University of Pretoria etd – Tefera, T L (2006)

CHAPTER 5
RURAL LIVELIHOOD STRATEGIES IN THE HARARGHE HIGHLANDS

5.1 INTRODUCTION

The extensive literature review in Chapter 2 has thrown some light on the alternative livelihood strategies that rural households and rural communities could pursue to ensure income and food security of their members in the context of population pressure. Population pressure induces an intensification of the production system owing to increased subsistence requirements and changes in factor price ratios. Deliberate government interventions such as the provision of market infrastructure, price incentives, land tenure security, credit, information and technology could also induce such intensification. Diminishing farm sizes and a decline in return to labour in farming under population pressure may encourage rural households to diversify their employment and sources of income. In rural areas, livelihood diversification is achieved, for example, by temporary and seasonal migration, wage labour, crafts and trades. Delayed marriage, migration and an attempt to control fertility by limiting births within marriage are important aspects of rural livelihood strategies in response to an increasing scarcity of natural resources.

Having this information, this chapter looks into livelihood strategies at the household as well the community level in the context of population pressure in the Hararghe Highlands. Qualitative and quantitative data obtained from the rural livelihoods survey formed the database for the analyses discussed in this chapter. Limited secondary data were used to supplement the cross-sectional household level data where the latter was insufficient to substantiate some of the arguments. In first section of the chapter there is an overview of the extent to which the arable land area cultivated per household has diminished over-time in the study area. The roles of demographic and non-demographic factors in the process are discussed. This section serves to confirm the increasing scarcity of arable land in the study area.

The analyses of rural livelihoods in this chapter are divided into three main sections. The first section (Section 5.3) is concerned with the identification, qualitative

description and/or quantitative analysis of land use strategies at the household and community levels. The next section presents an analysis of the nature, the extent and determinants of rural livelihood diversification. It shades more light on diversity in livelihood diversification behaviour across sites and among different households, and assesses the role of reduced access to cropland in households' diversification decision. The final section of the analysis focuses on the role of demographic adjustments, i.e., migration and fertility, in rural livelihood strategies. The section on migration and fertility specifically explores whether there is any relationship between family size preferences or the achieved/intended fertility and access to cropland along with other socio-economic and socio-cultural variables believed to influence the demand for children and rural households' fertility decisions. The main observations from the empirical analyses of rural livelihood strategies in the HHs in this chapter are summarised in Section 5.6.

5.2 DIMINISHING LANDHOLDING SIZE IN THE HARARGHE HIGHLANDS

A rapid decline in the cropland area available per household or adult equivalent is now more the rule than the exception at all the research sites. On average, a household in the study area cultivates 0.8 ha of cropland (seeTable 5.1). The results of the survey confirm the average land holding size in the region as calculated from the CSA sample survey. The later estimated average cropland size per household at 0.82 ha for the East Hararghe Zone and at 0.93 ha for the West Hararghe Zone (Tadesse, 1998).

Although they are only rough approximates, the estimations reported in Table 5.1 illustrate that the average cropland area per household has declined by 50% from nearly 1.5 ha just before the land reform of 1975 to about 0.8 ha in 2000/2001. The reported decline in average cropland area since 1975 may initially seem less than one would expect, given the rate of population growth in the area, which is estimated at 3% per annum, doubling every 20 years. However, the survey result can be accepted as a reasonable approximation of the actual scenario on two grounds:

- the periodic redistribution of communal grazing land and sometimes forest land by leaders of the PAs until the late 1980s helped to accommodate the

University of Pretoria etd – Tefera, T L (2006)

demand by newly established households for cropland, reducing further subdivision and fragmentation of holdings at inheritance to some degree; and

- the family system in the research area which tends to accommodate newly married couples within existing households may be obscuring the actual situation.

Table 5.1: Change in the cultivated land size per household over-time

	Number of respondents	Minimum In ha	Maximum in ha	Mean	Std. Deviation
Cropland size just before the land reform (1975)	72	0.00	13.00	1.6905	1.91245
Cropland size just after the dismantling of coops (1990)	157	0.17	5.50	0.9209	.72130
Current cropland size (2000/2001)	197	0.00	3.00	0.7669	.43723

Source: Own survey data

The picture would undoubtedly have been different had data on the cropland area per adult equivalent for the comparable periods been available. The current average cropland area per adult equivalent in the HHs is 0.18 ha. This figure is less than the minimum size considered adequate for subsistence (0.23 ha) by an earlier study (Adnew and Storck, 1992). Using this benchmark, 72% of the sample households (or by site, 81.5% in Sabale, 73% in Alemaya and 58% in Kuni) cultivates a cropland area per adult which is equivalent to or less than 0.2 ha. Hence, households do not have the minimum size required for subsistence. However, the cut-off size is subject to change depending on technology, crop mix and prices over-time.

The reduced size and fragmentation of cropland holdings in the HHs are, however, not only the consequence of rural population growth. There are various other causes. Among others, the past land policy of the country played a role. As was clearly indicated by representatives of the local community during group discussions and the findings of other researchers (McDowell and de Haan, 1997), the land policy that was in effect in Ethiopia between 1975 and 1990 discouraged rural-rural and rural-urban migration. According to this policy, access to agricultural land was determined by residential area and required the beneficiaries to stay in the PA to cultivate the land personally. On the one hand, this land policy restricted free movement of labour and, on the other hand, it encouraged larger family sizes due to periodic land redistribution according to family size.

Restricted voluntary demographic adjustments and limited employment opportunities for unskilled labour outside agriculture have kept the opportunities cost of labour employed in subsistence farming very low. Hence, although they do not see farming as a preferred occupation, it is the only viable option for the fast growing rural youth population. This has led to a 'levelling down' of cropland area and land fragmentation through periodic land redistribution and subdivisions of holdings at inheritance.

It seems as if the obverse of Low's observations in southern Africa (Low, 1986) has occurred in Ethiopia as far as the movement of labour is concerned. This is due to the policy barrier as well as limited employment opportunities outside subsistence farming. Interestingly, the final outcome is, however, similar. There is a stagnation of the subsistence sector. Nevertheless, the cases Low presented to explain the stagnation of the subsistence sector in SSA are in explaining the Ethiopian situation.

5.3 LAND USE STRATEGIES

The demand for more food rises as the population grows and/or household income increases. To meet the increasing demand for food, changes in the land use strategies are required. Bringing more land (forest or pasture) under cultivation also called extensification (extensification can be considered a special form of intensification), is one possible land use strategy to produce more food. Land use is intensified spatially and temporally to maintain per capita food production where the opportunities for further expansion of cropland is exhausted. Land use intensification is achieved in a number of ways. These include reducing the fallow period or increasing the frequency of cultivation, spatial intensification such as intercropping, shifting to the production of high-value crops, and labour and capital investment in land productivity-enhancing indigenous or external technologies. Soil and water conservation activities and the adoption of inorganic fertilisers, improved cultivars and selected agro-chemicals are examples of the latter land use intensification strategies.

Decisions concerning land use are made at household and community levels, but the se decisions are influenced by macro-level processes such as access to the market and technology, government policies regarding land use and ownership. In

University of Pretoria etd – Tefera, T L (2006)

particularly, clearly defined property rights and effective collective action are among the most important prerequisites for encouraging wider adoption of land productivity-enhancing and natural resource-conserving technologies. However, the extent of tenure security and the collective action needed for sustainable NRM differs according to the spatial and temporal dimensions of individual technologies (McCulloch *et al.,* 1998). For example, the adoption of inorganic fertilisers requires neither long-term tenure security nor collective action. Nonetheless, a higher degree of tenure security and effective collective action at a higher level, say at district level, are both essential for sustainable watershed management. Equally important in the context of subsistence farming is the cash expenditure needed and the risk involved in adopting new technologies. Resource-poor subsistence farmers are more likely to take up technologies the adoption of which require no or little cash outlay and technologies the adoption of which involve low risk. Thus, local land use strategies are the result of complex interactions among the attributes of technologies, macro- and micro-economic variables and agro-climatic factors.

This first section discussing the livelihood analyses closely examines the land use strategies pursued at the household and community levels in order to maintain or enhance rural livelihoods in the research area. Case study materials and cross-sectional household data are used to describe the local dynamics in the absence of time series data for the study sites that relate demographic change with changes in land use systems. Qualitative and quantitative data analysis techniques have been employed to complementary each other in identifying determinants of investment in land productivity-enhancing technologies. The roles of the market, the local physical environment and government policy in the process of change in land use strategies are discussed when and where they are relevant to relate the micro with the macro economic factors. Although references are made to the implications of rural livelihood behaviour, in terms of land use systems, for sustainable use of the renewable natural resource, these issues are discussed only later in the thesis. The final chapter of the thesis deals with welfare outcomes and the sustainability implications of rural livelihood strategies.

5.3.1 Cropland Expansion

Extensification (bringing more land under cultivation at the expense of forest and grazing land) has long been the most common strategy in the HHs, as elsewhere in the country, to produce more food as required to feed a growing population. Detailed discussions and transact walks with groups of knowledgeable elders in the communities in the study area helped the researcher to identify areas formerly covered by natural forest and communal pasture and to understand the direction and pattern of expansion of croplands and settlements in the last three to five decades, in the absence of quantitative information.

A case study from the Sabale site is presented here to highlight the dynamics of the extensification strategy. The Sabale site was selected for the case study because it roughly represents the general situation of both research sites (Sabale and Kuni) in the West Hararghe Zone where an extensification strategy has continued to be employed at the present, and also because Sabale has more or less the same topography with Kuni (Figure 5.1). However, the other arguments regarding the extent and consequences of following an extensification strategy are based on observations made in all the PAs covered by the investigation.

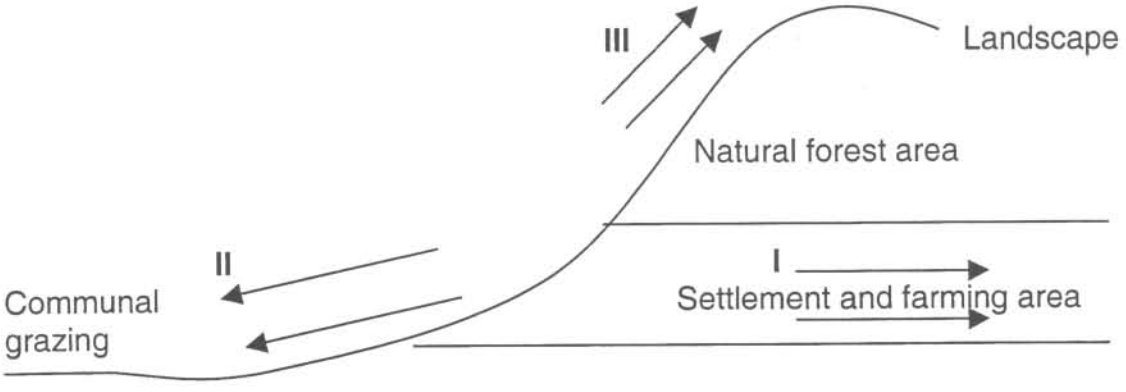

Figure 5.1 Spatial and temporal aspects of expansion of agricultural land in Sabale

Source: Developed by the author from group discussions and field observations

The expansion of croplands and settlements in Sabale followed a typical pattern (Figure 5.1) and has, interestingly, created spatially disaggregated socio-economic classes. The land on the middle of the slope was the original area where people lived and which they cultivated. The land at the bottom of the hill, though fertile, was

swampland, there was a water-logging problem and this land was less preferred in the past when land was abundant and labour was scarce. The dense forest area up the hill was difficult to clear; the soil on the upper slope is shallow, light and highly susceptible to erosion and it harbours crop pests such as monkeys and apes and was therefore also less preferred.

The areas between the dispersed homesteads were large enough to accommodate the demand of newly established households for cropland, in stage I. The cultivation area expanded horizontally within the original settlements, limited by the boundaries of PAs at inheritance and through periodic land redistribution after 1975. This strategy helped the community to accommodate the demand for cropland by the growing number of newly established households, first, by a conversion of 'unutilised land' to cropland and, second, by subdivision of land.

In stage II, the cultivation area expanded vertically further down to communal pasture (formerly unused for crop production) using increasing labour available due to natural population growth. Finally, in stage III, it expanded to marginal land and the steeper upper slope, formerly covered by communal natural forest, with further population growth. Currently, steeper slopes as steep as 50% are cultivated, particularly at the two sites in the West Hararghe Zone. Hand hoes are used for land preparation, because oxen cannot be used on such steep slopes. It is also interesting to note that the households cultivating moderately steep land tend to be older (in terms of the family cycle) and economically better-off, whereas marginal areas are cultivated by the relatively younger (more recently established) and poorer households.

The first obvious consequence of the extensification strategy is land degradation through soil erosion. The sample households mentioned this problem as the third major constraint to crop production after land scarcity and scarcity of working capital. Another study on one of the districts included in this study, the Chiro District, estimated that over 81% of soil erosion was caused mainly by the practices of cultivation on steeper slopes and runoff from surrounding fields (Tefera et al.., 2000).

The second consequence is a shortage of grazing land due to the expansion of crop cultivation to pasture areas. This was mentioned as the main constraint to animal

production, preceding a lack of capital to buy large livestock for rearing. So, for instance, the land use data provided by the local extension agents stationed in the two adjacent PAs in Sabale show that the communal pasture area has diminished to only 10 ha. In addition, 10% of all the sampled households, most of them in Kuni, reported limited grazing land (less than 0.1 ha each) over which they hold individual use rights. The remaining communal grazing land in most of the study sites has already been subdivided and converted into cropland or put under the management of PAs (PAs enclose and sell the grass to households in the dry season), due to increasing conflict over access.

Box 5.1: Coping with the increasing shortage of grazing land in the Hararghe Highlands

Livestock are a source of draught power, cash, soil nutrients (manure), meat and milk, a means of accumulation and a hedge against the risk of food insecurity for the people in the HHs. The dwindling grazing land is the major obstacle to rearing livestock. As a coping strategy, free grazing has been changed to stall-feeding and crop residues have become the main source of animal feed. For example, sorghum is preferred for its tall stack and is sown in high density to be thinned and fed to livestock later in the season. Of the sample households 24% reported growing grasses on their farm boundaries or on soil bunds for animal feed. In Alemaya, some farmers around The Hamaressa Edible Oil Factory reported that they had started purchasing A by-product (cake) to feed their animals. In some areas in Alemaya, bulls are bought from the lowlanders instead of rearing own bulls and are used for ploughing for two seasons after which they are fattened and sold to the local butchery to be replaced by other bulls. Farmers have also developed an exchange strategy to cope with the oxen shortage caused partly by the shortage of grazing land. Those who have only a single ox each combine and use them in turn and those who do not have any oxen exchange their labour for a few oxen days or look after the oxen of their neighbours (feeding and watering them) to have access to them for land preparation.

Source: Developed from own field observation, interview and survey

Some households reported earnings from grass sales, while others reported that they had borrowed money from neighbours or relatives to buy grass for their livestock. The emergence of the 'grass market' is a clear indication of the great scarcity of grazing land. It was also observed that households and communities have developed strategies to cope with the shortage of animal feed (Box 5.1). These strategies include changing the traditional free grazing system to stall-feeding, modifying crop

selection criteria by including stalk or straw quantity, growing grasses, buying feed, buying bulls instead of raising them, combing and exchanging of oxen power. It is also interesting to note here that the shrinking of grazing areas resulting from the expansion of cropland (extensification) has simultaneously generated intensive livestock feeding practices.

Moreover, as the survey results reveal, the selling by women of timber, charcoal and wood as fuel as a supplementary source of income has become a thing of the past and has been replaced by the selling of sorghum stalk for animal feed or feulwood. Farmers, particularly women, now have to travel a long way to find shrubs for fuelwood or to make charcoal to sell it in the nearest rural market. They have already found that selling wood and charcoal is the most unattractive and unsustainable livelihood diversification strategy available to them.

All these changes can be taken as proxy indicators of the extent to which cropland has replaced traditional communal grazing and natural forest due to an extensification strategy. The next important question that needs to be looked at is the reasons for the widespread adoption of the relatively unproductive and environmentally unsustainable extensification strategy in the study area. Although it is beyond the scope of this study to establish the relative importance of the different factors contributing to the expansion of cropland to the communal forest and grazing areas, it can be asserted that demographic change, government policy and stagnant production technology have all played their part in the process (also see Chapter 4).

Population growth is perhaps the most important reason for the adoption of an extensification strategy. The population size Sabale and other sites in the study area has undoubtedly more than doubled in the last three decades. When PAs were formed in the mid-1970s, a PA was supposed to have an average of 300 households and 800 ha of land. About 700 households, on average, currently reside in a PA. This indicates the degree of population growth since the formation of PAs, immediately after the land reform of 1975.

The increasing labour supply available due to natural population growth was first used to intensify crop production on land with a medium slope since it was closer to

residences, fairly fertile and workable. As more and more labour was applied to the fixed cropland area and capital investment continued, production and productivity started to decline due to deteriorating soil fertility. This encouraged an expansion of cropland first, to grazing land then to forest areas.

Presumably, the grazing land was the first option for expansion for at least two reasons. One is physical, the other legal. The bottomland of the soil toposequence is fertile and has a better water holding capacity, and as a consequence, it provides a better yield and reduces drought risk. Besides, the land use policy of the country prohibits, at least in theory, the cultivation of land with a gradient of more than 30%, but it does not say much regarding a restriction on the expansion of cropland to communal grazing areas as long as the leaders of the PAs give their blessing.

As discussed earlier, it is generally believed that the country's land use policy has discouraged the demographic adjustments. Leaders of the PAs have been distributing communal grazing land and forest areas periodically as they saw fit without any regard for sustainability to the households formed after the first round of land distribution. Moreover, the land policy has destroyed the indigenous common property use and management by the community and has effectively converted communal grazing and forestland into *de facto* open-access. The households cultivating crop next to a communal forest, grazing areas and, to a limited extent, public roads, slowly extend their cropland frontiers every year in the absence of effective restriction by the leaders of the PAs. The same ineffective policy and deepening poverty has encouraged some households, for example in Sabale and Kuni, illegally to settle on and cultivate land with very steep slopes which is highly susceptible to soil erosion during the change of political regimes. In some cases they have bribed PA committee members entrusted with land distribution and land administration responsibilities. Rahmato (1996:303) made similar observations at the national level:

> *"In the decades since the 1960s, massive destruction of forests and oodlands occurred on three significant occasions: in the mid-1960s when the imperial regime proclaimed that all large-scale forests belonged to the state; in 1975 following the land reform and expropriation of all forests; and at the fall of the DERG."*

Neither the imperial nor the socialist government has made a genuine effort to encourage sustainable intensification of smallholder farming through the provision of appropriate land productivity-enhancing and soil-conserving technologies, improved smallholder farmers' access to the market and investment capital, or the adoption of favorable pricing policies that make farming profitable. For instance, the marketing and pricing policies of the socialist government indirectly discouraged sustainable intensification of the smallholder sector by enforcing compulsory grain sales to the AMC at artificially lower prices and by deliberately creating physical barriers to interregional grain trade by the establishment of checkpoints and license requirements. Hence, until a decade or so, extensification, together with labour-based, but 'capital-deficient' intensification, was practically the only viable option to respond to the growing demand for food to feed a rapidly growing population in the absence of market incentives, appropriate and profitable crop and conservation technologies, and the effective policies needed to ensure land tenure security and reduce externalities in the NRM.

5.3.2 LAND USE INTENSIFICATION

Land use intensification is the second land use strategy that can be adopted in agriculture to produce more to feed a growing population especially where the option of further expansion of cropland has been exhausted, as is the case in the study area at present. A distinction has to be made at the outset between the two broader categories of land use intensification strategy due to their far-reaching implications from a sustainability point of view. The first is labour-based intensification, also called 'capital-deficient intensification' (Reardon, 1999, cited in Barbier, 2000). The second category of intensification, preferred on the ground of sustainability, entails the use of more capital and technology to produce more from a given piece of land. The latter can be termed external input-based intensification.

5.3.2.1 Labour-based Intensification

Labour-based or 'capital-deficient' land use intensification has been the strategy most widely adopted in the study area, West Hararghe in particular, in response to the increasing scarcity of land. Traditional crop rotation practices have been reduced substantially, despite a high level of awareness among smallholder farmers of the

University of Pretoria etd – Tefera, T L (2006)

role of crop rotation in maintaining the fertility of the soil and controlling diseases. The possible reasons for these undesirable land use practices from sustainability point of view are highlighted by the case study set out in Box 5.2.

Box 5.2: "Sorghum dies seven times and resurrects seven times"

Sorghum is the staple crop in Hararghe, but it had to compete with maize, teff, wheat and barley in the past. The production of sorghum has increased substantially in the recent years, beating all the other cereals, including maize, the crop that the extension system has been aggressively promoting. Asked about the reasons behind this trend, the farmers replied: "Sorghum dies seven times and resurrects seven times". Risk of crop failure as a result of unfavourable weather (abnormal timing and amount of rainfall) has become the rule of life. The farmers prefer sorghum due to its resilience to the vagaries of the weather. Sorghum is preferred to maize for its storability, the quality of its 'injera', the suitability of its stalk for animal feed and fuelwood though it requires more labor and gives a lower yield in comparison to maize. According to the farmers, once maize dies it can never be resurrected. Hence, sorghum is grown every year to reduce the risk of crop failure and it is commonly intercropped with chat.

Source: Developed from own field observations, interviews and surveys

It was further learned that almost all the households have abandoned the practice of leaving part of their arable land fallow for limited seasons to maintain soil fertility. Only six farmers (3% of all the sampled households) reported leaving part of their cropland fallow during the survey season. Whether it was the intention of these farmers to do so to maintain soil fertility is doubtful, as the reasons for leaving part of the arable land uncultivated for a season or so could be a lack of oxen, labour or seed as was discovered in a follow-up discussion with the key informants.

Box 5.3: Capital deficient intensification leads to soil mining and a yield decline

Getachew Belete is 35, married and a father of three sons. He cultivates 0.6 ha of land that he inherited from his father. His mother lives with him. Asked about his main problem, Getachew replied; "It is the scarcity of cropland. Due to the land shortage, I abandoned leaving part of my cropland fallow and practising crop rotation. The soil has no rest, I grow chat intercropped with sorghum and maize every year. I cannot keep livestock and use the manure for fertilisation due to a lack of money to buy the livestock and due to the shortage of grazing land. I can't afford commercial fertilisers either. Now, the soil is exhausted, and as a consequence, the crop yield is declining from year to year. I harvest not more than a *quintal* (100kg) of sorghum from a *timad* (0.125 ha) of land. Our fathers used to harvest as much as 2.5 *quintals* per *timad* during those good old days. My wife has rejoined me recently after two years of separation because I could not support my family."

Source: Developed from own field observations, interviews and surveys

The land use intensification strategy could also take the form of crop succession (multiple cropping) and intercropping (mixed cropping). Farmers in the upper highlands of Hararghe usually practise double cropping in order to maximize the benefits from the bimodal rainfall. Farmers who have access to water for small-scale irrigation also practise double cropping in the lower highlands or in the mid-altitude areas of the HHs. The strategy of growing cash crops in combination with food crops with different maturity periods ensures that households have a seasonally distributed flow of food supply and income, besides spreading the labour requirements for farming activities throughout the year (Figure 5.2).

Intercropping has a number of advantages: it reduces the susceptibility of crops to pests and diseases; it increases the nitrogen level in the soil when legumes are incorporated; and it suppresses weeds and ensures variety and nutritional balance in household food supplies (Ruthenberg, 1984). In the East Hararghe Zone, particularly in the Alemaya area, chat is intercropped with sorghum, maize and haricot beans. Intercropping is also practised in the West Hararghe Zone, but to a lesser degree. Moreover, the survey indicates that resource-poor households tend to practise intercropping more intensively than better-off households. This probably reflects more of a subsistence orientation and risk aversion behavior among resource-poor households than among better-off households.

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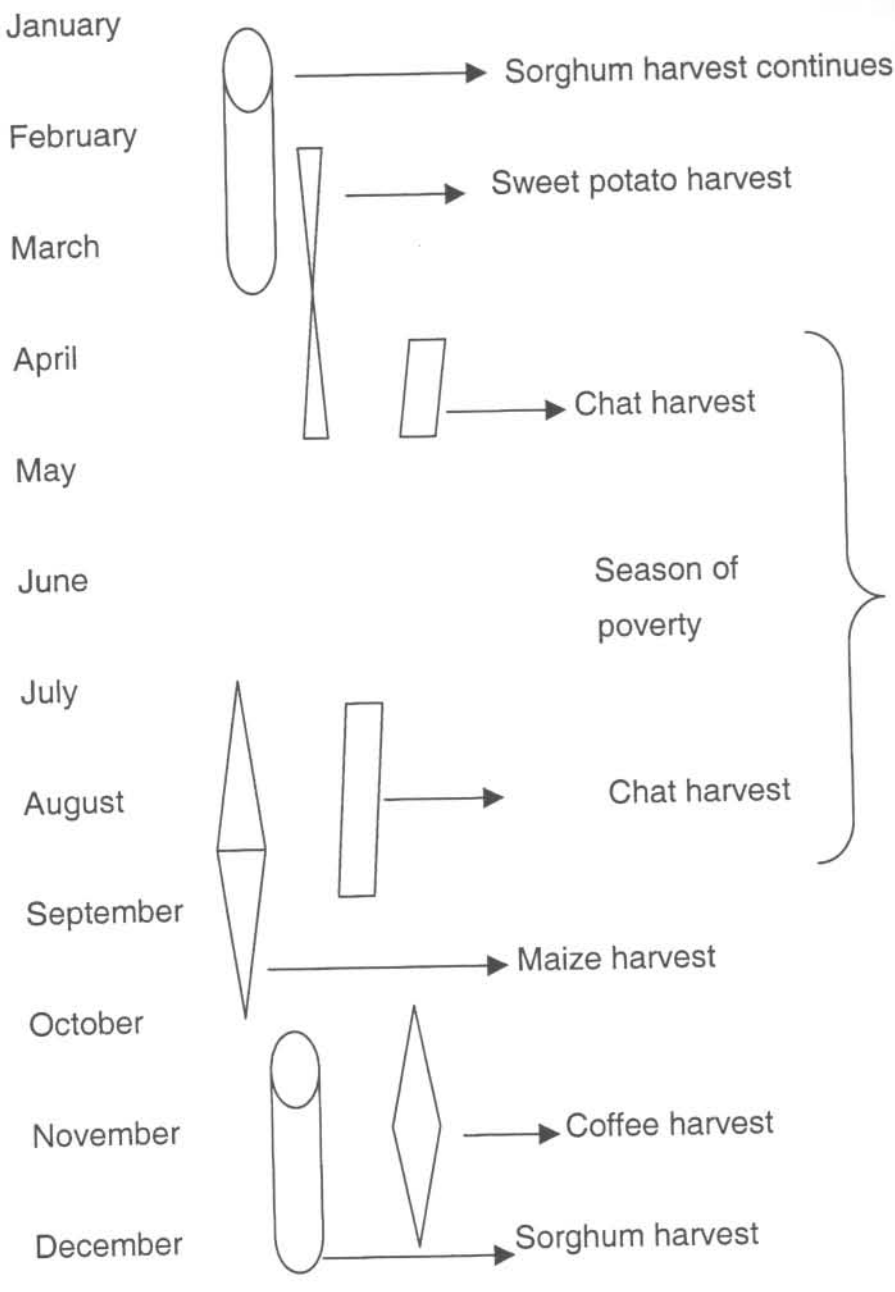

Figure 5.2 Food and income availability calendar for the upper highlands

Another less visible, yet commonly practised, land use intensification strategy in the area includes planting different varieties of the same crop and spatial synchronisation of the cropping system with micro-soil properties. In order to exploit their different desirable qualities, as many as three to four different cultivars of the same crop (such as sorghum) are planted within the same plot. Some of the cultivars are early-maturing; others are less preferred by birds, thus reducing the requirement for children's labour for scaring birds; still others are either high-yielding, suitable for particular purposes such as animal feed (with a tall stalk), as making local beer; or

less affected by storage pests, etc., Maize is usually planted on the bottomland of the soil toposequence and sorghum is planted on the upper slope. This is done to synchronise soil micro-properties with the requirements of the crops. As one moves down the slope, soil water retention capacity increases with increasing soil clay content. Therefore, maize is planted on the bottom of the slope to obtain a better yield and reduce drought risk, because maize is more susceptible to moisture stress and a lack of soil fertility than sorghum.

5.3.2.2 The Production of High-value Crops

A shift to the production of high-value crops is another land use intensification strategy available to farm households, but it does not automatically follow from higher population density. It requires changes in factor costs to be reflected in agricultural pricing and marketing, land tenure and crop research policies (Lele and Stone, 1989). As the case study of chat production demonstrates, smallholder farmers' response in terms of resource allocation to seize opportunities created by strong market incentives surpasses expectation. There are cases where farmers could shift their land and other resources to high value crops production with little or no external support.

The most interesting development in the HHs that is clear even to a casual observer, as far as a shift to high-value crop production is concerned, is the dramatic expansion of chat production. As Table 5.2 portrays, the proportion of arable land allocated to the production of chat (sole and intercropped) has substantially increased since the early 1990s with far-reaching consequences for the land use system and people's livelihoods. By contrast, the production of coffee, the crop that generates 60% of the export earnings of the country, has declined substantially in the same period. It is believed that the main reason for the decline in coffee production in the HHs is coffee berry disease and the increased cost of protection since the removal of subsidies following the implementation of the SAPs from the early 1990s. For example, the 1999/2000 post-harvest crop assessment by an NGO in collaboration with the zonal offices concerned reported a 40% to 60% decrease in coffee production in most of the major coffee growing areas in the West Hararghe Zone (CARE – Ethiopia, 2000) due to the CBD alone.

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Table 5.2: Trends in food crop and cash crop production in the Hararghe Highlands since the early 1990s (percentage of households that grow/used to grow the crop in question)

	Decreased substantially	Decreased a little	Remained the same	Increased a little	Increased substantially
Maize Sole	18.3%	25%	20.2%	15.4%	21.2%
Maize intercrop.	-	14.3%	50%	14.3%	21.4%
Sorghum sole	25.5%	35.7%	24.5%	7.1%	7.1%
Sorghum intercrop.	6.7%	14.6%	7.9%	22.5%	48.3%
Chat sole	-	4.7%	11.6%	**53.5%**	**30.2%**
Chat intercrop.	-	2.2%	4.4%	**16.5%**	**76.9%**
Coffee	**73.7%**	10.5%	5.3%	10.5%	-

Source: own field survey

This assessment goes with the findings of another study that indicated decreasing interest in coffee production among Hararghe farmers (Kingele, 1998). Interestingly, Ellis (2000b) observed a similar trend in some Tanzanian villages, where dairying has replaced coffee after the introduction of SAPs. Ironically, the reform package known as SAPs was primarily meant to increase the production of tradable agricultural commodities such as coffee.

Although other high value crops, such as vegetables in the Finkile PA and onions in the Kuni Sagaria PA, are important, chat deserves some space and thought since it is central to rural livelihoods in the HHs, given its importance in terms of the quantity of resources, land in particular, allocated to its production, the revenue it generates and its growth multiplier effect on the local economy in general. The following case study describes in more detail the expansion of chat production in the HHs.

A case study of market induced change in the land use strategy: the dramatic expansion of chat production in the HHs

Chat (Catha edulis) is a perennial tree crop mainly grown in Eastern Ethiopia. The people who live in the Horn of Africa and in some Arab countries chew young fresh leaves of chat as a stimulant. Very little is known about the effect of chat on the human physiology. It is, however, said that chat increases blood

sugar levels and improves blood circulation. This provides energy, which helps workers to withstand fatigue and improves the concentration of students when reading.

The main chat production area in Ethiopia is the HHs. It has, however, been observed that chat production has also been expanding in other regions, especially in areas south of the capital, Addis Ababa. In some areas of the HHs, in particular the chat-belt of Alemaya, it was found that the area of cropland allocated to chat is as high as 75% of the total arable land (SCF/UK, 1996). The proportion of the total arable land allocated to chat in the survey area ranges from 21% in Kuni (Chiro District) to 54% in Alemaya. It was also observed that the majority of irrigated land is allocated to chat production. In addition chat consumes most of the scarce organic manure in farm households. It is not uncommon to find farmers diverting some of the inorganic fertilisers provided on credit by the MoA for crop production to chat production. Indeed, Hararghe farmers have to be admired for their indigenous technical knowledge of the way they manage their chat fields. The farmers have developed appropriate spacing, defoliation time and other cultural practices, variety selection and disease control methods including the use of chemicals such as DDT. All of this was done independently, without any government involvement or assistance from farmers' associations.

Both legal and illegal channels are used to export chat. The volume of chat exported legally from the HHs was about 200 metric tons (Mt) in 1948 and reached 1,400 Mt in 1958 (Klingele, 1998). According to the local branch of the National Bank of Ethiopia, the volume and value of chat exports from the region rose from 2, 746 Mt and 30.2 million birr in 1977 to 3, 496 Mt and 114.4 million birr in 1986 (National Bank of Ethiopia, 1986). Ethiopia earned 618.8 million birr in hard currency in the year 1999/2000 by exporting 15, 684 Mt of chat (National Bank of Ethiopia, 2001). Chat had become the second most important earner of foreign exchange next to coffee by 1999/2000, as is shown in Figure 5.2.

University of Pretoria etd – Tefera, T L (2006)

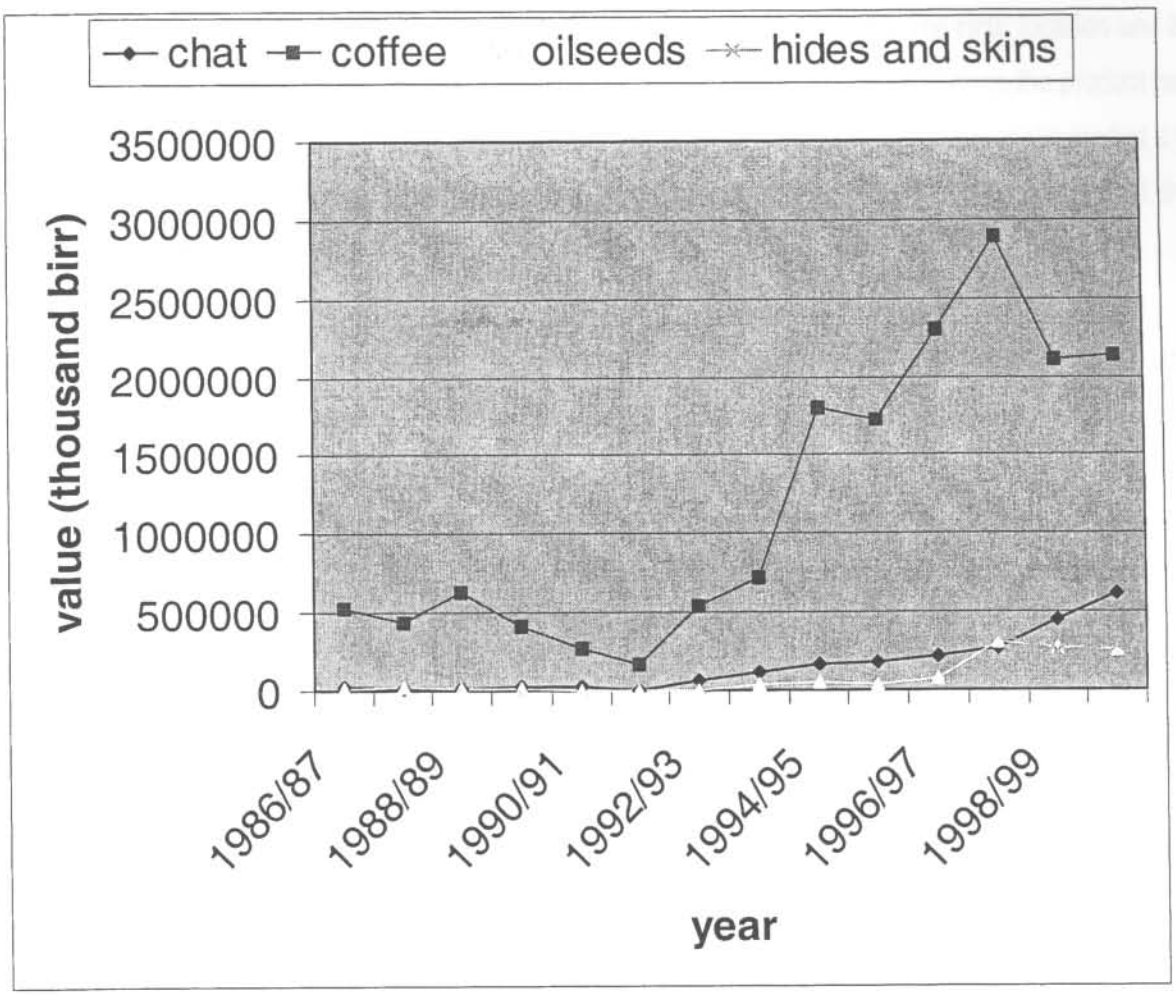

Figure 5.3:Value of main agricultural exports (in thousand birr)

Source: Developed from data reported by the National Bank of Ethiopia (2001)

The fact that chat production is replacing staple cereals and coffee is interesting for a number of reasons. Unlike coffee and cereals, chat has never directly benefited from research, extension advice and credit services. Besides its alleged effect on human health, the MoA is concerned that the expansion of chat production might have negative repercussions for the food security of households and on the foreign exchange earnings of the country. Chat is also blamed for decreased productivity, as people waste valuable working time sitting and chewing it for hours. No empirical evidence is available yet and it is not clear whether abusing chat is any different from abusing alcohol.

There are a number of factors that contribute to the expansion of chat production in the HHs. The first, and perhaps the most important factor, is the growing domestic and export markets for chat and improved access to these markets through an improved transport network. The export market is

substantial and expanding. This includes countries such as Djibouti, Somalia and Arab countries such as Yemen. It is also exported to Europe, but is banned in Canada and the US. The HHs' location and its superior transport network have played an important role in the expansion of chat, since the product has to reach its final destination fresh (and therefore fast transport is needed). In the domestic market it is quite evident that chat chewing has become a recreational activity and now also forms part of the culture of the urban youth.

The export price of chat has also been rising since the mid 1970s (Gebissa, 1994, cited in Degefa and Nega, 2000). While chat enjoys a relatively stable price in the world market, coffee suffers from both fluctuating export volumes and prices. Coffee berry disease, the increasing prices of chemicals since the removal of subsidies under the SAP and declining world coffee prices have all contributed to the decline of the coffee sector in the HHs. Producing chat has thus become a viable and important alternative to ensure continued cash income. Chat production has another advantage: chat can be harvested at least twice a year under rainfed agriculture and five times per year under irrigation. This ensures that households have a well-distributed flow of income.

Another economic reason for the growing interest in chat production is related to its cost of production relative to that of other competing enterprises. Labour is the most important cost item in the production of chat. The rapid population growth in the HHs has provided enough family labour or access to cheap hired labour for labour-intensive production, making chat production feasible. In the second place, chat is hardly affected by any disease, except some damage by insects that can easily be controlled by locally developed methods at little or no cost. The need for minimum off-farm inputs makes chat production compatible with poor farmers' limited access to credit. Table 5.3 gives an overview of the relative profitability of chat in the HHs economic systems.

Table 5.3: Income possibilities for staple foods and the main cash crops in the HHs

	Food crops		Cash crops			
	Sorghum	Maize	Coffee	Chat	Potato	Onion
Yield/ha – rainfed (kg)	700-1200	1000-1300	400-700	700-1000	5000-7000	3500-8000
Gross income/ha (birr)	560 – 1800	700- 1820	4800-11200	16100-23000	7500-10500	9100-20800
Production cost	Low	Low	Low-high	Low	High	High
Average net income	Low	Low	Medium	High	Medium	Medium-high
Risk factor	Low-medium	Low-medium	High	Low	High	Medium-high

Source: Klingele (1998)

Economic considerations are very important in peasant farmers' resource allocation decisions; however, there are other equally important factors that should be accounted for to understand their complex decision-making processes. Risk is one such factor. Although the average precipitation in the HHs is generally considered adequate for viable rainfed agriculture, its amount and abnormal distribution exposes crops to frequent weather hazards (Storck *et al.*, 1997). Intercropping is one of the widely used indigenous strategies to manage risks associated with weather, diseases and pests. Chat is less affected by these risks and perfectly suited for intercropping unlike, coffee. Chat is usually intercropped with sorghum, a crop preferred for its drought tolerance.

Finally, the topography of the HHs coupled with the cultivation of steep slopes and diminishing vegetation cover, has made soil erosion a critical problem in the HHs. Although land tenure insecurity is generally believed to discourage investment in soil improvement in the country, Hararghe farmers practise different soil conservation methods as a survival strategy. The farmers have always chosen soil and water conservation methods that take little land out of cultivation, although the improved conservation methods promoted by the extension service take more land (Sutcliffe, 1995). Thus, planting chat hedgerows on sloping land is preferred to other methods as an economically attractive conservation method that at the same time generates some income.

5.3.2.3 Investment in Land Productivity-enhancing Technologies

Extensive land use, such as forest, bush and grass fallow IS associated with little or no investment in land improvements (Pingali and Binswanger, 1987), whereas intensive land use systems under population pressure like reduced fallowing practise or multiple cropping, are usually supplemented by replenishing soil fertility and investment in soil and water conservation (Boserup, 1965). From this it follows that increased population density is implicitly correlated with investment in land improvement (Templeton and Scherr, 1997). This sub-section looks at the extent to which the intensive land use in the HHs is commensurate with investment in land improvement and the adoption of crop technologies such as inorganic fertilisers in order to increase production while maintaining the capability of the land for future use.

- *Investment in Soil and Water Conservation*

Soil and water conservation activities are mainly labour-based and are very important and widely adopted forms of intensification in the HHs. The topography of the HHs,

the cultivation of steeper slopes and the diminishing vegetation covers make soil fertility depletion through soil erosion a very critical or, to use the farmers' own phrase, a 'life threatening' problem in the area. Despite the problem of land tenure insecurity in the country, Hararghe farmers routinely practise soil and water conservation as a survival, if not as an investment, strategy. Pagiola (1994, cited in Templeton and Scherr, 1997) similarly argues that poor cultivators who have no better option outside subsistence farming have a greater incentive to protect the source of their sustenance.

According to the survey results (Table 5.4), more than 85% of the sample households had some conservation structures on their cropland with a steep slope. Investment (in terms of labour) in conservation activities tends to increase with altitude and the slope of the cropland. Grass strips or the planting of chat hedgerows on croplands with steeper slopes usually supports physical structures. Furthermore, Adnew (2000) observed that intercropping annuals with perennials tends to increase with the slope of cropland in the same area. Eucalyptus trees are widely planted around the homesteads in areas where land is relatively less scarce, Kuni in particular. Besides conserving soil, the trees are highly demanded for construction and for their attractive price on the market.

Moreover, almost all the sample households making a living from cultivating steep slopes expressed their intention of continuing to use the conservation methods previously introduced through FFW programmes beyond the lifespan of the programmes. This is contrary to the concern often expressed in the literature regarding the sustainability of this type of intervention, due to farmers' vested interest in the continuation of such programmes. This interest in conservation activities may be an indication of the increasing understanding of the farmers concerning the relationship between land degradation and the deterioration of their livelihoods. The farmers' own phrase 'life threatening' used above, to express the extent of the soil erosion problem in their areas supports to this argument. Consistent with this observation, an empirical quantitative analysis in the Central Highlands of Ethiopia revealed that the likelihood of keeping conservation structures developed through FFW programmes by households is higher on steeper slopes, where the perception of the soil erosion problem is higher.

Table 5.4: Type of conservation structure used by households

	Frequency	Percent
Flood diversion	18	9.1
Stone bund	39	19.8
Soil bund	75	38.1
Soil bund with grass strip	33	16.8
Stone and soil bund	3	1.5
Don't use	29	14.7
Total	197	100.0

Source: Own field survey

Few farmers, however, applied inorganic fertilisers on steeper slopes. One plausible explanation for the limited use of purchased fertilisers is the fact that it is predominantly the resource-poor and relatively young households who desperately struggle to make a living in such difficult condition and thus cannot afford inorganic fertilisers. Yet affordability is not always the main problem. One respondent from a female-headed household in Sabale, for instance, indicated that she could not use inorganic fertilizers, although she was willing and able to do so, using proceeds from chat sales. The reason is that if fertilisers were applied on cropland with such a slope, they would easily be washed away by erosion. Hence, she pleaded for technical assistance from extension to do something about it. This observation conforms with the insights from an empirical analysis in the Babile District of the East Hararghe Zone (Emana, 2000) that reported a negative and significant correlation between the proportion of plots on steep slopes and the adoption and intensity of use of inorganic fertilisers at household level.

- *Investment in Crop Technologies*

As the preceding analysis has indicated, labour-based and 'capital-deficient' intensification would, sooner or later, lead to soil mining, declining yield and eventually to food and environmental poverty, unless a transition is made to capital- and technology-based land use intensification. Only a few households in Alemaya invest in irrigation facilities such as pump and well construction for irrigated chat and perishables production. Thus, the use of purchased inputs, such as inorganic fertilisers and improved seed that increase the productivity of land, and labour are the key investments to support the growing population in a sustainable way. However, like the shift to higher-value crops, the shift to sustainable intensification does not automatically follow higher population density. It requires demand-driven research

and extension, an efficient input delivery system, improved access to rural finance and, above all, market incentives.

Almost all the sample households had reportedly applied organic fertilisers on their croplands (manure, leaf litter and household trash) in the study area. However, the amount of manure applied is declining along with the decline in the livestock population, as a result of increasing vulnerability to food insecurity, dwindling grazing land and recurrent drought. Furthermore, crop residues are no longer left on the farm as they used to be. Crop residues are removed from the farm to be fed to livestock, used for construction, fuelwood or sold on the market for similar purposes.

An expert estimate indicates that for each 4000kg of crop maize produced on a hectare of land, 200kg of nitrogen, 80kg of phosphate and 160kg of potassium are removed from the soil (Higgins, cited in Lele and Stone, 1989). Given this rate of absorption of the basic soil nutrients by crops, limited availability of organic fertilisers and increased frequency of cultivation, there is no alternative to increased use of inorganic fertilisers to increase production without further soil fertility depletion. In fact, it is with this understanding that the MoA has been aggressively promoting the use of inorganic fertilisers and improved seed by farmers through the national extension programme called the Participatory Demonstration and Training Extension System (PADETS), in the country, including the HHs at least since 1994.

About 55% of the sample households used chemical fertilisers at the rate of 74kg/ha in the 2000/2001 cropping season. The application rate is more than twice that the national average of 31kg/ha (Shank, 1996). As usual, the average figure obscures important variation across sites and between different households. As summarised in Table 5.5a, the percentage of farmers who use chemical fertilisers and the rate of application vary within the HHs, ranging from 17% and 12kg/ha in Kuni to 97.5% and 166kg/ha in Alemaya. It seems as if there is a positive and strong correlation between the extent of commercialisation of a site and the rate of adoption and the intensity of chemical fertilisers use. Clear variation was also observed in the use and the rate of application of chemical fertilisers among different socio-economic groups (Table 5.6b). Variance analysis indicates that the difference in mean inorganic

fertilisers application (kg/ha) between the household types is statistically significant at a zero percent probability.

Unlike with inorganic fertilizers, the use of improved seed in the HHs is quite low. Only 17% of the households reported that they had used improved seed, mainly maize. The high price of improved seed was mentioned often as a reason for their low adoption rate, as was the case with fertilisers, However, the most important reason proffered by those farmers who were willing and able to use the technology is associated more with the inability of the research system to come up with improved varieties, particularly of sorghum, which not only give a higher yield than the local cultivars, but also satisfy other locally desirable attributes that could be ascertained through participatory research.

Table 5.5a: Technology use, by site

	Kuni	Sabale	Alemaya	Overall
The percentage of farmers who use inorganic fertilizers	17	35.4	97.5	55.3
Average amount of fertiliser use (kg/ha)	12	12	166	74
The percentage of farmers who use improved seeds	17	21.5	12.7	16.8
The percentage of farmers who use pesticides	0	6.2	78.5	33.5

Source: own field survey

Table 5.5b: Technology use, by types of household

	Poor	Less poor	Better-off	Overall
The percentage of farmers who use inorganic fertilizers	35.7	63.8	79.5	55.3
Average amount used (kg/ha)	31	78	150	74
The percentage of farmers who use improved seeds	7.1	20.3	29.5	16.8
The percentage of farmers who used pesticides	17.9	40.6	52.3	33.5

Source: own field survey

Hararghe farmers apply many complex criteria, such as yield, price, resistance to common diseases and moisture stress, stalk height, storability, suitability to make local food, susceptibility to bird attack, etc.., to evaluate the relative advantages of new cultivars, as the earlier sorghum case indicated (Box 5.2). Indeed, empirical analysis has indicated that farmers' perception of the overall quality of improved cultivars is found to affect adoption decisions in the area significantly (Emana, 2000). In general, peasant farmers prefer varieties that guarantee a reasonable yield with a

low coefficient of variation to higher yielding varieties that entail high risk, especially in areas such as the HHs, characterised by risk and uncertainty (also see Ellis, 1993).

The use of chemical fertilisers with the local cultivars is a common practice in Hararghe. This is a cause for concern, since local varieties are generally believed to be less responsive to chemical fertilisers. For instance, Howard *et al.*. (1999) reported that the yield response to fertilisers (Urea and DAP) used in maize production declines dramatically without the use of hybrid seed. The practice of using fertilisers with local cultivars may make fertilisers use economically less attractive with negative repercussion for sustainable use.

Much also remains to be done to promote appropriate use of crop protection chemicals to reduce pre-harvest and post-harvest losses, estimated to range from 20% to 30% by farmers (CARE-Ethiopia, 1996). Reducing such losses can substantially contribute to farm households' food security. The use of pesticides can substantially reduce storage losses and enable farmers to store their grain to sell it at higher prices later in the season. The input loans policy of the MoA that requires farmers to repay input loans immediately after the harvest is one of the main problems in this regard (Howard *et al.*, 1999).

Finally, in the study, a multivariate binary logistic regression model as described in Chapter 1 was developed and estimated to formally identify and test the statistical significance of the determinants of inorganic fertilisers use in the HHs to achieve greater insight into local dynamics related to technology use.

Table 5.6: Definition of variables for assessing the determinants of fertilisers use

Variable	Expected sign	Variable description
Gender of household head	+	Dummy male-headed household = 1
Age of household head	?	Age in years
Have formal education	+	Dummy, favourable response = 1
Have access to extension	+	Dummy, favourable response = 1
Borrowed from formal source	+	Dummy, favourable response = 1
Distance to the nearest market	-	Walking distance in minutes
Cropland size per adult equivalent	-	Cropland (ha) / consumption unit
Livestock ownership	+	In tropical livestock unit
Grow chat for market (chat covers at least 10% of cropland)	+	Dummy, favourable response = 1
Participate in off/non farm activities	?	Dummy, favourable response = 1
Income from crop sale	+	Gross income

The first model (Table 5.7a) was estimated to test the direction and strength of the relationship between access to cropland and inorganic fertilisers use, in line with the objective of the study, alongside the other conventional explanatory variables in adoption studies related to personal traits, institutional and socio-economic factors. Cropland holding size per adult equivalent, instead of just cropland holding size, was chosen as it is used in the study as a proxy indicator of population pressure at household level. Growing chat was included as a dummy variable to achieve more insight into the impact of increasing chat-based commercialisation in the area on the adoption of technologies, in this case, chemical fertilisers. The parameter estimates are set out in Table 5.7a.

Table 5.7 a: Logistic regression estimates of the determinants of the adoption of chemical fertilisers in the HHs

	B	Wald	Sig.
Gender of head	1.039	3.927	.048
Age of head	-.034	3.762	.052
Has formal education	.034	.005	.946
Has access to extension	1.757	6.959	.008
Has access to formal credit	8.484	.153	.696
Distance to the nearest daily market	-.049	4.752.	.029
Cropland size per adult equivalent	-1.847	.958	.328
Grows chat	2.050	18.961	000
Tropical livestock unit	.006	.002	.967
Participate in off-farm and/or non-farm	-2.050	14.854	000
Constant	1.08	.75	.386
-2 log likelihood	142.282		
Adopters correctly classified	88%		
Non-adopters correctly classified	79.2%		
Hosmer and Lemeshow goodness of fit test (x^2) = 10.985 Significant at 0.203			

Source: Own data and analysis

An alternative model (Table 5.7b) was also estimated with two objectives in mind. In the first place, the sheer quantity of resources such as land does not indicate anything about quality. For example, a farmer with half a hectare of fertile and irrigated land can be much better-off than another farmer with a hectare of infertile land that is not irrigated. The revenue a factor of production generates may be a better index of quality in such circumstances. Using revenue generated by different enterprises for the estimation provides further insight concerning which income

source(s) is (are) more likely to be invested in land productivity-enhancing technologies. An estimation of the alternative model also emerged from an attempt to build a model with better predictive power.

Table 5.7b: Logistic regression estimates of the determinants of the adoption of chemical fertilisers in the HHs (alternative model)

	B	Wald	Sig.
Gender of head	.835	2.119	.146
Age of head (year)	-.031	2.416	.120
Has formal education	.065	.013	.910
Has access to extension	1.322	3.39	.066
Has access to formal credit	8.717	.193	.661
Distance to the nearest daily market	-.062	5.15	.023
Income from grain sale	.002	1.712	.191
Cash crop income	.002	19.879	.000
Income from livestock	.000	.205	.651
Participate in off-farm and/or non-farm	-.931	2.689	.101
Constant	-.042	.001	.977
-2 log likelihood	106.016		
Adopters correctly classified	84%		
Non-adopters correctly classified	92.2%		
Hosmer and lemeshow goodness of fit test (x^2) = 5.398 Significant at 0.714			

Source: own data and analysis

All the variables included in both models have expected signs. Although the level of significance for some variables and the predictive power of the two models are not the same, all the variables found to be significant in Model 5.7a are also significant in the alternative Model 5.7b, indicating similar conclusions about the determinants of chemical fertilizers adoption decisions. The goodness of fit of the models, as measured by the percentage of original grouped cases correctly predicted exceed 80%, and the Hosmer and Lemeshow's goodness of fit tests showed that both models fit the actual observation reasonably well.

The results of the analysis showed a tendency for an inverse relationship between population densities at household level, as measured by cultivated land per adult equivalent, and the decision to use fertilisers. At first glance, this result seems to support the Boserupian hypothesis when intensification, as in this case, means increased capital expenditure per unit of cropland. The fact that the average cultivated area per household in Sabale is less than that in the Kuni area, but that the

percentage of farmers using fertilisers and rate of its application in Sabale is twice as high as that in Kuni, makes the result robust. However, the relation is not significant enough to draw any solid conclusion as to whether the Boserup hypothesis holds up in the context of the study area.

Many other adoption studies have found a positive and significant or an insignificant relationship between cultivated land size and the adoption of technology. Emana (2000) found a positive, but insignificant relationship between holding size and adoption, as well as the intensity of the use of chemical fertilisers. In the same study, the relationship between the adoption of improved seed and cultivated land size was positive and significant for improved maize varieties, but negative and significant for improved sorghum variety. Alene *et al.,* (2000) also reported a positive and significant relation between the adoption of improved maize varieties and the area of cultivated land in the Western Ethiopian Highlands settings with different farming systems. It is not clear whether the conclusions of these studies would still hold if cropland area per adult equivalent were used, instead of cultivated area, controlling for multicolinearity, given the fact that family size and landholding size are highly and positively correlated in Ethiopia, due to periodic land redistribution according to family size.

The findings concerning a positive and highly significant effect of the increasing chat-based commercialisation in the HHs on the adoption as well as on the intensity of the use of chemical fertilisers is clear and solid, both at the household and community levels (see Table 5.6, Table 5.7a and Table 5.7b). Proximity to the nearest daily market, the other commercialization-related variable, as measured by walking distance (in minutes), has a negative and significant influence on adoption decisions. The probability of fertilisers use decreases with increasing distance from the market.

All the other significant variables made the theoretically expected contribution in explaining adoption behaviour. Access to extension services is positively and strongly correlated with the use inorganic fertilisers. The negative sign of participation in non-farm and off-farm activities probably shows the participating households' liquidity constraints or limited ability to bear the risks associated with technology

adoption, as a result of their extreme poverty. This issue is explored in detail in the subsequent sections dealing with rural livelihood diversification.

The role of proceeds from grain sales in the adoption of chemical fertilizers, though positive, is only marginally significant. The results seem to contradict the assumption of the MoA that farmers pay back fertilisers loans by selling the additional grain obtained as a result of their adoption of the technology. A survey at the national level has revealed that of the farm households who used fertiliser technology, more than 44% used it to produce extra grain for consumption and paid fertilisers credit from the sale of cash crops, high value grains such as teff, livestock and labour income (Shank, 1996). The later findings support the results of the current analysis and throw some light on the important role that the commercialisation of smallhoder production could play in accelerating the adoption of grain technologies.

5.4 LIVELIHOOD DIVERSIFICATION

Agricultural land is already over congested in the HHs. The size of the pieces of arable land cultivated by most of the households (72%) has diminished far below the estimated minimum size required for subsistence. Of course, there is undoubtedly unexploited potential to increase land productivity substantially and thereby improve the living standards of those trapped in subsistence farming, given the current disappointingly low level of land productivity. Nevertheless, realistically the hope that farming will continue to absorb the fast growing rural labour force in the HHs without further serious ecological damage seems unlikely to be realised.

Experience elsewhere in SSA has shown that off-farm and non-farm activities provide supplementary or alternative employment and income where the scenario of reduced access to land and declining farm sizes prevails. Hence, off-farm/non-farm employment can potentially play a significant role in rural poverty alleviation. The available empirical evidence shows that activity and income diversification is central to rural livelihoods in SSA (Barrett, Reardon and Webb, 2001) and that off-farm/non-farm employment already accounts for 40% to 45% of the average income of African rural households, with increasing importance over-time (Bryceson and Jamal, 1997; Reardon, 1997). Nonetheless, land scarcity is by no means the only reason for rural livelihood diversification, as was discussed at length earlier (see Chapter 2).

University of Pretoria etd – Tefera, T L (2006)

This second section of Chapter 5 investigates rural livelihood diversification strategies and endeavours to establish empirically the determinants of livelihood diversification into off-farm and non-farm activities in the HHs, with special attention to declining access to agricultural land and differential asset endowments. A livelihood activities composition analysis and an income portfolios analysis have been carried out using simple descriptive statistics. In the descriptive analysis, the livelihoods survey data has been disaggregated by household type and by site in order to capture the roles of these variables in explaining diversity in livelihood activities and income diversification strategies. Finally, a logistic regression model was developed and estimated to assess household level determinants of rural livelihood diversification into off-farm and non-farm activities and the role of population pressure in this process.

5.4.1 COMPOSITION OF LIVELIHOOD ACTIVITIES

Activities are the particular uses to which productive assets are put (Barrett and Reardon, 2000:11). The activities performed by rural households can be categorised in different ways. One method of grouping them is to decide whether activities use natural resources as input or not (Ashley and Carney, 1999). Natural resource-based activities include farming (growing crops and rearing livestock for subsistence and/or for the market), collection of items such as fuelwood and fruit, rural to rural migration in search of better grazing or cropland, and other natural resource-based non-farm activities such as timber making. Non- natural resource-based activities include trade, services, manufacturing, remittance and other transfers. Livelihood activities can also be categorised by sector (farm vs non-farm), by function (wage vs self-employment), and by space (local vs migratory) (Barrett and Reardon, 2000).

Rural households in the HHs participate in a number of activities other than crop production for consumption and sale. An analysis of the survey data identified livestock and many off-farm/non-farm activities in which households have been engaged.

- *Livestock-rearing activities*

Almost all the households (95%) participate in livestock-rearing activity. Most of the poorest households keep only a couple of chickens, one goat or none, but are considered to be participants in livestock-rearing activity in the analysis, thus inflating the rate of participation. The percentage is misleading, as it implies that this activity is equally accessible to the different categories of households (unless the data is disaggregated by the type of livestock kept to see whether there is any entry barrier as reflected by the extent of participation). The problem is resolved in Table 5.8, by incorporating the intensity of participation as measured by the type and the numbers of livestock kept by households.

The results in Table 5.8 show that poor households participate less intensively than the other two groups in livestock-rearing activity, particularly with regard to the large ruminants. There is a direct correlation between the extent of participation in livestock activity and wealth. Capital constraints are the most frequently mentioned problem used to explain households' involvement livestock production after the animal feed problem. This probably confirms that the participation of the poor in livestock-rearing activities is inhibited by a lack of own capital and the non-existence of an ability to access formal credit to invest in the livestock activity by the resource-poor households.

Table 5.8: The rate of participation in livestock-rearing activities, by types of household

Activity	Poor	Less Poor	Better-off
Oxen/bull kept			
0 – 0.5*	83.4%	0%	0%
1 – 1.5	16.7%	53.6%	47.7%
2.00 – 5	0%	7.2%	38.7%
Cow/heifer			
0 – 0.5	40.5%	4.3%	0%
1 – 1.5	50%	55.1%	15.9%
2 – 7	9.6%	40.5%	84.1%
Goats/sheep			
0	73.8%	60.9%	52.3%
1 – 2	16.6%	23.2%	25%
3 and above	9.6%	15.9%	22.8%
Donkey/horse			
0	98.5%	65.2%	36.4%
1-2	1.2%	34.8%	50%
> 2	0%	0%	13.7%

TLU was divided into two when households keep livestock belonged to others and share the benefits.

Source: Own survey

University of Pretoria etd – Tefera, T L (2006)

- *Off-farm and non-farm activities*

The off-farm and non-farm activities in which the households engaged mostly as a supplement to insufficient farming income and to a lesser extent as a sole source of livelihood, include labour, trade, food processing, fuelwood and charcoal sales, rural crafts and remittances from migrant household members.

Wage labour is employed for farm activities, the on-farm processing of chat, the processing of chat at collection points (district towns) and the loading and unloading of trucks transporting agricultural produce to the market, and fertilisers and household supplies to rural villages. Women's labour is employed in restaurants in the nearby town on a daily basis for making *injera (Ethiopian pancake)* and local drinks. Employment in the FFW programmes of the GOs and NGOs in soil and water conservation activities are also included under labour.

The chat trade, the grain trade, the livestock trade, rural shop, the second-hand clothes trade and petty trade (the latter exclusively engaged by women), are all included in the trade category. It was later learned that this procedure fails to distinguish between the more remunerative and capital-intensive types of trade activity dominated by the 'haves' and the less remunerative and less capital-intensive types of trade activity such as petty trade, dominated by the 'have-nots'.

Carpentry, metal work, pottery, etc., which are very rare in the study area, are included under rural crafts. The making and selling of *injera*, local drinks and cooked maize, sweet potatoes, eggs, etc. are classified under food processing. Remittances, as one way of livelihood diversification, are treated both as an activity (expressed as a percentage of households received in kind and/or as cash remittances from immigrant members) here, and as income in the income portfolios analysis in the next subsection.

Table 5.9a: Participation in off-farm/non-farm activities in the HHs, by types of household (expressed as percentage of participants)

Activity	Poor	Less poor	Better-off	Total
Labour	41.05%	33.96%	23.3%	35.96%
Trade	24.21%	39.62%	40%	31.46%
Food processing	16.84%	9.43%	3.33%	12.36%
Remittance	9.42%	13.21%	26.67%	13.48%
Rural crafts	3.16%	3.77%	3.33%	3.37%
Firewood/charcoal sales	5.26%	0%	0%	3.37%
Does not participate in off-farm/non-farm activities	26.2%	46.4%	52.3%	39.1%

Source: Computed from own survey data

Table 5.9b: Participation in off-farm/non-farm activities in the HHs, by site (percentage of the participant)

Activity	Sabale	Kuni	Alemaya	Total
Labour	46.34%	35.19%	16.67%	35.96%
Trade	20.73%	31.48%	52.38%	31.46%
Food processing	20.73%	9.26%	0%	12.36%
Remittance	7.32%	18.52%	19.05%	13.48%
Rural crafts	3.66%	5.56%	0%	3.37%
Firewood/charcoal sale	1.22%	0%	11.9%	3.37%
Does not participate in off-farm/non-farm activities	16.9%	35.8%	59.5%	39.1%

Source: Computed from own survey data

Quite a significant proportion (60%) of the households in the study participate in the different off-farm/non-farm activities. Wage labour and trade provide most of the employment opportunities, whereas rural crafts and fuelwood and charcoal sales are the least important in the diversification of livelihood activities. As discussed earlier, diminishing forest resources as a result of unwise exploitation, concomitant with the fast population growth and the ineffective land policy of the country, explain the reduced importance of charcoal and fuelwood sales as an alternative source of rural livelihoods. The decreased importance of rural crafts can probably be associated with the low intensification level of farming in the study area and the weak backward linkages between the farm and the non-farm sectors. The availability of cheap synthetic household goods from the urban manufacturing sector and/or imports such as plastic products and the past regimes' land policies that intentionally discouraged diversification in rural livelihoods might have played a role as well.

Box 5.4 a: Why do poor households diversify their livelihoods?

Mrs Sinke Beyene heads a household in Sabale. The household has 0.64 ha of cropland and has no livestock except for four goats. She had to sell an ox to cover costs of the hospitalization of her husband before his death. After her husband died, she sold the only remaining ox for his 'kurban' (a religious feast in memory of the dead). Then, she sold a cow the next year to buy grain for her family, as the harvest of the season was very poor. At the time of the survey, Sinke's two sons were involved in the FFW programme from which they obtained 175 kg of wheat and 10 kg of cooking oil. Sinke, usually travels to the nearby town (about six km) on foot to make 'injera' and the local alcoholic drink 'arake' for restaurants. With the money she gets, she buys grain or injera at the end of the day for daily consumption. She also participates in some petty trade from which she makes about 180 birr.

Source: Own field interview and informal discussion

Table 5.9a and Table 5.9b show another interesting dimension of rural livelihoods, namely, diversity across sites and among different household types. The rate of participation in wage labour is higher among poor households and among sites with a higher proportion of poor households. Alemaya is the better-off site with highly intensive farming where the labour demand is high (43% of the households used hired labour in 2001/2002); yet the labour comes from the neighbouring, less developed districts. This may imply that participation in wage labour is unattractive and that those engaged in it are mainly drawn into it by poverty. In other words, the opportunities cost of labour employed in faming is high in more commercialised villages.

The rate of participation in a more remunerative trade, which needs start-up capital, human capital and in some cases social capital, is relatively higher among the better-off households and at the better-off site. This picture would have been clearer had petty trade, a less remunerative type of trade exclusively practised by women either from female-headed or poor households, been categorized separately from the other types of remunerative trade such as the chat trade, rural shops and the livestock trade. Farm households in Alemaya participate more in the later remunerative trade activities than the other two sites. The availability of cheap labour, which can be hired for peak season farming activities, facilitates the process. In this case, one may argue that non-farm /off-farm activities are practised more as an asset accumulation strategy than as a survival strategy (Box 5.4b).

University of Pretoria etd – Tefera, T L (2006)

The situation regarding remittances is not very different (Box 5.4b). Better-off households often foster the sons of their poor neighbours or relatives to serve as shepherds, have the ability to hire additional labour during the peak season in case of labour shortage or organize *guuza*. Thus, the better-off can afford to invest in their children's education as a long-term livelihood diversification strategy. Better-off households also have better social networks to further their economic interests by the migration of some of their members to nearby towns, and regions, or even to abroad. Thus, the latter earn more remittances than their poor counterpart. The observation (by sites) follows a more or less similar pattern.

Box 5.4b: Why do better-off households diversify their livelihoods?

Mr Abduselam is 42, married and lives with his other two married brothers in Alemaya. The household owns 12.7 TLU, two pumps and 3.5 ha of land. The household earned 5,500 birr by selling surplus grain, 30, 000 birr from vegetable sales and 3000 birr from chat sales. They made another 3000 birr from renting out the pump, 1000 birr from milk sales and 1500 birr from their village shop. Four of the family members (two brothers, a sister and the mother) live in Canada as migrants. This household could always get cash remittances on request from the migrant members. During the survey season 2001/2002, it received 3000 birr in cash. The household also indicated a plan to get a loan from the bank to buy a truck to get involved in transport services as commercialisation is in the making in the area.

Source: Own field interview and informal discussions

5.4.2 INCOME PORTFOLIOS

The stream of activities leads to a stream of benefits, in other words, livelihood outcomes. Livelihood outcomes consist of increased income, improved food security, reduced vulnerability to shocks, stress or seasonality, and sustainable use of local natural resources (Ashley and Carney, 1999). Conversely, unsuccessful livelihood strategies could lead to outcomes that are the obverse of the former, such as, reduced income, food insecurity, increased vulnerability and unsustainable NRM.

This section deals with the income dimension of farm households' livelihood diversification. Income at a given point in time is commonly considered the most direct and measurable outcome of the livelihood process (Ellis, 2000), although

conceptually the benefit could be much broader than just income in cash and in kind (Barrett and Reardon, 2000). Barrett *et al.* (2000:10) classify income sources of rural households into the following:

- retained output for own consumption; food crop sales (sales of cereals, pulses and tubers produced by the household);
- cash crop sales;
- proceeds from sales of livestock and unprocessed animal products (eggs, milk and honey); and
- off-farm and non-farm income (unskilled labour for wages or a salary and income from trade, commerce or skilled labour employment).

The average estimated total annual income of the households in the HHs as a whole is 4042.9 birr or about 856.5 birr per adult equivalent. Alemaya has the highest average annual income of about 6562 birr or 1228 birr per adult equivalent, while Kuni has the lowest average annual income of about 2338.4 birr or 523.8 birr per adult equivalent. Cash crops account for 34% of the annual income of these households, followed by a retained output for consumption that contributes 28%. Surprisingly, off-farm/non-farm income accounts for 20% of the annual income, more than the income from livestock and grain sales, which, respectively, contribute 15% and 3% of the average annual income of the households. The low level of income from grain sales confirms that there is limited surplus grain production for the markets in the HHs.

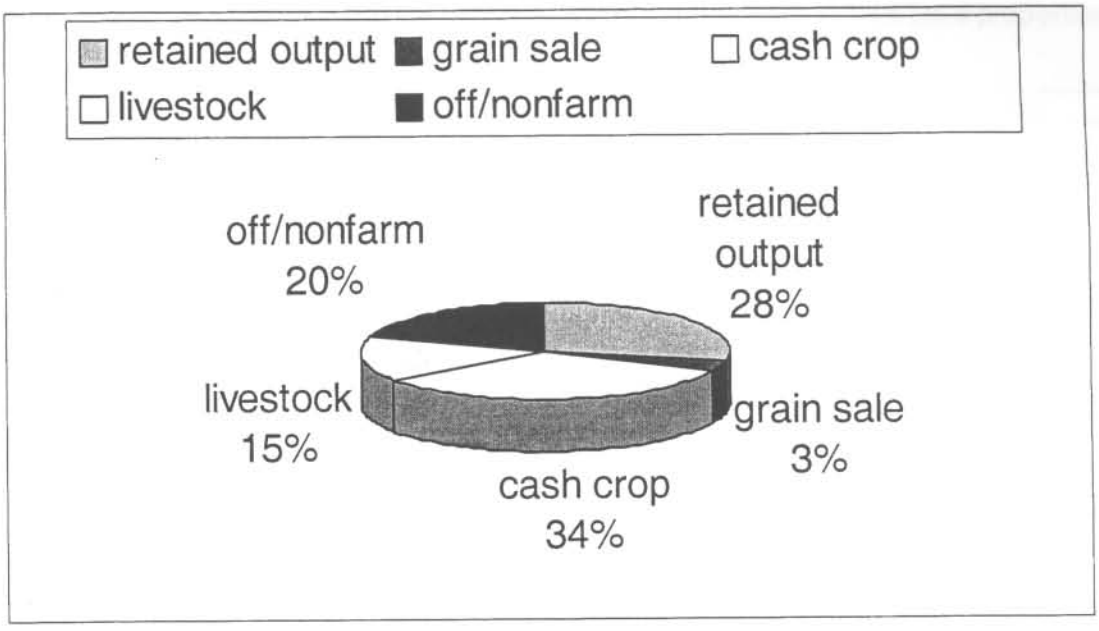

Figure 5.3: Mean household income portfolio, all sites

Source: Computed from own survey data

A number of interesting observations can be drawn from the income portfolios analysis (Table 5.10a and Table 5.10b) by site and by household types with regard to livelihood diversification behaviour. Off-farm and non-farm income is more important for the poor households and at the sites where cash crops contribute less to livelihood. The poor earn approximately the same proportion of income from subsistence crops, cash crops and off-farm/non-farm activities. Cash crop income is more important for better-off households and the better-off site. The revenue generated from chat sales accounts for 28.7% of the average annual income of these households and about 85% of cash crop income. This makes chat the single most important cash crop in the study area.

The households in Sabale earn a disproportionately higher cash income from livestock, because they tend to sell more milk to purchase grain and consume less, unlike at the other sites and the better-off households. Whether the general tendency of increasing sales of milk in pre-urban areas has a negative effect on children's nutrition is not known. However, women normally control the cash income from the sale of milk and milk products. The later may increase the probability that the cash obtained from milk sales is spent on children's welfare.

Table 5.10a: Mean household income portfolios, by types of household (as a proportion of the total income which is = 1.00)

Income source	Poor	Less poor	Better-off	Total
1. Crop total	0.594	0.681	0.725	0.653
-retained output	0.304	0.273	0.262	0.284
- grain sale	0.025	0.046	0.033	0.034
- cash crop	0.265	0.362	0.429	0.335
of which chat	*0.248*	*0.289*	*0.361*	*0.287*
2. Livestock	0.115	0.173	0.161	0.145
3. Off/non-farm	0.290	0.146	0.114	0.201

Source: Own survey and computation

Table 5.10b: Mean household income portfolios, by sites (proportion of the total income which is = 1.00)

Income source	Sabale	Kuni	Alemaya	Total
1. Crop total	0.597	0.493	0.812	0.653
-retained output	0.273	0.315	0.271	0.284
- grain sale	0.027	0.030	0.043	0.034
-cash crop	0.296	0.148	0.498	0.335
of which chat	*0.286*	*0.114*	*0.407*	*0.287*
2. Livestock	0.201	0.157	0.091	0.145
3. Off/non-farm	0.203	0.350	0.096	0.201

Source: Own survey and computation

In line with Ellis (2000b), diversity indices were estimated in an attempt to come up with summary statistics that simultaneously account for both income shares and participation shares. The inverse of the market concentration index, also known as Herfindahl-Hirschman index (Chang, 1997, cited in Ellis, 2000), in this case a diversification index, was used to the calculate diversity index for each household and the statistics were then summarised by household type and by site, using the mean and the standard deviation. Mathematically, the inverse market concentration index can be expressed as follows:

$$IMCI = \frac{1}{\sum_{I=1}^{n} Xi^2}$$

where IMCI = the inverse of Herfindahl-Hirschman index

Xi^2 = the square of proportional contribution to total income of each activity.

The diversification index summarised in Table 5.11 generally indicates that Sabale has more diverse sources of employment and income, and that less-poor households tend to have more diverse sources of income than the poor households. Unfortunately, the result does not give a concrete indication of the relationship

University of Pretoria etd – Tefera, T L (2006)

between the extent of diversification and poverty (Table 5.12) due to the high standard deviation. Further analysis is needed in order to draw concrete conclusions. The next subsection addresses this issue.

Table 5.11: Mean diversification indices, by site and types of household

	Poor	Less poor	Better-off
Mean index value	2.62	2.92	2.65
Std. Deviation	0.81	0.77	0.77
	Sabale	Kuni	Alemaya
Mean index value	3.11	2.57	2.52
Std. Deviation	0.74	0.78	0.72

Source: Own survey and computation

5.4.3 DETERMINANTS OF DIVERSIFICATION

The descriptive sections on the composition of livelihood activities as well as income portfolio analyses have already indicated some of the determinants of diversification into the off-farm and non-farm sector. The analyses so far seem to suggest that the poorer and the less commercialised households participate in and earn disproportionately from off-farm and non-farm activities than the less-poor and the more commercialised households. A binary logistic regression model was developed and estimated in order to examine the relative importance of these and the other pertinent variables rigorously and, most importantly, to determine empirically the role that population pressure, as measured by cropland area per adult equivalent, plays in the decision to participate in off-farm and non-farm activities. Table 5.12a specifies the parameters used for modeling the diversification behaviour of the households.

Table 5.12a: Definition of variables for assessing the determinants of participation in off-farm/non-farm activities

Variable	Expected sign	Variable description
Age of household head	?	Age in years
Education of head	+	Years of schooling
Adult male in household	+	Number
Adult female in household	+	Number
Livestock ownership	-	In tropical livestock unit
Cropland area per adult equivalent	-	Cropland (ha) / consumption unit
Distance to the nearest market	-	Walking distance in minutes
Cash crop income	-	As a ratio of total income
Level of food self-sufficiency	-	Scale 1 = self-insufficient 5 = produce surplus

Table 5.12 b displays estimates of the coefficients and level of significance of the determinants of involvement of the households in the HHs in off-farm and non-farm activities. The prediction power of the model is high and the model fits the actual observations reasonably well.

Table 5. 12b: Logistic regression estimation of the determinants of diversification into off-farm and non-farm activities in the HHs

Variable	B	S.E.	Wald	Sig.
Age of household head	-.009	.018	.262	.609
Education of head	.051	.237	.047	.829
Adult male	.448	.252	3.149	.076
Adult female	-.053	.271	.038	.845
Cropland area per adult equivalent	-7.000	2.166	10.440	.001
Livestock ownership	-.170	.148	1.321	.250
Distance to the nearest market	-.031	.020	2.411	.120
Cash crop income	-4.710	.994	22.440	.000
Level of self-sufficiency	-.451	.203	4.913	.027
Constant	6.073	1.330	20.866	.000
Percentage of correct prediction	78.4			
Hosmer and Lemeshow test	X =7.204	Df	8	0.515
- 2 Log likelihood	163.551			

Source: Own data and analysis

The results indicate that insufficient cropland holding per adult equivalent, food self-insufficiency and low revenue from sales of the cash crops are the main variables that significantly explain households' involvement in off-farm/non-farm sector. The number of adult males in a household is positively and significantly associated with participation in off-farm and non-farm activities, probably due to gender diversity in access to and the ability to participate in off-farm and non-farm activities. The distance to the nearest market is another variable found to be important in explaining the diversification behaviour of the households, at a 12% level of significance. Perhaps, these results indicate that the physical distance from the nearest market can be a barrier to participation in off-farm and non-farm activities. The other non-significant variables have theoretically expected signs.

In conclusion, although different households pursue different diversification strategies for a variety of reasons, the results of the logit analysis generally support the hypothesis that rural households in the HHs pursue livelihood diversification strategies more as a survival strategy than as an accumulation strategy.

University of Pretoria etd – Tefera, T L (2006)

5.5 DEMOGRAPHIC BEHAVIOUR OF RURAL HOUSEHOLDS

This third and final section of the analysis of rural livelihoods is concerned with the demographic aspects of rural livelihood strategies. Population growth influences the amount and quality of livelihood assets. An increase in the population of a country, a region or a particular village increases the labour force available, decreases the availability of agricultural land and increases the demand for food and non-food products. Nonetheless, the direction of influence could also run from livelihood assets to demographic change. The demand for more children is high as a means to expand own control over part of the common property regimes by 'capturing' (Panayotou, 1994) in situations where natural resources are abundant and access is open. Conversely, the demand for child labour could decrease and the cost of ringing up children could increase with reduced access to natural resources in general, and arable land in particular, if there is an increasing man-land ratio. The later reduces households' incentive for large families or for having many children.

Delayed marriage, migration and an attempt to control fertility by limiting births within marriage are other aspects of rural livelihood strategies in the context of population pressure. Thus, this section assesses the migration and fertility situation in the HHs. The section does not focus on migration, since its role in the livelihood strategies of rural households in the HHs is limited. Instead, the next subsection, dealing with migration, only provides some statistical evidence on the migration situation and briefly discusses the reasons for the generally low level of both rural-rural and rural-urban migration in Ethiopia. Subsection 5.5.2 forms the core of the section. The later sub-section rigorously explores the relationship between family size preference or achieved/intended fertility and access to cropland along with the other pertinent socio-economic and socio-cultural variables. In other words, it endeavours to establish whether and to what extent the demand for children and households' perceptions regarding the advantages of having large family sizes or many children have been changed given the increasing land-man ratio.

5.5.1 MIGRATION

Autonomous rural-rural or rural-urban migration in search of pasture, more productive cropland and off-farm/non-farm employment is a common demographic phenomenon across SSA. The situation in Ethiopia during the last three decades, including the HHs, has probably been exceptional in this regard. The only exception is the lowlands, where the pastoral system predominates and mobility is central to survival, and the politically motivated involuntary resettlement programmes of the previous government and massive population displacement in some parts of the country due to conflict or political instability.

According to the rural livelihoods' survey results, about 13.5% of the sample households had at least one migrant member. The figure is comparable with the national figure of 13% (CSA, 1994, cited in Degefa and Nega, 2000). Employment, marriage, education and family separation, in that order, are identified as the main reasons for a change of place of residence. It also seems as if the tendency to migrate is high in relatively less intensive and less commercialised farming area, such as Kuni. However, members of better-off households tend to migrate more within the same site. In terms of gender and age group, young males tend to migrate more than young females in the HHs, although the reverse is true at the national level, according to the 1994 census (cited in Degefa and Nega, 2000).

Table 5.13 reflects is surprisingly different figure from that of the reported livelihoods survey results and field observations. One possible explanation is that the CARE-Ethiopia baseline survey has underestimated the level of migration, despite its large sample size, probably because a narrower definition of migration was adopted. The alternative explanation might be that the migration situation of the region has changed since the CARE-Ehiopia 1995 survey, although it is hard to believe that it has changed to such an extent. Nevertheless, the CARE-Ethiopia survey provides important supplementary information regarding the generally low level of migration and indicates that rural-rural migration predominates over other types of migration and that the need to earn some additional income is the dominant motive for migration. The later finding confirms the results of the current survey.

Table 5.13: Migration situation in Hararghe

Variables	Chiro		Kuni		Hararghe region	
	Cases	Percent	Cases	Percent	Cases	Percent
Migration	468	100	184	100	881	100
- occurred	20	4.2	4	2.2	44	5
- not occurred	437	93.4	172	93.5	810	91.9
- not reported	11	2.4	8	4.3	27	3.1
Who migrated?	20	100	4	100	44	100
- family	4	20	1	25	8	18.2
- head of HH	5	25	2	50	15	34.1
- elder son	9	45	1	25	12	27.3
- wife and daughter	1	5	0	0	7	15.9
- relatives	1	5	0	0	2	4.5
Where did they migrated to?	20	100	4	100	44	100
- neighbouring PAs.	2	10	1	25	8	18..2
- neighbouring district	13	65	1	50	25	56.8
- nearest town	2	10	2	25	6	13.6
- outside the region	2	10	0	0	4	9.1
- unknown	1	5	0	0	1	2.3
Why did they migrate?	19	100	4	100	35	100
- additional income	12	63.2	2	50	22	62.9
- pasture and water	1	5.3	1	25	3	8.6
- drought	3	15.8	0	0	4	11.4
- conflict	3	15.8	1	25	6	17.1

Source: CARE- Ethiopia, 1995

Why has the level or the rate of migration remained very low in the HHs in particular, and in the country in general? There are a host of reasons for this. First, as indicated elsewhere in the thesis, the previous government deliberately discouraged rural-urban and rural-rural migration through its land policy until the early 1990s (Box 5.5). The periodic land redistribution by PAs until the late 1980s provided cropland to everyone who was willing and able to cultivate it personally, a measure that eliminated landlessness, one of the most frequently cited reasons for rural-urban migration in SSA. The same policy also restricted access to cropland within one's own residential area, a PA. The later measure is believed to have discouraged rural-rural migration.

Box 5.5: Deliberate restrictions on free labour movement in Ethiopia

Ethiopia illustrates an extreme case of the desire to control population movements. It is a very large country with remote areas and a predominantly subsistence rural economy. However, from the overthrow of Selassie and the socialist revolution in 1974, up the 1990s, the dominant ideology and planning aimed to control population movement, including in the countryside. During this period 'voluntary' migration was much lower in Ethiopia than in the rest of Sub-Saharan Africa, and it was not until the recent lifting of restrictions that migration was made easier. But at the same time, 'involuntary' politically-induced population displacement and resettlement occurred on an unprecedented scale and led to enormous population shifts, largely within rural areas.

Source: *McDowell and de Haan, 1997*

Although the restriction on the free movement of labour has been lifted, the heightened ethnic politics in the country and associated administrative barriers have replaced the previous policy bottlenecks for environmentally sound spatial distribution of the rural population since the demise of the previous government in 1992 (Devereux, 2000).

Also, generally, there are limited employment opportunities in Ethiopia outside subsistence farming, due to the expropriation of emerging private commercial farms after the 1975 land reform and their subsequent conversion to subsistence farms or highly mechanized state farms. The manufacturing sector is neither well developed nor sufficiently labour-intensive to provide sufficient employment opportunities for a growing and relatively more educated urban labour force, let alone less educated rural migrants.

Human and animal diseases such as tse tse fly and malaria and the need for public provision of basic economic and social infrastructure have hindered migration from the densely populated and degraded highlands to the lowlands. It was precisely for this reason, among others, that the previous regime's resettlement programmes failed in the HHs, despite some good intentions.

5.5.2 HOUSEHOLDS' SIZE AND FERTILITY PREFERENCE

Has the increasing scarcity of natural resources, particularly of agricultural land, changed households' demand for children or their preference for large family sizes in

the HHs? The answer is not straightforward. It is common practice to study the effect of population growth on natural resources. Nevertheless, influence could also run in the opposite direction, from natural resource scarcity to population growth. Still, the final result of the interaction is not known.

On the one hand, the diminishing landholding size under population pressure is expected to increase the cost of bringing up children and to decrease the demand for child labour in farming activities. These factors, taken together, are theoretically expected to reduce the incentive for large family sizes or for the maintenance of high fertility rates. On the other hand, the increasing scarcity of natural resources such as water, fuelwood or animal feed increases the demand for child labour, particularly daughters, in the absence of alternative sources of cheap labour, and with a high infant mortality rate, especially if people have to travel a long distance to collect fuelwood, fodder and to fetch water. This could increase fertility further, and thereby increasing the pressure on the local natural resource base (Cleaver and Schreiber, 1994; Dasgupta, 2000).

5.5.2.1 The Demand for Children

It is apparent from the above introductory remarks that understanding the role of child labour in the rural economy of the study area is a good starting point in a fertility analysis, although the economics of the demand for and the supply of child labourn is not necessarily expected to be the only factordictate rural households' reproductive choices.

Young children are important sources of labour in the HHs. Herding and scaring away birds and monkeys are the duties of children. Children, particularly daughters, assist their mothers by fetching water, collecting fuelwood and looking after their youngest siblings. The relatively older sons assist their fathers in ploughing, weeding and harvesting activities (Table 5.14a). The labour service obligation of children in the HHs could also be extended to blood relatives, effectively making children a group asset and childbearing a social responsibility (CARE-Ethiopia, 1995b). This type of child rearing cost-sharing, as well as benefits sharing social arrangements, may result in some degree of externalities in fertility decisions.

Table 5.14a: The extent of participation of children in different farming and household activities in Hararghe

Activities in which children participate	Chiro Percentage of respondents	Kuni Percentage of respondents	Hararghe region Percentage of respondents
Herding	61.5	53.2	61
Scaring away birds	35.7	37.2	36.4
Fetching water	23.3	21.7	22.3
Collecting fuelwood collection	18.5	15.6	17.3
Weeding	18	13	16.5
Harvesting	15.4	12.8	14.6
Ploughing	14.1	12.8	14

Source: CARE-Ethiopia (1995b)

The information generated by the CARE-Ethiopia survey (5.14a) is a bit outdated ,although one would not realistically expect a significant change in the demographic situation of the region within less than a decade. In fact, as Table 5.14b shows, the majority of the households still hold positive perceptions about the importance of the labour provided by their children. About 25% and 66% of the sample households, respectively, perceive their children's labour as 'very valuable' and 'valuable'. Only 8.9% of the households perceive their children's labour service as less valuable. This simple descriptive summary of the households' perceptions seems to indicate that the better-off households and the relatively better-off site, Alemaya, value children's labour services more. The later findingscan be explained by the level of the intensification of farming that determines the level of the demand for labour for farming activities.

Table 5.14b: Parents' perceptions of the value of their children's labour services in the HHs

	Not valuable	Valuable	Very valuable
Sabale	13.8%	79.3%	6.9%
Kuni	13.8%	51.7%	34.5%
Alemaya	2.9%	61.4%	35.7%
Poor	15.9%	58.7%	25.4%
Less poor	5.5%	74.5%	20%
Better-off	2.6%	66.7%	30.8%
Average	8.9%	66.2%	24.8%

Source: Own survey data

Nonetheless, the demand for children's labour services is expected to decrease and the cost of raising children to increase in the HHs in the near future, due to the tiny land sizes, the improving provision of safe potable water in nearby villages, the change of the grazing system from free grazing to stall-feeding, the deepening

poverty in environmentally fragile villages and the increasing enrolment of children in schools

Another underlying reason for rural households' preference for having large family sizes or many children may be the need for insurance for old age, particularly in circumstances of 'missing' or 'thin' capital and insurance markets or government pension plans as is the case in Ethiopia. Information was collected to get some insight into households' perception of the value of their children as a source of support for old age. Summary of the results of the survey is set out in Table 5.15a and Table 5.15 b.

Table 5.15a: Parents' perceptions of the value of their children as a source of old age support, by types of household

Old age expectation of source of support	Poor	Less poor	Better-off
Children	66.5%	25%	9.4%
Perennial crop	38.6%	38.6%	26.6%
Both children and perennial crop	35.4%	38%	26.6%
Others	28.6%	28.6%	42.9%

Source: Own survey data

Table 5.15b: Parents' perceptions of the value of their children as a source of old age support, by site

Expectation of sources of support for old age	Sabale	Kuni	Alemaya
Children	43.8%	31.3%	25%
Perennial crop	75%	15.9%	9.15%
Both children and perennial crop	17.7%	13.9%	68.4%
Others	36.7%	19.5%	43.8%

Source: Own survey data

The results show that the insurance value of children is given more weight in the absence of other resources or means as substitutes. The poor seem to rely more on their children for old age support, whereas quite a substantial proportion of the better-off households (42.9%) mentioned other sources of old age support. Included in the latter are building and renting houses, moving to town to start business, opening rural shop and leasing land. It seems as if the 'old age insurance argument' is weak in terms of its ability to explain the better-off households' demand for children, although the reverse seems true for the resource-poor. The observation across the sites (Table 5.15b) follows the same pattern.

The other noteworthy finding is the value of perennial crops, mainly chat and, to a lesser degree, eucalyptus trees, as old age insurance, despite the insecure and uncertain right to land, which is theoretically expected to discourage such long-term investment. Perennial crops, particularly chat, further serve as an important means of intergenerational transfers of wealth in the area, substituting for or supplementing the dwindling livestock resources which have traditionally been the preferred means of accumulation.

Furthermore, the weakening or total break down of the traditional community-based support system and deepening poverty could also increase reliance by parents on their children as support for their old age. According to a study conducted in the Habro District, adjacent to the Kuni District, numerous traditional welfare organisations, such as *Afosha* and *Zaka,* that used to cater for the social and economic needs of the community, including assisting the sick, looking after orphans and providing burial services to bereaved families were already disappearing with the secular decline in the livelihoods of households in the early 1990s (Diriba, 1994). Confirming Diriba's observation, an elder in the Kuni area indicated that the traditional community-based support system was on the verge of breakdown under the prevailing situation of deepening poverty, and due to increasing vulnerability to recurrent drought (Box 5.6).

Box 5.6: Weakening community-based support systems

Today everyone is poor and/ or getting poorer, unlike in the past. Drought occurs more frequently. When drought occurs, it usually hits a larger area.Under these circumstances, it is hardly possible during a time of hardship to borrow any grain or money, let al.one expect support, either from one's neighbours or relatives living far from the village. Maybe those who have educated sons or daughters working for the government in towns face fewer serious problems than others.

Source: Own field interviews and group discussions

5.5.2.2 Status of Women and the Family System

Women play an important role in the HHs in all aspects of rural livelihood activities and in ensuring food security of the households. They are responsible for household

chores and feeding animals, especially cows and small ruminants. They occasionally assist in harvesting when there is a labour scarcity (Storck et al., 1990). Marketing dairy products, vegetables and chat in small quantities fall within the women's domain, although men carry out the marketing of chat and perishables in large quantities. The women also participate in different off-farm and non-farm activities, mainly in ones related to trade. Despite their crucial role in household livelihood, women have virtually no decision-making power in the HHs.

Hararghe rural families, like families elsewhere in Ethiopia, are highly patriarchal. Women generally have low status in the family institution and in society at large. The majority of them are uneducated; they are not perceived to own productive resources such as land, livestock, farm implements, etc.; they also do not control income generated by the use of these resources, unless they are *de jure* household heads. Even though they may be consulted, men or husbands dominate decision-making pertaining to every aspect of rural livelihoods, including reproductive choice.

Polygamy is culturally acceptable among the Hararghe Muslim community. A man can have more than one wife, as long as he believes he has the capacity to support a large family. Polygamy is less acceptable, although not impossible, among the Amharas and the Christian Oromo counterparts. Despite this difference, the family system in the HHs in general is such that newly married couples are usually accommodated within existing households. This system encourages early marriage (the estimated average age at first marriage for females is 16.8 years, with a modal value of 16 years in the survey area). The family system also leads to what McNicoll and Cain (1990:18) termed the 'proliferation of households'. Furthermore, the family institution makes newly married women subordinate to other members of the extended family, most importantly to the mothers-in law and the fathers-in-law. Theis means that the wife has to surrender the power of making decisions concerning childbearing not only to her spouse, but also to his father and mother. In short, wives shoulder the burden of bearing and looking after children, while husbands and extended family dominate fertility decisions and benefit disproportionately from the children. The following remark by McNicoll and Cain (1990:19) concerning the role of the family system in fertility decisions is quite relevant: *"The persistence of corporate*

University of Pretoria etd – Tefera, T L (2006)

lineage groups permits the diffusion of reproductive costs and sustains the separation of fertility interests of husband and wife, impeding fertility decline."

Interesting disparities between husbands and wives were observed with regard to the desired number of children and decisions regarding contraceptive use. Wives usually set the desired number of children at a lower level than their husbands and were also far less resistant to the idea of contraceptive use than their husbands. During the fieldwork, a limited number of wives were observed using family planning service and obtaining contraceptives provided by a trained local woman in the PA. This was done without the knowledge of their husbands, risking their relationships and social acceptance in their society if caught, as thee past experience of other women has proved.

On the credit side, the practice of breastfeeding (usually for at least two years) in the area and cultural taboos related to sexual practices do contribute to limiting fertility to some extent. There is strict disapproval in the community of premarital sexual exercise, procreation outside wedlock and a failure to respect limited postpartum sexual abstinence. Perhaps, this is one of the most contentious areas in the role of modern education in bringing about a decline in fertility. If modern education is not sensitive to local culture and is accompanied by the erosion of such important cultural taboos, as is already happening in local towns and cities, then its expansion to the rural areas will work against indigenous fertility control. Sex education and improved access to family planning information and contraceptives with an increased level of female education could, however, compensate for the negative effects of the expansion of modern education.

5.5.2.3. Resource Endowments and Demographic Behaviour

The socio-economic and socio-cultural factors of the study area that have potent inducements to maintaining higher fertility rates in the HHs have been identified and discussed. This subsection is concerned with an empirical exploration of whether and to what extent the increasing resource scarcity and the general level of poverty in the study area influences family size preference or fertility decisions.

Age specific fertility rate and total fertility rate are variables commonly used to measure fertility in the population and development literature. Proxy indicators of the achieved and intended fertility levels are favoured in this study, since neither the sampling frame nor the sample size was to enable the researcher to estimate the preferred fertility variables accurately. For the purposes of this study, subjective intended fertility levels, as measured by the number of children a woman of a reproductive age would like to have and current contraceptive use and the intention to use contraception considered sufficient to reflect, respectively, the households' future intention to control fertility within marriage and current deliberate action. The results of the descriptive analysis of differences in demographic characteristics across the sites and among households are summarised in Table 5.16a and Table 5.16a.

Table 5.16a: Differences in the demographic characteristics (mean), by types of household

	Poor	Less-poor	Better-off	Level of sign
Family size	4.92	6.57	8.05	0.000
Children less than 5 years old	1.01	1.23	1.36	0.197
Children 5- 15 years old	1.56	2.49	3.14	0.000
Child-adult ratio	1.10	1.47	1.49	0.013
Child-female adult ratio	2.34	3.11	3.55	0.004
Children alive	3.73	5.09	5.46	0.000
Children died	1.37	1.07	1.56	0.367
Desired number of children	5.44	6.16	7.41	0.001
Heard about family planning	88.2%	94%	91.7%	.386 (x^2)
Have used contraceptive	17.1%	20.3%	11.1%	.508(x^2)
Have intention of using contraceptive	49.3%	46.9%	22.6%	.036(x^2)
Cultivated cropland area (ha)	0.58	0.75	1.15	0.000
Cultivated land per adult equivalent (ha)	0.17	0.17	0.20	0.277
Income per adult equivalent	580	915	1309	0.000

Source: Own data and analysis

There is a general tendency to a significant and inverse relationship between most of the proxy indicators of achieved and intended fertility and the socio-economic category of the households. Wives current contraceptive use and the intention to use are used as indirect measures of their deliberate action to limit family size at present and their intention to do so in future, respectively. The later in turn sheds some light on the link between fertility behaviour and poverty, and that follows the same pattern as the former. Resource-poor households display small family sizes, express a desire to have a lower number of children and they show interest in controlling their fertility more than the better-off households. The current high level of participation and the

intention to participate in family planning by the resource-poor households is a reflection of their interest in keeping their fertility levels low. Differences in demographic characteristics across the sites follow the same pattern. The relatively commercialised site (Alemaya in particular) with a higher level of income also has relatively larger family sizes and a higher level of intended fertility.

Table 5.16b: Differences in the demographic characteristics (mean), by site

	Sabale	Kuni	Alemaya	Level of sign
Family size	5.32	5.66	7.27	.000
Children less than 5 years old	0.85	0.96	1.57	000
Children 5- 15 years old	1.91	1.70	2.87	0.000
Child-adult ratio	1.18	0.9	1.71	0.000
Child-female adult ratio	2.60	1.91	3.79	0.000
Children alive	4.08	4.16	5.29	0.010
Children died	1.26	1.20	1.40	0.799
Desired number of children	5.35	4.83	7.48	0.000
Heard about family planning	94.8%	97.6	84.7%	0.033 (x^2)
Have used contraceptive	12.5%	38.1%	8.2%	0.00(x^2)
Have intention of using contraceptive	60.4%	36.7%	33.3%	0.011(x^2)
Cultivated cropland area (ha)	0.59	0.86	0.85	0.000
Cultivated land per adult equivalent (ha)	0.16	0.21	0.17	0.081
Income per adult equivalent	633	563	1253	0.00

Source: Own data and analysis

The cropland size the households cultivate is positively and strongly associated with family size and intended fertility when data is disaggregated by household type, but the association is weak or not clear across sites. There are obvious reasons for this finding. Sheer size captures neither the quality of the land in terms of location, fertility, topography, irrigation, etc. nor the level of intensification, including intensification in terms of return per unit of land. So, for example, the average size of cropland households cultivate in Kuni is high, but it is less irrigated and less intensively cultivated than land either in Alemaya or Sabale, as reflected by average income per adult equivalent. As a result, it is weakly related to demographic characteristics.

Finally, the determinants of achieved fertility (current household size) and intended fertility (the number of children wives of a reproductive age would like to have in their lifetime) were identified and their relative importance was empirically assessed using

the OLS method to obtain more insight. The results of the analysis set out in Table 5.17.

Although the intended fertility as it is used in the study is subjective, it provides, together with the preceding descriptive analysis, a number of important insights regarding household level determinant of fertility behaviour. The estimated model explains about 50% of the variation in intended fertility and there is not a large deviation between what the theory predicts and the results obtained.

Table 5.17: OLS estimates of the determinants of the actual family size and the number of children desired by a women of a reproductive age in the HHs

Dependent variable	Family size		Intended fertility	
Variable	B	Sig	B	Sig
(Constant)	1.045	.129	3.546	.000
Religion (1 = Muslim)	.101	.807	.301	.547
Age category of mother*	.658	.096	-1.83E-02	.979
Age category squared	-9.09E-02	.074	-6.15E-02	.571
Mother 's level of education	-1.78E-02	.941	-.199	.453
Children alive	.511	.000	.602	.000
Cropland area	2.006	0.000	-.595	.232
Tropical Livestock Unit	.331	.003	.267	.039
Site (Alemaya = 1)	8.773E-02	.998	1.22	.012
Has used contraceptive	-.458	.228	-.823	.086
R – square	.576		.508	
Adj. R-square	.547		.468	
F	19.949	.000	12.638	.000

Source: Own data and analysis

** age category: 1=17-24, 2=25-29, 3=30-34, 4=35-39, 5=40-44, 6=45-49, and 6= >= 50*

The cultivated land area in hectares, as expected, is positively and significantly correlated to household size, but negatively correlated to the desired number of children. It is not significant in the later. The probable explanation for this is that the quality of the land and the level of intensification rather than its sheer size matter more in explaining intended total fertility. The fact that Alemaya is positively associated with the current household size and positively and significantly related to the desired number of children supports this argument.

Livestock ownership in TLU positively and significantly explains the current household size and the desired number of children. As the previous descriptive analysis showed (5.14), herding is the responsibility of children. Dercon and Kirshnan (1996) also found a positive and significant relationship between the availability of

child labour and the probability of households' participation in livestock-rearing activities in their diversification study in one of the villages in the HHs.

The number of children alive is positively and significantly related to both family size and the desired number of children. One may normally expect an inverse relationship between the number of children alive, as an indicator of low mortality rate, and the desired number of children. In search of an explanation for this seemingly paradoxical result, the unprocessed data was scrutinised seriously. It was found that many of the women interviewed reported a number at least equal to the number of children alive during the time of the survey as the number of children they would like to have. This is understandable, since failure to do so by mothers might create a moral dilemma associated with considering some of their children already born unwanted, regardless of the difficulty they might face in looking after them. Moreover, some respondents may have misunderstood the question or had difficulty in answering about the number of children they desire or would prefer to have.

The level of education of the mother, though not significant, is negatively related to both the family size and the desired number of children. The negative sign of the mother's education coefficient highlights the potential role that females' education can play in bringing about a decline in fertility in the area. The coefficient for the mother's education is unsurprisingly insignificant as a result of the low females' literacy rate in the study area as elsewhere in the country.

The use of modern contraceptive methods by women in their reproductive age is usually used as a proximate determinant of the level of intended total fertility. Differences in fertility goals are reflected in the decision to use or not to use contraception (Dasgupta, 2000). The variable 'ever used contraceptive' has a negative coefficient in the household size model as well as in the intended fertility model. It is not significant in the former. Contraceptive use is negatively and significantly correlated with the number of children a woman would like to have in her lifetime. This means that current contraceptive use is a reasonable predictor of the level of intended total fertility.

From the study it seems that the poorer a household is, the smaller its size. A possible explanation might be that poor households have a smaller family size because of high child mortality rates. However, further analysis does not support this argument, since there is no significant difference among the socio-economic categories in the reported number of deaths of children (see Table 5. 16a). Another possible explanation is that when the initial level of household income is very low, the total fertility rates would rise with income, as per the 'inverted u' hypothesis and hence, the better-off households have relatively larger family sizes. However, the most plausible explanation for the study area is that most of the poor households are recently established households (85%), female-headed households (60% and elderly housheols (40%) whose family sizes are obviously small. The fact that the members of the community in the study area are predominantly Muslim may also explain why the family sizes of the better-off tend to be larger, since the religion allows polygamy, provided that the man can sustain the family. Besides, the finding that the family size of poor households tends to be smaller, despite the fact that the poor rely more on children for support in terms of old age seems unexpected. Nonetheless, a distinction has to be made between the decisions to have children from the decisions on the number of children (an analogy to the decision to use a given technology versus the decision on the extent of its use). Further research is recommended to verify the inverse relationship between wealth and family sizes in the study area, since the current study is mostly exploratory, given its multi-disciplinary nature.

In conclusion, resource-poor households and sites tend to perceive population pressure partially caused by high fertility rates as a problem. These households showed positive intentions, backed by some deliberate actions, to limit their fertility in response to the problem, where encouraged and provided with the means to do so. Nevertheless, the relatively better-off households, particularly in Alemaya, do not perceive the increasing resource scarcity as a serious problem for them to worry about. Members of the later group believe that their quality of life is far better today, despite the small and fragmented holding size, thanks to higher income from the commercial production of chat and perishables.

Interestingly, investment in children's education as a long-term livelihood diversification strategy was unanimously endorsed, particularly among the better-off

households and in Alemaya, as the preferred method to fertility control in response to diminishing access to agricultural land. Unfortunately, it seems as if the scarcity of cropland has strengthened the traditional gender discrimination related to investment in children's education in poorer areas. Intensive group discussions uncovered disturbing evidence that some parents prefer to send sons to school rather than daughters not only because of the traditional bias against females, but also because of the fact that daughters do not have a socially legitimate claim over part of their parents' land upon their marriage. In addition, sons have the social responsibility of looking after the elderly. This development deserves due attention as it has a negative impacts on the long-term fertility transition in the region.

5.6 SUMMARY AND CONCLUSION

This chapter presented the results of in-depth analyses of rural livelihoods in the HHs. The analyses looked into land use strategies, livelihood diversification and migration and fertility as components of the livelihood strategies pursued by rural households and communities. These livelihood analyses have been conducted in the context of population pressure on the land and constraining agro-climatic, institutional and policy factors. The analyses have revealed that households in the HHs pursue complex, diverse and continuously evolving livelihood strategies.

Cropland expansion at the expense of forest and grazing land was found to have been the most common strategy to maintain per capita food production until very recently. Currently, there is no potential for further expansion of cropland frontiers in the HHs. Intensive land use is an alternative land use strategy in the context of the increasing man-land ratio. Three types of intensification strategy have been identified and analysed. These include increased cropping intensity (both spatially and temporal), a shift to the production of high-value crops and investment in soil conservation and soil fertility maintenance. Labour investment in soil and water conservation tends to increase with the slope of the cropland and a perception that soil erosion is sever, and cash crop growers invest more in external input-based intensification of staple crop production to compensate for a shifting of land to the production of high-value crops.

The households further pursued livelihood diversification strategies, usually to supplement farming income and, in a few cases, as an alternative to farming. Livelihood diversification strategies in the area include extensive and intensive (stall-feeding) livestock rearing, and employment and income diversification through temporary and seasonal migration, wage labour, crafts and trades. The households' income portfolios analysis showed that cash crop income is more important for better-off households and better-off sites, whereas off-farm and non-farm income is more important for poor households, and in villages where cash crops contribute less to rural livelihoods. Subsistence crop production, cash crop production and off-farm/non-farm activities contribute roughly the same proportion to the average income of poor households. Most of the off-farm and non-farm activities in the area are related to farming, in other words they vary with crop income and are highly influenced by the performance of farming activities.

The application of logistic regression has confirmed that, in general, survival strategy takes precedence over accumulation strategy in households' livelihood diversification decisions in the area. Among other things, tiny land holding sizes per adult equivalent, low levels of food self-sufficiency and low proceeds from cash crop sales increase the probability that households' will participate in largely less remunerative and intermittent off-farm and non-farm activities.

The final section of the chapter dealt with migration and fertility as an aspect of rural livelihood strategies. Rural migration has been found to be less important in the area in households' livelihood strategies due to institutional and administrative constraints and limited employment opportunities in the other sectors of the economy. Only about 13% of the sampled households reported one or more migrant household member(s) at the time of the survey. Employment, marriage, education and family separation, in that order, were identified as the main reasons for a change in the place of residence. It was also learnt that rural-rural migration predominates over other types of migration and that the need to earn additional income is the dominant motive for migration.

The fertility analysis first looked at the prevailing socio-economic and socio-cultural factors that could influence fertility decisions in the study area. Then it empirically

explored whether and to what extent increasing natural resource scarcity (of arable land in particular) influences households' demographic behaviour. The qualitative analysis underscored that the prevailing family system, which accommodates newly married couples within existing households, low levels of female education and the generally low status of women in the community and their low decision-making power, including fertility decisions, in the family institution, externalities in reproductive choice, a total absence of alternative sources of old age insurance or government support mechanisms, and the collapse of the traditional community-based support system under deepening poverty and increasing vulnerability were all found to have a negative on fertility decisions.

According to the results of the quantitative exploratory analysis, there is a positive and statistically significant relationship between family size and resource endowment (agricultural land). The poorer a household is, the smaller its size in the HHs. Resource-poor households and sites tend to perceive large family sizes as a problem and in response they displayed positive intentions, backed by some deliberate actions in terms of participation in family planning, to limit their size. However, investment in children's schooling as a long-term livelihood diversification strategy was unanimously endorsed, especially among the better-off and in Alemaya, as the method preferred to fertility control to deal with increasing population pressure on the land. Unfortunately, it seems as if households tend to send sons to school rather than daughters, since socially, girls, unlike boys, cannot legitimately claim part of the land over which their parents hold use right up when they get married. This may have negative repercussions for long-term fertility transition, given the fact that females' levels of formal education are negatively related to the current family size, as well as intended fertility in the area, consistent with the theory.

Finally, the most important crosscutting finding that came out clearly throughout the three main sections of the chapter is that: rural households are differentiated in terms of resource endowment, they face different constraints and incentives and therefore pursue different livelihood strategies in farming, off-farm and non-farm, and in reproduction. Livelihood behaviour is diverse across households and sites. Overall, this observation raises questions about the current untargeted and uniform interventions based on the assumption that only farming and the intensification of

staple crop production for household food self-sufficiency is the remedy for all rural development ills and equally important to all households. Indeed, the poorest of the poor have so far benefited little from the MoA's crop production intensification campaign.