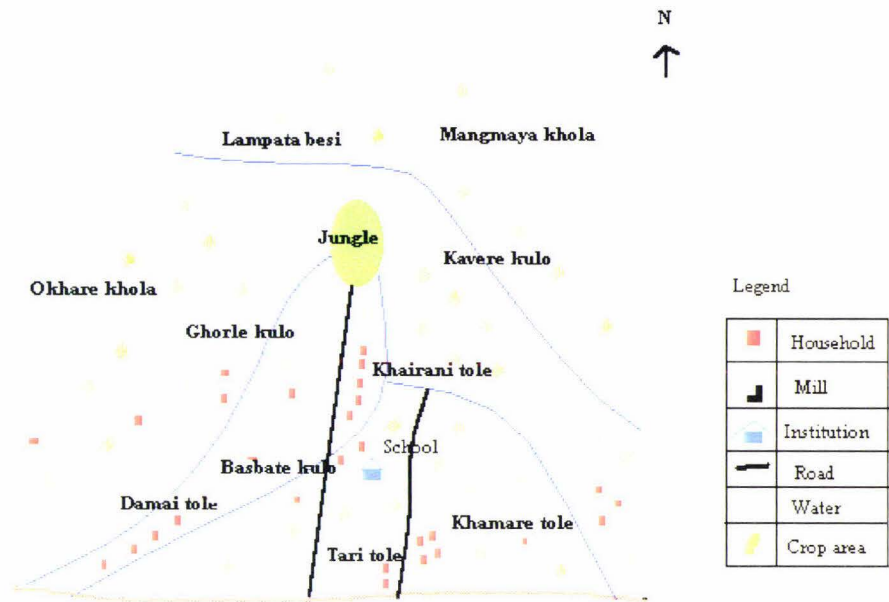


Figure 4.3: A resource map of Hathikharka ward 4 in the Hill.

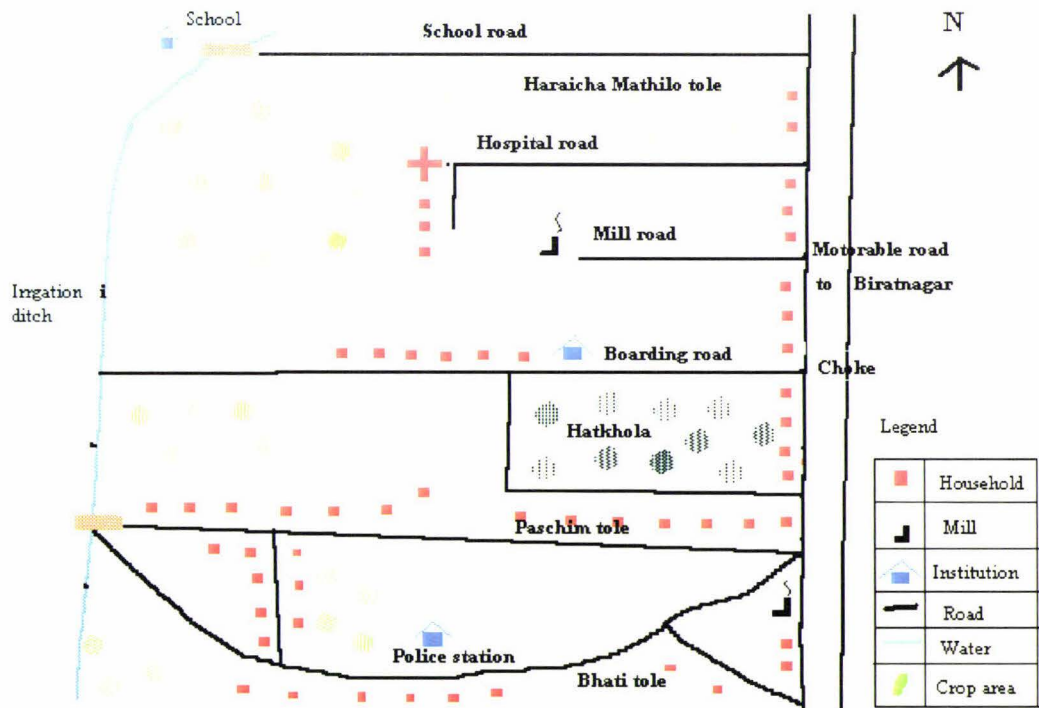


Figure 4.4: A resource map of Haraicha ward 1 in the Terai.

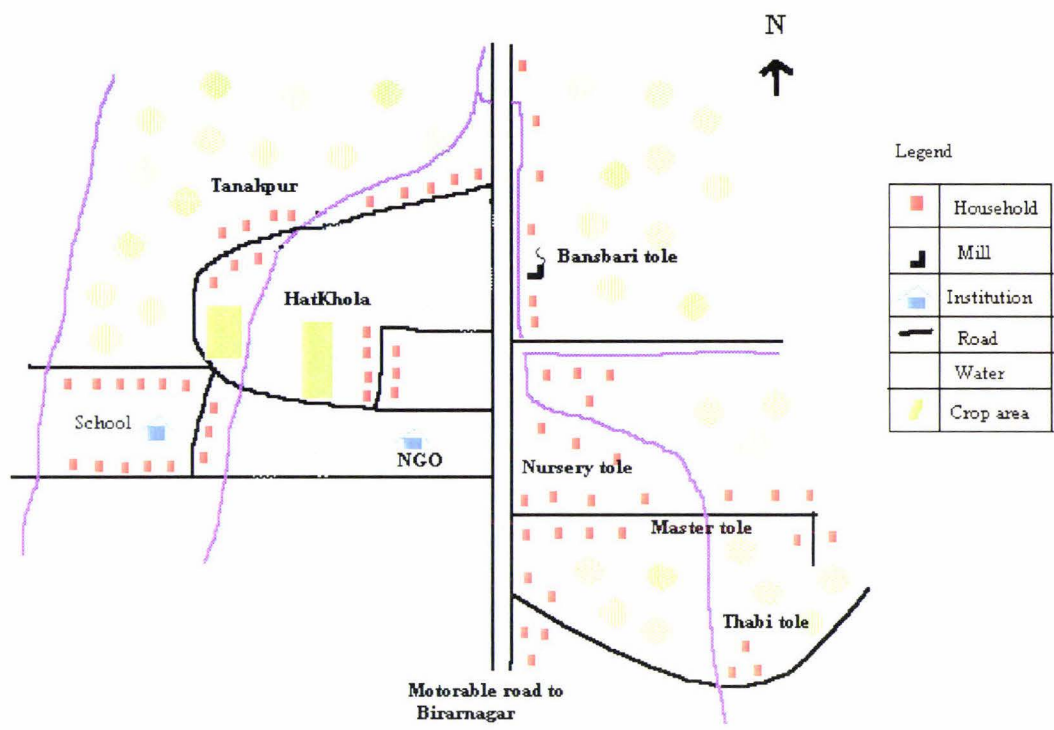


Figure 4.5: A resource map of Haraicha ward 7 in the Terai.

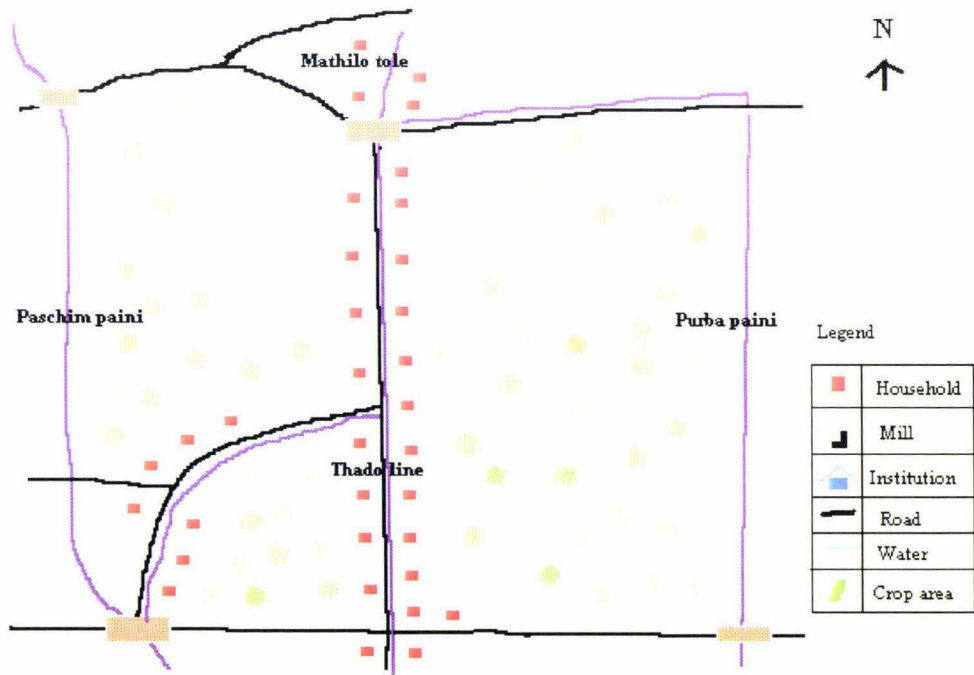


Figure 4.6: A resource map of Haraicha ward 5 in the Terai.

Ward 4 is the furthest from the highway and is the least resourced of the Hill wards (Figure 4.3). However, the rivulet running across the ward provides water throughout the year for the crops, but the distance from the nearest roading precludes their export to markets outside the ward. A pre-primary school serves Ward 4.

The wards of Haraicha VDC (Terai) are better resourced than those of the Hathikharka VDC (Hill). In the Terai, Ward 1 is the best resourced of the three wards studied (Figure 4.4). A highway runs through the ward linking it to Biratnagar, a major industrial town. A health post, private school, police station and rice mills serve the ward. There is also a market place in the ward for a weekly market and many retailers sell goods for daily use. The ward serves as a central marketing place for surrounding villages of about 500 households.

Ward 7 is the largest ward in the VDC and households are densely located throughout it (Figure 4.5). A highway links the ward to Biratnagar. It has a good network of irrigation channels which enable farmers to grow winter crops such as wheat and lentils. A non-government organisation (NGO) situated in the ward provides loans to establish enterprises for women's groups from the VDC. A rice mill grinds the farmers' crops.

Ward 5 is the smallest ward of the Haraicha VDC (Figure 4.6). It, too, has a good network of irrigation channels which enable farmers to grow both winter cereal and vegetable crops, and most land in the ward is under cultivation. A fair weather road links the ward to the VDC centre.

4.1.2 Development infrastructure

The infrastructure for development in the Hill wards was poorer than that in the Terai (Tables 4.1 and 4.2). Basic developmental infrastructure, such as schools and health posts, are scarce in the Hill. In Ward 2 and 4 transportation is difficult. For the households of these wards, about two to four hours are needed to reach the highway and other development institutions. In the Terai VDC a hospital, school, telephone service and electricity, were concentrated in Ward 1. Although the other wards of the Terai did not

have all of these facilities, they were, in contrast to the Hill, within “reach” (i.e. less than 45 minutes walking distance) of its residents.

Table 4.1: Development infrastructure within the different wards of the Hathikharka VDC (Hill).

Development structures	Ward 2	Ward 4	Ward 7
Road			
• All weather	No (3)	No (4.5)	Yes
• Only in fair weather	No (3)	No (4.5)	
Bank	No (3)	No (2)	No (0.5)
Post office	No (3)	No (1)	Yes
Telephone office	No (3)	No (2)	No (0.5)
Co-operative	No (3)	No (5)	No (0.5)
Health post	No (1)	No (2)	No (0.5)
Hospital	No (Dhankuta)	(No) Dhankuta	(No) Dhankuta
Shop	Yes	No (1)	Yes
Mill	Yes	No (1)	No (0.5)
Police station	No (1)	No (1.5)	No (0.5)
Pre-primary school	No (13 min)	Yes	Yes
Primary school	No (0.5)	No (1.5)	Yes
High school	No (0.5)	No (1.5)	No (0.5)

Note: Figures in the parentheses show the time required (hours) to reach the nearest service centre.

Table 4.2: Development infrastructures within the different wards of the Haraicha VDC (Terai).

Development structures	Ward 1	Ward 5	Ward 7
Road			
• All weather	Yes	No (20 min)	Yes
• Only in fair weather	No	Yes	No
Bank	No (0.5)	No (45 min)	No (35 min)
Post office	Yes	No (20 min)	No (15 min)
Telephone office	Yes	No (20 min)	No (15 min)
Co-operative	Yes	No (20 min)	No (15 min)
Health post		No	No
Hospital	Yes	No (20 min)	No (15 min)
Shop	Yes	Yes	Yes
Mill	Yes	No (20 min)	Yes
Police station	Yes	No (20 min)	No (15 min)
Pre-primary school	Yes	No (20 min)	No (5 min)
Primary school	Yes	No (20 min)	No (5 min)
High school	No (0.5)	No (45 min)	No (35 min)

Note: Figures in the parentheses show the time required (hours) to reach the nearest service centre.

4.1.3 Historical time frame

The historical time frame of major events in the Terai (Table 4.3) and Hill (Table 4.5) wards indicate when various development activities occurred. In the Hill, this related to agriculture. Both local people and non-government organisations (NGOs) contributed significantly to agricultural development. In contrast, the time line for the Terai indicates that in recent years development programmes have moved towards improving rural household income through off-farm activities. Most of the development programmes for this purpose were operated by NGOs and especially targeted toward the provision of credit to rural women.

Table 4.3 : Historical time frame of development and major events in the wards of Haraicha VDC (Terai).

Year	Event	Effect	Agent for implication
Ward 1			
1986	Highway to Biratnagar gravelled	Transportation of goods facilitated	Government
1988	Electricity was supplied	Shops opened till late	Government
1992	A private school opened	Education standards improved	Private
Ward 5			
1984	Settlement started	Population increased, increased sell and purchase of land	
1985	Construction of fair weather road	Transportation of goods facilitated	Local people
1986	Banana plantation started	Farmers' income increased	Local people
1989	Vegetable cropping started	Farmers' income increased	Local people
1995	A NGO was established to supply loans to women groups	Credit more readily available to women	NGO
1997	Construction of dam	Irrigation throughout the year, improved land productivity	Local people
Ward 7			
1986	Highway to Biratnagar gravelled	Transportation of goods facilitated	Government
1989	Landless people occupied public land	Population increased	
1990	Public bus operated to Biratnagar	Transportation facilitated	Private
1995	A rice mill was established	Local people did not have to walk for long distances to grind crops	
1995	A rural bank was established to provide loan to women groups	Credit were readily available to women	NGO
1997	A NGO was established to provide loans to women groups	Credit were readily available to women	NGO

Table 4.4: Historical time frame of development and major events in wards of the Hathikharka VDC (Hill).

Year	Event	Effect	Agent for implication
Ward 2			
1986	Hail storm damaged wheat and mustard crop	Reduced farmer's income	Local people
1987	Flood destroyed rice crop	Low income year for farmers	
1988	Construction of irrigation ditch	35 households benefited and rice yield increased	
1989	Earthquake	Few households were damaged	Private
1991	A rice mill was established	Households did not have to walk long distances to grind crops	
1993	Drinking water supplied by pipeline to households	Households did not have to walk long distances for water	Government and local people
1998	Another rice mill was established	Price of crop grinding reduced due to competition between the two mills	Private
Ward 4			
1989	Earthquake	Few houses were damaged	Local club
1990	Established a pre-primary school	Local students did not have to walk long	
1998	Drinking water supplied by pipelines to households	Households did not have to walk long distances for water	Government and local people
Ward 7			
1985	Bus started to operate service via newly constructed highway	Mobility of local people increased	Private
1989	Earthquake	Few houses were damaged	Government
1992	Pakribash Agricultural Centre stopped extension service	Farmers had difficulty without extension service advice	
1993	Village school promoted to primary school	Local students did not have to walk as far for schooling	
1993	A NGO established office and gave training on vegetable cultivation and supplied high yielding vegetable seeds	Farmers income increased	NGO
1995	A milk collection centre was established	Farmers did not have to walk long distances to sell milk	Government
1995	Vegetable produces co-operative formed	Market price of vegetables became more stable	Local farmers
1997	The NGO providing an extension service for vegetable crops was discontinued	Not major effect reported	
1997	Establishment of family planning clinic	Facilitated family planning and child health care	NGO
1997	Establishment of post office	Facilitated mail service	Government

A feature of the time frames collected independantly from the wards was their internal consistency. For example, spokespersons for all three Hill wards identified the 1989

earthquake. In some cases, events were ward specific, such as the 1997 opening of a Family Planning Clinic in Ward 7 of the Hill district.

4.1.4 Crop calendar

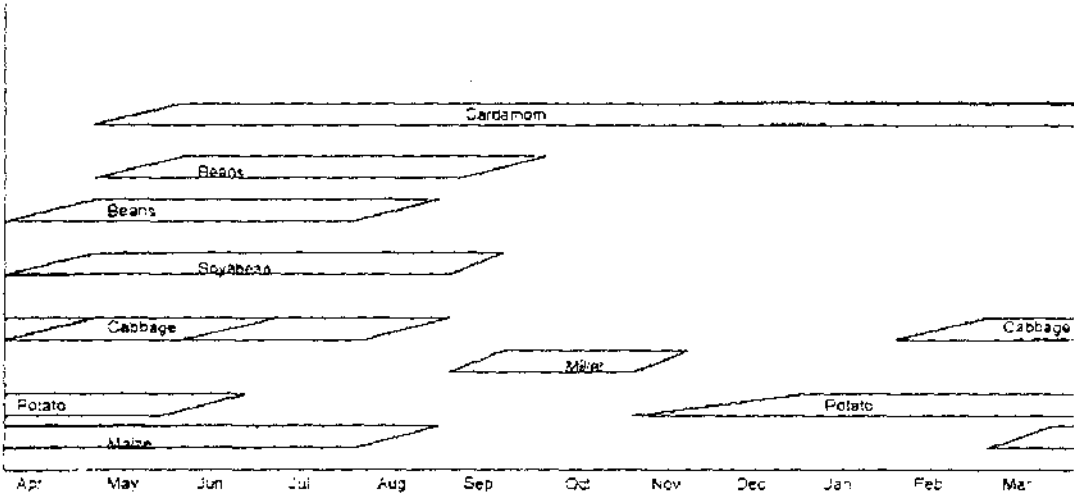
Figures 4.7 and 4.8 show the main crops cultivated and their season in the wards of the Hill and Terai VDCs, respectively. Crop cultivation varied by ward in the Hill. The cropping pattern of Ward 4 in the Hathikharka VDC (Hill) had a similar cultivation pattern to the Terai and is representative of the sub-tropical climate. The main crops grown in Ward 4 are rice, wheat, maize and soybean.

The cropping pattern of Ward 2 in the Hathikharka VDC represents a warm temperate climate, where rice is grown in irrigated areas and millet in the non-irrigated areas. The other major crops grown in this ward are wheat, potato, maize and soybean. Maize and soybean are often cultivated as mixed crops.

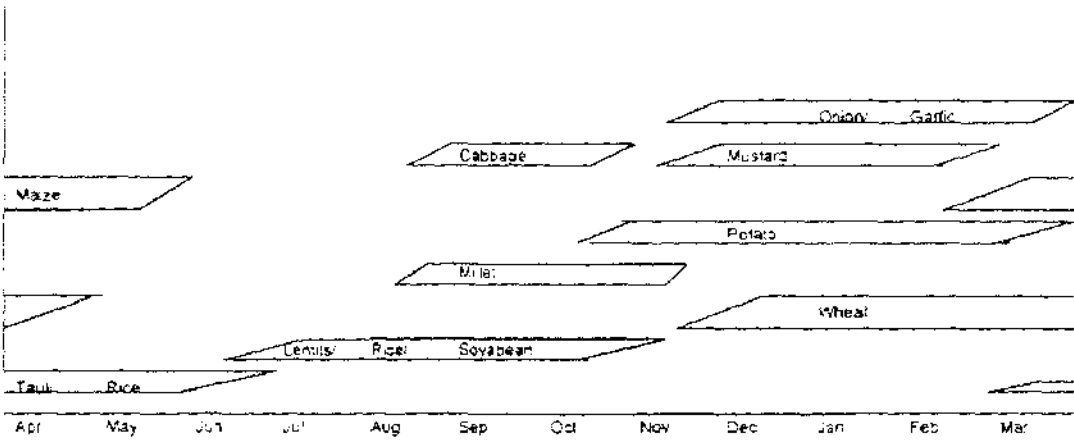
The cultivation pattern of Ward 7 of the Hathikharka VDC represents a cool temperate climate: rice and wheat cannot be grown. The main crops grown are millet, potato, maize and vegetables (cabbage and beans). The main cash crops are cardamom, potato and cabbage. Farmers in the Hill VDC are actively engaged in agriculture through the summer, from May in the high altitude areas and April in the lower altitudes, until October when they finish harvesting the rice or millet. In winter, after planting potato and wheat in November, most farmers are not able to carry out agricultural work in the Hill due to the cold weather.

The cropping patterns for the Terai wards were very similar (Figure 4.8). The main crops grown were rice, wheat, maize and lentils. Like farmers in the Hill, those in the Terai get busy when the monsoon starts in July: this initiates rice planting. Most farmers have finished their agricultural work after the rice harvest in October/November. However farmers with irrigation, plant wheat and vegetables in the winter.

Ward 7



Ward 2



Ward 4

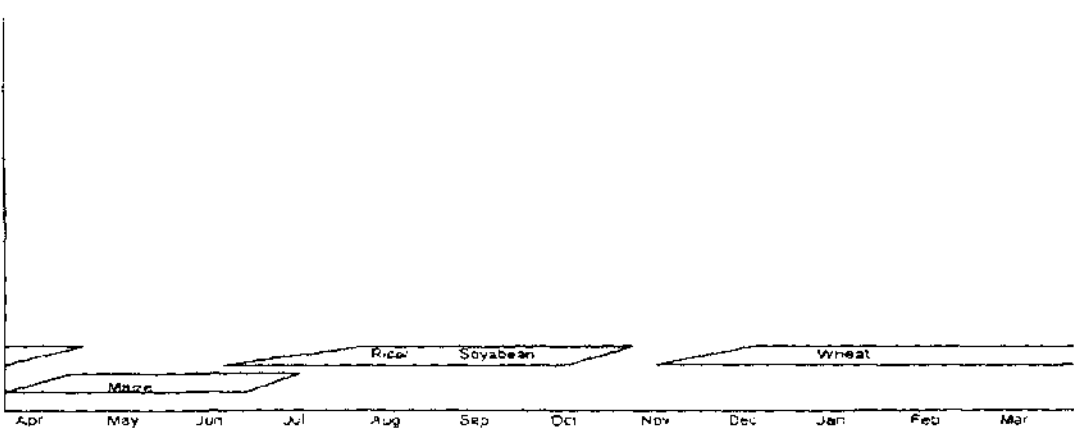


Figure 4.7: Crop calendar for the Hill wards.

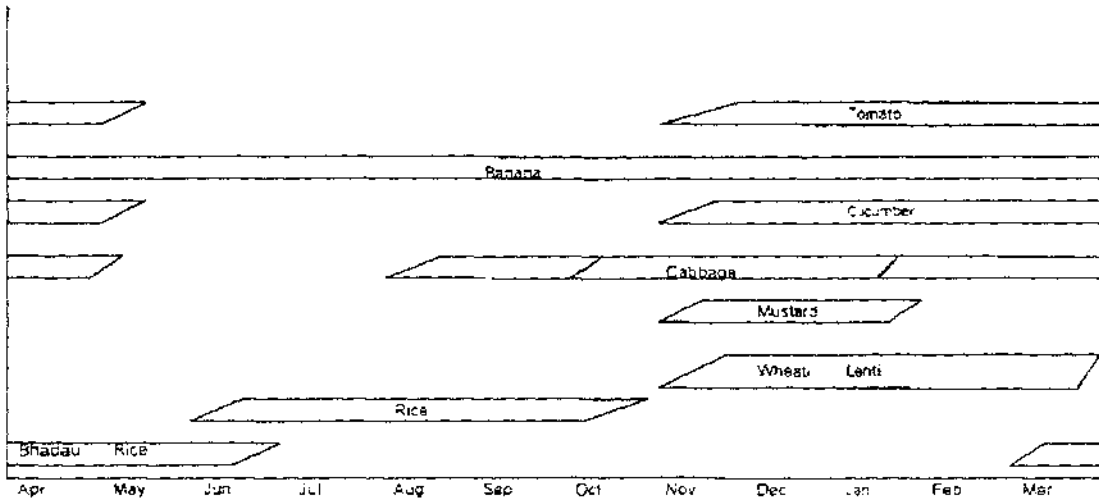
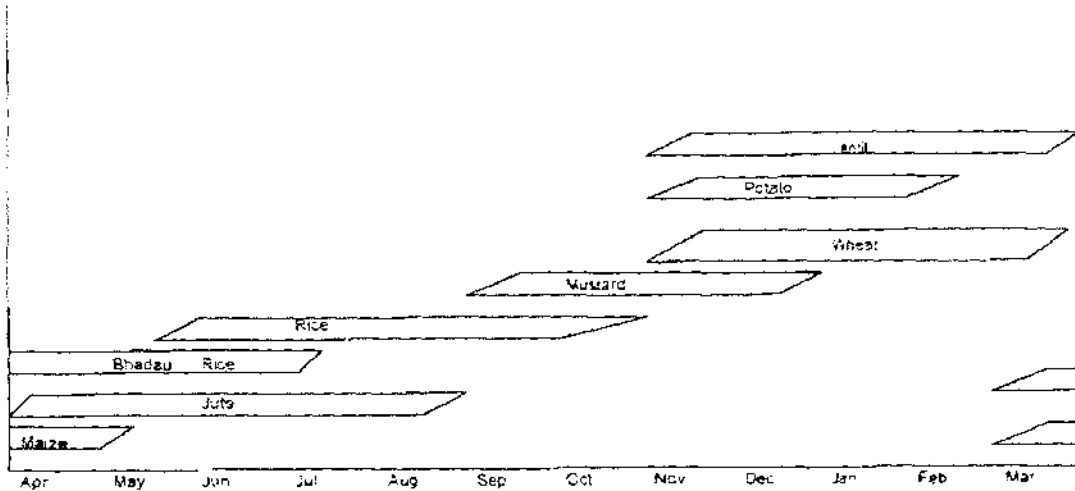
Ward 5**Wards 1 and 7**

Figure 4.8: Crop calendar for the Terai wards.

4.1.5 A list of households and their ethnic composition

An inventory of all households at each site was recorded by the name of the head of the households. The total numbers of household heads identified in the respective wards of the Hill and Terai (643) are summarised in Table 4.3. The household list suggests that Ward 7 of the Haraicha VDC (Terai) is the most populated ward in the sample ($n = 163$ households) and that ward 5 ($n = 71$) of the same VDC is the least populated. Compared to the Terai, households in the Hill ward were more evenly distributed geographically. Ward 7 is the most populated in the Hathikharka VDC ($n = 131$) and Ward 4 ($n = 83$) the least populated.

The ethnic compositions of the wards are also shown in Table 4.5. The Rai/Limbu/Magar /Tamang ethnic groups dominated in the Hill (Hathikharka VDC), whereas the Khawas/ Tharu dominate in the Terai. One-fourth of the Hill and one-third of the Terai households belonged to the Chhetri/Brahmin/ Newar group. Other ethnic groups such as the Bishwakarma, Pariyar, Muslim and other minor groups comprised an equal percentage of the households in both the Hill and Terai.

Table 4.5: Ethnic distribution in different wards of the Hathikharka VDC (Hill) and Haraicha VDC (Terai).

VDC and wards	Total household number	% households			
		Chhetri/Brahmin /Newar	Khawas/ Tharu	Rai/Limbu/ Magar/Tamang	Others ¹
Hathikharka VDC					
Ward 2	97	25	0	75	1
Ward 4	83	33	0	54	13
Ward 7	131	8	0	92	0
<i>All (Hathikharka)</i>	311	20	0	76	4
Haraicha VDC					
Ward 1	98	53	12	12	23
Ward 5	71	46	34	13	7
Ward 7	163	13	77	4	6
<i>All (Haraicha)</i>	332	32	49	8	11
<i>All (both VDC)</i>	643	26	25	41	8

¹ Others include Bishwakarma, Nepali, Muslim and other minor groups.

4.1.6 Wealth ranking

The results of the wealth ranking exercise conducted in the six wards are presented in Table 4.6. Food availability was used as a proxy for household wealth. Households with food supply for six months or less (38% of all households) were classified as the “poorest” households, while those with six to nine months’ food supply were classified as “poor”, and those with more than nine months food supply were designated as “non-poor” households.

With the present level of household income, 58% of the households in the Terai and 63% of the households in the Hill were unable to have two meals a day throughout the year. The distribution of households based on food availability was highly uneven in the Terai. For example, households which could afford to provide two meals a day throughout the year

ranged from 27% to 90% in the Terai wards. Households in the “poorest” category ranged from 5% to 43% of all households. In the Hill, the household distribution was similar in each ward in terms of the provision of two meals a day throughout the year, but variation was greater for the other household categories (from 5% to 43% for the “poorest” and 14% to 47% for the “poor”). Severe poverty (households which cannot afford to have two meals a day for fewer than six months) was ranked to be much higher in the Terai (30%) compared to the Hill (17%).

Table 4.6: Categorisation of households based on their food availability (provision of two meals per day) in the surveyed wards of the Haraicha (Terai) and Hathikharka (Hill) VDC. (Figures are percentage of the households in each category).

VDC and ward	Number of households	All year (%) (non-poor)	Up to 9 months (%) (poor)	Up to 6 months (%) (poorest-1)	For less than 6 months (%) (poorest-2)
Hathikharka VDC					
Ward 2	97	31	40	18	11
Ward 4	83	33	14	10	43
Ward 7	131	33	47	15	5
Sub total	311	32	36	14	17
Haraicha VDC					
Ward 1	98	31	24	15	30
Ward 5	71	90	10	0	0
Ward 7	163	27	11	18	44
Sub total	332	42	14	14	30
Total (both VDC)	643	37	25	14	24

4.1.7 Matrix ranking

Household income

Table 4.7 shows the percentage of household income derived from different sources. Rural households earned nearly three-fifths of their income from agriculture and the rest from off-farm sources. However, in the Hill, households had a greater share of income from agriculture than those of Terai (70% vs. 53%). Income from crops was similar for all groups of Hill households, whereas income from livestock varied from 32% in “non-poor” to 21% in the “poorest” households. In the Terai, livestock income was nearly equal for all the household groups, but crop income varied from 41% in the “non-poor” to 26% in the

“poorest” households. The share of farm income increased as households moved from the “poorest” to “non-poor” categories (from 62 to 76% in the Hill and from 47 to 59% in the Terai). Business/enterprise activities contributed significantly to the income of “non-poor” households (6% in the Hill and 19% in the Terai), while wages were the main source of earnings of the “poorest” households (31% in the Hill and 43% in the Terai).

Table 4.7: Distribution of household income by source (agriculture and off-farm) in the Hill and Terai VDCs of eastern rural Nepal. (Percentage of total household income).

Source	Hathikharka (Hill)				Haraicha (Terai)				All
	Non-poor	Poor	Poorest	All	Non-poor	Poor	Poorest	All	
Agriculture	76	72	62	70	59	53	47	53	61
• Crop	44	44	41	43	41	29	26	32	38
• Livestock	32	28	21	27	18	24	21	21	23
Off-farm	23	28	38	30	41	47	53	47	39
• Business/enterprise	6	3	4	4	19	18	9	15	10
• Wages	13	22	31	22	8	19	43	23	23
• Remittances	2	3	3	3	10	6	0	6	4
• Fixed income	2	0	0	1	4	4	1	3	2

Household expenditure

Households in both the Hill and Terai spent one-third of their annual expenditure on food items (grain and other food; Table 4.8). The proportion was greater in the “poorest” than in the “non-poor” households (41% in Hill and 48% in Terai). Expenditure on education increased as households moved from the “poorest” to the “non-poor” category. Clothing and footwear accounted for a substantial proportion (20% overall) of household expenditure. Households in the Hill spent a greater proportion of their expenditure on agricultural (crop and livestock) inputs (25%) compared to those in the Terai (17%). Business/enterprises accounted for a very small proportion of expenditure in both the Hill and Terai households. “Non-poor” households were more mobile than their poorest counterparts in both VDCs, and this enabled them to take greater advantage of business opportunities, particularly in the Terai. The proportion of expenditure on beverage/tobacco decreased from the “poorest” to the “non-poor” households in both the Hill and Terai VDCs.

Table 4.8: Pattern of annual household expenditure in the Hill and Terai VDCs of eastern rural Nepal. (Percentage of household expenditure).

Item	Hathikharka VDC (Hill)				Haraicha (Terai)				All
	Non-poor	Poor	Poorest	All	Non-poor	Poor	Poorest	All	
Grains	4	17	24	15	0	18	31	16	16
Other food	18	18	17	18	16	16	17	17	17
Education	13	6	5	8	18	13	4	12	10
Clothing and footwear	19	18	18	18	24	19	18	21	20
Crop	17	20	14	17	15	10	6	10	14
Livestock	12	8	5	8	9	8	6	7	7
Business/ Enterprise	3	1	0	1	3	4	3	3	2
Transport	9	5	6	7	12	8	7	9	8
Beverage/ Tobacco	5	7	11	8	3	4	8	5	6

Constraints to increasing household income

The major constraints in increasing income facing the rural households in the study VDCs are listed in Table 4.9. The major constraint in both the “poor” and “poorest” households, was the lack of capital. All household groups reported, with almost an equal frequency (27%), that poor education was a major constraint to increasing household income. The “non-poor” households of both VDCs lacked entrepreneurial skills (experience). Marketing of farm products to increase household income was viewed as a more serious constraint to the Hill than the Terai households.

Table 4.9: Constraints to household income growth in the Hill and Terai VDCs of eastern rural Nepal. (Percentage of households).

Constraint	Hathikharka (Hill)				Haraicha (Terai)				All
	Non-poor	Poor	Poorest	All	Non-poor	Poor	Poorest	All	
Education	29	27	29	28	24	27	27	26	27
Skill	31	20	16	22	53	24	18	32	27
Capital	20	44	40	35	16	42	53	37	36
Market	20	9	16	15	7	7	2	5	10

4.1.8 List of off-farm employment

The types of off-farm employment found in the respective wards of the Terai and Hill VDCs are listed in Tables 4.10 and 4.11, respectively. The list shows that there are more off-farm activities in the Terai than in the Hill. In both VDCs, farm work, carpentry and bricksmithing dominate off-farm employment, and these activities are essential for most households. Most wards have civil servants and teachers. In every Hill ward, a number of

individuals have ventured overseas in search of employment. Most of the off-farm employment in the Hill is service-related, whereas that in the Terai comprises a mix of service and trade occupations. Several individuals in the Terai are engaged in skilled occupations, including electronics and machinery.

Table 4.10: List of off-farm employment identified in the different wards in the Haraicha VDC (Morang district) of eastern rural Nepal.

Serial no.	Ward 1	Ward 5	Ward 7
1	Agricultural labour	Agricultural labour	Agricultural labour
2	Carpenters	Carpenters	Carpenters
3	Civil servants	Civil servants	Civil servants
4	Grain wholesalers	Grain wholesalers	Grain wholesalers
5	Shopkeepers	Shopkeepers	Shopkeepers
6	Wage labour	Wage labour	Wage labour
7	Basket weavers	Tailors	Basket weavers
8	Bricksmiths	Blacksmiths	Mechanics
9	Teachers	Mill owners	Teachers
10	Bicycle repairer	Workers in foreign country	Workers in foreign country
11	Butchers	Pensioners	Firewood retailers
12	Food shop owners		Labourers in town
13	Goldsmiths		Rickshaw pullers
14	Kerosene dealers		Bicycle repairers
15	Livestock retailers		NGO employees
16	Mechanics		
17	Photographers		
18	Sweepers		
19	Tea shop operators		
20	TV/Cassette player repairers		
21	Watch repairers		

Table 4.11: List of off-farm employment identified in the different wards in the Hathikharka VDC (Dhankuta district) of eastern rural Nepal.

Serial no.	Ward 2	Ward 4	Ward 7
1	Agricultural labour	Agricultural labour	Agricultural labour
2	Bricksmiths	Bricksmiths	Bricksmiths
3	Carpenters	Carpenters	Carpenters
4	Civil servants	Civil servants	Civil servants
5	Teachers	Teachers	Teachers
6	Workers in foreign countries	Workers in foreign countries	Workers in foreign countries
7	Village health workers	Village health workers	Labourers in town
8	Labourers in town	Army men (inside and outside the country)	British/Indian army men
9	Liquor makers and sellers	Pensioners	Pensioners
10	Porters	Blacksmiths	NGO employees
11	Rice mill owners	Animal health workers	Stone breakers and carriers
12	Shop keepers	Shop keepers	Livestock retailers
13		Tailors	Vegetable retailers



Figure 4.9: Portering as an off-farm activity (Hill).



Figure 4.10: Blacksmithing as an off-farm activity (Hill).



Figure 4.11: Tailoring as an off-farm activity (Terai).



Figure 4.12: Basket weaving as an off-farm activity (Terai).



Figure 4.13: Shop keeping as an off-farm activity (Hill).



Figure 4.14: Carpentry as an off-farm activity (Terai).

4.2 Household survey

The household survey was conducted with selected members from 150 households (see Section 3.5 for details on questionnaire design). The results from the survey include characteristics of the survey respondents and their households, resource endowments, sources of household income and expenditure, household business/enterprises, and off-farm employment and income. Selected bivariate relationships are also explained and determinants of off-farm employment and income are discussed.

4.2.1 Characteristics of the survey respondents

The general characteristics of the respondents in the Hill and the Terai VDCs are presented in Table 4.12. The survey respondents had a mean age of 42 years. In the Hill, an equal number of males and females responded, whereas in the Terai the respondents were almost all males (92%). Most respondents in the two geographical regions were married. In the Hill, 59% had no formal education (and were classified as “illiterate”), whereas in the Terai, 37% had been to primary school and 30% had experienced a post-primary education. Respondents in the Hill were primarily farmers while those in the Terai were equally divided between farming and off-farm occupations. Ethnically, the majority of the Hill people belonged to the Magar/Limbu/Tamang and Brahmin/Chhetri groups. However, in the Terai, representation of the Chhetri/Brahmin and Khawas/Tharu was nearly equal. Magar/Limbu/Tamang/Rai people were in the minority.

4.2.2 Number of members in a household

Table 4.12 shows the composition of households in the two studies VDCs. The average household size of the total sample was slightly under 6 members. Both household size and the number of dependant members per household were marginally greater in the Haraicha VDC (Terai) compared to the Hathikharka VDC (Hill) district. Proportionately more household members were absent from homesteads in the Hill VDC (12%) compared to the Terai (6%). Households were nearly equally distributed into household size groups of fewer than 4 persons, 5-6 persons and greater than 6 persons. The distribution of household

members in different age groups showed that 58% of the resident household members were in the “economically active” age group (15-64 years of age), 37% were young members (<15 years of age) and the rest (5%) were 64 years or older.

Table 4.12: Characteristics of survey respondents in the Hill and Terai VDCs of eastern rural Nepal.

Characteristics	Hill (Dhankuta) (n = 75)	Terai (Morang) (n = 75)	All (n = 150)
Age (mean years)	42.92 (15.86)	42.15 (15.67)	42.53 (15.71)
<i>Age distribution (% respondents)</i>			
<= 25	16	10	14
26 - 39	35	44	39
40 - 64	39	34	36
> 64	10	12	11
<i>Marital status (% respondents)</i>			
Married	84	94	90
Unmarried	8	3	5
Widowed	8	3	5
Education (mean years)	2.53 (2.94)	3.87 (3.75)	3.20 (3.43)
<i>Education distribution (% respondents)</i>			
None	59	33	46
Primary	27	37	32
Post primary	14	30	22
<i>Primary occupation (% respondents)</i>			
Farming	88	50	69
Off-farm	12	50	31
<i>Secondary occupation (% respondents)</i>			
None	72	61	67
Farming	8	7	7
Off-farm	20	32	26
<i>Ethnicity (% respondents)</i>			
Brahmin/ Chhetri/Newar	20	42	31
Magar/Limbu/Tamang/Rai	74	7	41
Khawas/Tharu	0	35	17
Others ¹	6	16	11
<i>Gender of respondents (% female)</i>	42	8	26

Figures in parentheses are standard deviations.

¹ Other ethnic groups included- Bishwakarma, Nepali and Muslims.

Table 4.13: Household composition in the Hill and Terai VDCs of eastern rural Nepal.

Characteristics	Hill (n = 75)	Terai (n = 75)	All (n = 150)
Average number of members per household	5.88 (3.17)	5.95 (2.63)	5.91 (2.91)
Average number of household members absent from homestead	0.69 (1.33)	0.35 (1.02)	0.52 (1.19)
Residents in household (% households)			
≤ 4	35	26	30
5 - 6	35	42	39
> 6	30	32	31
Dependant ratio ¹	37 (27)	38 (22)	38 (24)
Composition of households resident members by age group			
< 6 years	0.83 (1.03)	0.77 (0.89)	0.80 (0.96)
6 - 14 years	1.13 (1.41)	1.29 (1.16)	1.21 (1.29)
15 - 64 years	2.96 (1.77)	3.32 (1.82)	3.14 (1.80)
> 64 years	0.27 (0.55)	0.21 (0.50)	0.24 (0.53)

Figures in parentheses are standard deviations.

¹ Dependant ratio is defined as a proportion of total number of households who are under 15 and over 64 of age.

4.2.3 Landholding size

The average land area owned by the households was 0.66 hectares (0.86 ha in the Hill and 0.47 ha in the Terai ($P > 0.001$): Table 4.14). The average land area owned by the Terai households was affected because a significant number (20%) were landless. In the Hill, the distribution of household-owned land was evenly spread across the categories of .5 ha ≤, >0.5-1.0 ha and >1.0 ha. In contrast, nearly 80% of the households in the Terai had less than 0.5 hectares. There was a significant difference in the area of the cultivable land of the Hill and Terai households ($t = 1.96$, $P > 0.05$). While all households in the Hill had some cultivable land, 30% of those in the Terai did not. A quarter of Hill households also had land under agro-forestry. Irrigated land accounted for 64% of the total cultivable area (44% in the Hill and 90% in the Terai). Rice alone covered half of the cultivable area. Households in the Hill tended to rent land for agricultural purposes, while those in the Terai preferred share cropping. Nearly two-fifths of the households in the Hill VDCs rented land

from others and their landholding was more than twice as fragmented as from those the Terai (3.4 parcels in the Hill vs. 1.5 in the Terai).

Table 4.14: Farm characteristics in the Hill and Terai VDCs of eastern rural Nepal (Land area in hectares).

Characteristics	Hill (n = 75)	Terai (n = 75)	All (n = 150)
Own land (mean), ha	0.86 (0.78)	0.47 (0.47)	0.66 (0.66)
Own land distribution (% households)			
0	6	20	13
>0 - 0.5	30	60	45
>0.5 - 1.0	30	6	18
>1.0	34	14	24
Cultivable land (mean), ha	0.90 (0.73)	0.64 (0.99)	0.77 (0.87)
Cultivable land distribution (% households)			
0	0	38	19
>0 - 0.5	36	23	29
>0.5 - 1.0	26	12	19
>1.0	38	27	33
Irrigated land (mean), ha	0.43 (0.50)	0.58 (0.91)	0.50 (0.74)
Rice land (mean), ha	0.37 (0.45)	0.60 (0.93)	0.49 (0.74)
Rice land (% of cultivable land)	45 (42)	57 (49)	51 (45)
Land rented in (mean), ha	0.18 (0.35)	0.02 (0.08)	0.1 (0.26)
HH with rented in land (%)	42	6	23
Land rented out (mean), ha	0.02 (0.11)	0.08 (0.70)	0.05 (0.50)
HH with rented out land (% households)	6	2	3
Shared land (mean), ha	0.01 (0.04)	0.27 (0.52)	0.14 (0.39)
HH with shared land (% households)	6	28	17
Land fragmentation (mean), parcels	3.41 (1.81)	1.52 (1.18)	2.47 (1.79)
Forest land (mean), ha	0.09 (0.25)	0	0.04 (0.18)
HH with agro-forestry land (% households)	22	0	11

Figures in parentheses indicate standard deviations.

4.2.4 Household labour

Half of the members of most households were working (Table 4.15). Of these, half were engaged in agriculture, one-fourth were employed in both farm and off-farm activities, and the remainder were exclusively involved in off-farm work. The occupational mix of households varied by agro-ecological zone. For example, in the Terai nearly 36% of the working members in an average household were employed off-farm. Forty percent were employed in on-farm work only. In contrast, off-farm employment accounted for only 15% of the working members in the Hill households: 60% worked on-farm. Two-thirds of the Hill households had members who worked both on- and off-farm. The participation of off-

farm and agricultural labour was significantly different between the Hill and Terai ($t = -3.99$, $P > 0.01$ and $t = 2.00$, $P > 0.05$, respectively for off-farm and farm labour).

Table 4.15: Household labour characteristics in the Hill and Terai VDCs of eastern rural Nepal.

Characteristics	Hill (n = 75)	Terai (n = 75)	All (n = 150)
Average number of members per household	5.88 (3.17)	5.95 (2.63)	5.91 (2.91)
Average number of working members per household			
• Total	3.04 (1.74)	3.27 (1.56)	3.15 (1.65)
• Male	1.68 (1.21)	1.75 (0.95)	1.71 (1.08)
• Female	1.36 (1.21)	1.52 (0.95)	1.44 (0.83)
Average number of working members per household engaged in agricultural activities			
• Total	1.83 (1.57)	1.31 (1.60)	1.57 (1.60)
• Male	0.79 (0.95)	0.69 (0.99)	0.72 (0.97)
• Female	1.04 (0.86)	0.65 (0.91)	0.85 (0.90)
Average number of working members per household engaged in off-farm activities			
• Total	0.45 (0.78)	1.17 (1.30)	0.81 (1.13)
• Male	0.43 (0.72)	0.76 (0.75)	0.59 (0.75)
• Female	0.03 (0.16)	0.41 (0.79)	0.22 (0.60)
Average number of working members per household engaged in both farm and off-farm activities			
• Total	0.76 (0.93)	0.79 (1.07)	0.77 (1.00)
• Male	0.47 (0.58)	0.33 (0.58)	0.40 (0.58)
• Female	0.29 (0.54)	0.45 (0.76)	0.37 (0.66)

Figures in parentheses are standard deviations.

Women's participation in agriculture was greater in the Hills, and proportionately more males than females were employed. Relatively few females from the Hill worked off-farm compared to their counterparts in the Terai. Male members of Terai households worked more in off-farm activities than in on farm. In both agro-ecological zones, proportionally

more females worked in both farm and off-farm activities than in off-farm activities only. This was true also for males in the Hill. The result highlights greater dominance of males in off-farm employment in both VDCs.

4.2.5 Livestock ownership

Livestock raising is an essential part of Nepali farming systems. Table 4.16 shows that almost all the households in the survey kept at least one large or small animal in their homestead. Hill households had nearly twice the number of large and small animals as the Terai households. More than half of the households in the Hill had more than two cows/buffaloes/bulls and more than three pigs/goats, whereas only one third of the households kept the same number of animals in the Terai. However, poultry and ducks were more common in the Terai than in the Hill households. This may reflect the relatively better access to feed and fodder for livestock in the Hills than in the Terai areas.

Table 4.16: Livestock number in households of eastern rural Nepal.

Characteristics	Hill (n = 75)	Terai (n = 75)	All (n = 75)
Households with at least one large ¹ or small ² animal (% households)	99	96	97
Average number of large animals per household	2.71 (1.87)	1.56 (1.74)	2.13 (1.89)
<i>Distribution of large animals (% of households)</i>			
0	12	42	27
1 – 2	32	31	31
> 2	56	27	42
Average number of small animals per household	4.92 (3.66)	2.73 (2.84)	3.83 (3.45)
<i>Distribution of small animals (% of households)</i>			
0	6	22	15
1 – 3	36	46	40
> 3	58	32	45
Average number of poultry/ducks per household	0.16 (3.66)	0.49 (2.84)	0.33 (3.45)

Figures in parentheses are standard deviations.

¹Large animals are cattle or buffalo. ²Small animals are goats or pigs.

4.2.6 Construction of dwellings and availability of essential services

Almost all dwellings in the Hill were stone-bounded with mud walls and a thatched roof (Table 4.17). In the Terai, nearly two-thirds of the houses had mud and straw walls and half

of the houses had a thatched roof. Nearly all of the households used firewood for cooking. Only 8% of the households in the Terai used other sources of cooking fuel such as kerosene or cow dung. Most households had piped water outside their house in the Hill, while households in the Terai depended on tubewells for drinking water.

Table 4.17: House construction materials and essential services in the Hill and Terai VDCs in eastern rural Nepal.

Households (%) with	Hill (n = 75)	Terai (n = 75)	All (n = 150)
<i>Construction of wall</i>			
Cement bounded brick	0	4	2
Mud bounded brick	2	2	2
Mud bounded stone	96	0	48
Wood	0	30	15
Mud and straw	2	64	33
<i>Construction material of roof</i>			
Straw/Thatched	90	53	72
Galvanised sheet	10	25	17
Tile	0	22	11
<i>Room number</i>			
<= 2	65	44	55
3 - 4	29	38	34
>= 5	6	18	11
<i>Location of animal shed</i>			
None	10	34	22
Attached with living house	32	28	30
Separate shed	58	38	48
<i>Electricity</i>	0	26	13
<i>Cooking fuel used</i>			
Wood	100	92	96
Other (kerosene, cow dung)	0	8	4
<i>Source of water</i>			
Pipe outside house	98	0	47
Tubewell	0	100	50
Spring	2	0	1
<i>Toilet facility</i>	30	30	30

4.2.7 Agricultural equipment and transport ownership

Two-fifths of the households in the Terai had improved ploughs for cultivation, while none of the households in the Hill had access to such equipment. Very few households in the Terai had sprayers, water pumps or threshers, which reflects the continuing prevalence of traditional technology in Nepalese agriculture. Half of the respondents in the Terai used bicycles as a means of transport, while 7% had bullock carts.

Table 4.18: Agricultural equipment and vehicles in the Hill and Terai VDCs of eastern rural Nepal.

Households (%) with	Hill (n = 75)	Terai (n = 75)	All (n = 150)
Improved plough	0	40	20
Sprayer	2	6	5
Water pump	0	4	2
Thresher	0	2	1
Bullock cart	0	14	7
Bicycle	0	50	25

4.2.8 Household indebtedness

Half of the households were in debt in both regions (Table 4.19). A major share (56%) of the loans had been taken out for household consumption. In the Hill, there was a high percentage of borrowing for agricultural purposes, whereas in Terai, it was primarily for business/enterprises. Local moneylenders, friends and relatives were the major sources for loans in the Hill, whereas formal institutions and local moneylenders were the main sources in the Terai. Friends and relatives provided loan funds for nearly one-third of the Hill households. Access to formal lending institution(s) was very restricted in the Hill (90%) compared to the Terai (50%). Moneylenders were the dominant source of credit (consumption credit) in both districts. They charged 36% to 60% interest per annum.

Table 4.19: Household debt and sources of loans in the Hill and Terai VDCs of eastern rural Nepal.

Characteristics	Hill (n = 75)	Terai (n = 73)	All (n = 148)
Amount of outstanding loan (mean Rs)	4,626 (8,096)	4,907 (7,988)	4,763 (8,016)
Household with loan (% households)	53	47	49
Purpose for the loan (% households)			
Agricultural	18	19	19
Service/ business/ enterprises	13	22	17
Land purchase	10	6	8
Household	59	53	56
Source of loan (% households)			
Agricultural banks	10	17	13
Other banks	0	33	16
Moneylenders	59	42	51
Friend/ relatives	31	8	20

Figures in parentheses are the standard deviations.

4.2.9 Sources of household income

Table 4.20 reports the average household income and the percentage earned from various sources in the two geographical regions. The average income of rural households was Rs 33,963 (US\$ 500) per annum. However, there was a significant difference ($t = -3.70$, $P < 0.01$) in the household income of the Hill and Terai households (US\$ 383 vs. US\$ 603, respectively). Average per capita income was 1.5 times higher in the Terai than in the Hill (US\$104 vs. US\$65, respectively).

Table 4.20: Sources of household income in the Hill and Terai VDCs of eastern rural Nepal (1998).

Sources	Hill (n = 75)	Terai (n = 73)	All (n = 148)
Average household income (Rs)	25,853 (22,368)	42,296 (30,845)	33,963 (28,034)
Average per capita income (Rs)	4,398	7,109	5,747
Percentage of income to total income			
Agriculture	64	44	51
Crop	44	38	40
Livestock	20	6	11
Off-farm	36	56	49
Cash income	69	79	78
Contribution of off-farm income to total cash income	52	71	63

Figures in the parentheses are standard deviations.

Sources of household income varied between the two regions. In the Hill, agriculture dominated household income, contributing nearly two-thirds of the annual earnings. In the Terai, off-farm income contributed 56% of total household income. Crop income was the major source of agricultural income in both regions. However, livestock contributed significantly (30%) to the income of the Hill households. In the Terai, off-farm income was the principal source of cash earnings, whereas in the Hill, its contribution was similar to that from agriculture.

4.2.10 Sources of off-farm income

Sources of off-farm income in the study area are presented in Table 4.21. Four sources of off-farm income were identified: wage employment (37%: 29% in the Hill vs. 40% in the Terai); businesses/ enterprises (36%); remittances (23%); and land/property rental and

interest (4%). Remittances were an important source of off-farm income for Hill households - contributing nearly half of the off-farm income, whereas business/enterprises and wage income were the principal source of off-farm income for the rural Terai households - contributing more than three-fifths of the off-farm income.

Table 4.21: Sources of off-farm income in eastern rural Nepal.

Source of household income	Hill	Terai	All
Total income (Rs)	25,853 (22,368)	42,296 (30,845)	33,963 (28,034)
Total off-farm income	9,345 (17,885)	23,827 (24,162)	16,488 (22,355)
▪ Off-farm income as a % of total income	36	56	49
<u>Sources of off-farm income</u>			
Wage/ employment	2,729 (5,354)	9,518 (15,227)	6,078 (11,815)
▪ % of off-farm income	29	40	37
Business / Enterprise	1,261 (5,215)	10,620 (19,489)	5,877 (14,892)
▪ % of off-farm income	14	45	36
Remittances	4,191 (15,224)	3,388 (15,488)	3,795 (15,308)
▪ % of off-farm income	45	14	23
Income from rent/ bond/ interest/ pension	1,163 (5,272)	301 (10,20)	738 (3,833)
▪ % of off-farm income	12	1	4

Figures in parentheses show standard deviations.

The greater importance of wages and businesses/enterprises in the Terai than in the Hills area reflects its proximity to the marketplace and the greater mobility of household members due to roading. In contrast, remittances were much more important to the Hill households, indicating the relatively greater importance of members' residing outside the homestead seeking income for this VDC. Hill residents had to reside away from home to generate extra income from off-farm employment.

4.2.11 Household expenditure

Households in the Terai spent nearly 1.5 times more than those in the Hill (Table 4.22). Food accounted for 30% of the total expenditure in Hills but only around one-quarter in the Terai. Only a small proportion of the households in both regions (10% in the Hill and 12% in the Terai spent a small proportion of expenditure on health and education). Expenditure

on ceremonies accounted for a significant portion of total expenditure in the Hill. One-quarter of the expenditure for the Terai households was for business/enterprise-related expenses, whereas only 2% was spent by the Hill households for the same purpose.

Table 4.22: Allocation of household expenditure in the Hill and Terai VDCs of eastern rural Nepal.

Expenditure items	Hill	Terai	All
Total expenditure (mean Rs)	19,269 (12,255)	32,505 (40,538)	25,797 (30,407)
% of total expenditure			
<i>Food</i>	30	25	27
Grain	15	13	14
Other food items	15	12	13
<i>Services</i>	25	24	24
Cloth and foot wear	15	12	13
Education	5	5	5
Health	5	7	6
<i>Social/Entertainment</i>	24	11	16
Travel	3	3	3
Ceremonies	18	5	10
Liquor	3	3	3
<i>Production activities</i>	21	40	33
Crop	10	11	11
Livestock	9	5	6
Business/enterprises	2	24	16

Figures in parentheses are the standard deviations.

4.2.12 Gender involvement and time allocation in different activities

Table 4.23 shows the days males and females in the Hill and Terai allocated to cropping, off-farm and livestock activities. These times are indicative of their involvement in the various activities, rather than actual times (days are not calculated as eight hours per working day except for livestock). Both males and females in the Hills participated more in the farm production activities than their counterparts from the Terai. Of the total productive days, Hill males allocated 40%, 44% and 16% to cropping, off-farm and livestock activities, respectively while females allocated 58%, 12% and 30% of their time to the same activities, respectively. In the Terai, males allocated 27%, 63% and 10% to cropping, off-farm and livestock activities, respectively, while females allocated 30%, 49% and 21% of their time to the same activities, respectively. Females from both locations were more involved in

agriculture, especially livestock husbandry, whereas males worked more off-farm. Terai females participated much more in off-farm activities than did women from the Hills.

Table 4.23: Time allocation by male and female in various activities in the Hill and Terai VDCs of eastern rural Nepal.

Working days ¹	Hill			Terai			All		
	Male	Female	All	Male	Female	All	Male	Female	All
n	121	100	221	126	113	239	247	213	460
Total	253 (107)	196 (99)	227 (107)	208 (101)	161 (82)	186 (95)	230 (106)	178 (92)	206 (103)
Cropping	100 (83)	113 (70)	106 (78)	56 (68)	48 (56)	52 (63)	77 (79)	79 (71)	78 (75)
Livestock	42 (56)	60 (46)	50 (52)	21 (34)	33 (36)	27 (36)	31 (47)	46 (43)	38 (46)
Off-farm	111 (152)	23 (67)	71 (129)	132 (133)	79 (95)	107 (119)	122 (143)	53 (88)	90 (125)

Figures in parentheses are standard deviations.

¹ The days employed in the activities does not necessarily indicate eight hours a day. Involvement in the activities irrespective of working hour was counted as one working day except in livestock.

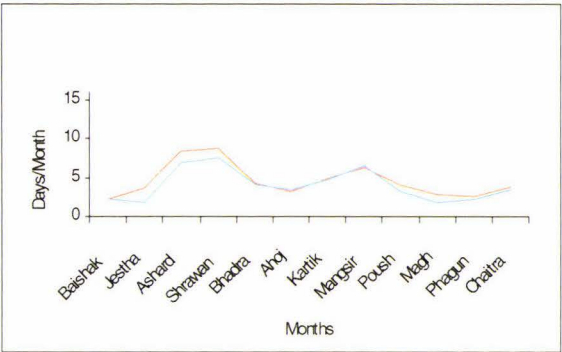
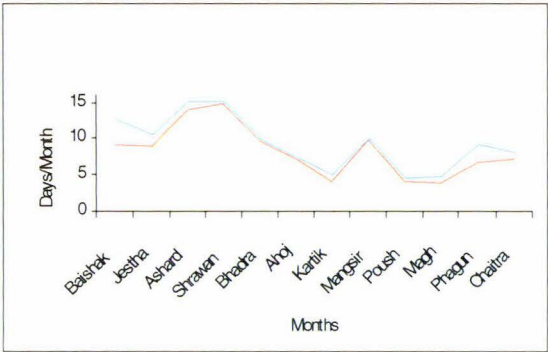
Figure 4.15 shows the monthly allocation of time by gender in the Hill and Terai to cropping, livestock and off-farm activities. Cropping activities in both VDCs were highly seasonal, and both males and females participated equally. The time allocation to livestock was the same throughout the year and in both agro-ecological zones, females spent more time on livestock care than did males. Off-farm activities in the Hill for both males and females were similar throughout the year. However, the participation of females in off-farm activities was very low.

The peak in off-farm activities for females in the Terai occurred in the rainy season (July/August) with planting, which is traditionally recognised in Nepal as a “women’s” job. Similarly, participation of females in off-farm activities in the agricultural season (April-October) in the Hill indicated that off-farm activities for them were limited to agriculture.

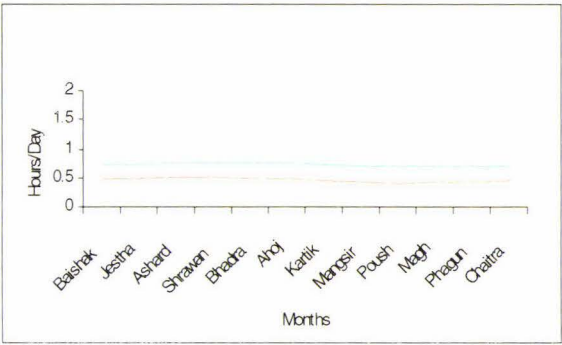
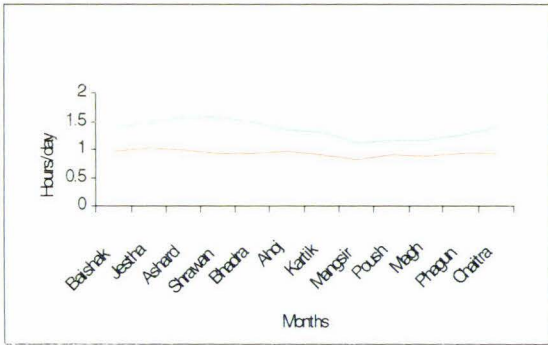
Hill

Terai

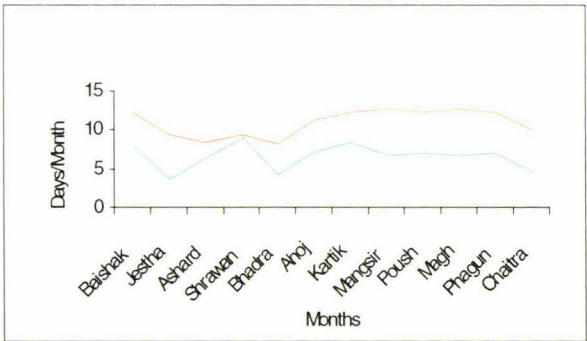
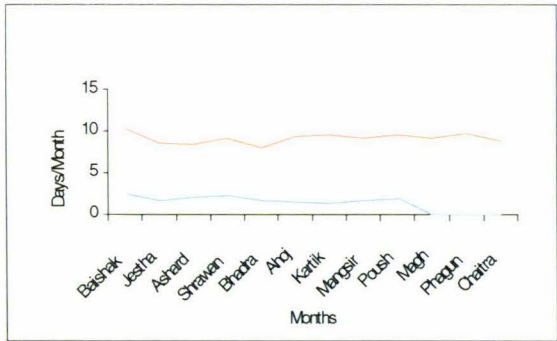
Cropping



Livestock



Off-farm



Legend

- Female
- Male

Figure 4.15: Time allocated to different activities by male and female members in the Hill and Terai VDCs of eastern rural Nepal.

Note: The English calendar starts on mid April reciprocal of Nepali calendar.

4.2.13 Rural business/enterprises

Thirty percent of the sampled households were engaged in business or enterprises, and of these (78%) were located in the Terai (Table 4.24). The full list of business/enterprises operated by the sample households is shown in Appendix VII. Business/enterprises were categorised into two groups to simplify the presentation and interpretation of results: skilled entrepreneurship and trades. In both districts, trades dominated the rural enterprises (Table 4.24). Four-fifths of the Hill and 75% of the Terai entrepreneurial households were engaged in trade. In the Hill, males operated almost all of the enterprises, whereas in the Terai, female involvement in trades was high. Of all the rural enterprises, 60% in the Hill and 80% in the Terai were home-based. In the Hill 60% of the enterprises were seasonal, but in the Terai most enterprises (89%) operated year round.

Table 4.24: Gender and household involvement in business/enterprises in the Hill and Terai VDCs of eastern rural Nepal.

Characteristic	Hill			Terai			All
	Skilled	Trade	All	Skilled	Trade	All	
n	2	8	10	9	27	36	46
<i>Operator</i> (% enterprise)							
• Male	50	100	90	67	44	50	59
• Female				33	41	38	24
• Household	50		10		15	12	11
<i>Location</i>							
• Own living house	50	63	60	78	78	78	74
• Own but separate house	50	25	20				4
• Rented house		12	20	22	15	17	18
• Hat-bazaar					7	5	4
<i>Operation months¹</i> (% enterprise)							
• Baishakh	50		10		4	3	4
• Bhadra		12	10				3
• Asoj		25	20				4
• Poush		12	10		4	4	4
• Magh				11	4	4	4
• Chaitra		12	10				3
• Year round	50	39	40	89	89	89	78

¹ Months are according to Nepali calendar: see Appendix III for the English equivalent.

4.2.14 Household income and landholding size

The relationship between total household income and land holding was positive (Figure 4.16). Though the difference within farm sizes was only 0.5 hectares, differences in household incomes between the different farm size groups were significant. Household income for the Terai households was nearly double that of the Hill households but this difference decreased as land holding size increased for the latter. Income disparity within farm size groups was much greater in the Hill households than in the Terai. The total income of the households with less than 0.5 hectares was nearly 2.5 times less than that of the largest farm size group (>1 ha) in the Hill, and about two times less in the Terai.

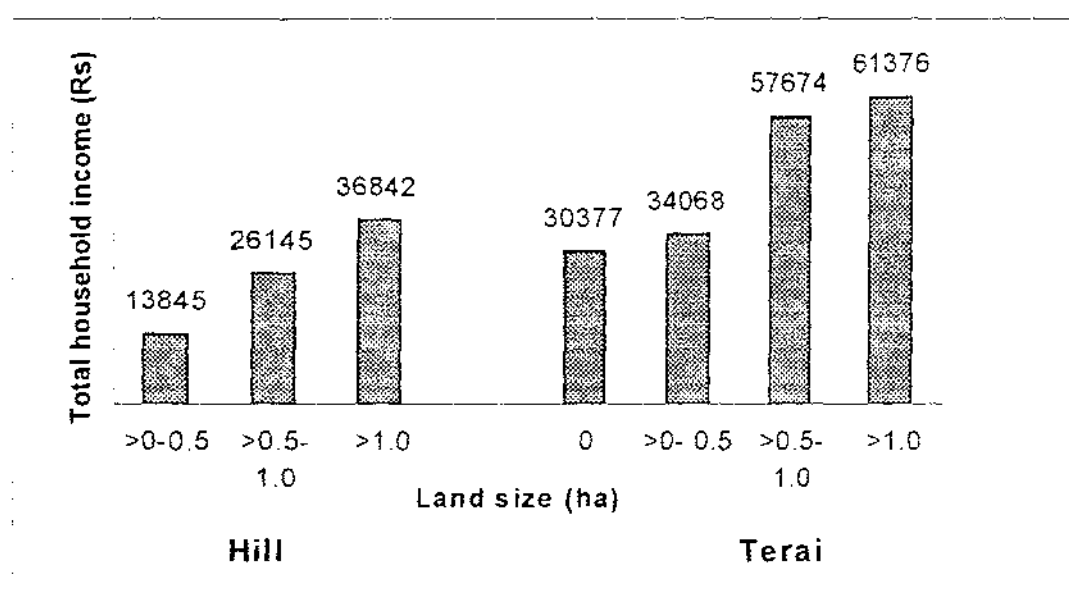


Figure 4.16: Total household income by landholding size in the Hill and Terai VDCs of eastern rural Nepal.

Source: Appendix IV.

Crops contributed more to total household income as landholding size increased (Figure 4.17). In contrast, the contribution of off-farm income in the Terai steadily declined as landholding size increased. The contribution of livestock to total household income was low, and was not clearly associated with landholding area. The relationship between land area and household income indicates that small landholders are much more dependant on off-farm income than large landholders.

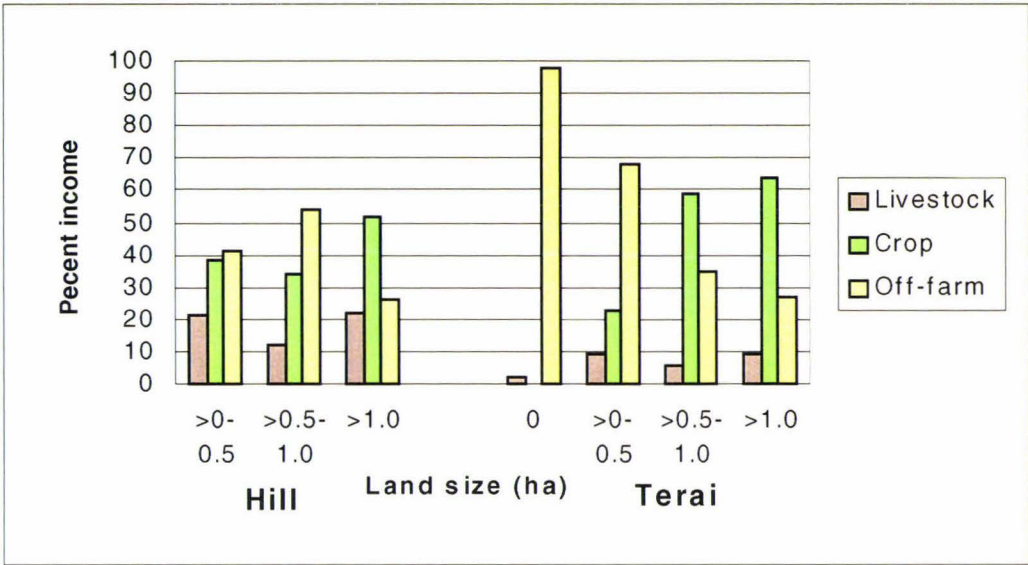


Figure 4.17: Percentage of total household income from various sources by landholding size in the Hill and Terai VDCs of eastern rural Nepal.

Source: Appendix IV.

4.2.15 Relation between off-farm and agricultural income

The relationship between the percentage of off-farm and agricultural (crop and livestock) income as a proportion of total household income is shown in Figure 4.18. The large pie represents the relationship between agricultural and off-farm income in household earning, while the small pie depicts the relationship between crop and livestock income as a percentage of total agricultural income. Off-farm income made a greater contribution to total income in the Terai than in the Hill, for all household categories.

A notable feature of Figure 4.12 is the association between the shares of household off-farm, livestock and crop income in the two agro-ecological zones. The results indicate that cropping activities are indispensable for the Hill households, as reflected by the higher share of crop income for every household category compared to the Terai. However, as the share of off-farm income increased in the Hill households, livestock contributed less to agricultural income, the opposite to the situation in the Terai. Both off-farm and livestock activities are labour-intensive, and a choice needs to be made between the livestock and off-farm earnings from them if surplus labour is not available. Similarly, in the Terai there was competition for household resources to support cropping and off-farm activities. In the

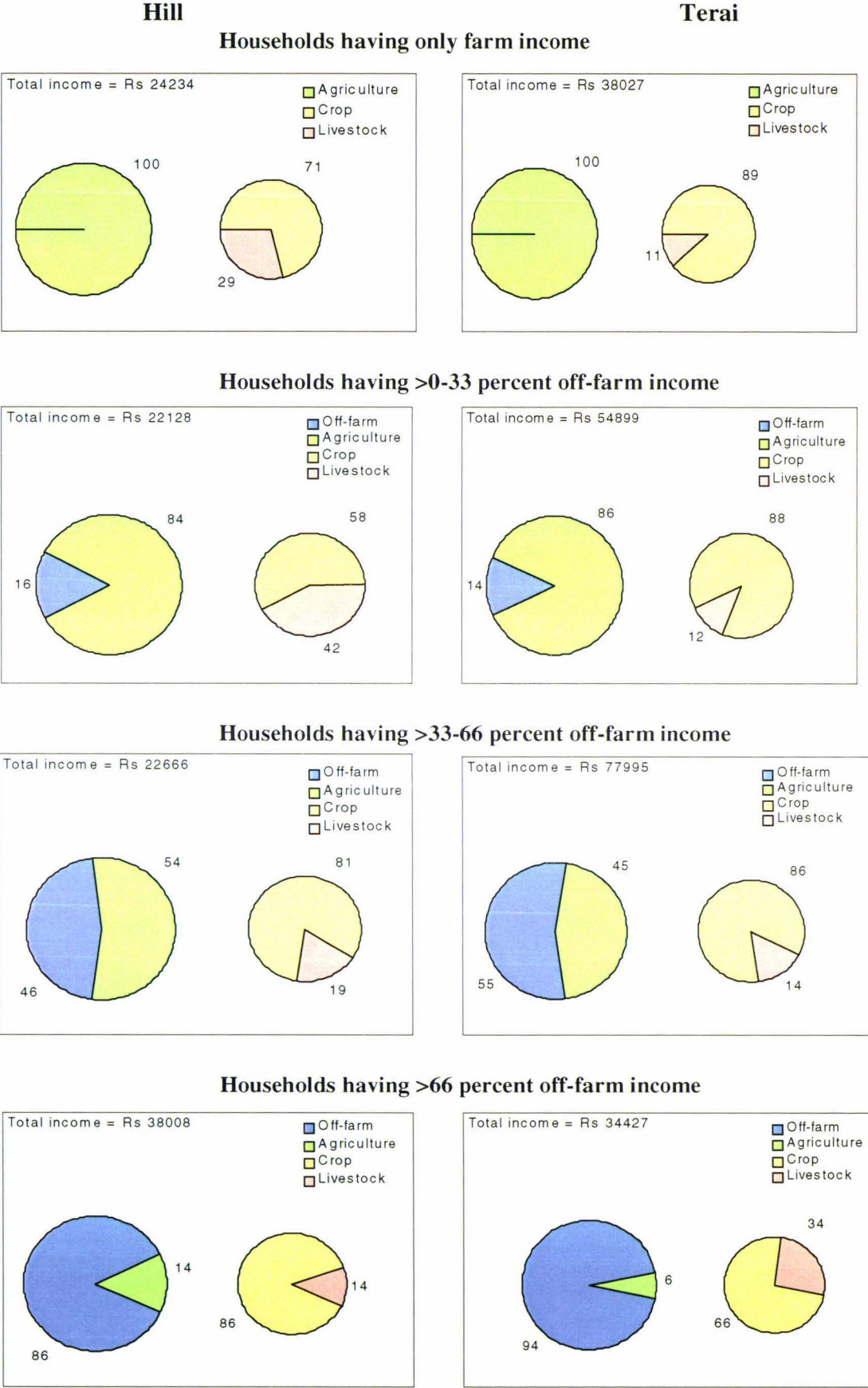


Figure 4.18: Sources of household income by percentage of off-farm income in the Hill and Terai VDCs of eastern rural Nepal.

Terai, because households with a greater share of off-farm income had less cultivable land, their main option for additional income was to adopt strategies for more off-farm work and livestock production. This increased the share of off-farm and livestock income as crop income declined as a percentage of household income.

Off-farm income by farm size

The relationships between the four categories of farm size and the four major sources of off-farm income are presented in Table 4.25. Small landholding households earned a substantial portion of their off-farm income from wages in both the Hill and the Terai, whereas larger farms earned more from business/enterprises and remittances, especially in the Terai. The results imply that poor households in the Hill have fewer opportunities to earn revenue from small business/enterprises than do their counterparts in the Terai.

Table 4.25: Sources of off-farm income by farm size (ha) in the Hill and Terai VDCs of eastern rural Nepal.

Farm size (ha)	n	Total off-farm income (mean Rs)	Percentage of off-farm income			
			Wage	Business/enterprises	Remittances	Fixed income ¹
Hill²						
> 0 - 0.5	27	5,644	45	8	23	24
> 0.5 - 1.0	19	14,074	16	11	60	13
> 1.0	29	9,691	34	19	42	5
Terai						
0	29	29,690	52	44	3	1
0.5 = <	17	23,553	37	25	36	2
> 0.5 - 1.0	8	20,338	1	81	18	0
> 1.0	19	16,592	29	54	14	3
All						
0	29	29,690	52	44	3	1
0.5 = <	44	12,564	40	20	32	8
> 0.5 - 1.0	27	15,930	10	37	45	8
> 1.0	48	12,423	31	37	27	5

¹ Fixed income includes income from rent, bond, interest and pension.

² In the Hill all the households had cultivable land, therefore there are only three categories of farm size.

The association between the sources of off-farm income and households with different shares of off-farm income is shown in Table 4.26. In the Hill, total off-farm income increased by nearly threefold as the share of off-farm income doubled. Hill households with a smaller share of off-farm income earned more through wages than those with higher proportions of off-farm income: the reverse applied in the Terai. Remittances to Hill households and earning from business/enterprises in the Terai contributed significantly to off-farm income. The greater share of remittances in the off-farm income of the Hill households highlights the limited opportunities for earning off-farm income within the VDC. In contrast, households in Terai had more opportunities to earn off-farm income from within their resident area.

Table 4.26: Sources of off-farm income by household share of off-farm in total income in the Hill and Terai VDCs of eastern rural Nepal.

Household share of off-farm income in total income (%)	n	Total off-farm income (mean Rs)	Percentage of off-farm income			
			Wage	Business/enterprises	Remittances	Fixed income
Hill						
33 =<	22	3,511 (2,797)	39	20	21	20
> 33 - 66	16	10,388 (7,444)	66	23	11	0
> 66	14	32,671 (30,737)	14	9	61	16
Terai						
33 =<	8	7,481 (4,956)	15	40	35	9
> 33 - 66	12	42,653 (32,303)	12	73	10	5
> 66	40	32,192 (24,017)	48	37	14	1
All						
33 =<	30	4,570 (3,845)	29	29	27	15
> 33 - 66	28	24,216 (26,838)	25	61	10	4
> 66	54	32,316 (25,617)	40	30	26	4

The figures in parentheses show standard deviations.

4.2.16 Household expenditure by household share of off-farm income

Table 4.27 indicates the proportion of expenditure on various items for households with different percentages of off-farm earnings. Food items accounted for most of the expenditure in all households. However, expenditure on food was generally greater in the Hill (25% to 39%) than the Terai households (14% to 31%). Moreover, the share of food expenditure increased as contribution of off-farm income increased and was greatest in households with the largest (>66%) share of off-farm income. Expenditure on services (health, education and clothing) decreased as the percentage of off-farm income increased in households of both regions. In the Hill VDCs, ceremonies and social events accounted for a significant portion of expenditure for all households. A notable share of household expenditure was on agriculture (crop and livestock), but most households did not have any expenditure on business/enterprise activities. In the Terai, only those households which received more than two-thirds of their income from agriculture spent a significant proportion (36% to 46%) on agriculture: other households spent more on business/enterprises (34%).

The contribution of off-farm income to household expenditure (expressed as the proportion of off-farm income in the total expenditure) is shown in Table 4.28. The contribution of off-farm income to expenditure was more prominent in the Terai than in the Hill households, and contributed more than half of the spending in these households. Even on agricultural items, off-farm income contributed to about 40% of the total expenditure in the Terai. In the Hill, except for enterprise/business related expenditure, off-farm income contributed to less than half of most household expenditure. In both locations, business/enterprises could be run solely by using off-farm income.

Table 4.27: Expenditure pattern of households by share of off-farm income as a percentage of total household income in the Hill and Terai VDCs of eastern rural Nepal.

Expenditure item	Hill Contribution of off-farm in total income (%)				Terai Contribution of off-farm in total income (%)				All Contribution of off-farm in total income (%)			
	0	>0-33	>33-66	>66	0	>0-33	>33-66	>66	0	>0-33	>33-66	>66
<i>Food</i>	25	32	29	39	16	14	14	30	24	24	19	32
Grain	10	16	16	21	3	2	5	19	7	10	9	20
Other food	15	16	13	18	13	12	9	11	17	14	10	12
<i>Services</i>	27	26	19	26	39	30	21	20	31	28	20	21
Education	6	4	5	4	8	7	3	5	7	5	4	5
Cloth/ footwear	15	15	12	16	18	15	11	10	16	15	11	11
Medicine	6	7	2	6	11	8	7	5	8	8	5	5
<i>Social/ entertainment</i>	21	24	32	21	11	8	13	12	17	17	21	14
Travel	3	4	4	2	4	3	3	3	3	4	4	3
Ceremonies	16	15	26	15	5	3	8	5	12	9	15	7
Liquor	2	5	2	4	2	2	2	4	2	4	2	4
<i>Investment</i>	27	17	20	14	38	48	52	37	31	32	40	35
Crop	11	10	7	11	27	36	10	1	17	22	9	3
Livestock	16	7	6	3	9	10	8	2	14	9	7	3
Business/ enterprises	0	0	7	0	0	2	34	34	0	1	24	29

Table 4.28: Contribution of off-farm income to household expenditure in the Hill and Terai VDCs of eastern rural Nepal.

Expenditure items	Percentage off-farm income (mean)		
	Hill	Terai	All
Grain	49 (48)	79 (37)	63 (45)
Other food items	42 (44)	68 (43)	55 (46)
Cloth and foot wear	42 (44)	65 (44)	53 (45)
Education	40 (46)	62 (46)	51 (47)
Health	33 (43)	66 (62)	50 (47)
Purchase of agricultural equipment	40 (49)	39 (48)	39 (48)
Agricultural labour	27 (44)	38 (46)	32 (45)
Livestock purchase	23 (41)	51 (50)	36 (47)
Livestock food	27 (42)	42 (49)	34 (46)
Business/enterprises material purchase	100	98 (10)	22 (58)
Business/enterprises maintenance	93 (12)	100	98 (6)
Travel	41 (47)	66 (45)	55 (48)
Ceremonies	40 (47)	74 (42)	53 (48)
Liquor	43 (47)	70 (45)	56 (48)

Figures in parentheses are the standard deviations.

Table 4.29 shows the contribution of off-farm income to household expenditure by farm size. Off-farm income's contribution decreased as farm size increased, especially in the Terai. In the Hill VDCs, the average contribution of off-farm income to household expenditure for all farm sizes was around half. Nevertheless, in the Terai, households with less than 1.0 hectare of land depended almost entirely on off-farm income for their household expenditure. Conversely, households with more than one hectare of cultivable land depended mostly on agricultural income for their expenditure. Thus, in the Hill VDCs, both off-farm and farm income were important to the household, whereas in the Terai, this was affected by the size of the landholding.

Table 4.29: Contribution of off-farm income to household expenditure by farm sizes (ha) in the Hill and Terai VDCs of eastern rural Nepal.

Expenditure items	Percentage off-farm income (mean) by farm size (ha)										
	Hill			Terai				All			
	>0-0.5	>0.5-1.0	>1.0	0	>0-0.5	>0.5-1.0	>1.0	0	>0-0.5	>0.5-1.0	>1.0
Grain	48 (49)	53 (48)	45 (48)	97 (10)	80 (37)	37 (44)	21 (44)	97 (10)	57 (47)	49 (46)	40 (48)
Other food items	46 (49)	56 (46)	30 (11)	97 (10)	64 (46)	39 (49)	38 (44)	97 (10)	53 (48)	51 (47)	33 (42)
Cloth and foot wear	43 (44)	51 (44)	35 (44)	95 (12)	62 (48)	44 (50)	30 (39)	95 (12)	50 (46)	49 (45)	33 (41)
Education	48 (48)	50 (50)	31 (44)	98 (5)	66 (46)	43 (51)	28 (41)	98 (5)	57 (47)	47 (49)	30 (42)
Health	38 (47)	50 (45)	19 (37)	97 (11)	67 (49)	49 (52)	21 (35)	97 (11)	52 (49)	49 (47)	20 (35)
Purchase of agricultural equipment	45 (51)	53 (48)	29 (46)	.	67 (49)	31 (43)	17 (38)	.	54 (51)	46 (47)	24 (43)
Agricultural labour	38 (50)	28 (44)	18 (39)	.	64 (50)	22 (39)	29 (41)	.	48 (51)	25 (41)	23 (40)
Livestock purchase	28 (44)	44 (53)	2 (8)	54 (51)	80 (45)	100 (46)	25 (51)	54 (51)	54 (50)	54 (53)	12 (32)
Livestock food	13 (35)	50 (55)	25 (40)	81 (42)	56 (53)	13 (25)	25 (45)	81 (42)	35 (49)	25 (47)	25 (41)
Business/enterprises material purchase	.	100	.	99 (2)	100 (0)	100 (0)	86 (24)	99 (2)	100 (0)	100 (0)	86 (26)
Business/enterprises maintenance	.	93 (12)	.	100 (0)	100 (0)	100 (0)	.	100 (0)	100 (0)	95 (10)	.
Travel	55 (51)	46 (47)	28 (43)	95 (19)	69 (48)	41 (47)	35 (44)	95 (19)	61 (49)	44 (46)	31 (43)
Ceremonies	41 (48)	40 (49)	39 (48)	93 (24)	90 (30)	50 (55)	39 (45)	93 (24)	57 (48)	43 (49)	39 (47)
Liquor	51 (49)	48 (49)	29 (43)	98 (10)	62 (51)	42 (49)	43 (50)	98 (10)	54 (49)	46 (48)	34 (46)

Note: Figures in parentheses are the standard deviations.

A . indicates that the expenditure item was not applicable.

4.2.17 Land holding pattern by household share of off-farm income

In both the Hill and Terai VDCs, household land (own and cultivable) decreased as the contribution of off-farm income to household income increased (Table 4.30). The irrigated area also decreased as income from off-farm sources increased. The distribution of land across the household categories was even in the Hill but varied substantially in the Terai – the difference in cultivable land size was 18 times between the households with 33 - 66% and > 66% of total household income from off-farm sources. Share-cropping was more common in the Terai than in the Hill, and the land rental was inversely related to the contribution of off-farm income to the household in both regions.

Table 4.30: Household land holding size in household category based on share of off-farm income in total household income in the Hill and Terai VDCs of eastern rural Nepal.

Household category by share of off-farm income	Household own land (ha)	Cultivable land (ha)	Irrigated land (ha)	Rented in-land (ha)	Share cropping (ha)
Hill					
0	1.02 (1.04)	0.98 (0.92)	0.51 (0.50)	0.22 (0.32)	0
33 =<	0.98 (0.73)	1.14 (0.70)	0.48 (0.57)	0.22 (0.44)	0
> 33 - 66	0.67 (0.41)	0.67 (0.43)	0.34 (0.44)	0.12 (0.21)	0.03 (0.07)
> 66	0.62 (0.65)	0.67 (0.61)	0.33 (0.46)	0.15 (0.38)	0.01 (0.04)
All Hill	0.86 (0.78)	0.90 (0.73)	0.43 (0.50)	0.18 (0.35)	0.01 (0.04)
Terai					
0	0.42 (0.41)	0.85 (0.50)	0.85 (0.50)	0.07 (0.14)	0.41 (0.52)
33 =<	1.45 (1.12)	1.79 (0.71)	1.66 (0.61)	0.04 (0.12)	0.35 (0.73)
> 33 - 66	1.14 (2.12)	1.40 (1.69)	1.14 (1.61)	0	0.50 (0.69)
> 66	0.07 (0.10)	0.10 (0.32)	0.10 (0.30)	0	0.13 (0.39)
All Terai	0.47 (0.47)	0.64 (0.99)	0.58 (0.91)	0.02 (0.08)	0.27 (0.52)
All					
0	0.79 (0.90)	0.93 (0.78)	0.64 (0.52)	0.16 (0.28)	0.16 (0.37)
33 =<	1.11 (0.86)	1.31 (0.75)	0.80 (0.78)	0.17 (0.38)	0.09 (0.39)
> 33 - 66	0.87 (1.41)	0.99 (1.18)	0.69 (1.15)	0.07 (0.17)	0.23 (0.51)
> 66	0.21 (0.42)	0.25 (0.48)	0.16 (0.35)	0.04 (0.20)	0.10 (0.34)
All (Hill and Terai)	0.66 (0.66)	0.77 (0.87)	0.50 (0.74)	0.1 (0.26)	0.14 (0.39)

Figures in parentheses are standard deviations.

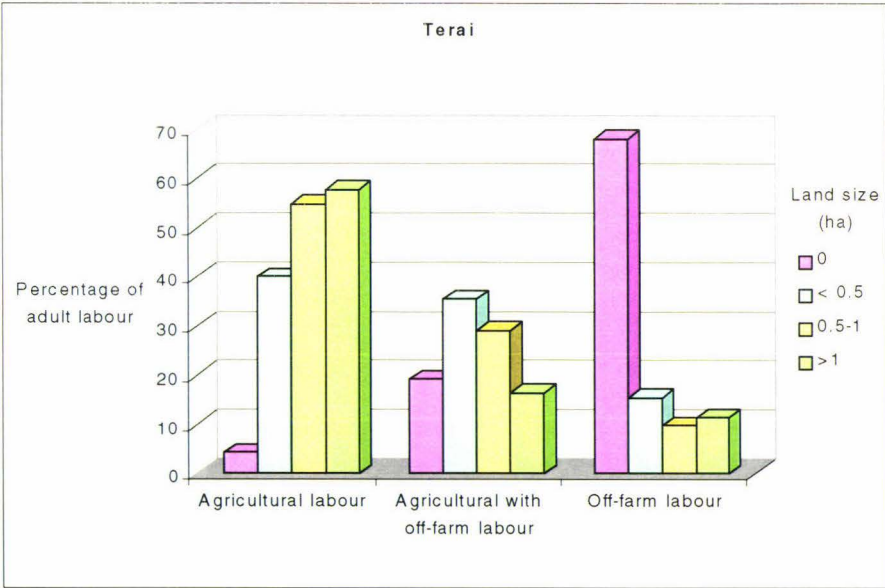
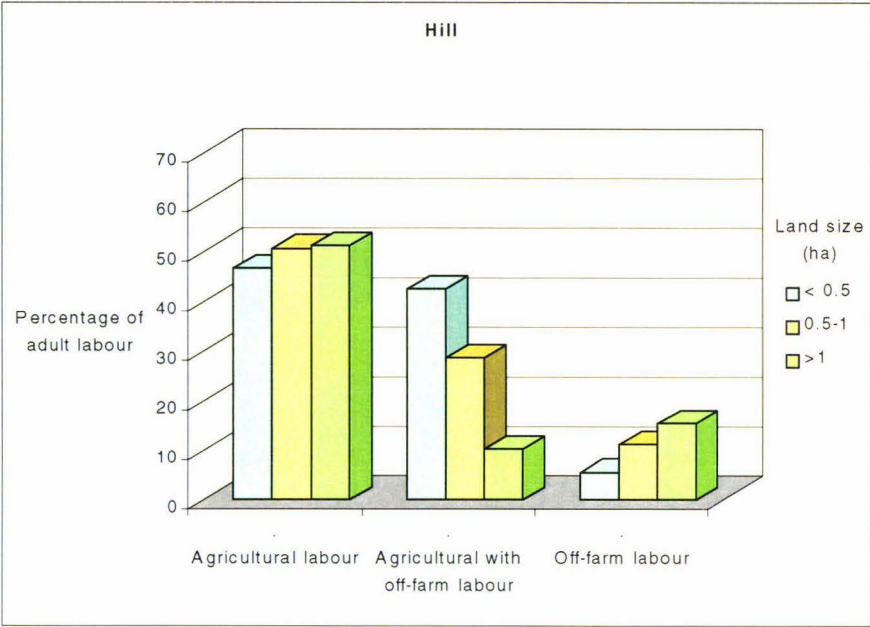
4.2.18 Involvement of household labour and land holding size

Figure 4.19 depicts the relationship between household labour (members in the 15-64 years of age group) by land holding size. In the Hill, the number of household members involved in both agricultural and off-farm activities increased with farm size, while in the Terai the reverse applied as farm size increased. Household labour involvement in farming activities

was high in both agro-ecological zones, reflecting the relatively few off-farm opportunities for work. For example, households with more than 0.5 ha land (in both areas) allocated half or more of their labour to agricultural activities. Smaller farms (< 0.5 ha) also employed a similar portion of labour in farm activities. In the Terai, the majority of households were engaged in off-farm work. The lower involvement in off-farm activities in the Hill was reported to be associated with the high cost, particularly for marginal households of searching for a job.

Household labour and share of off-farm income in the households

The distribution of household labour in terms of the type of employment relative to the contribution of off-farm income to the household is shown in Table 4.31. When households generated income from off-farm sources, the household size (members in the household) consistently decreased as the share of income from off-farm increased. Household size was the least for those who did not generate any off-farm income. This suggests that there is a threshold beyond which household size increases as its members initially earn additional income from off-farm sources. It was not possible to determine this threshold for the study area from the data collected. In a few cases, households had members working off-farm who did not contribute to their income. (These were therefore classified as “only with farm income”). As expected, the number of household members working off-farm increased as contribution of off-farm income to the household increased, especially in the Terai VDC.



Figures 4.19: Household labour and landholding size (ha) in the Hill and Terai VDCs of eastern rural Nepal.

Table 4.31: Household labour distribution relative to the share of off-farm income earned by the household (1998).

Share of off-farm income (%)	Total household members (Number)	Economically active members (15-64 years) (Number)	Agricultural labour members (Number)	Agricultural with off-farm labour members (Number)	Off-farm labour members (Number)
Hill					
0	5.61 (2.97)	3.22 (2.32)	2.65 (1.70)	0	0.22 (0.42)
>0-33	6.32 (3.08)	4.14 (2.44)	1.27 (1.24)	1.27 (1.08)	0.59 (0.96)
>33-66	6.06 (3.34)	3.69 (2.63)	1.88 (1.26)	0.94 (0.57)	0.56 (1.03)
>66	5.43 (3.69)	3.57 (2.59)	1.29 (1.68)	1.00 (1.04)	0.50 (0.52)
All (Hill)	5.88 (3.17)	3.65 (2.45)	1.83 (1.57)	0.76 (0.93)	0.45 (0.78)
Terai					
0	4.64 (1.28)	3.07 (1.21)	2.79 (1.12)	0	0.07 (0.27)
>0-33	9.50 (4.78)	5.50 (3.46)	3.13 (2.59)	1.25 (1.16)	0.50 (0.76)
>33-66	6.86 (2.08)	4.42 (1.73)	1.58 (1.00)	1.42 (1.38)	0.83 (0.94)
>66	5.45 (1.88)	3.29 (1.68)	0.35 (0.74)	0.08 (0.99)	1.80 (1.36)
All (Terai)	5.95 (2.63)	3.67 (1.99)	1.31 (1.60)	0.79 (1.07)	1.17 (1.30)
All					
0	5.24 (2.49)	3.16 (1.95)	2.70 (1.49)	0	0.16 (0.37)
>0-33	7.17 (3.80)	4.50 (2.75)	1.77 (1.85)	1.27 (1.08)	0.57 (0.90)
>33-66	6.39 (2.85)	4.00 (2.28)	1.75 (1.14)	1.14 (1.01)	0.68 (0.98)
>66	5.44 (2.44)	3.36 (1.93)	0.59 (1.12)	0.85 (1.00)	1.46 (1.33)
All (Hill and Terai)	5.91 (2.91)	3.66 (2.22)	1.57 (1.60)	0.77 (1.00)	0.81 (1.13)

Figures in parentheses are the standard deviations.

4.2.19 Off-farm employment of household members

The data set provided information on 233 individuals employed in off-farm activities. To simplify the analysis of data, the off-farm activities were categorised into three areas: waged labour; skilled labour, and traders (Appendix VI).

Table 4.32 indicates the characteristics of the off-farm employees in the study area. In both VDCs, the average age of off-farm employees was similar for all three categories (mean 32 years). On average, skilled labourers were the “best” and wage labourers the “least” educated in both VDCs, respectively. There was a significant difference in the education level of waged and skilled labour ($t = -4.73$, $P < 0.01$), and between skilled labourers and traders ($t = 3.315$, $P < 0.01$), but not between traders and waged labours. The participation of females from the Hill in off-farm activities was low and dominated by waged employment. In the Terai, however more than half of the females were employed in both waged labour and trades, and about one quarter were involved in occupations requiring skilled labour. Overall, the gender of Terai household members was significantly associated with the type of off-farm employment ($\chi^2 (2, N = 233) = 34.15$, $P < 0.01$). Because no females from the Hills participated in the trades and skilled occupations, statistically valid conclusions concerning gender and off-farm employment could not be drawn.

Three quarters of the off-farm employees were married. Unmarried individuals were most common (about one-third in the Hill and Terai) in the waged labour group. Off-farm employment was also associated with ethnicity, $\chi^2 (6, n = 233) = 33.14$, $P < 0.01$. The Chhetri/Brahmin/Newar mostly concentrated in skilled labour and trade. On the other hand, the Magar/Limbu/Rai/Tamang were mostly engaged in waged labour. Ethnic groups such as the Bishwakarma/Nepali/Muslim were engaged as skilled labourers rather than in other types of off-farm activities. In the Terai, the local tribes (Tharu/Khawas) were mostly engaged in waged labour and trades rather than in skilled labour. Just nine percent of all the individuals ($n = 233$) had some form of vocational training. Trained individuals were more prevalent in the Terai than in the Hill, and were mostly involved in either skilled labour or a trade.

The spouses of the individuals who were engaged in off-farm activities were less educated (mean 2.54 years of schooling) than those who were not. In the Hill, most spouses of the off-farm employees were engaged in agriculture, while in the Terai, two-fifths of the spouses of the traders and waged labourers had the same occupation as the off-farm employee. In both locations, the spouses of the skilled labourers were mostly engaged in household work (41% and 31% in the Hill and Terai, respectively).

Skilled labour in the Hill and traders in the Terai had the largest household size. Waged workers in the Hill and traders in the Terai had the highest dependant ratio. In both agro-ecological zones, traders owned the most land, and waged labourers the least. However, skilled labourers had more cultivable land than the other two categories of off-farm employees.

Table 4.32: Characteristics of off-farm employees in the Hill and Terai VDCs of eastern Nepal (1998).

Characteristics	Hill			Terai			All
	Waged	Skilled	Trader	Waged	Skilled	Trader	
n	48	37	6	42	44	56	233
Age	30 (11)	32 (10)	35 (12)	32 (15)	34 (13)	32 (11)	32 (12)
Years of schooling	2.50 (3.31)	5.56 (4.61)	3.50 (3.73)	2.17 (3.56)	5.18 (5.02)	2.96 (3.80)	3.58 (4.24)
% female	50	0	0	52	23	57	38
% married	69	78	83	62	75	89	76
<i>Ethnicity (% individuals)</i>							
• Chhetri/Brahmin/Newar	15	24	17	0	32	30	21
• Magar/Limbu/Rai/Tamang	79	62	83	7	9	11	34
• Tharu/Khawas	0	0	0	69	32	50	30
• Others*	6	14	0	24	27	9	15
Individuals with vocational training (% individuals)	2	11	17	0	27	7	9
Spouse years of schooling	1.73 (2.97)	2.00 (3.17)	0.40 (0.55)	2.91 (3.80)	2.34 (3.81)	3.58 (3.87)	2.54 (3.57)
<i>Spouse occupation (% married individuals)</i>							
• Housework	18	41			31	19	21
• Agriculture	55	56	100	17	16	17	33
• Wage labour	18	4		48	12	10	16
• Skilled labour	6			17	25	15	13
• Trader				17	16	40	17
Members per household	7.21 (3.68)	7.76 (4.04)	4.00 (1.79)	6.43 (2.25)	6.52 (3.04)	6.80 (2.71)	6.85 (3.18)
Dependant ratio	40 (24)	28 (21)	17 (21)	35 (17)	32 (22)	39 (19)	35 (21)
Household own land (ha)	0.76 (0.68)	0.87 (0.85)	1.11 (0.95)	0.07 (0.12)	0.41 (1.20)	0.47 (1.16)	0.53 (0.95)
Cultivable land (ha)	0.92 (0.69)	1.04 (0.74)	0.99 (0.89)	0.26 (0.34)	0.67 (1.11)	0.56 (1.02)	0.69 (0.87)

Figures in parentheses are standard deviations.

Two-thirds of the off-farm employees worked in their own village (Table 4.33). However, more Hill residents worked outside of their village than those from the Terai. Hill residents who were engaged in skilled labour in contrast to those from Terai, sought employment outside the country, especially in India, rather than in urban Nepal. In both districts, those in trades worked closer to their homestead rather than outside their village.

Table 4.33: Attributes of individuals involved in off-farm employment in the Hill and Terai VDCs of eastern Nepal (1998).

Characteristics	Hill			Terai			All
	Wage labour	Skilled labour	Trader	Wage labour	Skilled labour	Trader	
n	48	37	6	42	44	56	233
<i>Employment place</i> (% individuals)							
• Own village	75	41	67	69	55	88	67
• Different village	4	5	33	7	21	3	8
• Urban place	15	8		17	23	9	14
• India		27		5	2		6
• Overseas	6	19		2			5
<i>Reason for off-farm employment</i> (% individuals)							
• Not enough farm income	88	78	50	12	18	25	43
• Not sufficient farm work	4	3	33	24	23	29	18
• No cultivable land	8	19	17	64	59	46	39
<i>Knowledge of off-farm employment</i>							
• Family members	52	19	17	45	18	30	33
• Relatives	4	11	66	2	5	9	6
• Friends	8	65		23	39	27	31
• Own	35	5	17	23	39	39	30
<i>Wanting more days to work off-farm</i> (% individuals)	73	81	50	100	82	81	84
<i>Reason for not working off-farm</i> (% wanting more off-farm)							
• Could not find any work	80	88	50	74	96	70	79
• No skill	4						1
• Work in agriculture				3			4
• Work in house		12	5			9	10
• No capital	12			18			4
• Health						9	1
• Study	4			2	1	11	1

Low farm income in the Hill and no cultivable land in the Terai, were the respective primary reasons, why off-farm employment was sought in the study VDCs. Nearly half of the waged labour received information about their job through family members whereas skilled labourers received the information through friends. An overwhelming majority of the individuals (84%) wanted to work more days in off-farm activities. About 80% of these who wanted more off-farm work were unable to find it. Only a few respondents (4%) said farming requirements took precedence over off-farm work.

4.2.20 Relationship between income, employment and landholding size

The correlation analysis showed that total household and crop income were positively associated with land owned and cultivated by the households, and with household size in the two agro-ecological zones (Table 4.34). Off-farm income was not significantly associated with any of these variables, while livestock income was positively associated with land size. Crop income was moderately to strongly associated with land holding and household size. As expected, members working only in agriculture were positively, but moderately, related to land and household size in both locations. Members working only in off-farm activities were positively, but weakly, associated with land area and household size in the Hill - and negatively with land area in the Terai. Members working in both agricultural and off-farm activities were weakly, but negatively, associated with land holding in the Hill - but were positively associated with these variables in the Terai. The results highlight the importance of the size of land holding for household income in rural Nepal. Furthermore, the positive association between household size and crop income suggests a high dependency on cropping activities, and indicates an imperfect labour market where both the hiring and selling of labour are difficult.

Table 4.34: Association between household size, land and income.

Variables	Total income	Off-farm income	Crop income	Livestock income	Household members in		
					only off-farm activities	only agricultural activities	both off-farm and agricultural activities
Hill							
Own land	0.48*** ¹	0.01	0.40***	0.25**	0.30***	0.32***	-0.31***
Cultivable land	0.47***	0.02	0.60***	0.36***	0.39***	0.36***	-0.23**
Household size	0.43***	0.17	0.36***	0.00	0.47***	0.48***	0.11
Terai							
Own land	0.56***	0.06	0.70***	0.22*	-0.21	0.22*	0.00
Cultivable land	0.59***	-0.03	0.86***	0.47***	-0.23**	0.45***	0.00
Household size	0.31***	0.04	0.46***	0.18	0.07	0.47***	0.35***
All							
Own land	0.41***	-0.3	0.54***	0.25***	-0.6	0.29***	-0.12
Cultivable land	0.46***	-0.06	0.72***	0.39***	-0.08	0.43***	-0.10
Household size	0.34***	0.01	0.38***	0.06	0.22***	0.46***	0.23***

¹P<0.1 **P<0.05 ***P<0.01.

4.2.21 Income and expenditure of off-farm employee households

Both the income and expenditure of households with off-farm employees were greater than for the average household surveyed (Rs 36,040 vs. Rs 33,963 in terms of income and Rs 28,422 vs. Rs 25,797 in terms of expenditure) of the survey sample (Table 4.35). Income of the Terai households with off-farm employees was 1.5 times greater than for their counterparts in the Hill. In both VDCs, household income was greater for traders than skilled labourers, and this, in turn, was greater than for waged labourers. However, the percentage household income from off-farm sources was greater for wage earners than for those with skilled labour or who were traders.

Waged labourers spent about one-fourth of their household expenditure on food in both the Hill and the Terai. They also spent about one-fifth of their expenditure on services (education, health, clothing, and footwear). Households with off-farm employment in the Terai spent much more (36%) on crops, livestock and business/enterprises than did the Hill

households (19%). Traders from both locations spent a significant proportion of their total household expenditure (33% and 45%, respectively in the Hill and Terai) on investments.

Table 4.35: Income and expenditure of households with individuals engaged in off-farm employment in the Hill and Terai VDCs of eastern rural Nepal (1998).

Income/ expenditure	Hill				Terai				All
	Wage labour	Skilled labour	Trader	All	Wage labour	Skilled labour	Trader	All	
Total income	24,874 (23,583)	33,161 (23,753)	3,2791 (18,547)	28,766 (23,502)	33,725 (16,402)	44,109 (34,653)	43,256 (30,084)	40,701 (28,604)	36,040 (27,305)
% off-farm	48	45	42	46	81	69	66	71	63
Total expenditure	16,722 (9,516)	24984 (13799)	22,432 (12,329)	20,458 (12,166)	26,526 (14,906)	28,875 (17,985)	42,428 (45,890)	33,525 (32,210)	28,422 (87,15)
% on:									
Food	38	30	27	33	40	31	24	30	31
Service	26	23	20	24	23	27	17	21	22
Investment	12	24	33	19	24	29	45	36	31
Social/ entertainment	24	23	20	24	13	13	12	13	16

Figures in parentheses are the standard deviation.

4.3 Determinants of off-farm employment and off-farm income

Multivariate analysis was used to study two aspects of the research: off-farm employment and off-farm income. A logistic regression analysis was conducted to determine the factors associated with off-farm employment at the household and individual levels. Ordinary least square (OLS) regression was employed to determine factors associated with household off-farm income. The structures of the models used have been described previously in Section 3.2.

4.3.1 Determinants of off-farm employment at the household level

Four alternative logit model estimations of off-farm employment are presented in Table 4.36. Model 1 indicates factors associated with households involved exclusively in agricultural production; Model 2 shows factors associated with households involved exclusively in off-farm activities; Model 3 shows factors associated with households with both agricultural and off-farm labour compared with only "agricultural" households; and Model 4 explains factors associated with households with both agricultural and off-farm labour compared to only "off-farm" households.

Table 4.36: Factors associated with type of employment at the household level in eastern Nepal (Logistic regression parameter estimates).

Variable	Model 1 Households with agricultural labour only	Model 2 Households with off-farm labour only	Model 3 Households with both agricultural and off-farm labour vs. agricultural households	Model 4 Households with both agricultural and off-farm labour vs. off- farm households
Intercept	-1.5758	-2.9671** ¹	1.7279	2.4410**
Respondent age (years)	-0.0039	0.0050	-0.0075	-0.0207
Ethnicity (Brahmin/Chhetri/ Newar = 1, Others = 0)	1.3316***	-0.0060	-1.4072***	-0.0559
Members per household	-0.2888***	0.0368	0.2967***	0.1128
Dependant ratio ²	1.1707	-2.8752*	-1.4813 ⁺	1.1120
Percentage irrigated land	0.0190***	-0.0256***	-0.0144**	0.0221***
Agro-ecological position of the household (Terai = 1, Hill = 0)	-1.2156**	3.3947***	1.1365**	-2.4101***
Amount owed to financial institutions ('00 Rs)	0.0063**	-0.0020	-0.0061**	0.0001
Income from livestock ('00 Rs)	0.0038	-0.0145	-0.0030	0.0152
Amount spent on social events ('00 Rs)	-0.0049	0.0076	0.0040	-0.0052
Chi square (d.f.)	39.345 (9)	41.985 (9)	33.056 (9)	31.060 (9)
% correct prediction	76.9	84.6	72.8	80.4
Number of observations	143	143	125	112

¹ + P < 0.15 *P < 0.1 **P < 0.05 ***P < 0.01.

² Dependant ratio is defined as a proportion of total number in households who are under 15 and over 64 years of age.

The results suggest that “agriculture only” households tend to be from the Brahmin/Chhetri/Newar ethnic group, and located in the Hills, and have fewer household members. These households also had proportionately more irrigated area, and a higher level of borrowing (Model 1). The households belonging to the Brahmin/Chhetri/Newar ethnic community were nearly four times more likely to be engaged in solely agricultural activities (odds ratio=3.9). On the other hand, the “off-farm” households were more likely to have a

smaller irrigated area, be located in the Terai, and have a lower dependency ratio (fewer younger and older people as a percentage of total household members) (Model 2). The Terai households were 30 times more likely to be involved in off-farm activities only compared to the Hill households (odds ratio=29.8).

Six variables differentiated households with both agricultural and off-farm workers from those with only agricultural workers (Model 3). The latter households tended to: be non-Brahmin/Chhetri/Newar, have more household members, have a lower percentage of irrigated areas, be located in the Terai and have a lower level of borrowing. The households located in the Terai were also three times more likely to be engaged in both off-farm and farm activities compared to those with only agricultural activities.

Model 4 suggests households with both on- and off-farm activities were differentiated from those with only agricultural production by two variables -- a higher percentage of irrigated area and location in the Hills district. Households located in the Terai were less likely to have both agricultural and off-farm workers compared to the households with only off-farm workers.

4.3.2 Factors differentiating types of off-farm employees

The type of off-farm employment varied with the socio-economic characteristics of individuals and their household background. Attempts were made to identify factors which differentiated skilled labourers from wage labourers; skilled labour from traders; and traders from wage labourers using logistic regression models (Table 4.37).

The skilled labourers compared to waged labourers were more likely to be male, have a formal education and belong to the Brahmin/Chhetri/Newar community. Their spouses tended to be engaged in agriculture, and they were more likely to be located in the Terai and to have a better asset structure as reflected by the use of galvanised/tile roofing on their houses. Factors which differentiated skilled labourers from traders included gender (male), education (more years of schooling), better asset structure (galvanised/tile roofing) and residence in the Hill area, although they tended to spend less on social events. The skilled labourers compared to traders were five times more likely to be male and three times more

likely to have a better standard of housing (odds ratio = 5.1 and 3.0, respectively). When traders were compared to waged labourers, they tended to be older (quadratic relationship) and to belong to the Brahmin/Chhetri/Newar ethnic group. Their spouses were employed in agriculture, had fewer dependants and tended to be located in the Terai region. Males were more than five times more likely to be a skilled than a waged labourer (odd ratio = 5.6). Similarly, skilled labourers were more than twice as likely to be located in the Terai and to own a better house (odd ratio = 2.5 and 2.3, respectively).

Table 4.37: Factors differentiating individuals in different types of off-farm employment (1998).

Variables	Skilled labourer vs. wage labourer	Skilled labourer vs. trader	Trader vs. wage labourer
Intercept	-4.1438** ¹	1.8017	-7.5655***
Age (years)	0.0863	-0.1343	0.2994***
Age squared	-0.0008	0.0021 ⁺	-0.0041***
Gender (male = 1, female = 0)	1.7301***	1.6311***	-0.3236
Education (years)	0.1182**	0.1037*	0.0119
Ethnicity (Brahmin/Chhetri/Newar = 1, Others = 0)	0.8959 ⁺	-0.8184 ⁺	2.5384***
Spouse occupation (Agriculture = 1, others = 0)	0.8630*	-0.0802	1.8867***
Members per household	-0.0250	0.0769	-0.0926
Dependant ratio ²	-1.3569	-0.4049	-2.0326 ⁺
House roof (galvanised, tile = 1, others = 0)	0.9268**	1.0887**	-0.2899
Agro-ecological position of the household (Terai = 1, Hill = 0)	0.8335*	-1.8885***	3.9177***
Amount spent on social events ('00 Rs)	-0.0018	-0.0071**	0.0052
Chi square (d.f.)	63.550 (11)	51.634 (11)	70.360 (11)
% correct prediction	69.6	72.0	76.3
Number of observations	171	143	152

¹ ⁺P < 0.15 *P < 0.1 **P < 0.05 ***P < 0.01.

² Dependant ratio is defined as a proportion of total number in households who are under 15 and over 64 years of age.

4.3.3 Factors associated with off-farm income levels

Table 4.38 gives the characteristics of the households with less, or more, than 50% off-farm income. The Chhetri/Brahmin/Newar ethnic group comprised about a quarter of the households with less than 50% off-farm income. On average, household membership was greater for those with less than 50% income from off-farm sources than for those who earned more by this means. However, the dependency ratio was larger in the latter households.

Table 4.38: Characteristics of rural households with less or more than 50% of total income from off-farm sources.

Explanatory Variables	Households' with equal/greater than 50% off-farm income (n = 73)	Households' with less than 50% off-farm income (n = 70)	All (n = 143)
Age of respondents (years)	42.29 (15.65)	42.86 (16.03)	42.57 (15.78)
Gender of respondent (% female)	26	24	25
Ethnicity of respondent (% Brahmin/Chhetri/ Newar)	37	23	30
Members per household	6.07 (3.26)	5.61 (2.53)	5.85 (2.92)
Dependant ratio ¹	0.37 (0.25)	0.39 (0.24)	0.38 (0.25)
Household own land	0.96 (1.10)	0.26 (0.42)	0.62 (0.91)
Percentage irrigated land	65.99 (40.06)	38.09 (48.00)	52.34 (46.14)
Household members working off-farm	0.38 (0.70)	1.26 (1.33)	0.81 (1.14)
Household member working both on farm and off-farm	2.25 (1.66)	0.76 (1.06)	1.52 (1.58)
% Household with business/enterprises	12	51	31
Income from livestock (Rs)	6080 (7221)	1317 (2498)	3749 (5931)
% Households in Terai	30	70	49
% Landless households	0	24	12
% Households with galvanised or tile roofing material	16	39	27
Amount owed to financial institutions (Rs)	5075 (7743)	4439 (8335)	4764 (8016)
Amount spent on social events (Rs)	4795 (6487)	3883 (4365)	4348 (5551)

¹ The dependant ratio is defined as a proportion of total number in households who are under 15 and 64 years of age.

Households with less than 50% off-farm income had nearly three times more owned and cultivable land than those with higher levels of off-farm income. Accordingly, the former households had nearly three times as many members working on-farm, and three times fewer members involved in off-farm work. Livestock income was also much greater (4.5 times) in the households with less than 50% off-farm income. Seventy percent of the households with 50% or more of their income from off-farm resided in the Terai; 24% of these households were landless. There were statistically significant differences with respect to these households owned land, cultivable land, and the percentage of irrigated land, livestock income, and members working only off-farm and the members working only in agricultural labour.

4.3.4 Factors associated with off-farm income

The estimated coefficients for a household's off-farm income (Model 1 and Model 2) and the percentage of household income which this represented (Model 3) are presented in Table 4.39. Household ethnicity and size significantly and positively influenced off-farm income for households with 50% or more of their income earned off-farm (Model 1). Although both the dependency ratio and the percentage of irrigated land were hypothesised to be negatively related to off-farm income (see Table 3.1), these factors were not significant. Landless households, as expected, were more likely to have more off-farm income.

In Model 2 (households with less than 50% off-farm income) respondent age, household size and indebtedness were negatively and significantly related to household off-farm income. However, the area of land owned, and the percentage of this which was irrigated were significantly and positively related to the amount of off-farm income. Households with a business/enterprise were positively and significantly associated with higher levels of off-farm income, but livestock income had no significant effect on off-farm income.

A significant inverse relation was found between the respondents' gender and the percentage off-farm income in Model 3 (Table 4.39). Variables associated with household agricultural income notably - the area of land owned, the percentage of irrigated land and

livestock income - were all negatively associated with the percentage of off-farm income earned by the household. Location in the Terai positively ($P < 0.001$) affected the percentage of off-farm income earned. Ethnicity and the dependency ratio had no significant effect on the percentage off-farm income. Household debt was positively ($P < 0.001$) associated with off-farm income.

Table 4.39: Parameter estimates of off-farm income and the percentage of off-farm income in total household income in eastern rural Nepal.

Explanatory Variables	Model 1 Households' with more than 50% off-farm income	Model 2 Households' with less than 50% off-farm income	Model 3 Percentage of off-farm income
Intercept	9734.61	1645.51	87.76
Respondent age (years)	-91.89	-143.66*** ¹	-0.09
Gender (Male = 1, female = 0)	NA ²	NA	-10.89**
Ethnicity (Brahmin/Chhetri/ Newar)	10427**	1062.52	-6.93
Members per household	2346.85***	-650.03***	-1.27*
Dependant ratio ³	-2975.19	4076.36 ⁺	-1.99
Household own land	NA	4889.40***	-5.96**
Percentage irrigated land	-0.44	49.87***	-0.13***
Household members working off-farm	NA	1704.24	NA
Household member working both on farm and off-farm	-213.36	NA	-5.78***
Business/enterprise (Yes = 1, no = 0)	NA	10889***	NA
Income from livestock ('00 Rs)	58.77	-7.06	-0.21***
Agro-ecological position of the household (Terai = 1, Hill = 0)	NA	NA	29.70***
Landless households (Landless = 1; others = 0)	8734.40*	NA	NA
House roofing material(galvanised, tile = 1, others = 0)	3212.07	NA	NA
Amount owed to financial institutions ('00 Rs)	NA	-22.09***	0.07**
Amount spent on social events ('00 Rs)	NA	44.48***	-0.01
R-square	0.33	0.72	0.62

¹ + $P < 0.15$ * $P < 0.1$ ** $P < 0.05$ *** $P < 0.01$.

²NA is not applicable

³ The dependant ratio is defined as a proportion in total number of households who are under 15 and over 64 years of age.

4.4 Discussion

Many of the results from this research resemble those of past studies in Nepal (World Bank, 1991; ICIMOD, 1992; ADB & ICIMOD, 1992; CBS 1997a, 1997b) and the national census conducted in 1991. Further, the results agree with studies related to off-farm income and employment in many Asian and other countries. However, some of the results contradict previous findings, and offer new insights into the topic of off-farm income and employment in Nepal.

4.4.1 Survey sample characteristics

The household size in the study area was 5.91 people, somewhat higher than the 1991 national Census average of 5.6 for rural areas (Kansakar, 1995), but only slightly higher than the recent CBS (1997b) household survey (5.71 in rural areas). When classified by agro-ecological region, the Hill area had more members per household than reported by both the CBS (1997b) study and the 1991 Census (5.4 people in the eastern Mountain/Hill). However, household size in the Terai (5.95) was closer to the 1991 Census (5.8: Kansakar, 1995) and CBS study (5.74: 1997b). The distribution of household size in the study areas (30%, 39% and 31% in household groups of $\leq$ four members, five to six members and $>$ six members, respectively) was similar to the CBS (1997b) study (38%, 32%, 30% respectively for similar household groups in the study area). The age group distribution of the survey population was comparable to the 1991 Census (37%, 58% and 5% in the study area vs. 43%, 54% and 2.5% in the 1991 Census, for age groups of less than 15, 15-64 and $>$ 64 years of age, respectively).

The study finding that all households in the Hill and 70% in the Terai had cultivable land, was similar to the CBS (1997b) study which indicated 95% and 73% of the households in the Hill and Terai had cultivable land, respectively. However, there was a notable difference in the landholding size of the households in the current research and the CBS (1997b) study, especially in the Terai. The average landholding area of the households in the Hill, Terai and Nepal was reported by CBS (1997b) to be 1.03, 1.19 and 1.09 hectares, respectively - which is much higher than for the current survey (0.90, 0.64 and 0.77 hectares, respectively). The small average landholding area in the Terai was associated with the

presence of a significant number of landless households. However, the distribution of households by landholding size -- in the < 0.5 hectare, 0.5 to 1.0 hectare and >1.0 hectare - for the CBS (1997b) study and this research was similar (40%, 26% and 34%, respectively vs. 48%, 19% and 33% (this study)).

The finding that the Hill households kept more large (cattle, buffalo, ox and bulls) and small animals (goats and pigs) than Terai households is consistent with the CBS (1997b) report. This may reflect the greater availability of feed and fodder in the Hills than in the Terai area. However, the average number of livestock per household was much higher in the CBS (1997b) investigation than in this study, possibly because of the smaller variation in the sample area in the current research. The finding that the percentage households using improved agricultural equipment was much higher in the Terai than the Hill also tallies with the CBS (1997b) report, and reflects the on-going use of traditional technology in Nepalese agriculture, particularly in the Hill.

The materials used for housing as found in the study area were similar to those reported by CBS (1997b) for rural eastern Hill and Terai households. Both studies indicate that most houses in the Hill are mud-bounded and stonewalled, while about one-third of those in the Terai have wooden walls. CBS (1997b) reported that galvanised sheet roofing was more common in the Hill than in the Terai, the opposite of this study (8% vs. 25%). Households with piped water, toilet facilities and the use of wood for cooking were much more prevalent in the study area than reported by CBS (1997b). This suggests that the level of socio-economic development in the area studied may be higher than the average Hill VDC.

The degree and purpose of household debt is of special interest since it provides an indication of household economic viability. Nearly half of the households in the study area were in debt - more in the Hill than in the Terai, and of these half had borrowed for consumption purposes. Thus, a large proportion of households in the Hill earnt insufficient income to provide a subsistence level of living. The wealth ranking (PRA technique) results from this study reinforce this conclusion. Similar results (more households in the Hill than in the Terai being in debt and borrowing for consumption) were reported in the CBS (1997b) study.

4.4.2 Household income

The income pattern of households in eastern rural Nepal was found to be as diverse as in other developing countries (Onchan & Chalamwong, 1986; Reardon *et al.* 1992). Agriculture and off-farm income were the two main sources of income. Crop and livestock were the prominent sources of incomes from agriculture. Off-farm income was derived from wages, remittances, business/enterprises and/or other fixed income.

Total household income was calculated to be Rs 33,963 vs. Rs 40,400 per annum for the CBS study of Nepali rural households (CBS, 1997b). Some of the difference may be due to the methods used in the two studies to compute household income. For example, CBS (1997b) included the value of non-crop goods such as eggs, milk, fish, cooking oil, etc. consumed by the household in the estimation of total income, whereas these items were excluded from this study. Likewise, CBS (1997b) included the rental value of housing. Some of the difference between the two studies can be attributed also to the years for which the data were collected (1995/96 for CBS (1997a) and 1998 for this study). Total household income per annum in the Hill for this study was much lower than shown in the CBS (1997b) research (Rs 25,853 vs. 41,084), but similar for the Terai (Rs 42,296 vs. Rs 45,284). The greater difference for the Hill income may have arisen from the selection of only one area for the study, and because of the inclusion of the value of non-crop goods for home consumption in the CBS study (1997b). The latter value is likely to be higher for the Hill households where they are more dependant on a subsistence economy than for the Terai households.

Like most developing countries in Asia, agriculture was the prominent source of household income (51%) in both the Hill and Terai VDCs. This result is consistent with that reported by Haggblade and Hazell (1989) for Asian countries overall, and Jazairy *et al.* (1992) for Thailand, Sri Lanka, and the Philippines. The proportions of farm and off-farm income for the study area were, however, different from those reported by CBS (1997b), especially the share of off-farm income in the Terai (56% vs. 36%). The share of off-farm income in the Hill was very similar for the two studies (36% vs. 34%). The PRA results from this study were in between the two sets of results (30% in the Hill and 47% in the Terai). The higher

share of off-farm income in the Terai may be due to better access to urban centres, transport and communication services compared to those of the Hills. This creates better off-farm employment and income opportunities in the Terai. Differences in off-farm income due to location have been reported for Thailand (Chalamwong, 1986; Rief & Cochrane, 1990), the US (Sumner, 1982; Gunter & McNamara, 1990), Canada (Olfert, 1992), Burkina Faso (Reardon *et al.*, 1992) and other African countries (Reardon, 1997; Reardon *et al.*, 1994). In addition, Oshima (1996a) in Japan and Taiwan, and Kasim and Najimudin (1986) in Malaysia also reported a higher off-farm income being earned by households closer to urban areas. They argued that a well-developed rural infrastructure for transport and communication contributed to the dominance of off-farm income. Likewise, Robinson *et al.* (1990) noted that areas with a large labour force in the agricultural sector tend to offer fewer opportunities for off-farm income, and this is applicable to the Hill households in Nepal.

Wages were the dominant source of off-farm income in the study areas, which is consistent with findings in the studies by Hagglade *et al.* (1989) for Zambia and Side and Guojie (1992) for the Chinese province of Hengduan. Moreover, wages were the leading source of income for the resource-poor households in both the Hill and the Terai VDCs. Most rural poor earned their income from low-paying agricultural work and general labour. Similar results were obtained by Chada (1986) for Punjab/India, the World Bank (1991) for Nepal and Adam Jr. (1995) for Pakistan. Income from business/enterprises in the Terai and remittances in the Hill were more prominent in the rich than in the poor households. The PRA results were similar - "poor" households depended more on wages, while business/enterprises contributed a higher proportion of income to the "non-poor" households.

Nearly half of the off-farm income for the Hill households came from remittances. This highlights the importance of members' residing outside the homesteads. However, remittances decreased in the households with > 1.0 hectare of land. Oberai and Singh (1986), too, observed that households with higher income earnings - or those who were more dependant on agriculture - received fewer remittances in the Punjab (India). Off-farm income was also the dominant source of cash income for these rural households. Similar

results were reported by Haggblade *et al.* (1989) for Tanzania and Zambia, and Side and Guojie (1992) for the Hengduan province in China.

Household off-farm income in eastern rural Nepal is mainly dependant on landholding area, household size, ethnicity and location. Total household and agricultural incomes were highly correlated to the land area: off-farm income increased as this decreased. This finding is consistent with previous studies in Nepal (Amatya, 1982; Nepal Rastra Bank, 1988 cited in NSAC, 1998; and World Bank, 1991), and with that of Park (1984) for Korea, Adam Jr. (1994) for Pakistan and Saleth (1997) for India. These results highlight the importance of off-farm income for resource-poor households, and support the need for development strategies for the rural poor which will increase their participation in off-farm income-generating activities.

Household size influenced the level of income required to ensure the welfare of its members. Household size was highly correlated with total, and crop, income - but not with the off-farm income. Family labour is important for crop production in rural Nepal, which still adopts labour-intensive traditional technology.

Households with more off-farm income had more debt than those who had a lower share of off-farm income - but it was not established whether this was a cause, or an effect of their dependence on off-farm income. Simpson and Kipitany (1983) reported that US farms with high debt levels earned a higher share of off-farm income than those with less debt.

An important finding of this study was the relationship between crop, livestock and off-farm income in the two agro-ecological locations. For the Hill households, as the share of off-farm income increased, livestock contributed less to agricultural income, the opposite to the situation in the Terai. The contribution of crops to household income was similar for all Hill household groups. This may indicate that a threshold level of crop production is required for the Hill households to ensure their survival because of their remoteness from, and poor access to, markets. For additional income, Hill households had to look to either off-farm or livestock activities. Therefore, these two sectors competed for extra household resources in the Hill. In the Terai, where the percentage of irrigated land is high, and inputs such as fertiliser and labour are readily available, large landholders took the opportunity to earn more

from cropping activities. However, small landholders, in order to meet a subsistence level of living, had no option but to increase their income from either off-farm activities or livestock. Therefore, in the Terai as crop income decreased, both livestock and off-farm income increased.

Ethnicity was another important determinant of off-farm income in the VDCs studied. Most of the Chettri/Brahmin/Newar households were "agricultural based" but, if they did have off-farm income, then this tended to be a relatively high proportion of annual household income. This may be attributable to the higher education of these ethnic groups, and therefore their ability to access higher-paying work.

4.4.3 Household expenditure

Household expenditure is a reliable indicator of its welfare (CBS 1997b). Most literature (Anderson & Leiserson, 1980; Hazell & Röell, 1983; Stokke *et al.*, 1991; Tschirely & Webber, 1994) reports that as household income increases, the proportion of expenditure on food decreases and vice versa. A similar relationship existed between household income and expenditure in the two VDCs studied. Households with higher incomes spent more on education (PRA findings), which concurs with the results of Stokke *et al.* (1991) for Sri Lanka. However, the share of expenditure on education and health was lower in households with off-farm income than in those with only farm income. In both VDCs, households spent more on consumption items than on investment. This was most prominent in the Hill VDCs. In addition, Hill households spent a significant portion of their income on social events.

Households with a small landholding depended more on off-farm income for their expenditure than did those with more land - particularly in the Terai. Off-farm income enabled the purchase of food items. It also contributed significantly to the purchase of agricultural equipment and inputs in both VDCs. This was manifested in the close relationship between agricultural productivity and off-farm income in rural households. Resource-poor households in both the Hill and Terai depended heavily on off-farm income for their sustainability. These findings concur with those of Amatya (1982) and ICIMOD (1992, 1996) for Nepal, Khuda (1986) for Bangladesh, Onchan and Chalamwong (1986) for Thailand and Adam Jr. (1995) for Pakistan.

4.4.4 Seasonality in employment

As in most developing countries with a monsoon climate, both farm and off-farm activities are seasonal in rural Nepal. However in the Hill, the number of days spent on off-farm activities varied less with the season. In the Terai, however, off-farm activities increased in the agricultural slack season and vice versa, reflecting the greater availability of seasonal off-farm employment in the VDC than in the Hill. In the Hill, individuals seeking off-farm employment took up long-term migration rather than seasonal work. A seasonal pattern of off-farm activities such as those of the Terai have been reported also by Khuda (1986) for Bangladesh and Charsombut (1986) for Thailand, and those for the Hill by Fabella (1986) for the Philippines.

Both males and females participated equally in agricultural activities (with more females spending more time with livestock). However, males participated more in off-farm activities than did females in both agro-ecological zones. In July/August Terai females were involved almost full-time in rice planting. The off-farm participation of Hill females only in the agricultural season (April-October) indicates that only agricultural work is available to them. Lower mobility, less education and a lack of skill limited the Hill women from taking up off-farm work. Similar results of low and high participation of females and males in off-farm work, respectively, were reported by Onchan and Chalamwong (1986) for Thailand and Fabella (1986) for the Philippines.

4.4.5 Rural business/enterprise

About one-third of the households in the study area were engaged in a business/enterprise, mostly in the Terai. Trade-related enterprises were the most common type of business - which is consistent with the findings of the World Bank (1991) for Nepal - but contrary to those of Mead and Liedholm (1998) in Africa, where they found that manufacturing enterprises dominated the rural sector. This discrepancy may stem from Nepal is being primarily an agrarian economy with more than 80% of its people dependant on farming. Most of the business/enterprises were seasonal in the Hill, whereas in the Terai, they operated throughout the year.

Males dominated the operation of rural enterprises in the Hill, whereas both males and females participated equally in the Terai. Most of the enterprises were run by one family member, as was found by Charsombut (1986) for Thailand, Davies *et al.* (1992) for Egypt, CBS (1996) for Nepal and Mead and Liedholm (1998) for Africa. Most enterprises were operated from the family's home - which agrees with the findings of Davies *et al.* (1992) for Egypt.

4.4.6 Off-farm employment

Off-farm employment was found to be well-established in eastern Nepal. Skilled labour, from the Hills in particular, worked outside their locality - especially in India and overseas. Individuals in the Terai however, worked closer to their village, and in urban centres within Nepal. This result confirms the view of Sumner (1982) for the US, Chalamwong (1986) for Thailand and Olfert (1992) for Canada, that proximity to markets and employment centres is critical to improving off-farm employment opportunities.

The importance of education in securing higher income earning opportunities is well-established in the literature (Huffman, 1980; Amatya, 1982; Eapen 1994). This was observed in the VDCs studied as well. Education and training provided access to skill-based employment opportunities, and enabled these individuals generally to improve their well-being, and that of other members in their household.

The study suggests that ethnicity and gender both influence the type of off-farm employment an individual is able to take. Most well-paid jobs tend to go to men, as Khuda (1986) also reported for Bangladesh. Similarly, the dominance of the relatively 'well-off' ethnic communities (Brahmins/Chettries /Newars) reflects their influence over both the private and public sectors' off-farm employment activities. The other determinants of off-farm employment in eastern rural Nepal were household size, area of landholding, and household debt.

In Nepal, the area of land holding is critical to a household's income earning potential and need for off-farm activities. However, in addition to land area, the percentage irrigated is an important factor in providing work and income for the household. The role of irrigation in

the study area was distinct: it contributed to more intensive agricultural production, and thus kept household members employed for more days on the farm, reducing their dependency on income from other sources. Rief and Cochrane (1990) reported the same result for Thailand.

In the Terai, a smaller landholding coincided with increased off-farm work, which is consistent with the studies of Robinson *et al.* (1982) for Australia, Islam (1986) for Bangladesh, India and Pakistan, and Olfert (1992) for Canada. Nevertheless, contrary to expectations, the current study indicated that, in the Hills, households with a larger landholding had more members working off-farm than those with a small holding. This is because most Hill off-farm work is obtained outside the local village. The high cost of migration prevents members of poor households from seeking off-farm employment. Such a relationship between landholding and off-farm labour is not unique to the Hills of Nepal. In similar geographical contexts, Stark (1991a) for Mexico, Adam Jr. (1996) for Pakistan, Spear and Harris (1986) for Java and House (1984) for Nairobi all found the same relationship between a household's landholding and migrant employment. Nevertheless, members working both on- and off-farm decreased as the landholding increased in both locations. This probably reflects the need for poor households to seek work in both sectors in order to achieve economic survival.

Household demographic characters, such as the number of adults and dependants, determines the allocation of its labour to farm and off-farm work. In the current study, households with more dependants had fewer members working off-farm only than did those with fewer dependants. This result is consistent with Leinbach and Smith's (1994) study in Sumatra (Indonesia), where they found that only the head of the household worked off-farm, while the spouse took care of the dependants. In the VDCs investigated, households with more dependants took up work near their house (wage labour in the Hill and traders in the Terai). This finding is consistent also with that of Leinbach and Smith (1994).

Overall, this study indicates that off-farm income is indispensable to rural households in eastern rural Nepal, especially the poor. Off-farm income assisted rural households to increase their income and meet a minimum level of livelihood. It thus assisted in food security and, in this respect, helped to avoid the 'vicious cycle' of poverty. Moreover, the

contribution of off-farm income to the purchase of agricultural inputs such as fertiliser and materials also signifies that farm productivity can be increased through income earning off-farm activities.

The results indicate also that off-farm employment can be an effective mechanism for curbing rural underemployment in Nepal. This can be best achieved through the provision of education and skill development programmes to the disadvantaged groups. Further, a basic rural infrastructure, particularly roading and communication, is necessary to facilitate access to off-farm and employment opportunities. In conclusion, the study clearly indicates that the generation of off-farm income and employment opportunities is necessary to sustain the rural population in eastern Nepal.

CHAPTER FIVE - CONCLUSIONS, POLICY IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The objective of the research was to examine the role of off-farm income in sustaining households in rural Nepal, and to identify factors associated with off-farm income and employment. It was hypothesised that households with off-farm income had better access to health and education compared to those which relied exclusively on farm income. This was expected to hold for small landholding (less than 0.5 hectares) households. Similarly, off-farm employment was postulated to be the major contributor to household and off-farm income, and was thought to generate capital for poorly resourced households so that they could invest in agriculture.

One Village Development Committee (VDC) from each of two ecologically distinct-districts (Dhankuta in the Hill and Morang in the Terai) of eastern Nepal were selected for the study. A Participatory Rural Appraisal (PRA) exercise was carried out to collect community level data. A household survey was conducted in both regions to obtain data on households and individuals, and the association between off-farm income and employment. Key Informant Interviews were also conducted to understand public policies and constraints to off-farm income and employment in the study area.

Five PRA techniques: resource mapping; wealth ranking; matrix ranking; crop calendars; and time lines and development structures were used to capture the community level information. These exercises successfully illustrated community issues and socio-economic conditions in the study area, and backed up the household survey results. There was a marked difference in access to infrastructure between the Hill and Terai VDCs, with the latter generally being better served. The Terai VDC had basic infrastructure such as a hospital, schools, a public telephone office, a post office, and a police station, whereas in the Hill VDC (Hathikharka) except for pre- and primary schools, non of these services was available. Further, the Terai VDC was well-linked by an all weather motarable road to an industrial town. Public transport runs frequently to the town. Although the Hill VDC had a highway running along its border, people had to walk at least 2-3 hours to reach it. The

PRA exercise also reflected higher off-farm activities in the Terai than in the Hill. More households were below the poverty line in the Hill than in the Terai. However, proportionately more extremely poor households (those who could afford to eat only two meals a day for six or fewer months) were located in the Terai.

Even though the PRA exercise lacked many of the conventional attributes of a questionnaire survey which are widely used in developing countries (for example, representative sample size and well-defined data collection methods) the results provided explicit community-level information and supported the findings from the household survey. Thus, properly managed PRA is a useful survey tool in developing countries. In addition, the PRA exercise was less time-consuming and more economical than the questionnaire survey used in the study. Nevertheless, the household survey served its purpose by identifying the sources and determinants of household off-farm income and employment.

Methods used for data collection were comprehensive, and provided a good balance and cross-check of results. However, due to time constraints, data collection was confined to only one VDC in each district. The findings from this study should, therefore, be interpreted with caution when generalising to the wider rural community of eastern Nepal. However, the research results did agree well with those from recent national surveys conducted in Nepal (World Bank, 1991; ADB and ICIMOD, 1992; CBS, 1997a; CBS, 1997b) and suggest that they can be used with confidence for policy formulation.

5.1 Conclusions

Off-farm income is a prominent source of income for rural households, particularly those with a small land holding. The income contributed to the purchase of additional food, and therefore helped both in achieving food security and in mitigating poverty. Off-farm income assisted in the purchase of agricultural inputs and materials, and was positively associated with agricultural productivity in rural Nepal. Thus, income earned from off-farm activities could contribute to further increasing agricultural productivity, and hence the food supplies to rural households.

This study indicated also that there is a high level of underemployment in rural Nepal, and that opportunities for off-farm employment are highly biased by gender, ethnicity and educational level. Increasing the educational and skill level of the most vulnerable groups (e.g. with no, or a small, land holding) can greatly help to overcome these biases and the problem of unemployment and underemployment in rural Nepal.

Likewise, the differences between the two VDCs in their ability to access resources (Hathikharka in the Hill and Haraicha in the Terai) emphasise the importance of infrastructure such as roading and communications in enabling individuals to take up off-farm income and employment opportunities. Roothing increases mobility, and opens access to markets for labour and home-made products. Such access to markets helps a household to secure extra income. Overall, off-farm income was shown to assist rural households in sustaining their livelihood.

5.2 Policy implications

Findings from this study provide insights into the formulation of rural development strategies for rural Nepal. Development strategies to increase the capacity of the rural poor to earn off-farm income are beneficial.

The single most important asset of rural people, particularly the poor, is their labour. Therefore off-farm income-generating activities should focus on increasing the labour productivity of rural households. This can be best achieved through education and vocational training to develop entrepreneurial skills. However, given the vastness of Nepal's rural area and the time required for increasing the level of formal education, emphasis at present should be given to training which enhances the skills needed to participate in providing goods and services to local markets. This human development should target vulnerable groups, particularly women and other disadvantaged groups (e.g. those without land). Raising the income of these groups will help to ensure the well-being of other household members. Proactive strategies are required, because, as this study has shown, off-farm employment opportunities are more likely to be taken up by advantaged groups.

Basic infrastructure such as roading and communications are pre-requisites for the success of many off-farm activities in rural Nepal. Investment should be targeted to upgrading and extending roads to key markets. This will enable rural households to sell their labour, handicrafts and higher value agricultural products.

Further, the importance of agricultural development in raising land productivity should not be underestimated in helping to ensure food security and promoting off-farm employment (such as on other farms). Second, the promotion of irrigation will reduce underemployment by increasing the number, productivity and range of crops grown each year. This will help to increase agricultural wages, and product sales, and will particularly benefit rural women.

To ensure their practical application at the village-level, development policies and programmes should be developed with the participation of local people, especially the disadvantaged segments of the population. This strategy will strengthen the programme, as well as secure the active participation of the poor and other disadvantaged groups.

5.3 Suggestions for future research

Time constraints limited the scope of this study. Nevertheless, the study was successful in identifying the role of off-farm income in household sustainability in Nepal. Four key areas of future research are suggested.

There is often a mismatch between the skills and knowledge of rural residents and that required in off-farm work places. The level of this mismatch should be investigated and defined, and strategies developed to narrow the gap so that individuals are better prepared to enter employment and entrepreneurial activities in the off-farm sector.

Remittances are an important source of income, particularly for the Hill households. The reliability and utilisation of remittances has not been studied adequately. With improved access to transport, the contribution of remittances could increase over time. The way in

which remittances are invested for the long term household financial security is a specific topic which needs to be studied.

Effective policy formulation requires access to a database which provides information on the inflow and outflow of human resources from the rural community; the skills based in the local economy; and market linkages between rural and urban sectors. Data base development will require research to identify economically-viable off-farm opportunities, both in the Hill and in the Terai.

As household income increases in rural areas, so do consumer demand for different goods and investment opportunities. Studies are needed to track these demands, and household investment, in terms of their impact on the sustainability of the rural economy.

There is spatial variation in Nepal, and thus off-farm opportunities are likely to be different. A replication of this study in other development regions of Nepal will provide a more comprehensive database of information for the policy makers.

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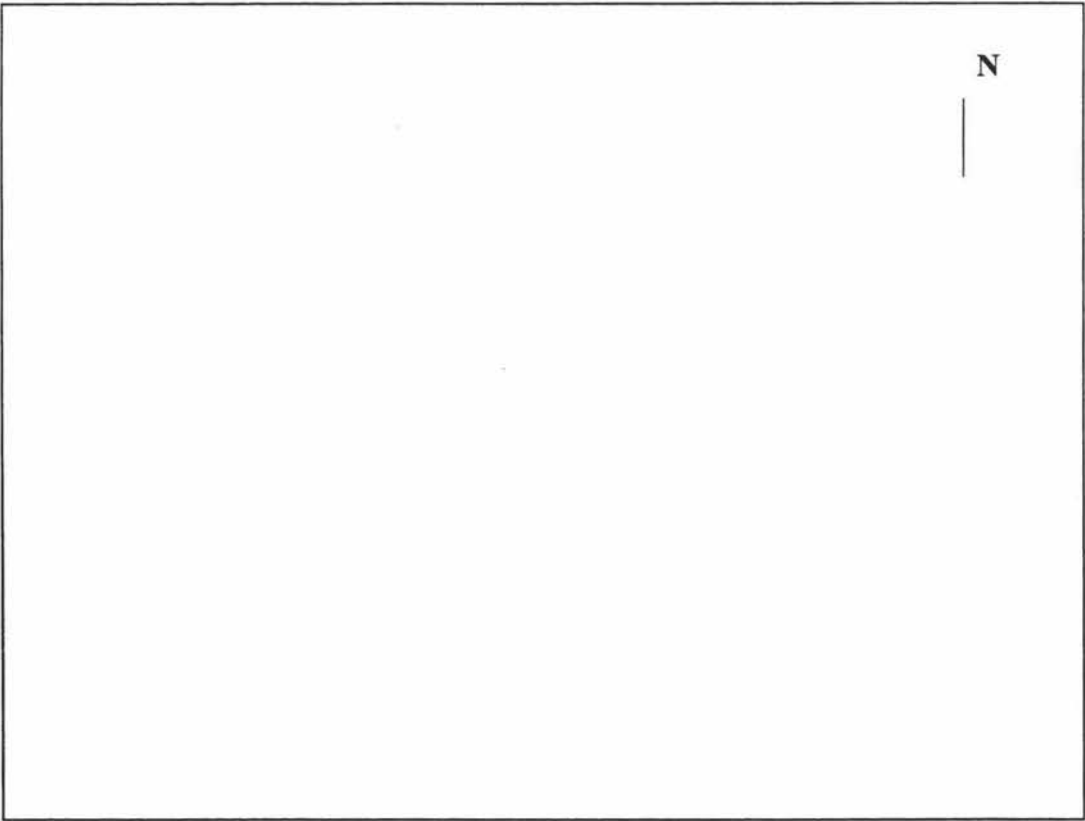
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APPENDIX I
PARTICIPATORY RURAL APPRAISAL FORMATS

Massey University
College of Sciences
Institute of Natural Resources
A survey of off-farm income and employment in eastern Nepal (1998)

District :
VDC :
Ward number :

A. VILLAGE RESOURE PROFILE



Legend

Massey University

College of Sciences

Institute of Natural Resources

A survey of off-farm income and employment in eastern Nepal (1998)

District :

VDC :

Ward number :

B. HEAD OF HOUSEHOLD

[illegible]

Massey University

College of Sciences

Institute of Natural Resources

A survey of off-farm income and employment in eastern Nepal (1998)

District :

VDC :

Ward number :

C. ETHNIC DISTRIBUTION

[illegible]

D. WEALTH RANKING

[illegible]

Massey University

College of Sciences

Institute of Natural Resources

A survey of off-farm income and employment in eastern Nepal (1998)

District :

VDC :

Ward number :

E. MATIRIX RANKING

1. Household income

Please indicate your household income from these sources in the past 12 months.

	Crop	Livestock	Business/ enterprises	Labour/ service	Remittance	Rents of ox, house, agricultural equipment	Total
Non-poor							
Poor							
Poorest							

2. Household expenditure

Please indicate your household expenses on the following activities in the past 12 months.

	Food (grain only)	Food (salt, oil, spices, vegetables)	Clothing	Education	Cropping	Livestock	Business/enterprise	Transport	Beverage / Tobacco	Total
Non-poor										
Poor										
Poorest										

3. Income constraint

From the following reasons, which one do you think has the most effect in increasing your household income?

	Education	Skill	Capital	Market	Total
Non-poor					
Poor					
Poorest					

APPENDIX II
HOUSEHOLD QUESTIONNAIRE

Massey University
College of Sciences
Institute of Natural Resources

A survey of off-farm income and employment in eastern Nepal (1998)

Code No. _____

A. Respondent characteristics

Gender: 1. Male _____ 2. Female _____

Age: _____ years

Ethnicity: _____

Primary occupation: _____

Secondary occupation: _____

Years of schooling: _____ years

Marital status 1. Married _____ 2. Unmarried _____

3. Others (please specify) _____

B. Household characteristics

B.1 How many members do you have in your household? _____(number)

B.1 How many resident household members are in the following age groups?

(Only those who had stayed for more than 15 days in past 12 months)

Gender	Age group	Number of members
Male	< 6	
	6-14	
	15-64	
	>64	
Female	< 6	
	6-14	
	15-64	
	>64	

B.3. What is the main occupation of the household? _____

E. Household enterprise

E.1. Did the household operate any kind of household enterprise (beaten rice, beverage making, mat making, pottery etc.) in past 12 months?

1. Yes, please provide the following details.

2. No, please go to section F.

a. What kind of household enterprise was it?

b. Who runs the enterprise?

c. Where was the enterprise located?

(1) Farm

(2) Own house off-farm

(3) Rented house

(4) Rent per month Rs

d. What kinds of products were produced?

e. How much/many products were made in past 12 months?

f. How much did it sell in the market for?

g. In which months did the household sell?

Month 1

Month 2

Month 3

Month 4

F. Off-farm employment

Please answer following questions for those members who had off-farm work in the past 12 months.

Variables	Member 1	Member 2	Member 3	Member 4	Member 5
a. Relation to the household head					
b. Age (years)					
c. Schooling (years)					
d. Primary occupation					
e. Married (yes =1, no =2)					
f. Vocational training of the respondent (yes = 1, no = 2)					
g. Type of vocational training					
h. Different off-farm work in the past					
First					
Second					
i. Where was the off-farm work (1) Own village (2) Other village (3) Town/City					
j. Reason for off-farm work:					
1. Not enough money from the farm					
2. Not enough work on farm					
3. (Others please specify)					
Continue to next page					

k. How did you first find about the job?					
1. Other household members					
2. Relatives					
3. Friends / village folks					
4. Own self					
5. Others (please specify)					
l. If you could, would you have worked more days in off-farm job? (Yes =1, no =2)					
m. If yes, why were you unable to work more days for off-farm jobs?					
1. Did not find					
2. No skill for the job available					
3. Cannot not be away from farm work any more days					
4. Cannot be away from home any more days					
5. Other reasons (please specify)					
n. If, married then,					
Spouse's schooling (years)					
Spouse's primary occupation					

G. If any of the members (15-64 years of age) was not working off-farm, reason for not working:

	Member 1	Member 2	Member 3	Member 4	Member 5
Relation to the household head					
Reasons: 1. Housework 2. Health 3. Study 4. Busy with farm work 5. Could not find a job 6. Others (please specify)					

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H.1. Please give details of household labour on each of the following activities by month

Household member	Activity	Baishakh (Days)	Jestha (Days)	Ashad (Days)	Shrawan (Days)	Bhadra (Days)	Asoj (Days)	Kartik (Days)	Mansir (Days)	Poush (Days)	Magh (Days)	Falgun (Days)	Chaitra (Days)
Male 1	Cropping												
	Livestock												
	Exchange labour												
	Off-farm												
	Household enterprise												
Male 2	Cropping												
	Livestock												
	Exchange labour												
	Off-farm												
	Household enterprise												
Male 3	Cropping												
	Livestock												
	Exchange labour												
	Off-farm												
	Household enterprise												
Female 1	Cropping												
	Livestock												
	Exchange labour												
	Off-farm												
	Household enterprise												
Female 2	Cropping												
	Livestock												
	Exchange labour												
	Off-farm												
	Household enterprise												
Female 3	Cropping												
	Livestock												
	Exchange labour												
	Off-farm												
	Household enterprise												

I. Household expenses

I.1. What were the household expenses on following items in the past 12 months?

Items	Expenditure (Rs) (last month)	Expenditure (Rs) (last 12 months)	Percentage from off-farm income
Food (Crop expenditure)			
Food (Other items)			
Education			
Clothing and footwear			
Health			
Purchase of farm inputs (seed, fertiliser, pesticide etc.)			
Agricultural labour			
Agricultural labour food			
Purchase of farm equipment			
Purchase of livestock			
Purchase of livestock food			
Purchase of agricultural tools			
Purchase of land			
Farm construction and maintenance			
Purchase of household enterprise inputs			
Construction and maintenance for household enterprise			
Operation cost of enterprises (electricity, fuel, water)			
Travel			
Social expenditure (marriage, religious functions.)			
Beverage, cigarettes etc.			
Others (please specify)			

J. Please give the your household cash income from the following sources by month.

Sources	Total income (Rs)	Baishakh	Jestha	Ashad	Shrawan	Bhadra	Asoj	Kartik	Mansir	Poush	Magh	Falgun	Chaitra
Business/ Enterprises													
Employment													
Remittances													
Interest and bonds													
House rents													
Rent for agricultural equipment													
Animal rent													
Other source (please specify)													
Other source (please specify)													

K. Household borrowing/loans

K.1 Did the household have any borrowing/loans in the past 12 months?

1. Yes _____ 2. No _____

If yes, please give the following details. If no, go to section L.

Year taken out	19__	19__	19__
Loan value (Rs)			
Interest rate (%)			
Amount still owed (Rs)			
Source			
Loan purpose:			
1. House construction			
2. Farm equipment purchase			
3. Land purchases			
4. Others (please specify)			
Was the loan used for intended purpose? (yes =1, no =2)			
If no, for what other purpose was the loan used?			
Percent of loan used			

L. Comments

Thank you for co-operation

Name of the interviewer

Date of the interview

Village

APPENDIX III

Conversion of Nepali months to English calendar

Nepali month	English month
Baishakh	mid April - mid May
Jestha	mid May - mid June
Ashad	mid June - mid July
Shrawan	mid July - mid August
Bhadra	mid August - mid September
Asoj	mid September - mid October
Kartik	mid October - mid November
Mangshir	mid November - mid December
Poush	mid December - mid January
Magh	mid January - mid February
Falgun	mid February - mid March
Chaitra	mid March - mid April

Appendix IV

Household income by farm size in the Hill and Terai VDCs of eastern rural Nepal

Land holding size (Ha)	n	Percent	Total income (mean Rs)	Percentage income to total income		
				Crop	Livestock	Off-farm
Hill						
>0 - 0.5	27	36	13,845 (13,379)	38	21	41
>0.5 - 1.0	19	25	26,145 (24,999)	34	12	54
>1.0	29	39	36,842 (22,140)	52	22	26
Terai						
0	29	40	30,377 (19,914)	0	2	98
>0 - 0.5	17	23	34,068 (26,668)	23	8	69
>0.5 - 1.0	8	11	57,674 (42,878)	59	6	35
>1.0	19	26	61,376 (32,550)	64	8	27
All						
0	29	20	30,377 (19,914)	0	2	98
>0 - 0.5	44	30	21,658 (21,727)	40	2	58
>0.5 - 1.0	27	18	35,487 (33,807)	46	9	45
>1.0	48	32	46,553 (29,065)	58	15	27

Figures in parentheses indicate standard deviations.

APPENDIX V

List of key informant interviewees

- 1 Director of Centre for Economic Development Studies, Kathmandu.
- 2 Professor Govinda Ram Agrawal, Department of Economics, Trivhubhan University, Kathmandu.
- 3 VDC chairperson of Haraicha VDC, Morang.
- 4 District Agricultural Development Officer, Morang.
- 5 District Livestock Development Officer, Morang.
- 6 Previous chairperson of Hathikharka VDC, Dhankuta.
- 7 Director of Small Enterprises Development Board, Dhankuta.
- 8 District Agricultural Development Officer, Dhankuta.
- 9 Ward chairperson of Hathikharka 7, Dhankuta.

APPENDIX VI

Types of off-farm employment found in the study area and their grouping

Number	Skilled labour	Wage labour	Trader
1	Metal workers	Agricultural labourers	Household good retailers
2	Wood workers	Daily wage labourers	Firewood retailers
3	Tailors	Rickshaw pullers	Vegetable retailers
4	Bricklayers	Sweeper	Rice puff retailers
5	Mill mechanics		Butchers
6	Bicycle repairers		Land brokers
7	Radio mechanics		Grain wholesalers
8	Basket weavers		Mill owners
9	Government employees		Food shopkeepers
10	Army personnel		Liquor makers and sellers
11	Teachers		
12	Police		
13	Health workers		
14	Bank employees		
15	NGO employees		
16	Hotel employees		
17	Overseas employees		

APPENDIX VII

Business/enterprises found in the study area.

Serial number	Business/ enterprises
1	Beaten rice
2	Beverage
3	Retailer
4	Electric appliances
5	Grain wholesaler
6	Bicycle repairer
7	Metal work
8	Food shop
9	Tailor
10	Vegetable retailer
11	Furniture shop
12	Cosmetic shop
13	Bamboo work
14	Utensils
15	Rice mill
16	Beaten rice mill and grain wholesaler
17	Medicine shop
18	Footwear shop
19	Animal retailer
20	Butcher
21	Grain wholesaler