

**POVERTY AND RURAL LIVELIHOODS IN SELECTED SITES
IN UGANDA, MALAWI AND TANZANIA**

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TABLE OF CONTENTS

Preface	iii
Acknowledgements	v
Acronyms	vi
1. Introduction	1
Organisation of the report.....	2
Methodology.....	3
Site description.....	4
2. Rubaya sub-county, Kabale District, Uganda	6
Demographic profile of surveyed households.....	6
Household resources, poverty and vulnerability.....	7
Farmers' investment aspirations.....	9
Agricultural production.....	9
Crops.....	9
Livestock.....	11
Input use and seed sources.....	11
Marketing of agricultural produce.....	12
Land use and management.....	13
Tree planting.....	14
Food security.....	15
Development activities.....	16
Conflict, collective action and social capital.....	16
Marital conflict and decision-making.....	18
3. Linthipe EPA, Dedza District, Malawi	20
Demographic profile of surveyed households.....	20
Household resources, poverty and vulnerability.....	20
Farmers' investment aspirations.....	22
Agricultural production.....	23
Crops.....	23
Livestock.....	25
Input use and seed sources.....	26
Marketing of agricultural produce.....	26
Land use and management.....	27
Tree planting.....	28
Food security.....	28
Development activities.....	30
Conflict, collective action and social capital.....	30
Marital conflict and decision-making.....	32

4. Soni Ward, Lushoto District, Tanzania	33
Demographic profile of surveyed households	33
Household resources, poverty and vulnerability	33
Farmers' investment aspirations	35
Agricultural production	36
Crops	36
Livestock	37
Input use and seed sources	37
Marketing of crop and livestock produce	38
Land management	39
Food security	39
Development activities	40
Conflict, collective action and social capital	40
Marital conflict and decision-making	42
5. Across site comparison and recommendations	44
Agricultural production and livelihood activities	44
Asset ownership	46
Vulnerability	47
Appendices	49
References	61

PREFACE

While increasing food supply is often a necessary condition for improving food security, increases in food supply and rural incomes do not guarantee improved rural livelihoods and food security at the household level. The alleviation of poverty requires that the research community go beyond contributions to improving food supply from new agricultural technologies to working with the development community in better understanding both the underlying causes of poverty and in identifying- and confirming-effective ways to catalyze an “upward spiral” managed by rural households and communities.

CIAT and its partners, in Africa as elsewhere in the World, have a long record in developing and adapting farmer participatory approaches while devising agricultural technologies that can be used by development partners in addressing equity and gender concerns. The work reported here was carried out within a collaborative project that extends that research approach to an emphasis on integrated community development - building on gains in bean productivity but going beyond productivity issues.

This baseline survey of pilot sites in three countries of Eastern and Southern Africa is, for our research/development partnership, an essential step in measuring the effectiveness of going “Beyond Agricultural Productivity to Poverty Alleviation” (BAPPA) through a process that we hope will enable rural innovation to flourish. By publishing this survey, we hope that others can also make use of the information, and we look forward to exchanging experiences. We also summarise some interesting cross-site comparisons of potential indicators of household and community well-being.

This Occasional Papers series includes research reports and network discussion papers, and is complemented by two associated series: Workshop Proceedings and Reprints. These publications serve to disseminate research information from activities in which CIAT and its partners are involved in Africa, including the work of two sub-regional networks of national bean programs: the Eastern and Central Africa Bean Research Network (ECABREN) and the Southern Africa Bean Research Network (SABRN) for southern Africa.

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ACRONYMS

AEW	-	Adult Equivalent Workers
AHI	-	African Highlands Initiative
ARDC	-	Agricultural Research Development Centre
BAPPA	-	Beyond Agricultural Productivity to Poverty Alleviation
CGIAR	-	Consultative Group for International Agricultural Research
CIAT	-	International Centre for Tropical Agriculture
CIDA	-	Canadian International Development Agency
CU	-	Concern Universal
ECABREN-	-	Eastern and Central Africa Bean Research Network
EPA	-	Extension Planning Area [Malawi]
NARO	-	National Agricultural Research Organisation [Uganda]
NGO	-	Non-Government Organisation
PRAs	-	Participatory Rural Appraisals
SABRN	-	Southern Africa Bean Research Network
SDC	-	Swiss Agency for Development and Cooperation
TIP	-	Traditional Irrigation and Environmental Development Organization
TSBF	-	Tropical Soil Biology and Fertility
USAID	-	United States Agency for International Development

1. INTRODUCTION

In 2001, the International Centre for Tropical Agriculture (CIAT) embarked on a new project entitled “Beyond Agricultural Productivity to Poverty Alleviation” (BAPPA). CIAT, one of the Future Harvest Centres of the CGIAR (Consultative Group on International Agricultural Research), has worked in Eastern and Southern Africa since the early 1980s in partnership with national research and development partners. CIAT’s mission is to reduce hunger and poverty in the tropics through collaborative research that improves agricultural productivity and natural resource management. Until recently, CIAT’s focus in Africa has been on improving the productivity of the common bean, an important food and cash crop for millions of small-scale African farmers. Key achievements of CIAT through numerous institutional partnerships to date include:

- Demonstrable impacts of new bean varieties at the household and community levels (e.g. David, 2000, Odendo et al., 2003). In Uganda, for example, a productive and tasty new bean is greatly appreciated by women farmers and enabled them to increase their storage in the dry season and to spend less or no time in searching for wild vegetables;
- By 2000, at least US\$ 150 million of economic benefits in just five countries;
- Innovative and low-cost approaches to promoting crop, soil and pest management techniques for sustaining farmers’ natural resource base, including the use of rural schools, clinics, traditional drama, radio, posters and farmer group visits across countries;
- Better understanding of the preferences of user groups, including the specific needs of female farmers;
- The development and promotion of community-based participatory research, now reaching pilot communities in at least six countries;
- Approaches developed for sustainable seed supply.

To achieve the broader goal of poverty alleviation, CIAT and its partners need to go beyond improving food supply to address the underlying causes of poverty. The BAPPA project represents a greater emphasis in CIAT’s work on integrated community development, building on gains in bean productivity, but going beyond productivity issues.

While increasing food supply is often a necessary condition for improving food security, increases in food supply and rural incomes do not guarantee improved rural livelihoods and food security at the household level. Farmers’ financial benefits from agriculture are often reduced by their limited opportunities for adding value to their agricultural produce, poor marketing information and low bargaining power with middlemen. Unless resolved at the household level, factors such as chronic disease, lack of clean drinking water, gender bias, poor knowledge of nutrition and socio-cultural practices, may undermine the adequate utilization of available food.

The BAPPA project aims to address the bottlenecks that hinder farmers from benefiting fully from research generated agricultural technologies and, in so doing, to learn lessons that would be more widely applicable. Recognizing that none of this is new territory to many NGOs, the project’s strategy to achieve this objective involves forming strong, holistic, interdisciplinary partnerships with development organizations. The project aims to produce outputs in five areas:

1. Catalyze improved organizational capacity in pilot communities
2. Support farmers’ experimentation and application of technical skills
3. Develop an approach to strengthen community capacity to invest their potentially higher income in alleviating poverty
4. Assist farming communities to protect their environmental resources

5. Support women's empowerment and leadership at the community level

The BAPPA project works in 3 pilot sites in Eastern and Southern Africa: Kabale District in south-western Uganda, Dedza District in central Malawi and Lushoto District in northern Tanzania. These sites were selected on the basis of two main criteria: impact achieved from bean technologies and presence of a willing NGO collaborator. In Kabale, the project started operating in May 2001 in two villages in Rubaya Sub-county, in collaboration with Africare, a U.S. based NGO. Concern Universal (CU), a U.K based NGO, implemented the project in two villages in Linthipe EPA for one year starting in July 2001; although CU withdrew in 2002 the activities have continued. In Lushoto District of Tanzania, the project operates in one village in Soni Ward and is implemented by the Traditional Irrigation and Environmental Development Organization (TIP), a local NGO; activities were initiated in January 2002.

To monitor the impact of the project and assess change, a baseline study was carried out during the first year. This report presents the results of that study. The study was loosely based on the sustainable livelihoods framework (Carney, 1998) which focuses on a comprehensive view of the livelihood circumstances of the poor, including ownership of assets, livelihood activities, factors contributing to their vulnerability and the relationship between relevant factors at micro, intermediate and macro levels.

Organisation of the report

This report is divided into 4 sections. After the sections on methodology and site descriptions, results from the three sites are presented separately. The final section provides a cross-site comparative analysis.

The paper explores the following dimensions of rural livelihoods in relation to the 5 project outputs (indicated in parentheses):

- Household resources (output 3)
- Poverty and vulnerability (outputs 3 and 5)
- Social capital, participation and conflict (outputs 1 and 2)
- Agricultural production and food security (output 3)
- Land use and management (output 4)
- Gender relations (output 5)

Social capital is commonly defined as “features of social organization, such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit” (Putnam, 1995). Three connected types of social capital can be identified:

- Bonding social capital - strong ties between people in similar circumstances.
- Bridging social capital - weaker ties between people from different ethnic, geographical and occupational backgrounds but who have similar economic status and political influence which helps them to access additional resources and networks.
- Linking social capital - ties between the poor and people in positions of influence in formal institutions (e.g. banks, schools, housing authorities, rural service providers).

Table 1.1: Indicators used to measure livelihood variables related to the project's main outputs.

Variable	Indicators	Comments
Livelihood assets	Sex and age of head of household, household size, educational and literacy level of the head of household and partner, number of school age children out of school, household labour, dependency ratio, annual agricultural income, sources and importance of non-farm income, ownership of livestock	Successful asset accumulation "often involves trading-up assets in sequence" e.g. chickens to goats to cattle to land (Ellis et al., 2002); no information was collected on overall household income
Social capital and conflict	Group membership, technology/knowledge diffusion pathways, participation in NGO activities, participation in collective action, social divisions and conflict, changes in the level of theft in the past 10 years	The existence of indigenous groups and technology and information diffusion pathways are indicators of the bonds of social trust and social networks; participation in NGO activities is a measure of linking social capital
Poverty and vulnerability	Household wealth status, borrowing and saving behaviour, investment priorities, coping strategies in emergencies	Rising prosperity depends on having multiple opportunities for asset accumulation. Respondents were asked what they would invest in if their income were to double.
Agricultural production	Crops produced and purpose, multiplication rate of major crops, adoption of modern crop varieties, use of inputs, seed sources, proportion of crops sold, marketing constraints	
Food security	Food shortages, how long the harvest lasts, reasons for food shortage, number of meals eaten during the hungry season	
Land use and management	Location of farm land, erosion control measures, measures for improving soil fertility, tree planting behaviour	
Participation	Optimism about the ability to bring about positive change locally, willingness for children to become small-scale farmers	The extent to which people are willing to act collectively to solve social problems is a good indication of the level of social cohesion
Gender and gender relations	Areas of conflict and decision-making patterns among married couples and differences in perceptions by husbands and wives, school attendance by boys and girls, differences in livelihood assets and strategies of men and women (see above indicators)	

Methodology

Both participatory rural appraisals (PRAs) and formal surveys were used to collect baseline data in the three study sites. PRAs were conducted over one to two days and involved activities such as visioning and group discussions on the gender division of labour, wealth ranking, prices and crop calendar. Formal surveys took place during the first season of project activities: November 2001 in Rubaya, November-December 2001 in Linthipe and June 2002 in Soni. Key informants from each study village were involved in wealth ranking and the results used to assign surveyed households to wealth groups. Since wealth categories identified in the three sites are not necessarily comparable (i.e. to be wealthy in Soni is not the same as being wealthy in Linthipe), descriptions of wealth are provided in the appendix.

The formal survey covered a simple random sample of households from project villages plus a third nearby non-project village. Table 1.2 shows the sample size and breakdown by location. Interviews were divided into two parts: a first general section, addressed to farm couples, where applicable, and a second part conducted individually with male and female farmers. The interview schedule covered the following topics: household characteristics and resources, agricultural enterprises, use of inputs, marketing, environmental issues, tree planting, household well being, savings and credit behaviour, group membership, intra-household decision-making and conflict, social participation and conflict. All quantitative information related to income, savings, borrowing and crops yields were based on farmer recall. Due to the unreliability of income data collected through recall, farmers were only asked to report on agricultural income.

In Rubaya, 52% of the first part of the interview was conducted with women, 40% with farm couples and 8% with men alone. In Linthipe, 43% of interviews were held with couples, 37% with women alone and 20% with men alone. In Soni, 78% of interviews were conducted with couples, 19% with women alone and 2% with men alone.

Table 1.2: Sample size (number of households)

	Rubaya, Uganda		Linthipe, Malawi		Soni, Tanzania	
	Sample	Number of households	Sample	Number of households	Sample	Number of households
Project villages	Muguli B: 32 Kalambo: 30	63 53	Mnthala: 49 Yazini: 31	160 36	Shashui: 53	107
Non-project village	Rukore: 30	53	Chikonde: 41	79	Vuga: 30	469
Total sample size	92	169	121	275	83	576

Data analysis relied on descriptive statistics, namely frequencies, means, *chi* square, t tests and ANOVA to compare means. To assess and compare men's and women's investment priorities more accurately, frequencies and ranked data were converted to scores. A score of "1" was given non-ranked responses and "0" for non-responses. Ranked responses were allocated scores of 2, 3 or 4 according to importance. Throughout the report, variation within study communities was analyzed along three dimensions: wealth, gender and location (village and country) with the objective of exploring how social differentiation affects people's experience of poverty.

Site description

Rubaya (Uganda)

Rubaya Sub-county is located in Kabale District in the highlands of south-western Uganda. The sub-county covers 114 square kilometers and has an estimated population of 46,800 people. Rubaya consists of 8 administrative parishes, two of which, Mugandu (Muguli B, Rukore) and Buramba (Kalambo), were sampled for the baseline survey. It is located in the Katuna watershed where agricultural production takes place in valley bottoms, steep hillsides and hilltops. Land in the valley bottoms is owned by community members and the Catholic and Protestant churches. Rubaya sub-county had 22 primary schools, 4 secondary schools and 1 technical school. At the time of the study, there were two access roads; one passing through Katuna border post and the other via Kacwekano Agricultural Research Development Centre (ARDC). Most feeder roads were virtually impassable during the wet season, making transportation difficult. There

was no electricity supply, but telephone connections existed through a mobile telecommunication network. A sorghum-pea-bean-sweet potato based farming system is practiced in this high altitude, densely populated area. There are two growing seasons: January to July (season A) and September to December (season B). Ryakarimira was the nearest trading centre to the study villages. Bi-weekly markets were held there as well as in Katuna, approximately 18 km away. The nearest health centre in Ryakarimira also offered family planning services. Services were free but the centre had no medications. A private health centre was located 5 km away in Rwanda. Africare conducted nutrition training in Muguli B. Most villagers got water from protected springs: there were 3 protected springs near Muguli B and Kalambo. The rate of HIV/AIDS infection in the sub-county was thought to be relatively low, but moderate to high in neighbouring sub-counties.

Linthipe (Malawi)

Linthipe EPA is located in Dedza District, central Malawi, along the Lilongwe-Blantyre highway. Linthipe covers 1120 km² and has a population of 160,000 people. Malawi has a unimodal rainfall pattern and the Linthipe area receives an average of 800 mm falling between November and March. The single growing season means that farmers must produce enough to last for a dry season that spans 7-8 months (April to October). Maize is the most important food crop, with farmers commonly intercropping local varieties with beans, pumpkin and minor vegetables. During the dry season, many farmers grow a *dimba* (off-season) and watercourses (*dambos*) to take advantage of residual moisture.

A weekly market was held at Chimbiya Market, 10 kms from Mnthala. There were 30 primary schools and 5 community day schools in the area. Although most people were Christian, a sizable Muslim population existed.

At village level, conditions in Mnthala were fairly representative of the wider area. There are two boreholes in Mnthala that were constructed by the community and CU Malawi. Most families had no sanitation facilities of any kind. Children attended two primary schools about 3 km away. A health centre was located in the next village but no outreach services were available to Mnthala. The main causes of deaths were malaria, cholera and HIV/AIDS. Conditions in Chikonde village appeared to be better than most villages judging by the high proportion of households that fell in the top wealth category (83%). Affluence in Chikonde may be attributed to the close ties that existed between this village and members of the Asian Muslim community in Lilongwe through which villagers received clothes and money.

Soni (Tanzania)

Soni Ward is located in the southern part of Lushoto District (Tanga Region) in the highlands of the Usambara Mountains in North-eastern Tanzania. The area is characterized by a maize-coffee based farming system. There are two growing seasons: March to July (long rains) and September to December (short rains). Maize, the main staple food crop, is typically intercropped with beans and sometimes coffee and bananas. Some farmers in the area grew horticultural crops (vegetables, fruits) for urban markets in valley bottoms or on hillsides using irrigation. Prior to 2000, TIP was involved in an irrigation project and organized farmers in several villages in the Ward (including Shashui village) into water user groups to work on constructing gravity borne traditional irrigation systems. The TIP project also focussed on organization development and gender awareness. Other research and development projects operating in the Soni Ward at the time of the study, or in the past, include SECAP (a project with an environmental focus that closed in 1998) and the African Highlands Initiative (AHI) with which CIAT also collaborates in this site.

The nearest market is in Soni Town. Three primary schools were located near the village of Shashui (about 3 km) and there was a health dispensary 4 km away. The rate of HIV/AIDS infection was moderate to low: in 2001, 5,620 cases were reported in Tanga Region, compared with 30, 320 cases in Mbeya, the hardest hit region (Republic of Tanzania, 2001).

Table 1.3: Description of BAPPA project sites

	Rubaya Sub-county Uganda	Linthipe EPA Malawi	Soni Ward Tanzania
Altitude (m)	1800	1660	1300
Rainfall pattern/mm	Bimodal/1000-1500	Unimodal/800	Bimodal
Population density (persons/km ²)	246	140	Not available but high
Market orientation	Moderate	Low	High
Access to roads	Good	Good	Moderate
Level of absolute poverty	Moderate	High	Moderate
Major causes of poverty	Small farm size, poor soil fertility, environmental degradation, low prices for agricultural produce	Poor soil fertility, drought, low agricultural production	Low prices for agricultural produce, lack of market information

2. RUBAYA SUB-COUNTY, KABALE DISTRICT, UGANDA

Demographic profile of surveyed households

A total of 466 people lived in the 92 households surveyed in Rubaya: 200 in Muguli B, 136 in Rukore and 130 in Kalambo. Women, including many widows (Appendix Table 4), headed half of the households. This figure is much higher than the national average of 23% and 2% respectively for *de facto* and *de jure* female-headed households (Republic of Uganda, 1993). The high proportion of female-headed households was mainly due to seasonal male migration to other parts of the country for work. Most male-headed households (88%) had one wife. The mean age of male respondents was 42, compared with 37 for female respondents. No child-headed households were included in the sample. Heads of households had lived in their respective villages for most of their life, an average of 33 years. The Bakiga, a patrilineal, patrilocal people, are the predominant ethnic group. Nearly all heads of households surveyed were Bakiga; 4% were Banyankole.

Average household size in Rubaya was above the national average of 4.7 for rural areas (Government of Uganda, 1993) (Appendix Table 5). On average, households in Muguli B were the largest with 6.2 members, compared to 4.5 in Rukore and 4.3 in Kalambo.

The educational level of survey respondents was close to the average literacy rates for rural areas: 74% for men and 47% for women (Government of Uganda, 1993). The majority of men surveyed (72%) could read and write a local language and 34% could read and write English (Appendix Table 6). By contrast, 41% of women could read and write a local language and only 13% were literate in English.

Among the 26% of households that had a school age child out of school, the number with girl and boy dropouts was nearly equal (Appendix Table 7). Fifteen households had a girl out of school compared with 14 households with a boy out of school. A total of 22 girls were not attending school compared to 15 boys. Notably, however, the major reason for girls not attending school (6 of 17 cases) was to take on domestic or farming responsibilities, whereas lack of school fees was a key reason for both male (5 out of 14 cases) and female (4 out of 17 cases) attrition.

¹ To arrive at a single measure of household labour, children who work full time on the farm were counted as half of an adult working full time, while children and adults who are part-time farm workers were counted as one third of a full time adult worker.

Household resources, poverty and vulnerability

Surveyed households had an average of 1.8 adult equivalent workers¹ (AEWs) (Appendix Table 8) and a mean of 1.4 adults involved full-time in farm work. Male-headed households had a significantly higher number of AEWs than female-headed households: 2.1 compared with 1.5 ($P \leq .003$ for t test). Although survey results indicates an equal number of men and women involved in agriculture full time or part time (Appendix Table 8), information from PRAs, observation and other surveys (AHI, 1998; Puhalla, 1998) suggest that in Kabale District generally, men's involvement in agriculture is significantly lower than women's. The mean ratio of producers to consumers (people who do no farm work at all) was low at 1.7.

Informants identified three major wealth groups in Rubaya: wealthy, average and poor. A small fourth group, the very poor, consisted mainly of households headed by elderly or handicapped people (Appendix Table 9). As Table 2.1 shows, over half of surveyed households fell in the poor category. Notably, the standard of living in Rukore was somewhat better, as a significantly lower proportion of households in that village (30%) fell in the poor category, compared to 71% in project villages. There were significant differences between wealth groups in terms of household size, household type, annual income, ownership of assets and food security. Richer households were typically larger (a mean of 11 people compared to 5 in poor households), tended to have a resident male head, had higher annual income and owned assets such as livestock, a bicycle, radio and foam mattresses. Agricultural income data, though not highly accurate due to respondents' tendency to underreport income, shows the extent of poverty and indicates significant differences between wealth groups (Table 2.1). Notably, female-headed households tended to be poorer: no female-headed household fell in the wealthy category and on average, in 2001 they had a significantly lower annual income compared to male-headed households (Ush 57,716 compared with Ush 153,371)².

Table 2.1: Household differentiation by wealth on selected socio-economic characteristics, Rubaya

	Wealthy (n=5)	Average (n=33)	Poor (n=51)	Overall average (N=92)	Probability
Household size	11.2	5.0	4.5	5.0	<0.001*
Per cent headed by women	0	38	62	51	<0.05
Adult equivalent workers	3.4	1.6	1.8	1.8	<0.001*
Annual agricultural income (Ush), 2000-01	454,000	125,826	57,144	111,782	<0.001*
Owens livestock (per cent)	100	65	57	62	<0.15
Owens a bicycle (per cent)	80	12	0	9	<0.001
Owens a radio (per cent)	100	42	8	26	<0.001
Owens a foam mattress (per cent)	100	82	41	60	<0.001

*Statistics from ANOVA; the rest from *chi* square

Most households earned their highest income between August and October, after season A harvest of the major income earners (e.g. potatoes, sorghum), and their lowest income between April and June when crops are still in the fields.

In addition to inter-household wealth differences, there was an income gap between men and women. Men (53%) were more likely than women (36%) to engage in off-farm income generating activities and were involved in more activities (a mean of 1.9 compared to 1.3). Women generally had more limited options for making money due to their principal roles in farming, childcare and domestic work, limited mobility and lower educational levels, and were typically involved in activities that yielded low returns (Appendix Table 10). The most important source of income for women was casual labour (52%), whereas men were engaged in a wider range of activities, including casual labour and migration to tea plantations in Toro and Bunyoro.

² US\$ 1 = Ush. 1730

Women in Rukore were more dependent on petty trade as a source of income, whereas beer brewing and hired labour were principal activities for women in project villages. Remittances are often an important source of capital for investing in agriculture but very few respondents in Rubaya reported receiving remittances.

The borrowing and saving behaviour of men and women was similar, although women's greater poverty was reflected in the amounts they saved and borrowed (Appendix Table 11). Sixty-six per cent of surveyed men and 68% of women saved money regularly, an average of Ush. 7,640 (\$4) at a time for women and Ush. 24,103 (\$14) for men. Most (66% of men and 70% of women) saved on a monthly basis. As expected, the wealthy saved significantly higher amounts per time: an average of Ush 36,200 (\$21) for women and Ush. 91,200 (\$53) for men, compared to Ush. 4,190 (\$2) for poor women and Ush. 7,142 (\$4) for men. Given their low incomes, the majority of surveyed farmers (89% of men and 91% of women) borrowed money. In 2000, 68% of both male and female respondents borrowed money, mainly from relatives and friends (Appendix Table 11). Women borrowed from a wider number of sources compared to men, but very few of either sex obtained loans from formal credit institutions. In 2000, men borrowed significantly larger amounts of money (an average of Ush. 62,230 or \$36 compared to Ush. 21,160 or \$13 for women), with no significant difference between wealth groups. As borrowing is often a last resort measure, men and women used borrowed money for similar expenditures, although the pattern followed the gender division of responsibilities. In 2000, respondents used borrowed money for medical expenses (39% of women and 23% of men), food (30% of women and 23% of men), and non-food household necessities (21% of women and 14%). An important area of expenditure for men was land rental (23% compared with 7% of women).

Short term coping strategies used by farmers in less severe crises include borrowing or asking friends and relatives for money or food, borrowing money from local credit groups, buying food and calling on local burial groups and neighbours to help bury the dead (Table 2.2). People responded to more severe crises such as food shortage and crop failure by working for money or food, selling crops, livestock, land and other property, reducing the number of meals eaten, eating wild foods and, finally, migrating. Men and women responded similarly to crises with a few exceptions. Women were more likely than men to borrow from credit groups in the event of sudden death, whereas men were more likely to borrow money from these groups to deal with crop failure. Women were also more likely than men to work for money and food and to beg for food from friends and relatives when affected by crop failure, whereas men were more likely to migrate in this situation. Both men and women were more likely to turn to friends, rather than relatives, for help.

Table 2.2: Emergency coping strategies, Rubaya (per cent)

	Sudden death		Need money for school fees		Need money for health expenses		Food shortage		Crop failure	
	M	W	M	W	M	W	M	W	M	W
Borrow/ask relatives/friends for money	18	11	33	33	53	46	7	3	0	4
Borrow money from credit groups	2	11	18	18	21	26	16	11	12	4
Sell crops/livestock	0	0	20	17	14	12	0	0	0	0
Sell land/property	0	0	15	16	7	10	14	16	9	10
Work for money/food	0	0	0	0	0	0	36	46	18	44
Buy food	0	0	0	0	0	0	16	13	33	28
Ask relative/friend for food	0	0	0	0	0	0	9	9	9	16
Other	7	3	15	16	5	4	5	2	15	2

Note: 73% of men and 74% of women reported that they would depend on a burial group or neighbours in the event of a sudden death

Farmers' investment aspirations

An analysis of investment scores shows that after land, women's strongest interests centred around purchasing livestock and clothes, improving their home and food security, business and school fees (Appendix Table 12). Men's investment priority scores were highest for land, livestock, and business, housing and agricultural inputs (fertilizer, seed, tools). Farmers' business interests centred around petty trade of crops (sorghum, potatoes) and retailing. Judging from the priority both male and female farmers gave to land and livestock, their paramount budgetary strategy was to increase crop production while investing in an enterprise that would provide a reliable source of cash in-flow for immediate use. Livestock provide manure and marketable products (e.g. milk, eggs, meat in the form of broilers and rabbits), and cattle can serve as a store of wealth that can easily be sold. The investment priorities of both men and women did not differ significantly by wealth (Table 2.3)- with the one exception that poor men, unlike men in other wealth groups, had a stronger interest in improving their homes and the quality of their diet.

Table 2.3: Investment priority scores by wealth status and gender, Rubaya
(men n=44; women n=90)

	Wealth rank					
	Wealthy		Average		Poor	
	M	W	M	W	M	W
Save	1.00	1.00	0.38	0.29	0.17	0.37
Business	0.80	0.60	1.44	0.97	0.70	0.35
Improve house	0.80	1.60	0.13	0.74	1.09	0.94
Buy livestock	1.20	1.20	1.56	0.68	2.17	1.41
Buy land	2.40	2.20	2.06	1.74	2.35	1.90
Better food	0.40	0.40	0	0.59	0.43	0.55
More food	0.20	0.20	0.19	0.62	0.57	1.06
Agricultural inputs	0.60	0.20	0.38	0.56	1.13	0.61
Buy clothes	0.80	1.60	0.63	0.97	0.61	1.18
School fees	1.60	1.60	0.63	0.65	0.39	0.45
Rent land	0	0	0.25	0.12	0	0.24
Other	0	0	0.63	0.24	0.17	0.51

Agricultural production

Crops

Farmers in Rubaya grew a wide range of crops to meet their food and cash needs (Table 2.4). Potatoes were grown in both uplands and wetlands. Climbing beans, a land saving, labour intensive technology that provides significantly higher yields than bush beans, were introduced to Kabale District by NARO (National Agricultural Research Organization) and CIAT researchers in the early 1990s. Minor crops include fruits, wheat (22%), millet (16%), tomatoes (11%), coffee (7%), pyrethrum (2%), onions (2%) and carrots (1%). Married couples in Kabale did not cultivate personal plots, and there was little gender specialization in crops.

Table 2.4: Main crops usually grown and their uses, Rubaya (per cent)

	Per cent of sample (N=92)	Purpose			
		Home consumption only	Mainly home consumption	Home consumption and sale	Sale mainly
Sorghum	99	13	18	66	3
Bush beans	98	27	28	46	0
Sweet potatoes	98	62	17	20	1
Potatoes	97	19	22	53	6
Climbing beans	85	41	24	33	1
Maize	75	55	25	19	1
Cabbage	67	42	6	37	15
Peas	48	37	21	40	2
Tobacco	46	0	0	19	81
Bananas	42	84	5	11	0
Green leafy vegetables	39	94	3	3	0
Avocado	37	76	6	12	6
Passion fruit	34	52	6	29	13
Wheat	22	20	15	45	20

There was little crop specialization in Rubaya because, with the exception of tobacco, pyrethrum and coffee, farmers grew few crops exclusively for sale (Table 2.4). At the time of the survey, only two households grew pyrethrum (one each in Kalambo and one in Rukore). Notably, mainly wealthy farmers grew coffee, but other new crops such as climbing beans and passion fruit were wealth neutral. Farmers grew horticultural crops for both food and sale. Forty-seven per cent of households reported potatoes as their most important source of crop income. Sorghum was a key income earner for 27% of households, while tobacco was mentioned by 9% of households. The main secondary sources of on-farm income were sorghum (40%), potatoes (18%) and bush beans (15%).

Multiplication rates for potatoes and beans were very low at 2.4 for potatoes grown on hillsides, 2.8 for potatoes grown in valley bottoms, 4.3 for bush beans and 4.8 for climbing beans (Table 2.5). As typical farmers' multiplication rates are 7 for potatoes, 15-20 for bush beans and 22-25 for climbers (pers. comm. CIP, CIAT), it is likely that farmers underreported planting and harvesting quantities. In the first season of 2001, 60% of potato farmers sold some of their crop. Farmers sold an average of 47% of potatoes harvested from the main season and 51% of potatoes grown in wetlands. About a third of bush bean farmers sold an average of 36% of their harvest. Relatively few farmers sold climbing beans; those who did sold a mean of 41% of their harvest.

Table 2.5: Production and sale of some principal crops in first season of 2001 (kg), Rubaya

	Potatoes	Potatoes grown in wetland	Bush beans	Climbing beans
Amount planted	125	114	37	5
Amount harvested	312	2981	159	26
Per cent who sold	43	60	31	13
Amount sold	248	202	64	24

Farmers in Rubaya grew both local and researcher-introduced varieties of the main crops (Table 2.6). Because identification of introduced varieties was problematic due to the use of local names and farmers' lack of information about the origins of varieties, some varieties may have been unreported. Varietal diversity was high, even for climbing beans, a crop new to the area. Three introduced potato varieties were widely grown: Cruza (used largely for home consumption) (64% of potato growers), Rutuku (43%) and Victoria (35%). The first two are older varieties, while all farmers started growing Victoria after 1996. A significantly higher number of potato growing households in project villages (53%) compared with non-project villages (25%) were growing Victoria due to Africare's seed distribution activities. There was no difference between sites for adoption of other potato varieties.

Table 2.6: Number of varieties grown and names of introduced varieties, Rubaya

	Potatoes	Bush beans	Climbing beans	Maize
Total number of varieties grown	7	5	5	4
Mean number of varieties grown	3.0	2.7	1.6	2.1
Introduced varieties	Cruza Rutuku Kisoro Victoria	Kachwekano (K20 and/or K132)	Gisenyi Vunikingi Ngwinurare	Africare Kabuyanda

The majority of bean farmers (96%) grew two bred bush bean varieties. K20, released in 1968, and K132 released in 1994, are both red mottled seed types that are difficult for farmers to differentiate. If time of adoption is used to distinguish between the two varieties, it can be assumed that 24% of bean growing households grew K132 at the time of the survey. Landraces of climbing beans, brought from neighbouring Kisoro District, the DR Congo or Rwanda, were more widely grown than modern varieties. Ngwinurare, grown by 32% of climbing bean growers, and Gisenyi grown by 13%, were the most common introduced climbing bean varieties. Significantly more households were growing Ngwinurare in project (40%) compared to non-project villages (13%) as a result of seed distribution by Africare, but there was no difference for adoption of other bean varieties.

Livestock

The majority of households in Rubaya (62%) owned livestock, mainly poultry and small ruminants (Appendix Table 13). It is noteworthy that a significantly higher proportion of project village households (69%) compared to 47% in Rukore owned livestock - in part due to Africare's livestock distribution activities. Dairy, but not local, cattle ownership was significantly associated with wealth, with 40% of wealthy households owning dairy cows, compared with 4% of average and 7% of poor households. Dairy cattle were only found in project villages. On average, the number of livestock owned is small due to land scarcity for grazing and the high cost of animals. The only animals owned by women were goats, sheep, chickens and rabbits.

Input use and seed sources

With the exception of labour and manure, few farmers in Rubaya used inputs in crop production (Appendix Table 14). Fungicide and chemical fertilizer use were significantly associated with wealth ($\chi^2=7.56$, Cramer's $v=0.29$; $P \leq 0.02$ for the former; $\chi^2=21.8$, Cramer's $v=0.58$; $P \leq 0.001$ for fertilizer). Farmers mainly used fungicide on potatoes to control bacterial blight and insecticide on cabbage to control insect pests. They applied manure to beans (to mitigate bean root rot, a disease associated with low soil fertility) (33%), potatoes (19%) and sweet potatoes (17%).

As in most parts of Africa, farmers in Rubaya relied principally on their own stocks for seed or planting material of potato and beans (Table 2.7). Cabbage was an exception, with the main seed sources being purchases from other farmers, shops and markets. Notably, however, farmers were not self-sufficient in seed, as in the second season of 2001 a significant proportion obtained potato and bean seed from off-farm sources. Commercial sources were second in importance to own stock, followed by purchases from other farmers. Surprisingly, none of the households interviewed sowed potato seed purchased from specialized seed producers (the Uganda Seed Potato Producers' Association) in the second season of 2001. Exchange, loans and gifts accounted for a relatively unimportant source of potato and bush bean seed, a pattern observed elsewhere in Uganda (David and Sperling, 1999). These sources were relatively more important for climbing beans, a new crop to the area.

Table 2.7: Source of seed planted in the second season of 2001, Rubaya

	Potatoes (n=63)	Bush beans (n=83)	Climbing beans (n=75)	Cabbage (n=49)
Own stock	57	59	32	2
Markets/shops	41	36	24	35
Purchased from other farmers	14	12	22	43
Borrowed/exchange/gifts	2	1	13	12
Other	5	4	13	12

Notes: Other = Africare and Kabale District Farmers' Association.
Totals exceed 100% due to multiple sources

Marketing of agricultural produce

Farmers sold agricultural produce to other farmers, local traders and long distance traders, with some variation by crop. Most farmers sold potatoes, beans and sorghum to local traders, but both local and long distance traders bought cabbage and tobacco (Table 2.8).

Table 2.8: Buyers of agricultural produce, Rubaya (per cent)

	Potatoes	Beans	Sorghum	Cabbage	Tobacco	Wheat
Farmers	11	15	2	8	4	0
Local traders	58	78	79	45	44	74
Long distance traders	31	7	19	47	52	26

As Table 2.9 shows, across crops, the single most important marketing problem mentioned by farmers was low prices. Storage loss was a problem for potato, bean and sorghum producers, and fast spoilage was a major constraint for cabbage growers.

Table 2.9: Marketing constraints of major cash crops, Rubaya (per cent)

	Potatoes	Beans	Sorghum	Cabbage	Wheat
Low price	41	53	50	30	53
Storage loss	16	14	14	3	0
Lack of market	10	7	6	15	20
Fast spoilage	10	8	3	41	0
Lack of transport	7	6	11	4	13
Lack of storage facilities	6	3	8	3	0
Poor quality of produce	8	9	6	3	13
Lack of information on buyers	2	1	2	1	0

Land use and management

Because land is highly fragmented in Rubaya, farmers cultivated multiple plots in different locations (Table 2.10). Studies conducted in the 1990s in Rubaya and neighbouring sub-counties document farmers cultivating up to 16 fields (Olson, 1996; Puhalla, 1998). In the first season of 2001, most surveyed households cultivated land on hillsides and on hilltops in their own village. In the majority of cases, households owned hillside and hilltop plots in their own and in other villages. Hilltop plots that were not abandoned as a result of overgrazing were mainly used for grazing or as woodlots. Over half of surveyed households cultivated in the wetlands in 2001; however, wetland cultivation in the respondent's own village was strongly associated with wealth ($\chi^2=19.56$, Cramer's $v=0.46$, $P\leq.001$), with poor households having least access (45% compared with 88% of average and 100% of wealthy households). In most cases, farmers owned wetland plots, but a significant number of households rented land in the wetlands.

Table 2.10: Location of farmland, first season of 2001, Rubaya (per cent)

Hillside, same village	92
Hillside, other village	30
Hill top, same village	46
Hill top, other village	16
Wetlands, same village	64
Wetlands, other village	7

Continuous cultivation of steep slopes contributes to soil infertility and erosion. Consequently, the vast majority of households in Rubaya (72%) attempted to improve soil fertility through the use of manure (82%), crop residues (68%), crop rotation (50%), planting agro-forestry tree species (35%) and fertilizer (6%). Surprisingly, no farmer mentioned fallowing as a measure to improve soil fertility, although a 1995 study in a nearby sub-county showed that 37% of land was under short and long term fallow (Olson, 1996). Olson concluded that fallowing is practiced when potential returns to labour are low and is positively associated with the amount of land owned.

Nearly all surveyed households (91%) had gullies on their farmland, a sign of serious soil erosion. Not surprisingly, the majority (61%) considered soil erosion a very serious problem, while 29% considered it a serious problem and nearly all (98%) had implemented measures to control soil erosion. The main soil erosion control measures implemented in Rubaya were: terracing (98%), trenches (67%), contour bands (62%), hedgerows (51%), grass strips (49%), mulching (29%) and trash lines (29%).

A third of surveyed households had established terraces during colonial times and in the immediate post-colonial period (Table 2.11). Notably, in 2001, the year the BAPPA project began, 12% of households

built new terraces. In Kabale District, terrace destruction, a short-term strategy to obtain fertile soils accumulated on terraces, was common, though illegal. Ninety-two per cent of households in Rubaya reported “collapsing terraces”, a euphemism for this practice. As Table 2.11 shows, prior to 2001, relatively few households dug trenches to control soil erosion and reclaim gullies. Farmers identified this intervention as a BAPPA project activity and nearly all trenches were dug in 2001 at the start of the project. At the time of the survey, a higher proportion of households in project villages had trenches: 77% in Kalambo and 81% in Muguli B, compared with 43% in Rukore.

Table 2.11: Year of establishment of soil erosion measures, Rubaya (per cent)

	Terraces (n=90)	Trenches (n=62)
1923-1969	30	0
1970-1986	31	0
1987-1994	11	3
1995-2000	18	21
2001	12	76

Farmers reported a number of problems in controlling soil erosion, namely, lack of tools (for digging trenches, etc), the presence of rocks and stones (which make digging difficult), and lack of labour. The main reason for not implementing soil erosion control measures was lack of knowledge. Other reasons include lack of labour, lack of materials (tree seedlings, mulch) and the belief that mulch, grass strips, contour bands and trash lines harbour rats and waste land.

Tree planting

The vast majority of surveyed households (74%) planted trees between 1999 and 2001, mainly in woodlots, cropland and homesteads (Appendix Table 15). This is a significant increase from the 10% recorded in Africare’s baseline survey (Anaele, 1997) and may be attributed to promotion of tree planting by NGOs, research institutions and the government. There was no significant difference in tree planting behaviour by wealth. Most farmers (78%) planted trees to meet multiple objectives, principally firewood, timber and poles (Table 2.12). Other objectives include erosion control, fruits stakes for climbing beans, fodder and medicine. The main tree species planted were *Eucalyptus* (36%) (mainly in woodlots and abandoned land), *Calliandra* (26%) (in cropland and homesteads), *Grevillea* (12%) (in cropland and homesteads), fruit trees (9%) (in homesteads) and black wattle (9%) (in woodlots and abandoned land). Other species planted included *Sesbania* spp., *Erythrina abyssinica*, *Pinus* and *Alnus*.

Table 2.12: Purpose of tree planting by niche, Rubaya (frequency, n=68)

	Farm boundaries	Crop land	Homestead	Bunds	Terraces	Woodlots	Abandoned land	Total
Erosion control	2	8	5	5	2	2	0	24
Firewood	1	0	0	0	0	11	6	18
Fruits	0	1	12	0	0	0	0	13
Poles/timber	1	3	1	2	0	4	0	11
Fodder	1	3	1	3	0	0	0	8
Soil fertility	0	3	1	0	0	0	0	4
Demarcation	2	1	0	0	0	0	0	3
Multi-purpose	1	9	7	1	0	22	13	53

Food security

The main dietary staples in Rubaya are potatoes and sweet potatoes accompanied by, or cooked together with, beans, peas or cabbage. Sorghum is eaten as porridge and as an alcoholic drink (*omuramba*). There are two periods of severe food shortage: April-May, when most agricultural produce have been used for planting, and November-December. During these months, most households in Rubaya reduced the number of meals eaten due to food scarcity, with poor households eating significantly fewer meals than better off households (Appendix Table 16).

The majority of surveyed households regularly experienced shortages of the main staples - potatoes, beans and sorghum (Table 2.13). Harvested crops fed households for only a short time: on average 3.2 months for potatoes, 4.3 months for beans and 6.6 months for sorghum, with no significant difference between wealth groups. When faced with food shortages, most farmers bought potatoes and beans, ate other foods in substitute for potatoes and sorghum, or worked for food (Table 2.13). The main reasons farmers gave for food shortages were low yields - due to unfavourable climatic conditions, low soil fertility and land shortage (Table 2.14). In particular, the responses of bean farmers suggest their awareness of the linkage between diseases, pests and low soil fertility, which has resulted in the devastating effects of bean root rots. The high dependence on food crops for income is believed to contribute to food insecurity, but was only mentioned by a significant proportion of farmers in the case of sorghum.

Table 2.13: Percentage of households experiencing shortages of major foods grown, and strategies to alleviate shortage, Rubaya

Experience shortages		Strategies to alleviate shortage	
Potatoes	83	Buys	41
		Eats other foods	33
		Works for food	23
		Other	3
Beans	77	Buys	52
		Eats other foods	13
		Works for food	22
		Other	13
Sorghum	520	Buys	35
		Eats other foods	38
		Works for food	25
		Other	2

Table 2.14: Reasons for shortages of major staples, Rubaya (per cent)

	Potatoes (n=73)	Beans (n=69)	Sorghum (n=47)
Poor yields due to heavy rains, drought, wind damage	45	29	21
Poor yields due to low soil fertility	15	25	26
Land shortage	19	20	30
Seed shortage	15	0	2
Diseases	4	22	0
Field pests	3	20	4
Sells crop	8	3	28
Post-harvest loss	7	3	0
Other	1	2	6

Note: Totals exceed 100% due to multiple responses

Development activities

Nearly half of the households surveyed (48%) in Rubaya had participated in activities organized by Africare/BAPPA. The major Africare sponsored activities reported by farmers were seed distribution of new bean (89%) and potato (86%) varieties, tree planting (86%), nutrition education (70%), compost making (61%) and distribution of livestock (pigs and rabbits) (50%). Ninety-three per cent had participated in digging trenches, an activity organized by the BAPPA project.

Although both men and women were reasonably optimistic about their ability to bring about positive change in their local situation (Appendix Table 17), men tended to be more optimistic, reflecting their higher status in society and their greater access to political power and resources such as education and land. Fifty per cent of men compared to 34% of women felt they would do a lot to bring about change, but 27% of men and 26% of women felt they could do little to change their environment. As evidence of their optimism about the future, about half of the sample of both men and women would like their children to be small-scale farmers, with little difference by sex of the child (Appendix Table 18).

Conflict, collective action and social capital

Although the majority of respondents felt that their community was peaceful (Appendix Table 19), they noted social divisions in relation to ownership of livestock, gender, education, land size, access to swamps, wealth, and involvement with NGOs (Appendix Table 20). Men and women had different perceptions of social differentiation. For men, the main factors dividing the community were the number of livestock owned, access to swamps, whether one works with an NGO or not, education and gender relations. Thirty per cent or more of male respondents reported that the first three issues were responsible for social problems and conflict. Women perceived ownership of livestock, gender, educational and land size differences as major factors dividing their communities. Thirty per cent or more of women perceived ownership of livestock and gender differences as the most serious divisional issues at community level. Theft is another indicator of increased social differentiation and breakdown of communal values. Forty-one per cent of men and 42% of women observed that theft had increased in the past 10 years, and a few respondents participated in collective action against this problem.

In contrast to women, men perceived the spirit of participation/cooperation in their village to be high (Appendix Table 21). Fifty-four per cent of men perceived participation as high or very high compared to 7% of women. Only 21% of men considered it to be low or very low; 38% of women rated the level of participation as average. A high proportion of both men and women had been involved in collective action between 2000 and 2001 (Table 2.15), with no significant difference between project and non-project villages. Higher male involvement in collective action may reflect the types of issues involved (e.g. land disputes and overgrazing are male domains), as well as men's greater amount of free time. Notably, domestic violence was the issue on which women participated most in collective action.

Table 2.15: Involvement in collective action, 2000-2001, Rubaya (per cent involved)

	Men (n=44)	Women (n=90)
<i>Overall</i>	55	38
<i>Type of issue</i>		
Excessive drinking by the opposite sex	2	2
Domestic violence	11	14
Land disputes	9	1
Improved farming methods/soil fertility	14	1
Theft	7	3
Transportation of sick	2	2
Overgrazing by livestock	5	1
Witchcraft	2	0
Other	23	19

A wide array of local groups existed in Rubaya (Table 2.16), and 95% of surveyed households belonged to at least one group. The mean number of household members belonging to a group was 2.4, with wealthy households having a significantly higher number of group members (6.4 compared with 2.1 for average and 2.2 for poor households; F statistic=7.65, 86 df; $P \leq .001$). It is unclear why the mean number of household members belonging to groups was significantly higher in project villages: 2.7 compared to 1.9 in the non-project village. Since all groups are village or parish based, they represent forms of bonding social capital, which are useful as coping or survival strategies, but do not necessarily help poor people to overcome poverty. The majority of households belonged to a burial group, which assists members to purchase a coffin and with other burial activities. Most groups, with the exception of household utensil groups, have mixed membership. Although the proportion of men and women belonging to groups was nearly equal (88% for men and 82% for women), women appeared to be more active in groups that facilitate their access to resources such as land, capital and labour.

Table 2.16: Household membership in local groups by gender, Rubaya (per cent)

	% of households (n=88)	Men alone	Women alone	Both
Burial	83	21	32	47
Credit/savings	13	8	67	25
Stretcher (<i>Ngozi</i>)	9	25	38	38
Household utensil	8	0	100	0
Digging/agricultural	7	33	33	33
Clan based groups	2	1	0	1

NOTE: Digging groups dig to raise money that is used to purchase farmland for the group. Agricultural groups include groups that give loans for purchasing seed and provide training. Household utensil groups assist women to purchase household utensils.

As Table 2.17 shows, few farmers shared information indiscriminately, although both men and women were more likely to share information and knowledge, rather than technologies, with anyone. Based on response frequency, diffusion pathway patterns were similar for men and women but varied by technology. Women, the key managers of seed and planting material, were more likely than men to share seed of new varieties. Diffusion of new varieties and tools is likely to start in the donor's own village, going to friends, relatives and fellow group members in that order. Next, farmers share new varieties and tools with relatives and

friends in other villages. The higher proportion of farmers who share with friends compared with relatives is similar to farmers' preference for borrowing more from friends than relatives.

Table 2.17: Diffusion pathways of agricultural technologies and information (Rubaya percent)

	Men (n=44)		Women (n=89)			
	Seed	Knowledge	Tools	Seed	Knowledge	Tools
Relative, same village	34	75	75	70	70	62
Friend, same village	77	73	86	82	81	82
Relative, other village	55	59	52	56	61	52
Friend, other village	41	48	45	40	46	36
Member of same group	55	73	59	56	62	52
Anyone	7	18	5	10	27	8

Marital conflict and decision-making

Married women (64%) were more likely than men (40%) to report marital conflict. For both husbands and wives, male drinking was the principal area of conflict (Table 2.18). Women's second area of concern was decision-making about the sale of produce and use of money, whereas men had a range of concerns over decision-making and wives' disobedience.

Table 2.18: Areas of marital conflict, Rubaya (per cent)

	Women (n=40) ^a	Men (n=17)
Husband's drinking	35	48
Wife's disobedience	18	0
Decision-making about sale of property/produce, use of money	18	23
Wife's lack of respect for husband	12	0
Husband does not provide adequately/take on male responsibilities	0	18
Other	18	13

Includes responses of women with both resident and non-resident husbands

A range of decision-making patterns were observed among married couples in Rubaya but, surprisingly, the most commonly reported form (by a third or more of both husbands and wives) was a consensual one in which husbands and wives discuss issues and make decisions together (Tables 2.19, 2.20). Notably, however, couples' responses on decision-making generally showed a high level of disagreement, which is corroborated by the proportion of couples who reported conflicts over decision-making (Table 2.18). Disagreements may also be attributed to the highly variable nature of decision-making, perception of that behaviour and the tendency to report norms rather than actual behaviour. Couples showed the highest levels of disagreement on decision-making about family planning and children's education, with each sex reported a stronger input for themselves. Contrary to expectation, there was little difference in decision-making pattern by the amount of income and crop, with a third or more of both husbands and wives reporting joint decision-making for all crops and revenue levels (Table 1.20). However, women were slightly more likely to make decisions about the disposal of small amounts of money on their own.

Table 2.19: Decision-making patterns on key issues as perceived by husbands and wives and extent of disagreement in responses, Rubaya (per cent)

	Man alone		Woman alone		Man consults woman		Woman consults man		Both discuss and decide together		% disagreement
	M	W	M	W	M	W	M	W	M	W	
Amount of beans to sell	20	28	18	8	20	8	13	18	30	39	55
Amount of potatoes to sell	24	24	13	8	21	11	13	18	29	40	57
Adoption of new bean varieties	22	17	24	24	20	10	15	15	17	34	60
Adoption of new potato varieties	20	25	23	20	20	13	18	13	20	30	53
Family planning	20	16	10	29	17	3	13	16	40	40	67
Sending children to school	29	28	3	11	16	8	8	17	45	36	62

Table 2.20: Decision-making patterns on use of crop income as perceived by husbands and wives and extent of disagreement in responses, Rubaya (per cent)

	Man alone		Woman alone		Man consults woman		Woman consults man		Both discuss and decide together		% disagreement
	M	W	M	W	M	W	M	W	M	W	
Small earnings from potatoes	22	17	19	19	19	11	8	14	30	33	58
Large earnings from potatoes	24	19	3	11	30	22	8	14	35	35	49
Small earnings from sorghum	21	21	13	21	21	10	8	18	36	28	62
Large earnings from sorghum	23	20	5	13	23	10	8	20	43	38	55
Small earnings from beans	19	17	14	22	19	11	11	17	32	28	53
Large earnings from beans	18	21	8	11	29	16	8	18	34	34	58

3. LINTHIPE EPA, DEDZA DISTRICT, MALAWI

Demographic profile of surveyed households

A total of 530 people lived in the 121 households surveyed in Linthipe EPA: 223 from Mnthala, 199 from Chikonde and 108 from Yazini. A resident male headed most households, but nearly a third was headed by women, mostly widows (Appendix Table 4). The proportion of female-headed households was higher than the national average of just under 25% (IFPRI, 2000). The mean age of male respondents was 41 years, compared to 38 for female respondents. No child-headed households were included in the sample. Heads of households had lived in their village for an average of 28 years. Among household heads, the Yao were the predominant ethnic group, accounting for 54% of those sampled. Forty-two per cent of household heads were Chewa, while 4% were Ngoni. The Yao and Chewa are matrilineal people, while the Ngoni are patrilineal. While most people in Mnthala were Christian, the majority in Yazini and Chikonde were Muslims.

Average household size was 4.4 persons (Appendix Table 5), close to the national average of 4.5 persons. Mean household size differed significantly by village, with Chikonde, the non-project village, having the largest households (4.8) and Yazini the smallest (3.4). Illiteracy levels were high, with a third of male heads of households and 60% of wives being unable to read or write (Appendix Table 6). These figures are similar to national rates of illiteracy of 26% for men and 55% for women (PHNIP, 2002). Sixty-two per cent of male respondents could read and write a local language and 23% could read and write English. Only 29% of surveyed women could read and write a local language, while a scant 6% were literate in English.

Twenty-one per cent of households in Linthipe had a school age child out of school (Appendix Table 7). There was no evidence of deliberate educational discrimination against girls at primary level, as a slightly higher number of households had a male child not attending school (18 compared with 13 with a female drop out). Moreover, the total number of male school dropouts (N=23) was higher than the number of girl dropouts (N=17). Irrespective of sex, the main reason for school non-attendance was refusal and laziness; lack of money for fees was the third most important reason.

Household resources, poverty and vulnerability

On average, households had 2.3 AEWs (Appendix Table 8) and a mean of 2.1 adults involved full-time in agricultural work. As in most countries, women have a heavier workload than men, divided between farm and domestic work (see appendix). Households with a resident male head had a significantly higher number of AEWs than female-headed households: 2.6 compared with 1.5 ($P \leq .000$ for t test). The dependency ratio was low, with, on average, one producer supporting 1.4 non-producers.

There were four distinct wealth groups in Linthipe: wealthy, average, poor and very poor. Notably, the average wealth group was only identified by informants in Yazini village, and, as earlier mentioned, Chikonde has a disproportionate number of wealthy households compared to the other two villages. Wealth groups differed significantly by ownership of livestock and other key assets, annual agricultural income and household type (Table 3.1). Better off households tended to be headed by men, but were not significantly larger than households in other wealth groups. Poorer households had a disproportionate number of female heads and were less likely to own key assets. Consequently, female-headed households, many of whom had limited agricultural activities, had significantly lower annual agricultural income than male-headed households: MK 1347 (\$28.78) compared to MK 4737 (\$101.21)³ ($P \leq .001$ for t test).

Table 3.1: Household differentiation by wealth on selected socio-economic characteristics, Linthipe

	Wealthy (n=23)	Average (n=21)	Poor (n=52)	Very poor (n=25)	Overall average	Probability
Household size	5.2	3.8	4.5	4.0	4.4	0.12*
Per cent headed by women	9	19	25	64	29	0.00
Adult equivalent workers	2.5	2.0	2.4	2.2	2.3	0.38*
Annual agricultural income (MK) (2000-01)	5664	4706	3503	1419	3,752	0.02*
Own livestock (%)	91	100	77	56	79	0.00
Owens a bicycle (%)	65	48	39	20	42	0.02
Owens a radio (%)	78	71	45	16	50	0.00
Owens a foam mattress (%)	22	10	2	4	7.5	0.02
Owens mats (%)	100	95	100	88	97	0.04
Owens chairs (%)	48	38	31	4	30	0.01

*Statistics from ANOVA; the rest from chi square

Average annual income from agriculture was MK 3,752. According to recent research on poverty in Malawi, in Dedza District, “just under 50 per cent of household incomes was derived from own production of crops and livestock, and just over 50 per cent, therefore, from other sources comprising *ganyu*, non-farm self-employment, remittance income or safety net transfers” (Ellis et al., 2002). For most households, April to July, the period following the harvest from the main season, were the months of highest income, while November to February, the planting period, were the months of least income. Eighty-two per cent of men compared to 61% per cent of women engaged in some type of income generating activity, with men having a wider portfolio of activities (Appendix Table 10). Men were typically involved in 1.4 off-farm activities compared with 1.2 for women, with no significant difference in the number of activities by wealth. *Ganyu* (casual) labour and business ranked first and second as the principal sources of personal income among both men and women. Notably, petty trade was more important for women in Chikonde, whereas hired labour was the principal source of income for 40% of women in project villages. Men in project villages were also more dependent on *ganyu* labour than men in Chikonde. Whereas men tended to leave the village for *ganyu* labour, women engaged in casual labour locally, often in exchange for food. Women were more likely than men to rely on remittances.

Eighty per cent of men and 78% of women saved money. About half of the farmers who saved (49% of women and 57% of men) did so monthly or more frequently. Women saved on average MK 548 (\$11.70) compared to MK 887 (\$18.95) by men ($P \leq 0.16$ for t test). Better off women saved significantly more money than poor women, but the difference between men of different wealth groups was not significant. On average, women borrowed MK 305 (\$6.51) in 2000 and MK 212 (\$4.52) in 2001, while men borrowed MK 512 (\$10.94) in 2000 and MK 928 (19.82) in 2001. Amounts borrowed by men and women did not differ significantly by wealth. Women were more likely than men to borrow money from relatives, whereas men borrowed equally from friends, relatives and formal sources such as NGOs and churches (Appendix Table 11). No surveyed farmer had ever borrowed from a credit institution. Farmers mainly used borrowed money to invest in business, purchase household necessities (mainly women), pay for medical expenses and purchase food. A minority of men used borrowed money to rent land and build a house.

The main coping strategies that Malawian farmers fall back on in emergency situations included borrowing money and seeking assistance from friends and relatives, using savings, doing *ganyu* labour or other types

³ US\$ 1 = Malawi Kwacha (MK) 46.88

of work, selling crops or livestock, letting children drop out of school, buying food and begging (Table 3.2). Men and women responded to emergencies in similar ways, with begging being the one response more likely to be taken by women. Survey respondents were more likely to seek assistance from friends rather than relatives.

Table 3.2: Emergency coping strategies, Linthipe (per cent)

	Sudden death		Need money for school fees		Need money for health expenses		Food shortage		Crop failure	
	W	M	W	M	W	M	W	M	W	M
Borrow money/seek assistance from friends	58	59	51	56	70	59	9	7	6	0
Use saved money	9	11	1	2	1	1	0	1	0	0
Assistance from parents/relatives	18	18	7	5	7	12	2	2	3	0
Do ganyu	0	0	11	10	3	2	59	61	46	41
Sell crops/livestock assets	11	8	11	21	14	22	9	10	6	7
Let child drop school	0	0	10	0	0	0	1	2	0	0
Buy food	0	0	0	0	0	0	3	6	3	7
Beg	2	0	3	1	2	0	11	1	6	0
Work for money	0	0	5	4	4	4	6	5	22	41
Other	2	1	1	1	0	0	1	4	10	4

Farmers' investment aspirations

Farmers' two main investment priority areas were business and agricultural inputs (principally fertilizer) (Appendix Table 12). Women's preferred business activities included brewing, baking and petty trade of maize or second hand clothes. Men were mainly interested in trading fish and maize. Other priority investment areas for women were clothes and food security, while men favoured investing in livestock and food security. Analysis of investment scores by wealth shows interesting trends (Table 3.3). Wealthy women were more prepared to invest in agricultural inputs, women of average wealth were more interested in improving their houses, while poor women were more concerned with food security. Men of different wealth groups differed significantly on three areas of investment. Wealthier men (wealthy and average) put high priority on buying land, agricultural inputs and more food, whereas poor men preferred to invest in business, agricultural inputs and livestock, in that order.

Table 3.3: Investment priority scores by gender and wealth category (men n=83; women n=113), Linthipe

	Wealth category							
	Wealthy		Average		Poor		Very poor	
	M	W	M	W	M	W	M	W
Save	0.76	0.57	0.41	0.74	0.58	0.79	0	0.72
Business	2.29	2.43	2.00	1.89	2.75	2.51	2.00	2.21
House improvement	0.81	0.48	0.53	0.68	0.44	0.15	0.11	0.08
Livestock	1.19	1.22	1.06	0.68	1.36	0.85	1.11	1.08
Land	1.00	1.00	0.12	0.21	0.78	0.53	0.33	0.83
Better food	0.52	0.48	0.18	0.47	0.25	0.40	0	0.21
More food	0.81	0.70	0.65	0.53	0.81	1.34	1.56	1.58
Agricultural inputs	2.43	2.00	3.47	3.26	1.94	1.87	1.78	1.21
Clothes	1.05	1.26	0.53	1.05	0.81	1.02	1.33	1.63
School fees	0.38	0.30	0.47	0.47	0.19	0.23	0	0
Rent land	0	0.09	0	0	0	0	0	0.04
Other	0.33	0	0.18	0.21	0.47	0.23	0.33	0

Agricultural production

Crops

A total of 30 crops were recorded in Linthipe, most of which farmers grew for both food and cash (Table 3.4). Beans, pumpkin and other vegetable crops were commonly intercropped with local maize. Minor crops included papaya (18%), onions (12%), Bambara nuts (10%), okra (10%), rape (9%), cow pea (8%), peas (8%), pitch fruit (8%), cabbage (7%), avocado (2%) and paprika (2%). Some crops, such as maize, sweet potato, sorghum, millet and pigeon pea, were mainly grown for home consumption; the remaining crops had both food and sale value. The two key cash crops grown by Linthipe farmers were soya bean and burley tobacco. Potatoes, paprika, tobacco, onions, cabbage and tomatoes were relatively new crops to the area with high market potential. It is significant that, while a higher proportion of wealthy and average households grew potatoes, soya bean production was wealth neutral. During participatory planning exercises, farmers noted that cassava and sweet potato production had increased over time in response to recurrent droughts and increased food insecurity. They also pointed out the increased importance of fruits for nutrition and income generation. Given the lack of crop specialization, no single crop was reported by a high proportion of farmers as a key source of income. Farmers reported soya beans (27%), beans (23%) cassava (19%) and groundnuts (9%) as their highest agricultural income earners; secondary sources of income included beans (33%) and groundnuts (19%).

There was little gender specialization in crops in Linthipe, although men generally took more responsibility for tobacco and some cultivated personal plots of this crop. However, women were also involved in tobacco production.

Table 3.4: Major crops usually grown on upland fields and their uses, Linthipe (per cent)

	Purpose				
	Per cent of sample (N=121)	Home consumption only	Mainly home consumption	Home consumption and sale	Sale mainly
Beans	99	9	18	72	0
Groundnut	91	13	15	73	0
Local maize	88	80	1	17	1
Pumpkin	87	87	1	12	0
Soya bean	74	3	6	70	20
Cassava	73	11	5	86	0
Sweet potato	67	49	4	39	3
Bananas	52	38	7	53	2
Hybrid maize	46	55	9	35	2
Sugar cane	43	20	6	67	8
Mangoes	41	68	4	28	0
Potatoes	39	32	4	60	4
Sorghum	36	95	2	2	0
Tomatoes	28	30	3	67	0
Pigeon pea	28	76	12	12	0
Mustard	27	15	3	79	3
Millet	26	55	29	16	0
Tobacco	20	8	0	17	75

The majority of households (70%) interviewed grew crops in *dimbas* during the dry season. As Table 3.5 shows, major *dimba* crops were: beans (78%), hybrid maize (68%), tomatoes (60%), green leafy vegetables (60%), potatoes (49%), sugar cane (38%) local maize (34%), cabbage (26%) and sweet potato (26%).

Table 3.5: Crops usually grown in *dimbas* and their use, Linthipe (per cent)

	Purpose				
	% of <i>dimba</i> growers (n=85)	Food only	Mainly food	Food and sale	Sale mainly
Beans	78	35	9	46	0
Hybrid maize	68	43	21	30	5
Leafy vegetables	60	42	6	50	2
Tomatoes	60	20	8	67	4
Potatoes	49	22	7	66	5
Sugar cane	38	6	3	84	6
Local maize	34	79	10	10	0
Sweet potato	26	30	25	40	5
Cabbage	26	10	5	86	0
Onions	22	25	20	50	5

Farmers' estimates suggest that the largest crop areas were sown to maize and beans (Tables 3.6, 3.7). Multiplication rates for key crops were moderate to low (Tables 3.6, 3.7). On average from the 2000/01 season, farmers sold a quarter of their local maize harvest and nearly a fourth (38%) of their hybrid maize harvest. Beans and groundnuts sales averaged 47-48% of amounts harvested. Average proportions of potatoes and cassava harvests sold were high at 60% and 77% respectively. Although few farmers reported growing crops in the *dimbas* mainly for sale (Table 3.5), figures on amounts sold suggests that *dimba* production is commercially oriented for most crops and especially hybrid maize, beans and potatoes. Farmers sold an average of 48-67% of the main staple crops grown in *dimbas* during the dry season of 2001.

Table 3.6: Production of some major crops on upland fields and quantities sold (kg), Linthipe, 2000-01

	Local maize (n=104)	Hybrid maize (n=51)	Beans (n=119)	Potatoes (n=40)	Cassava (n=82)	Groundnuts (n=106)
Area (ha)	0.53 (0.10-1.22)	0.49 (0.08-1.22)	0.57 (0.10-1.42)	0.20 (0.04-1.62)	0.28 (0.04-0.61)	0.24 (0.04-0.81)
Amount planted	13.7 (2-60)	10.5 (2-50)	9.7 (1-40)	38 (2-400)	84.6 (3-800)	8.8 (1-75)
Amount harvested	458.3 (20-1500)	565 (26-2500)	107.4 (9-1125)	229 (13-3250)	658.5 (50-5000)	185.5 (3-1000)
Amount sold	176.3 (3-500)	175 (50-450)	56.9 (3-250)	304.1 (25-3100)	596.1 (10-4500)	107.8 (8-500)

Table 3.7: Production of some major crops in *dimbas* and quantities sold (kg), Linthipe, 2001 (Range in parentheses)

	Local maize (n=28)	Hybrid maize (n=55)	Beans (n=58)	Potatoes (n=30)
Area (ha)	0.20 (0.04-0.40)	0.16 (0.04-0.61)	0.16 (0.02-0.40)	0.16 (0.08-0.61)
Amount planted	3.2 (1-10)	4.1 (1-20)	4.2 (0.5-72)	21.3 (1.5-100)
Amount harvested	65.1 (1-200)	82.9 (1-800)	28.5 (1-150)	99.3 (1-500)
Amount sold	79.2 (50-150)	170.8 (25-400)	31.5 (10-100)	120.8 (25-400)

Varietal diversity at community level differed by crop (Table 3.8). A large number of bean, maize and sweet potato varieties were reported, but individual households grew relatively few varieties of these crops. Varietal diversity of cassava and potatoes was lower, not surprisingly in the case of for potatoes, a crop new to the area. Two hybrid maize varieties had modest adoption rates: MB 18 (26%) and MH 17 (22%). Adoption rates were only different between project and non-project villages for MH 18, which was more widely grown in Chikonde (37% of households compared with 19% in Mnthala and Yazini). Only one improved bean variety, Napilira (CAL 143), was widely grown by surveyed farmers (49%). Notably, this variety was grown by significantly more households in project villages (66% compared with 17% in Chikonde) as a result of seed distribution by CU. Other introduced varieties included Kenya sweet potato variety (55%), CG7 groundnut variety (52%), Nkhalatsonga cassava variety (76%), and Red (43%) and Lusen (26%) potato varieties. Of these varieties, only CG7 groundnut variety was grown by significantly more farmers in project villages (70% compared with 8% in Chikonde).

Table 3.8: Number of varieties grown and introduced varieties by crop, Linthipe

	Sweet potato	Beans	Potato	Cassava	Maize	Groundnuts
Total number of varieties grown	5	6+	4	3+	6+	5+
Mean number of varieties grown	1.8	2.4	1.4	1.4	1.7	1.6
Introduced varieties	Kenya	Napilira	Red Luseni	Nkhalatsonga	Parma MH 18 MH 17 Masika MH 41	CG 7

Livestock

The majority of surveyed households in Linthipe (79%) owned livestock, mainly goats and poultry (Appendix Table 13). Livestock ownership was significantly correlated with wealth. There was no significant difference between project and non-project villages in livestock ownership, although 83% of households in project villages owned animals compared with 71% in Chikonde. Low livestock populations and the absence of certain types of animals were attributed to several factors. Cattle rustling and disease caused the absence of cattle, a recent phenomenon, which is consistent with findings by Ellis et al (2002). Diseases were also responsible for low pig and duck populations. Notably, nearly a third of livestock

owners (29%) used drugs to treat their animals, nearly always chickens. Livestock theft was noted as a common problem that forced farmers to keep their animals (goats particularly) indoors at night. Indicative of the importance of livestock as an economic asset, some households had sold off their livestock to obtain cash in emergency situations and could not afford to restock.

Input use and seed sources

Seed sourcing varied by crop and whether the crop was traditional or newly introduced (Table 3.9). In the 2000/01 season, the majority of farmer used farm saved seed of local maize and beans. Other important sources for these two crops were exchange and purchasing from the market or other farmers, which corroborates the findings of other studies (Ferguson, 1991).

Not surprisingly, the most important source of hybrid maize seed was the commercial sector. However, a significant per cent of farmers recycled hybrid maize seed due to lack of cash. Another important source of hybrid maize seed was government distribution programs such as Starter Pack. Probably because potato is a relatively new crop to the area and has high cash value, most farmers obtained seed from off-farm sources. It is notable that across crops, few farmers obtained seed as gifts from other farmers.

Table 3.9: Source of seed planted in 2000/01 season, Linthipe (per cent)

	Local maize (n=106)	Hybrid maize (n=68)	Beans (n=120)	Potatoes (n=50)
Own stock	56	21	53	22
Purchase from shops/markets	18	49	22	36
Purchase from other farmers	13	11	10	30
Borrowed/exchange/worked for seed	11	6	24	8
Gift from another farmer	7	1	3	2
Government	0	16	1	0
Concern Universal	0	7	12	2
Other	1	9	11	4

Notes: Other included specialized seed producer for potatoes.

Totals exceed 100% due to multiple sources

Marketing of agricultural produce

Farmers sold agricultural produce principally to local traders (Table 3.10). Long distance traders came to Linthipe to purchase potatoes, beans and cassava. A minority of farmers sold crops, mainly cassava, maize and potatoes, to other farmers. Farmers complained about only one major marketing constraint: low price (Table 3.11) - which is confirmed by the prices indicated in Table 3.12. Problems associated specifically with the marketing of tubers include poor quality (cassava), storage loss and spoilage and lack of transport. A minority of respondents noted the lack of markets and market information, and cheating by traders.

Table 3.10: Buyers of agricultural produce, Linthipe (per cent)

	Maize (n=59)	Beans (n=110)	Potatoes (n=39)	Cassava (n=79)
Farmers	15	8	12	20
Local traders	71	66	56	54
Long distance traders	14	26	33	26

Table 3.11: Marketing constraints by crop. Linthipe (per cent)

	Maize (n=53)	Beans (n=104)	Irish potatoes (n=29)	Cassava (n=56)
Low price	94	97	90	82
Lack of market	2	1	0	0
Lack of information on buyers	0	1	0	0
Lack of transport	2	0	7	9
Poor quality of produce	0	0	0	5
Storage loss	0	0	0	2
Lack of storage facilities	0	0	0	0
Cheating on scales	2	1	0	0
Fast spoilage	0	0	3	2

Table 3. 12: Price of major crops in 2000-01, Linthipe

Crop	Time of year	Price (MK/kg)
Maize	May-June	3-3.50
	July-September	3-10
	November-December	12-15
Beans	March-May	8
	June-September	12-25
	October-November	15-18
Potatoes	Feb-May	80/pail
	June-January	200/pail
Cassava	August-December	25

Land use and management

In Linthipe, the average size of fields was 0.93 ha in the uplands and 0.29 ha in *dimbas*, with significant differences for both land use types by wealth. Similar land size holdings, although not broken down by land use categories, were cited by other studies (Malawi, 2000; Ellis et al, 2002). On average, male-headed households cultivated a mean of 1.26 ha of land compared with 0.69 ha for female-headed households ($P \leq .001$ for t test). Land inheritance follows the matrilineal lineage and is passed on to female offspring, with the maternal uncle presiding over ownership.

All households, with one exception, used soil fertility improvement measures, the most common being incorporation of crop residues, crop rotation, chemical fertilizer and compost manure (Table 3.13).

Reflecting the low livestock population, about a fourth of households used livestock manure. Farmers typically applied soil amendments to maize, the main food crop.

Table 3.13: Soil fertility improvement measures, Linthipe (per cent) (N=120)

Crop residue	66
Crop rotation	56
Chemical fertilizer	56
Compost manure	56
Livestock manure	38
Farmyard manure	37
Other	13

The majority of farmers (93%) practiced some form of soil erosion control measure, mainly contour ridges (68%), marker ridges (56%) and box ridges (48%), technologies promoted by CU. Although 38% of households reported having gullies or rills on their farmland, over 58% perceived soil erosion as a minor problem; only 28% rated it a very serious or serious problem.

Tree planting

Thirty-four per cent of households had planted trees between 1999 and 2001. The most common niches for trees were the homestead and farm boundaries (Appendix Table 15). The most common trees planted were *Eucalyptus* and *Acacia* spp., but a few farmers planted *Tephrosia*, *Grevillea* and *Leucaena*. Farmers mainly planted trees for timber and poles (43%), multiple purposes (38%) and firewood (21%). Farmers in Linthipe did not plant trees exclusively to improve soil fertility, curb erosion or for fruit, but combined these with other multi-purpose objectives, notably firewood production. Notably, the predominant cooking fuel among surveyed households was firewood (95%) but 9% of households used maize stover for cooking as a result of firewood shortages.

Table 3.14: Purpose of tree planting by niche, Linthipe (frequency; n=42)

Purpose	Farm boundaries	Crop land	Home- stead	Dimbas	Woodlot	Village forests	Total
Poles/timber	8	0	5	0	3	2	18
Multipurpose	3	2	5	0	4	2	16
Firewood	3	0	5	0	1	0	9
Shade	0	1	3	1	0	0	5
Other	1	2	0	0	0	1	4

Food security

The most important dietary staple in Malawi is maize, eaten as a stiff porridge (*nsima*); secondary staples include sweet potato, cassava, millet and sorghum. Normally, the “hungry period” extends from June to November, but recently, a number of factors have contributed to an extended hungry season lasting through February. These factors include repeated droughts, frequent involvement of household members in *ganyu* labour and the high incidence of HIV/AIDS (pers. comm. C. Chitsike). The last two factors have significantly decreased labour available for agricultural activities, thereby contributing to lower productivity. Nearly all surveyed households experienced food shortages of the major foods (Table 3.15).

Harvested crops fed households for only a short time: on average 6.7 months for maize, 7.4 months for beans, 3.4 months for sweet potato and 4.1 months for cassava. As Table 3.16 shows, maize, bean and cassava harvests lasted significantly longer in wealthier households.

Table 3.15: Percentage of households that experience shortages of major foods, and strategies to alleviate shortage, Linthipe

	Experience shortages	Strategies to alleviate shortage	
Maize	90	Buy	56
		Work for food	32
		Borrow/beg	2
		Food aid	2
Beans	63	Buy	33
		Work for food	16
		Eat other foods	48
		Borrow/beg	4
Sweet potato	69	Buy	28
		Work for food	2
		Eat other food	69
Cassava	71	Eats other foods	62
		Buys	29
		Work for food	9

Table 3.16: Number of months that food crop harvests last by household wealth category, Linthipe

	Wealthy	Average	Poor	Very poor	Probability by ANOVA
Maize	7.8	7.3	6.8	5.0	<0.005
Beans	9.2	7.9	7.3	5.5	<0.002
Sweet potato	3.2	4.1	3.4	2.3	<0.169
Cassava	4.4	4.8	3.1	5.1	<0.057

Reasons for food shortage were crop specific but, surprisingly, few farmers related food shortage directly to drought or disease (Table 3.17). Across crops, a common reason cited by farmers was land shortage, a puzzling answer given the low population density. Maize shortfalls were largely attributed to soil infertility, lack of fertilizer and land shortage. Farmers explained bean shortages in terms of land and seed shortage, low yields and crop sales. Seed shortage might also refer to the lack of high yielding varieties, as noted by farmers during participatory appraisal exercises. The most important factor accounting for shortages of sweet potato and cassava were respectively, land shortage and crop sales.

Table 3.17: Reasons for food shortages of major staples, Linthipe (per cent)

	Maize (n=99)	Beans (n=67)	Sweet potato (n=53)	Cassava (n=56)
Land shortage	18	19	42	21
Infertile soil/lack of fertilizer	45	4	0	0
Drought	6	4	0	0
Large households	5	1	3	0
Sells crop	4	16	13	31
Low yields/little harvest	8	18	10	6
Storage problems	1	3	18	7
Seed shortage	0	19	10	2
Theft	1	0	0	18
Diseases	0	3	0	3
Other	12	12	3	12

Farmers coped with food shortages in different ways depending on the crop (Table 3.15). When maize stocks ran out, farmers purchased maize or did *ganyu* labour to obtain this preferred staple. When they ran out of beans, sweet potatoes or cassava, most farmers either ate other foods or purchased those commodities. During the hungry period, surveyed households ate an average of 1.4 meals a day, with no significant difference by wealth categories (Appendix Table 16).

Development activities

Sixty-two per cent of households had participated in activities organized by CU, mainly in the area of receiving seed/planting materials (97%), tree planting (32%), seed production (33%), making marker ridges (27%), crop storage (19%), livestock donations (13%) and installation of treadle pumps (13%). A third of respondents were members of CU village committees (31%).

The majority of respondents of both sexes were highly optimistic about their ability to bring about change locally, with little difference in opinion by gender (Appendix Table 17). Slightly more than half of both male and female respondents had no objection to their children becoming small-scale farmers, irrespective of their sex (Appendix Table 18).

Conflict, collective action and social capital

About half of the farmers surveyed, both men and women, felt that their community was very peaceful (Appendix Table 19). Only a minority reported a high level of conflict. The three factors reported by both men and women to divide communities in Linthipe were land size, differences in educational level and wealth (Appendix Table 20). Women, in particular, perceived differences in asset ownership as a diversionary factor. A significant proportion of respondents (42% of men and 31% of women) felt that theft had increased in the past 10 years, but a near equal number felt that there had been no change (28% of men and 40% of women). Farmers, both men and women, reported a high level of participation in their communities (Appendix Table 21). This was confirmed by the high proportion of both male and female respondents who had taken part in some form of collective action in 2000-2001 (Table 3.18). Because collective action was mainly related to constructing communal facilities (schools, bore hole and bridge construction), all of which were initiated by government or CU, a slightly higher number of men than women were involved. Also, more farmers in project villages compared with Chikonde were involved in collective action. Relatively few respondents reported collective action unrelated to development activities, such as theft reduction, family disputes and funeral arrangements.

Table 3.18: Involvement in collective action, 2000-01, Linthipe (per cent)

Type of issue	Men (n=60)	Women (n=69)
<u>Overall</u>	71	60
<i>Type of involvement:</i>		
School construction	28	33
Bore hole construction	28	28
Bridge construction	15	15
Theft reduction	13	9
Others	22	23

Fifty-six per cent of households belonged to a group. On average, each household had 1.3 group members, with no significant difference by household wealth status, gender or residence in a project or non-project village. Relatively few households belonged to the three indigenous groups: Khulamoyo Development Group, burial groups and groups formed by elderly women (Table 3.19). The relatively scarcity of indigenous groups can be largely attributed to the Banda government's policy of stamping out local organizations as part of a strategy of containing political dissent. Village development groups (including MSAF), school committees and health groups were established by the government, while literacy school community groups and groups related to specific project activities were formed by CU. Group interviews confirmed the important role of NGOs, especially CU, in fostering trust between people and encouraging group formation.

Table 3.19: Household membership in groups, Linthipe (per cent)

	% of households (n=43)	Men alone	Women alone	Both
Village development group	65	32	36	32
Concern Universal groups	43	41	35	24
Burial groups	7	33	67	0
School committee group	7	67	0	33
Health group	5	100	0	0
Literacy School Community group	5	50	50	0
Khulamoyo Development group	2	0	100	0
Malawi Social Action Fund (MASAF)	2	0	0	100
Elderly women groups	2	0	100	0

Most development groups had mixed membership with the exception of Khulamoyo Development Group, an exclusive female group, and the health group, an exclusive male group. Although burial groups had members of both sex, membership was predominantly female.

Patterns of technology and information/knowledge diffusion were similar for men and women (Table 3.20). Most farmers shared seed and knowledge, but less commonly tools, possibly because new tools were rarely available. Based on the frequency of responses, diffusion follows a spatial pattern, starting with relatives in the same village, followed by friends in the same village and relatives and friends in other villages. Men were more likely than women to share technologies indiscriminately.

Table 3.20: Diffusion pathways of new agricultural technologies and information, Linthipe (per cent)

	Men (n=85)			Women (n=113)		
	Seed (n=66)	Knowledge (n=73)	Tools (n=24)	Seed (n=85)	Knowledge (n=95)	Tools (n=23)
Relative, same village	85	74	83	81	77	78
Friend, same village	55	48	50	47	48	57
Relative, other village	41	36	38	44	36	39
Friend, other village	44	38	33	34	31	30
Member of same group	52	47	54	38	31	52
Concern Universal	9	11	4	1	13	4
Agricultural officer	3	14	8	2	16	4
Anyone	26	22	17	17	15	9

Marital conflict and decision-making

About half of married respondents (51% of women and 48% of men) reported conflicts with their spouse. The single most important area of conflict reported by both men and women was financial decision-making and decision-making generally (Table 3.21). Both sexes also reported conflicts over their spouses' refusal to work. Only women reported conflicts over extra-marital affairs by men. Excessive drinking and domestic violence were mentioned by a minority of respondents of both sexes, the latter possibly because of social norms. Other conflict areas include non-performance of conjugal roles and personality conflicts.

Table 3.21: Areas of marital conflict, Linthipe (per cent)

	Men (n=39)	Women (n=46)
Conflicts over money/decision-making	29	33
Refusal to work/division of labour	22	16
Conflicts over other women	5	15
Husband's drinking	3	8
Wife's drinking	2	3
Domestic violence	0	4
Laziness	3	0
Other	38	21

Note: includes women with both resident and non-resident husbands

Decision-making among married couples in Linthipe took two major forms dominated by men: husbands made decisions unilaterally or consulted their wives before making a decision (Table 3.22). Joint decision-making was common among a minority of couples. Women rarely initiated or made decision unilaterally, the exception being the use of small amounts of money. There was a moderate degree of disagreement among couples on decision-making patterns, which could mean that responses were largely based on social norms, rather than reality. Couples agreed most on decisions related to land use and family planning and least on financial decisions.

Table 3.22: Decision-making patterns on key issues as perceived by husbands and wives and extent of disagreement, Linthipe (per cent)

	Man alone		Woman alone		Man consults woman		Woman consults man		Discuss and decide together		Disagreement (%)
	M	W	M	W	M	W	M	W	M	W	
Use of small amounts of money	45	34	36	36	15	28	1	0	3	3	46
Use of large amounts of money	50	41	9	10	29	39	0	0	13	10	40
What to plant in upland fields	38	39	6	11	43	40	0	0	14	10	30
What to plant in dimba fields	45	47	4	8	43	41	0	0	8	5	28
Family planning	49	47	6	9	35	30	3	3	6	12	27
Sending children to school	56	42	3	6	31	33	0	0	10	18	35

4. SONI WARD, LUSHOTO DISTRICT, TANZANIA

Demographic profile of surveyed households

A total of 501 persons lived in the 83 households surveyed: 348 in Shashui and 153 in Vuga. A resident male with one wife headed most households (Appendix Table 4), but a high proportion of married men (22%) had multiple wives. Households headed by non-married women constituted nearly 20% of the sample, with a higher proportion in Vuga compared with Shashui. The mean age of male respondents was 49 compared with 42 for female respondents. The youngest head of household was 25 years old. Although no data were collected on religion, observation suggests that a high proportion of people in Soni Ward were Muslim. Nearly all heads of households were of the Sambia tribe (94%); the rest were Mpare (4%) and Mbugu (2%).

Mean household size in the surveyed communities was 6.0 (Appendix Table 5), higher than the national average of 4.9 (Republic of Tanzania, 2002). Households in Shashui were on average larger than those in Vuga (6.6 persons compared with 5.1). The majority of survey respondents, both men (91%) and women (67%), had primary education and 91% of men and 61% of women were literate in the local language, Kiswahili (Appendix Table 6). Few respondents were literate in English (16% of men and 6% of women). Since an insignificant number of households in Soni had a school-aged child out of school (Appendix Table 7), there was little evidence that girls in this area faced educational discrimination. This may be attributed to the relatively high standard of living enjoyed by farmers in this area of Tanzania.

Household resources, poverty and vulnerability

Households had an average of three AEWs (Appendix Table 8) and a mean of 2.6 adults involved full time in agricultural work. Compared with men, women have a heavier workload with little time for rest, although men are actively involved in agriculture (see Appendices). There was no significant difference between the amount of household labour available to male and female-headed households. On average, one producer supported 1.5 non-producers.

⁴ US\$ 1 = Tanzanian shillings (Tsh) 930

Informants identified eight wealth groups that were collapsed for ease of analysis into four groups: wealthy, above average, average, poor and very poor (Appendix Table 9). The wealthiest and poorest groups, the latter consisting of destitute people (e.g. the mentally disturbed and alcoholics), were not represented in the surveyed communities. There was no significant difference in the representation of wealth groups in project and non-project areas, although 17% of households in Vuga were classified as poor compared with 6% in Shashui. The three wealth groups represented in the sample (above average, average and poor) differed significantly on household size, available labour and annual agricultural income, with wealthier households being largely male-headed and better endowed with people, labour and income (Table 4.1). On average, in 2001-02 households earned Tzs 139,077 from agriculture, with significant differences by wealth and gender. Female-headed households had significantly lower annual agricultural incomes than male-headed households: Tsh 41,066 compared with Tsh 155,614⁴ ($P \leq .01$ for t test). Average annual earnings from crops amounted to Tsh 106,182 and Tsh 79,156 from livestock.

Table 4.1: Household differentiation by wealth on selected socio-economic characteristics, Soni

	Above average (n=21)	Average (n=51)	Poor (n=8)	Overall average	Probability
Household size	7.1	5.9	4.4	6.1	0.02*
Percentage headed by women	10	24	25	20	0.37
Adult equivalent workers	3.9	2.8	2.1	3.0	0.00*
Annual agricultural income (Tsh) (2001-2002)	235,914	105,204	88,125	139,077	0.00*
Own livestock (percent)	100	96	88	96	0.28
Owens a radio (percent)	81	59	50	64	0.14

* *Statistics from ANOVA; the rest from *chi* square

Average annual income from agriculture was Tsh. 139,077. A recent household budget survey in Tanzania estimated mean annual income for rural households at Tsh. 169,608, with 60% generated by agricultural activities (United Republic of Tanzania, 2001). Most farmers had their highest income between July and November, when they sell produce from the long rains. Generally, incomes were depressed between March and June when crops are in the field.

Only a quarter of female respondents had off-farm sources of income, compared with 56% of men. Women were involved in a limited number of income generating activities (Appendix Table 10), with petty trade and baking providing the highest income. The most common and lucrative income generating activities for men were business and casual labour. Petty trade was more important for men in Shashui, whereas salaried employment was a principal source of income for men in Vuga. On average, men were involved in 1.4 off-farm activities compared with 1.2 for women, with no significant difference in the number of activities by wealth.

The majority of farmers (75% of men and 78% of women) saved money, but for the most part, irregularly. Most (74% of men and 66% of women) saved less than 5 times a year. Amount saved did not differ significantly by wealth among both men and women, but on average, per saving period, men saved significantly more money than women: Tsh 11,642 compared to Tsh 2,137 ($P \leq 0.001$ for t test). Fifty-five per cent of men borrowed money in 2000 compared to a third of women. The main sources of borrowed money were relatives and friends, but a minority of women got loans from informal credit and savings groups, while a few men obtained loans from formal institutions such as NGOs and churches (Appendix Table 11). Survey respondents mainly used borrowed money to purchase non-food household necessities, food, pay for medical and school related expenses, invest in business (mainly men) and purchase agricultural inputs (mainly men).

Farmers' coping strategies in emergency situations included borrowing money, selling livestock, working as hired labour, borrowing or buying food, and more rarely, selling crops, land or property (Table 4.2). Differences in men's and women's coping strategies corresponded to gender differences in spheres of control over property such as livestock and land.

Table 4.2: Emergency coping strategies, Soni (per cent)

Strategy	Need money for school fees		Need money for health expenses		Food shortage		Crop failure	
	Women	Men	Women	Men	Women	Men	Women	Men
Borrow money from friends or relatives	31	26	62	53	23	26	17	20
Sell livestock	28	29	17	27	19	17	16	20
Work as hired labour	13	15	7	9	18	17	23	24
Sell crop	14	8	4	4	0	1	4	1
Sell land or property	9	13	2	1	2	1	1	2
Borrow food from shop, relative or friend	0	0	0	0	20	26	18	9
Buy food	0	0	0	0	14	9	14	16
Other	6	7	8	4	4	3	6	9

Farmers' investment aspirations

Men and women had similar broad areas of investment interests, but different priorities (Appendix Table 12). Women's emphasis was on livestock, housing, clothes and business, whereas men's priorities were housing, agricultural inputs (seed, fertilizer, pesticide), livestock and business - in that order. Improving food security, an area emphasized more by women, received relatively low priority. Business interests centred around retail shops and petty trade of crops (mainly women). Investment scores showed that wealthier women had a strong interest in using extra income for school fees, whereas poor women put more emphasis on improving food security (Table 4.3). Aside from poor men's strong interest in buying clothes, there were no wealth-related differences in men's investment scores.

Table 4.3: Investment priority scores by wealth status and gender, Soni (men n=83; women n=113)

	Wealth rank					
	Above average		Average		Poor	
	M	W	M	W	M	W
Save	0.53	1.00	0.72	0.72	0.50	1.00
Business	0.84	1.29	1.18	0.84	1.33	0.29
House improvement	2.11	1.10	2.0	1.74	2.50	0.71
Livestock	1.26	1.90	1.26	1.72	1.67	0.71
Land	1.63	1.05	1.10	1.08	1.17	1.00
Better food	0.42	0.38	0.41	0.42	0.67	1.57
More food	0.42	0.78	0.77	0.90	1.17	1.86
Agricultural inputs	1.74	0.52	1.23	0.48	1.50	0.86
Clothes	0.37	0.81	0.31	1.10	1.00	2.00
School fees	1.00	1.33	0.90	0.54	0.50	0.86
Other	0.21	0	0.23	0.04	0	0

Agricultural production

Crops

Farmers in Soni grew over 20 crops, including annual and horticultural crops as well as fruits (Table 4.4). Minor crops included onions, lettuce/Swiss chard, peaches, sweet sop, snap beans, peas, cauliflower and eggplant. To some extent, farmers specialized in growing certain crops for food and others for sale. Crops mainly grown for home consumption include maize, the main staple, cassava, cocoyam, arrowroot and papaya. Farmers relied on coffee, sweet pepper, tomatoes, passion fruit, carrots and cucumber for income. Other crops such as beans, cooking banana, sweet potato, potato and avocados were grown for both household and cash purposes. Tomatoes (36%), sweet pepper (20%), beans (15%) and coffee (12%) were the top income earners.

Table 4.4: Major crops grown and their uses, Soni (percent)

	Percent of sample (N=83)	Purpose			
		Home consumption only	Home consumption mainly	Home consumption and sale	Sale mainly
Maize	100	76	2	22	0
Beans	100	5	4	91	0
Cooking bananas	98	37	5	55	3
Cassava	96	54	5	31	0
Sweet potato	89	45	3	52	0
Sweet pepper	82	0	0	3	97
Cocoyam/arrow root	80	61	0	39	0
Coffee	80	0	0	2	98
Sugar cane	78	19	0	40	41
Tomato	76	0	0	3	97
Cabbage	75	0	0	8	92
Passion fruit	70	2	3	5	90
Potato	63	31	2	63	4
Carrots	61	0	0	2	98
Avocado	52	9	2	60	29
Papaya	43	56	6	38	0
Green leafy vegetables	42	23	12	15	50
Cucumber	40	0	0	0	100

Although most households grew crops on common plots worked on by all family members, 10 of the 65 married couples grew crops on personal plots. Cultivation of personal plots was not associated with polygamy, as 6 of the 10 households with personal plots were involved in monogamous marriages. With the exception of maize (n=5), mainly crops with high market value were grown on personal plots- namely, beans (n=9), tomatoes (n=6), potatoes (n=4), sweet potatoes (n=4), cabbage (n=4) and sweet pepper (n=4).

Multiplication rates for key crops ranged from low for food crops to high for horticultural crops grown for the market (Table 4.5). Notably, in the first season of 2001, only 3% of maize growers sold maize, in contrast with 64% of bean producers. On average, farmers sold about half or more of their maize and bean harvests, but sold all or nearly all tomatoes and sweet pepper produced.

Table 4.5: Production of some principal crops in first season of 2001 (kg), Soni

	Maize (n=68)	Beans (n=61)	Tomatoes (n=50)	Sweet pepper (n=52)
Amount planted	17 (3-60)	23 (3-80)	0.1 (0.01-0.5)	4.6 (0.1-120)
Amount harvested	265 (36-1200)	105 (2-400)	1051 (5-5000)	333 (20-3200)
Amount sold	300*	77 (4-300)	1072 (40-5000)	333 (20-3200)

Note: Only 2 farmers sold maize

The level of varietal diversity at community level was high for the main crops with the exception of sweet pepper, a cash crop (Table 4.6). However, at household level, varietal diversity was relatively low. Farmers in Soni were moderately or highly responsive to new maize and bean varieties. Commonly adopted maize varieties include Red maize (46%), Katumani (43%), Ilonga (33%) and Kilima (25%); most households had adopted these varieties prior to 1996. There was no clear pattern of differences in adoption rates for maize varieties between project and non-project villages. Lyamungu 85 and 90 bean varieties, introduced in the late 1980s or early 1990s, were grown by 77% of households, but only 2% of households grew other introduced bean varieties (i.e. Selian and Jesca). Notably, a significantly higher proportion of bean growing households in Shashui grew Lyamungu 85/90 (94%) compared with Vuga (47%).

Table 4.6: Number of varieties grown of some major crops and names of introduced varieties, Soni

	Maize (n=83)	Beans (n=83)	Tomato (n=63)	Sweet pepper (n=69)
Total number of varieties grown	8	12	7	3
Mean number of varieties grown	1.8	3.1	1.6	1.2
Introduced varieties	Red maize Katumani Ilonga Kilima Hybrid F1 H632 Et al	Lyamungu 85/90 Selian 94 Jesca	Dumudumu/ Kigongo Kitaruma	Yellow wonder A and B California

Livestock

Nearly all households in Soni (95%), irrespective of wealth status, owned livestock, mainly chickens, cattle, goats and sheep (Appendix Table 13). However, all households in Shashui owned livestock compared with 87% of households in Vuga. Mainly men owned cattle, sheep and goats, while women and children owned chickens. Farmers kept cattle for income generation (milk and meat) and manure: dairy farming, an activity promoted by a German project in the early 1990s, was an important activity mainly for men. Goats were kept as an asset (44%), while sheep were both an asset and source of manure (33%).

Input use and seed sources

Reflecting the prevalence of hybrid maize, vegetable and coffee production in Soni, the vast majority of surveyed farmers used manure, fungicide, insecticide and chemical fertilizer (Appendix Table 14). Farmers

were moderately experienced in the use of fungicides, having used them for an average of 4 years on tomatoes (91%), sweet pepper (72%), coffee (40%) and cucumber (28%). Farmers applied insecticide to tomatoes (87%), sweet pepper (58%), cabbage (47%) and coffee (45%).

In the long rains of 2002, most farmers sowed home saved seed of the major crops (Table 4.7). Although some farmers saved seed of tomatoes and sweet pepper, a significant proportion - the majority in the case of sweet pepper- purchased seed from stockists. Despite the prevalence of hybrid maize, most maize farmers recycled their seed; only 19% purchased certified maize seed. Notably, however, a relatively high proportion of bean farmers obtained seed from local commercial sources. Informal seed exchange and purchases from other farmers were an insignificant source of seed for any crop.

Table 4.7: Seed sources, 2002 long rains, Soni (per cent)

	Maize (n=74)	Beans (n=82)	Tomato (n=19)	Sweet pepper (n=20)
Own stock	76	67	68	20
Markets/shops	11	40	5	10
Stockists	19	1	37	75
Purchased from other farmers	1	0	0	0
Borrowed/exchange/gifts	1	0	0	0

Note: Totals exceed 100% due to multiple sources

Marketing of crop and livestock produce

Most food and horticultural produce was sold to outside markets through local traders; more rarely, long distance traders came to the area to purchase vegetables, beans and bananas (Table 4.8). Cooperatives, farmer associations and a purchasing company were the main buyers of coffee. A local market existed for bananas.

Table 4.8: Buyers of agricultural produce, Soni (per cent)

	Beans	Banana	Cabbage	Tomato	Sweet pepper	Coffee
Farmers	6	30	2	0	2	0
Local traders	90	67	84	82	81	9
Long distance traders	4	3	14	18	17	0
Farmer associations	0	0	0	0	0	14
Cooperatives	0	0	0	0	0	68

A third of livestock owners sold livestock products, mainly milk and eggs. Two farmers sold manure. A quarter of cattle keepers sold milk, mainly to other farmers and local traders. Most milk was sold on farm or in local markets. Ten farmers sold eggs, mainly to other farmers.

Virtually all farmers (97%) reported marketing problems for crops. For all crops, farmers identified two related marketing constraints: low price and lack of markets (Table 4.9). A high proportion of farmers complained about low prices for coffee, bananas and beans. As Table 4.10 shows, prices of the key crops fluctuated seasonally but were low for all crops. Other less important marketing constraints identified by farmers include lack of information on buyers, lack of transport and storage facilities, which results in the fast spoilage of perishable horticultural crops.

Table 4.9: Marketing constraints of major crops, Soni (per cent)

	Beans	Bananas	Cabbage	Tomato	Sweet pepper	Coffee
Low price	58	63	38	32	38	68
Lack of market	23	16	27	24	26	13
Lack of information on buyers	2	0	6	8	7	8
Lack of transport	8	9	8	7	8	6
Poor quality of produce	0	0	0	4	0	1
Storage loss	3	0	7	7	8	0
Lack of storage facilities	6	2	8	11	7	2
Fast spoilage	1	9	6	7	6	0

Table 4.10: Prices of major crops at different times of the year, Soni

Crop	Season	Price (Tsh/kg)
Tomato	June-October	150
	October-January (short rains)	250-300
Cabbage	June-September	50
Carrots	Feb-May (long rains)	100
	June-September	100-150
Sweet pepper	May-September	100
	October-January (short rains)	250
Beans	February-May (long rains)	200

Land management

All farmers (99%) sought to improve soil fertility in the mountainous conditions of the Usambaras by using manure (97%), incorporating crop residues (95%), chemical fertilizer (52%), planting agroforestry trees (52%), crop rotation (32%) or terracing (32%). Possibly as a reflection of the success of conservation programs, only 12% of respondents perceived erosion as a serious problem.

Food security

Maize is the most important staple food in Lushoto District and is eaten as a stiff porridge (*ugali*) typically accompanied by beans and other sauces. Secondary staples include rice and potatoes. The hungry period extends from July to November, during the short rains, which tend to be unpredictable. During that period, households did not significantly cut down consumption, eating an average of 2.3 meals, with no difference by household wealth status (Appendix Table 16). As the staple crops of maize and beans lasted for an average of 5.8 and 3.7 months respectively, a high proportion of surveyed households experienced shortages of maize and beans (Table 4.11) primarily as a result of drought (Table 4.12). Bean, but not maize, harvests lasted significantly longer among better off households, possibly due to the more diversified diet enjoyed by this group. Given the dietary importance of maize and beans and the commercialized economy, most farmers buy these commodities when they run out of them. Notably, because farmers in Soni grow cash crops, few attributed food shortages to crop sale.

Table 4.11: Percentage of households that experienced shortages of major foods and strategies to alleviate shortages, Soni

	Experience shortages	Strategies to alleviate shortage	
Maize	87	Buys	73
		Eats other foods	25
		Work for food	2
Beans	92	Buys	75
		Eats other foods	24
		Works for food	1

Table 4.12: Reasons for food shortages, Soni (per cent)

	Maize (n=72)	Beans (n=76)
Drought	57	52
Scarcity of land	11	9
Storage problems	3	1
Low yields/sell harvest	2	4
Low soil fertility	9	5
Other	19	22

Development activities

All surveyed households in Shashui had been involved with TIP in a range of activities including terrace construction (98%), digging irrigation canals (98%) collecting stones for building the reservoir (85%), collecting forest soil for tree planting (77%), planting trees (21%), maintaining irrigation canals (23%) and attending training seminars (15%). On average, surveyed households had worked with TIP for 7.8 years.

Farmers in Soni were relatively optimistic about their ability to influence their local situation, with about half of surveyed respondents reporting some level of influence (Appendix Table 17). There was little difference in men's and women's views on this issue. Perhaps reflecting their relatively high level of prosperity, over half of men and women respondents wanted their children to follow their footsteps and become small-scale farmers (Appendix Table 18).

Conflict, collective action and social capital

The vast majority of farmers, both men and women, felt that their community was peaceful (Appendix Table 19). As further evidence of the relatively high degree of social harmony, and perhaps reflecting the prevailing Islamic culture, the majority of men (70%) and women (64%) felt that there had been no change in the incidence of theft in the past 10 years. Respondents perceived several factors as responsible for social divisions, namely, wealth, education and land size (Appendix Table 20). The majority of respondents felt that the level of participation in their community was moderate to high (Appendix Table 21). A higher proportion of men than women, particularly from Shashui, were involved in collective action in 2001-02 (Table 4.13). While men were more likely than women to be involved in mediating family disputes and transporting the sick to hospital, both sexes were involved in activities related to burials, communal work generally and irrigation.

Table 4.13: Involvement in collective action in 2001-2002, Soni (per cent)

	Men (n=35)	Women (n=30)
Percent involved	52	39
Type of problem		
Burials	49	60
Communal work	49	40
Family disputes	17	7
Distillation of irrigation canal	17	13
Transport of sick to hospital	20	10
Construction related to irrigation	11	10
Other	37	23

Most households (81%) belonged to a local group. Aside from the land conservation groups created by TIP, all groups were indigenous. Respondents belonged to 6 categories of groups (Table 4.14). While membership in burial groups was widespread, relatively few households belonged to other types of groups. On average, 1.2 household members belonged to a group, with no significant difference between the two villages. Wealthier households had a significantly higher number of members belonging to groups: 2.2 compared to 1.4 for poor households (F statistic=3.70, 62 df; $P \leq 0.03$). Membership in groups was generally mixed, with the exception of credit and savings groups and sewing groups that had exclusively female membership, and land conservation groups and communal work groups, which were dominated by men. A higher proportion of women (49%) compared to men (27%) belonged to groups.

Table 4.14: Household membership in local groups by gender, Soni (per cent)

	% of households (n=67)	Men alone	Women alone	Both
Burial group	94	3	62	35
Communal work/digging group	12	63	13	25
Religious group	9	17	33	50
Soil/land conservation	5	67	33	0
Income generating group	3	50	50	0
Sewing group	2	0	100	0
Credit/savings	2	0	100	0

Farmers carefully select those with whom they shared information, following a geographically spatially pattern, starting with relatives and friends in the same village, members of the same group and relatives and friends in other villages (Table 4.15). There was little difference between men's and women's diffusion patterns.

Table 4.15: Diffusion of new technologies and knowledge, Soni (per cent)

	Men (n=67)			Women (n=81)		
	Seed	Knowledge	Tools	Seed	Knowledge	Tools
Relative, same village	90	85	81	90	89	77
Friend, same village	85	82	73	40	78	73
Relative, other village	43	55	24	82	42	20
Friend, other village	43	48	27	37	42	24
Member of same group	79	82	75	59	61	55
Anyone	9	15	2	9	12	0

Marital conflict and decision-making

About a quarter of husbands (23%) and wives (28%) reported having marital conflicts, but significantly, they perceived areas on which they disagreed very differently (Table 4.16). According to husbands, marital discord mainly centred on wives' failure to work and unfaithfulness. Wives complained about three related issues: male drinking, staying out late and domestic violence.

Table 4.16: Areas of marital conflict as reported by husbands and wives, Soni (per cent)

	Husbands (n=14)	Wives (n=18)
Drunkenness	0	24
Coming home late	0	28
Doesn't provide money for household necessities	0	8
Domestic violence	0	24
Unfaithfulness	25	0
Failure to do assigned work	40	0
Other	35	16

Conjugal decision-making followed three common patterns: decisions are taken unilaterally by the husband, the husband consults the wife and the couple discusses the issue and decides together. In rare cases, mainly involving the adoption and sale of food crops such as beans and the use of family planning, wives make decisions on their own or in consultation with husbands (Table 4.17). In 25-30% of households, decisions regarding crop sales and varietal adoption were made jointly by husbands and wives. However, in a significant number of households, men unilaterally made decisions involving cash crop sales and use of large amounts of money (Table 4.18). Women were more likely to make decisions about the use of small amounts of money from both food and cash crops. In the majority of households, family planning and school-related decisions were made jointly by husbands and wives. A high proportion of couples disagreed about who made financial decisions and on the decision to adopt new sweet pepper and bean varieties. There was moderate disagreement on sale of cash crops such as sweet pepper (29%) and tomato (25%) but high disagreement on bean sales (41%) - perhaps because some women played down their role in making decisions about this food crop. Most couples agreed on how they made family planning and school-related decisions.

Table 4.17: Decision-making patterns on key issues as perceived by husbands and wives and extent of disagreement, Soni (per cent)

	Man alone		Woman alone		Man consults woman		Woman consults man		Both discuss and decide together		% disagreement
	M	W	M	W	M	W	M	W	M	W	
Amount of beans to sell	23	23	11	5	17	11	19	28	25	28	41
Amount of sweet pepper to sell	36	24	0	0	36	34	2	3	24	36	29
Amount of tomatoes to sell	33	29	0	0	36	34	0	3	28	31	25
Adoption of new bean varieties	28	15	6	11	14	11	12	23	35	35	49
Adoption of new sweet pepper varieties	37	32	0	0	32	29	0	2	27	35	43
Adoption of new tomato variety	41	31	0	2	24	31	0	3	31	29	34
Family planning	7	10	0	3	3	0	2	5	89	82	21
Sending children to school	13	16	0	0	8	6	0	2	79	76	25

Table 4.18: Decision-making patterns on use of crop income as perceived by husbands and wives and extent of disagreement, Soni (per cent)

	Man alone		Woman alone		Man consults woman		Woman consults man		Both discuss and decide together		% disagreement
	M	W	M	W	M	W	M	W	M	W	
Small earnings from beans	15	18	29	19	8	6	16	29	26	22	49
Large earnings from beans	24	24	13	8	10	6	6	18	29	30	51
Small earnings from sweet pepper	23	27	20	19	21	23	2	2	30	24	45
Large earnings from sweet pepper	42	40	0	2	0	24	2	0	27	27	43
Small earnings from tomatoes	26	36	9	14	26	19	2	3	30	21	47
Large earnings from tomatoes	40	48	0	3	26	16	0	2	29	24	47

5. ACROSS-SITE COMPARISON AND RECOMMENDATIONS

The picture that emerges from the three sites is one of varying levels of poverty across and within sites, when poverty is measured by factors such as income, ownership of assets, access to resources (credit, land, etc.) and vulnerability. Of the three sites, farmers in Soni (Tanzania) were relatively better off, enjoying the highest annual agricultural income (\$149). Poverty was most acute in Linthipe (Malawi), while Rubaya (Uganda) represents a situation of moderate poverty. The following section analyzes poverty within and across the three study communities in the context of four dimensions: agricultural production, livelihood activities, ownership of assets and vulnerability.

Agricultural production and livelihood activities

In all three sites, agriculture was the predominant economic activity. Farmers in Soni had the most diverse portfolio of crops, including at least 7 crops grown exclusively for sale. By contrast, in Rubaya and Linthipe, farmers grew some crops mainly for subsistence, many for both consumption and sale, and only relied on one or two crops exclusively for sale. In these two sites, however, there was evidence of diversification of cash crops: soybean, potatoes and paprika in Linthipe and coffee, wheat and pyrethrum in Rubaya. Additionally, in Linthipe, there was evidence of food crop diversification, away from the traditional dependence on maize to increased production of cassava and sweet potato. As this and other studies (David, 1999) show, the absence of traditional cash crops contributes to food insecurity, with farmers falling into a cycle of selling large parts of their food crop harvests when prices are low and buying those same foods when prices are high. Significantly, although farmers in Soni bought maize and beans when they experienced food shortages, unlike farmers in the other two sites, they did not attribute shortages to food crop sales.

Crop productivity was generally low due to soil infertility (Linthipe and Rubaya especially), diseases and pests, low input use (Linthipe and Rubaya) and adverse climatic conditions. Although the study did not directly investigate the extent to which new agricultural technologies contributed to shaping the asset base of rural households, the level of technology adoption gives some indication of the contribution of agricultural research to poverty alleviation. The study investigated the uptake of crop varieties and land management technologies. On the whole, the adoption of introduced crop varieties in the study sites was moderate to high, but yield estimates for some crops such as potatoes and maize suggest that farmers had not benefited fully from the yield advantages of introduced varieties because of their failure or inability to carry out good agronomic practices (e.g. fertilizer use, fungicide use on potatoes, good seed selection, planting “clean” seed). In addition, in areas where NGOs were involved in seed dissemination, the low adoption of some bean varieties (climbing beans in Rubaya, beans in Linthipe) was unexpected. One possible explanation may be related to the practice of one-time seed dissemination by NGOs and farmers’ difficulties in retaining seed of new varieties (David and Sperling, 1999), especially in communities where informal social networks are weak. Overall, study results across sites did not show consistently higher adoption of new crop varieties in project villages, although this was the case with some varieties.

Uptake of land management technologies provides insight into the types of support farmers and communities need to facilitate technology adoption. As the Linthipe data suggests, CU’s input in terms of training and follow-up was largely responsible for the high adoption of land management technologies. The significant increase in the digging of trenches in Rubaya in the early days of the BAPPA project highlights two basic ingredients needed for effective NRM and community development generally: organization and means. Prior to 2001, few households in Rubaya had dug trenches to control erosion and reclaim gullies, despite farmers’ awareness of the technology. The BAPPA project organized farmers into groups to dig trenches across plots belonging to several households and provided digging tools. This intervention subsequently led village leaders to establish by-laws requiring all households to dig trenches.

The study highlights several important issues pertaining to the role of women in agriculture. Although the study does not quantify male and female labour, qualitative information on daily activity schedules and the gender division of labour confirms that women provide a disproportionate amount of labour in farming. Moreover, the high numbers of female headed households, both *de facto* and *de jure*, in all sites, is further evidence of the feminisation of agriculture in the study communities. However, the factors contributing to this phenomenon vary between communities: in Rubaya many women head households due to male migration, while the reason for the high number of unmarried women in Dedza is unclear, but may be due to high male mortality caused by HIV/AIDS. As the study shows, in all study communities, female-headed households formed a disproportionate number of the poorest group.

Despite women's predominant role in agriculture, they remain disadvantaged in terms of decision-making and control over agricultural income. The study did not investigate married women's access to productive resources such as land and labour but shows that female-headed households have least access to productive resources. In all sites, farming is usually done on household plots, and while analysis of conjugal decision making data was problematic, the findings across sites suggest that married women rarely make agricultural or personal decisions on their own. On the whole, however, women do tend to have greater control over smaller amounts of income. Cultivation on personal plots, which allows married women more economic freedom, was only found in Soni, the most market oriented location. Male dominant decision-making patterns were responsible for marital conflict in all study communities. The implications of these findings on intra-household resource allocation, which need more detailed investigation using qualitative research methods, are disturbing and need to be taken with other evidence that shows an association between higher female income and input in decision-making and improved household nutrition and well-being (Quisumbing et al., 1995).

A major factor preventing farmers in the study communities from benefiting fully from improved productivity was the combination of low prices and limited market outlets. This problem is associated with multiple factors including lack of crop diversification, poor quality of produce, farmers' lack of pricing information and low bargaining power, the low volumes sold by individual farmers and the high volume of trade with middlemen. Farmer marketing groups were non-existent in all communities.

In all sites, the combination of low agricultural productivity and limited market opportunities has increased household dependence on non-farm activities. The high proportion of Linthipe farmers that were involved in non-farm activities, for example, is a reflection of poor agricultural performance and chronic food insecurity in Malawi due to drought, low soil fertility and the inability of most households to achieve self-sufficiency in maize. Farmers' attempts to minimize risk by opting for a dualistic strategy of intensifying agricultural production while seeking off-farm employment as a short term survival strategy is clearly evident in their investment priorities. Farmers in Linthipe and Soni attached a high premium to purchasing chemical fertilizer, while farmers in all three sites showed strong interest in business.

While non-farm activities offer a potential pathway out of poverty for rural African households (Ellis et al, 2002: 17), the types of opportunities available to farmers are limited, and some may even contribute to low agricultural performance. Four areas of off-farm income generating activities were common to the three sites: casual labour, petty trade, brewing and salaried employment. A recent study in Malawi (McDonagh, 2002) shows that, while casual labour is an effective survival strategy, it forces many farmers, the poor in particular, to neglect their own fields at key periods during the farming season. The study concludes that the overall effect of casual labour on farm-based livelihoods is negative. Due to high start-up costs and limited credit opportunities, relatively few farmers in the three communities were involved in remunerative self-employment activities, such as maize milling, carpentry and poultry that could serve as pathways out of poverty. Indeed, farmers' investment aspirations highlight the need to expose farmers to new business ideas.

Because of women's higher labour contribution to farming and household reproduction, across sites, men were more likely than women to engage in income generating activities and had a more diverse portfolio of activities, including more skilled activities such as salaried employment. Male migration for casual employment was only found in Rubaya, an area of low male involvement in agriculture. Aside from petty trade, women tended to engage in relatively low paying activities such as casual labour, brewing and handicraft production, which complement their farming and domestic activities. Efforts to diversify women's income generating activities must consider their heavy workloads, limited mobility and tendency by some husbands to appropriate women's earnings. Working through women's groups is often an effective strategy for avoiding the latter problem, but problems in group-based income generating efforts should not be underestimated.

Asset ownership

The key assets of rural African households are land, livestock, labour, educational attainment, implements and tools, and networks that increase trust, ability to work together, access to opportunities and informal safety nets. Access to enough productive land for crop cultivation and livestock rearing is crucial for the ability of rural households to generate a viable living. It is well established that in most parts of rural Africa, poor households have smaller land holdings and farm the least productive land. In Rubaya, there was evidence that the poorest households had least access to land in the wetlands, the most suitable land production for vegetable production. In Linthipe, better off farmers cultivated significantly larger land holdings in both the uplands and *dambos*.

Ownership of agricultural tools and use of agricultural inputs are also associated with improved well-being, as they enhance agricultural productivity and the latter in turn permits further investment in inputs. Farmers' inability to dig trenches in Rubaya due to lack of appropriate tools illustrates the association between ownership of agricultural tools and poverty. The relatively high use of inputs by farmers in Soni, together with access to irrigation, is one factor responsible for successful cash crop production that in turn permits reinvestment in inputs. The high importance farmers attach to investing in inputs was noted earlier.

In all sites, wealth was strongly correlated with livestock ownership. However, because an important aspect of livestock lies in substitution of lower value livestock (e.g. chickens, small ruminants) for higher value livestock (cattle, pigs, donkeys), the type and number of livestock owned is key to achieving rising assets over time. While most surveyed households owned chickens, only the wealthiest households owned cattle, pigs or donkeys. In Soni, a third or more of livestock owners kept cattle and small ruminants, whereas in Rubaya and Linthipe few households owned cattle. In those two sites, aside from chickens, most households owned, on average, 2-3 goats or sheep, not enough to make a significant contribution to poverty alleviation. Not surprisingly, farmers in Rubaya and Soni attached high importance to livestock as an investment priority. Livestock received lower priority in Linthipe because of the high risk associated with theft. Another point of importance was the consistently higher ownership of livestock in project villages than in non-project villages, even by this early stage in project activities, which suggests a need for development assistance in kind.

Survey data confirms that the amount of available household labour contributes to household well-being. Households in Soni had the highest number of productive workers, and notably in Rubaya and Soni, but not Linthipe, wealthier households had a significantly higher number of productive workers. Rubaya had the lowest number of productive workers due to the high number of men and women engaged part time in agriculture. The lack of correlation between wealth and household labour in Linthipe may be related to another recent study that showed, with the exception of livestock holding, few significant differences in the asset profiles (defined as household size, educational attainment, ownership of tools, land and livestock) of different income groups in Malawi (Ellis et al, 2002).

At community level, Soni had the highest proportion of formally educated farmers, both male and female, while farmers in Linthipe were the least educated. Tanzania during President Nyerere's time was known for its emphasis on education and self-reliance and, unlike Uganda, has enjoyed stable government. At household level, however, a correlation between wealth and educational level was only found among men in Linthipe. Educational attainment contributes to poverty alleviation through various direct and indirect mechanisms, an area not explored in this study.

Significant differences existed between study communities in terms of membership in indigenous groups, with Rubaya having the highest number of groups and proportion of households belonging to groups. Soni had the next highest number of local groups and number of households belonging to groups, while there were few indigenous groups in Linthipe. Across sites, group membership per household was not significantly different between project and non-project villages, even in Linthipe and Soni, where many groups were initiated by NGOs. Neither was involvement in collective action or community related activities higher in project compared to non-project villages. Local groups played various functions including providing informal safety nets for burial assistance, transportation to hospital, facilitating credit, savings and the exchange of new technologies and information, providing services such as labour exchange, and generally strengthening social cohesion among kin-based groups. Despite the importance of local social networks for farmers' coping and survival strategies, there was little evidence that they play a central role in poverty alleviation.

Wealthier households in Rubaya and Soni had more members involved in groups, presumably because of their larger size and better access to resources (e.g. time, money and skills). Surprisingly, with the exception of Soni, there was little difference in the proportion of men and women belonging to groups. In Rubaya, women were more likely than men to join groups which improve their access to resources. In Linthipe, where social networks were weak, but also in Soni, government and NGOs created groups to carry out development activities. The basis on which these groups were formed, and the consequent implications for their sustainability after the end of development projects, is an issue of concern and require further investigation.

Vulnerability

Rural households in the three study sites and throughout Africa are subject to trends, shocks and seasonality in health, prices, agricultural production, employment opportunities and resource availability, factors that are outside their control. Ill health, particularly malaria and HIV/AIDS, was an important shock not investigated by the study. The study did not find any evidence of child-headed households, a recent phenomenon related to the AIDS epidemic. As noted by a recent study in Malawi and Tanzania, rural households are unable to plan ahead and therefore cope with illnesses with short-term survival strategies, resulting in losses in net welfare, cash and capacity that weaken the capacity of households to generate work (Koestle, 2002). Across sites, drought, crop failure, food shortages, insufficient capital, low prices and lack of markets were common shocks. In a number of instances, farmers showed great innovation, often without external assistance, in tackling major shocks. For example, in Rubaya, farmers responded to the devastating effects of bean root rots by spontaneously adopting more tolerant climbing beans obtained from neighbouring districts or countries. In line with government policy to combat the effects of drought, farmers in Linthipe had diversified their food crops and were growing more drought tolerant crops such as cassava. Farmers' response to drought in other sites was not clear. Crop diversification was a general response to vulnerability observed in all three sites but was most successful in Soni due to several factors including favourable climatic conditions and strong institutional support for horticultural production dating back to the late 1960s (pers comm., R. Kirkby).

Coping strategies were similar across sites, with most households reducing the number of meals eaten during the "hungry season", borrowing money from friends and relatives, working for food or money and

borrowing or buying food. To cover educational and health expenses, farmers were often forced to sell crops, land or livestock, contributing to the cycle of poverty. Local groups played an important safety net role by providing credit only in Rubaya, but farmers everywhere showed a stronger tendency to seek assistance from friends.

Vulnerability may be exacerbated at community level by a high level of social division that prevents communities from engaging in collective action to address common problems. The major social divisions identified in the study communities were asset related (access to land, including wetlands, wealth, ownership of livestock, educational attainment). Interestingly, a high proportion of farmers in Linthipe and Rubaya, the poorest communities, perceived an increase in the level of theft, suggesting an association between poverty, theft and social divisions.

Although Rubaya was the only site where survey respondents highlighted poor relations between men and women as a social problem, the study consistently documents women's disadvantaged position and greater poverty in the three communities. Generally, women were less educated, saved and borrowed smaller amounts of money compared with men, had less decision making powers than men and owned fewer productive assets (livestock, land).

Women had heavier workloads than men, largely due to their domestic responsibilities - but in the case of Rubaya, also as a result of male migration and men's lower input in agriculture generally. Surprisingly, the study did not reveal strong educational discrimination against girls, possibly because most children in surveyed households were in primary school where girls face less discrimination. Still, this finding represents an important advance in the education of girls. The challenge for most African countries is how to keep girls in school at the higher levels of primary school and in secondary school and to improve their performance.

Across sites, women complained of similar marital problems: conflicts over money and decision-making, failure of men to work and provide for their families, drinking and domestic violence. Marital problems shared by men in the three communities include conflict over money and decision-making, and wives' disobedience.

Even though this study presents a rather dismal snapshot view of the three communities, farmers in all sites, but especially in Soni where living standards were better, were relatively optimistic about the future, with half or more wanting their children to become small-scale farmers. As other studies have proposed, the key to developing pathways out of poverty in rural Africa "is a cumulative process that requires the ability to build assets and diversity across farm and non-farm activities" (Ellis et al., 2002). Farmers in the BAPPA project sites, working together with development partners, have started this process. The BAPPA project, an unusually close partnership between an agricultural research institution and NGOs, can build on progress made and make unique contributions to understanding poverty alleviation. Based on the study's findings, some specific recommendations for project interventions that complement on-going activities include:

- Developing creative, workable mechanisms for credit and identifying partners who can manage credit programs that cater for the needs of both men and women of different wealth categories;
- Assisting men and women farmers to build assets, particularly livestock holdings;
- Training farmers in the identification of market opportunities and working with them to carry out diverse non-farm economic activities;
- Organizing farmers into producer associations for both food (for input supply) and cash crops;
- Improving farmer access to agricultural inputs through credit and more creative programs;
- Strengthening farmers' capacity to form and manage groups based on a sound understanding of social ties and existing groups, and developing conflict resolution skills at group and local leadership level;
- Identifying partners that can improve farmers' literacy levels;
- Developing sustainable technology dissemination mechanisms;
- Redressing gender inequalities in work load, decision making and income levels through awareness raising among adults and children, introducing labour saving technologies for women and diversifying women's non-farm economic activities.

APPENDICES

Appendix Table 1

Wealth indicators identified by farmers in Rubaya and proportion of representation in the total population (n=169)

	Wealthy (5%)	Average (38%)	Poor (55%)	Very poor (2%)
Food security	Produces enough food for food and sale: e.g. 8 bags of beans and 5 bags of potatoes	Produces enough food for subsistence	Does not produce enough food for subsistence	Does not produce enough food for subsistence
Roofing material	Iron sheets	Iron sheets	Grass	Grass
Livestock	6 indigenous animals on average	2-4 goats	None	None
Assets owned	Bicycle, radio	Radio, foam mattress	None	None
School attendance of children	All children go to school	Some children attend school due to Universal Primary Education, but attendance may be irregular due to lack of school materials	Some children not in school	Some children not in school
Other		An average 6 plots of land for cereal crops	Works as hired labour; has only one plot of land, rents land on “shared harvest” basis	Very old (70+) or disabled

Cropping calendar, Rubaya

Month	Task	Crops
January**	Planting	Sorghum
	Harvesting	Millet, beans, maize, peas
February**	Planting	Sorghum
	Harvesting	Millet, maize, peas
March**	Weeding	Sorghum
	Planting	S. potatoes, beans, peas
	Harvesting	Peas
April**	Planting	Peas, potatoes, beans, bananas
May*	Planting	Potatoes, beans, s.potatoes
June*	Land preparation	Millet
	Planting	Potatoes
July*	Planting	Cabbage, potatoes in reclaimed valleys
	Weeding	Potatoes and cabbage
	Harvesting	Sorghum, peas, beans, s.potatoes
August**	Weeding	Potatoes and cabbage
	Harvesting	Sorghum, peas, beans, potatoes
September**	Planting	S.potatoes, millet, maize
	Harvesting	Potatoes, bananas
October**	Land preparation	Peas, millet, maize
	Planting	Peas, millet, s.potatoes, beans
November**	Land preparation	S.potatoes, bananas
	Planting	S.potatoes, beans, maize, sorghum
December	Planting	Sorghum
	Harvesting	Beans, s.potatoes
	Weeding	Millet

Source: AHI, 1998

** Peak labour periods, * Non-peak labour periods

Gender division of labour, Rubaya

Operation	Enterprise	Gender
Bush clearing	All	Men
Land opening	All	Both
Planting	Bananas	Men
	S.potatoes	Women
	Beans	Women
	Potatoes	Women
	Millet	Women
	Peas	Both
	Sorghum	Both
	Trees	Men
	Tobacco	Men
Weeding	Millet	Women
	Sweet potatoes	Women
	Others	Both
Harvesting	Tobacco	Men
	Sweet Potatoes	Women
	Millet	Women
	Others	Both
Threshing	Sorghum, beans, peas	Men
Winnowing	Sorghum, beans, peas	Women
Grinding	Sorghum, beans, peas	Women
Fetching	Fuel wood, water	Children, Women
Processing	Banana beer	Men
Grazing	Livestock	Men, Children
Selling	Tobacco	Men
	Beer bananas	Men
	Sweet potatoes	Women
	Millet	Women
	Sorghum	Both
	Irish potatoes	Both
	Beans	Both
	Land	Men

Source: AHI, 1998

Appendix Table 2

Wealth categories identified by farmers in Linthipe and their proportional representation in the total population (n=275)

Assets	Wealthy (16%)	Average (7%)	Poor (43%)	Very poor (33%)
Food security	Have enough maize throughout the year	Maize harvest lasts from June to Dec-January	Maize harvest lasts 1-6 months; sometimes all is eaten from the field	Maize harvest lasts for 1 month; sometimes all is eaten from the field
Livestock	Own many including cattle in the past	Chickens, ducks, rarely goats	None	None
Hires labour	Yes	No	No	No
Amount of fertilizer used	4-6 bags	1 bag	None	None
Monthly cash earnings	K800	K100	K50	Negligible
Other assets And activities	Owens a bicycle, radio, iron sheet house, can afford soap for washing and bathing	May own a bicycle	Relies as <i>ganyu</i> labour	Depends largely on <i>ganyu</i> labour

Daily activity schedule for men and women in Linthipe

Summer

Time	Activity	Time	Activity
	Women		Men
5-6 a.m	Sweep compound, draw water	4 a.m-12 p.m	Work in the field (clearing, ridging, weeding)
6-11 a.m.	Work in the fields with the husband	12 p.m	Eat
11 a.m-12 p.m.	Look for relish for lunch, prepare food and eat	12-1 p.m	Rest
12-1 p.m.	Rest	1-5 p.m	Work in the fields
2-4 p.m.	Work in the fields	6 p.m	Bathe
4-5 p.m.	Look for relish for supper		
5-6 p.m.	Draw water and boil for bathing (for self and husband)	7 p.m	Eat
6-7 p.m.	Prepare food and eat	7-8 p.m.	Chat
7-8 p.m.	Chat with family members , go to bed	8 p.m.	Go to bed

Winter

Time	Activity	Time	Activity
	Women		Men
6-7 p.m.	Sweep compound, draw water and clean plates.	5-11 a.m.	Work in the <i>dimba</i>
7-9 a.m.	Work in the <i>dimba</i>	11-12 p.m.	Do various activities at home i.e. cutting poles for reinforcing the roof, constructing kholas
9-11 a.m.	Gather firewood	12-1 p.m.	Eat
11-12 p.m.	Look for relish	1-3 p.m.	Rest or chat with friends
12-1 p.m.	Cook and eat	3-5 p.m.	May do any work at home
1-4 p.m.	Rest and chat with friends		
4-5 p.m.	Water crops in the <i>dimba</i> .		
5-6 p.m.	Boil water for husband and herself, bathe	5-6 p.m.	Bathe and rest at home
6-7 p.m.	Prepare supper	6-7 p.m.	Wait for supper
7-8 p.m.	Eat chat, chat, go to bed.	7-8 p.m.	Eat, chat, go to bed

Appendix Table 3

Wealth categories identified by farmers in Soni and their proportional representation in the total population (N=576)

	Wealthy (groups A and B) (0.5%)	Above average (groups C and D) (27%)	Average (groups E and F) (64%)	Poor (group G) (8%)
Assets	Owens a car or motor bike	Owens a bicycle	None	None
Land size	5+ acres of coffee	5-10 acres	1-3 acres	$\frac{3}{4}$ acre
Livestock	1+ crossbred cow	5-10 indigenous cows, goats, sheep, not healthy	5-10 goats/sheep, free range chickens	None
Housing	Modern house of bricks or stone with kitchen	Modern house or mud and wattle house with iron sheets with kitchen	Iron sheets or tin, grass thatched, mud and wattle, outside kitchen, covered or 1uncovered	Small mud and wattle, grass thatched, no latrine
Education of children	Best primary/ secondary schools	Government primary and secondary schools	latrine Government schools, Only up to primary (group F)	Do not go to school

Note: A fifth group, the very poor, was omitted from this table as it consisted of only one household (0.2%).

Daily activity schedules in Soni Ward

Women

Time	Activity
6-7 am	Wake up, plaster the house, fetch water
7:00- 1.00	Prepare breakfast, wash utensils, collect fodder, fieldwork
1.00 – 2.00	Prepare food, lunch
2.00 – 6.00	Wash utensils, clothes, collect fuel wood, fetch water, bathe children
6.00 - 8.00	Prepare food
8.00 – 9.00	Dinner
9.00 onwards	Sleep

Men

Time	Activity
6.00 onwards	Wake up Morning prayer
7.15 - 8.00	Collect fodder Irrigate crops
8.00 – 9.00	Breakfast
9.00 – 2.00	Work in the fields
2.00 - 3.00	Lunch
3.00 – 5.00	Work in the fields
5.00 – 7.00	Rest
7.00 – 9.00	Bath Dinner
9.00 onwards	Sleep

Appendix Table 4

Household type (per cent)

	Rubaya (N=92)	Linthipe (N=121)	Soni (N=83)
Male headed, one wife	41	60	61
Male headed, multiple wives	5	7	17
<i>De jure</i> female headed	22	22	19
<i>De facto</i> female headed	29	7	0
Other	2	4	2

Note: other includes single men with no children, single women, with no children

Appendix Table 5

Mean household size, number of adults and children

	Rubaya (N=92)	Linthipe (N=121)	Soni (N=83)
Mean household size	5.0	4.4	6.0
Mean number of adults	2.6	2.2	3.2
Mean number of children	2.9	2.6	3.2

Appendix Table 6

Educational levels of respondents (per cent)

	Rubaya		Linthipe		Soni	
	Men (n=43)	Women (n=90)	Men (n=86)	Women (n=116)	Men (n=67)	Women (n=81)
No formal education	23	53	31	60	8	33
Primary	63	42	65	39	91	67
Secondary and above	14	4	3	1	2	0

Note: Information on absent male heads was sometimes missing

Appendix Table 7

Non-attendance of school by school-aged children (per cent of households)

	Rubaya (N=92)	Linthipe (N=121)	Soni (N=83)
Girls	19	10	1
Boys	15	14	2

Appendix Table 8

Mean number of household members involved in agriculture

	Rubaya (N=92)	Linthipe (N=121)	Soni (N=83)
Full time female	1.1	1.2	1.4
Part time female	1.5	1.0	1.1
Full time male	1.1	1.2	1.4
Part time male	1.6	1.1	1.2
Full time children	1.0	1.3	2.5
Part time children	1.8	1.8	1.8
Total labour expressed as adult equivalent workers	1.8	2.3	3.0

Appendix Table 9

Wealth classification of surveyed households (per cent)

	Rubaya (N=92)	Linthipe (N=121)	Soni (N=83)
Wealthy	5	19	0
Above average	0	0	26
Average	37	17	64
Poor	57	43	10
Very poor	1	21	0

Appendix Table 10

Sources of non-farm income by gender (per cent)

	Rubaya		Linthipe		Soni	
	Women (n=33)	Men (n=23)	Women (n=70)	Men (n=70)	Women (n=21)	Men (n=34)
Casual labourer	52	30	37	25	14	25
Handicraft	21	0	3	3	0	0
Business/trade	21	13	27	33	38	28
Brewing	6	9	14	1	0	3
Salaried employment	0	13	0	6	0	14
Baking	0	0	0	0	29	0
Remittances	0	0	17	3	10	3
Sale of timber/poles	0	9	0	0	0	12
Migrant labor	0	9	0	0	0	0
Other	0	13	1	30	10	17

Appendix Table 11

Borrowing and saving behavior of men and women (per cent)

	Rubaya		Linthipe		Soni	
	Male (n=44)	Female (n=90)	Male (n=85)	Female (n=115)	Male (n=67)	Female (n=81)
Saves money	66	68	88	78	75	78
Ever borrowed money	89	91	31	26	68	33
Borrowed money in 2000	59	62	22	16	55	30
<u>Usual source of borrowed money</u>						
Relative	87	82	42	73	73	74
Friend	69	78	42	20	61	59
Informal savings/credit group	77	63	0	0	0	7
Money lender	0	1	4	7	0	0
NGO/church	0	4	12	3	2	0
Bank/credit institution	3	1	0	0	0	0

Appendix Table 12

Investment scores by gender (per cent)

	Rubaya		Linthipe		Soni	
	Male (n=44)	Female (n=90)	Male (n=83)	Female (n=113)	Male (n=67)	Female (n=81)
Purchase land	2.25	1.86	0.65	0.64	1.22	1.02
Improve house	0.70	0.90	0.52	0.29	2.01	1.43
Invest in business	0.98	0.60	2.40	2.33	1.04	0.88
Buy livestock	1.84	1.12	1.23	0.95	1.30	1.64
Buy better food	0.27	0.56	0.28	0.39	0.42	0.56
Buy more food	0.39	0.84	0.86	1.12	0.73	0.96
Buy agricultural inputs	0.80	0.57	2.36	1.99	1.49	0.56
Buy clothes	0.64	1.12	0.87	1.20	0.40	1.14
Pay school fees	0.61	0.59	0.28	0.24	0.91	0.79
Save	0.34	0.38	0.53	0.72	0.66	0.86
Other	0.32	0.38	0.36	0.13	0.19	0.02

Appendix Table 13

Livestock holdings

	Rubaya (n=57)		Linthipe (n=96)		Soni (n=79)	
	Percentage owning	Mean	Percentage owning	Mean	Percentage owning	Mean
Local cattle	12	1.1	0	0	34	1.8
Dairy cattle	9	1.8	0	0	45	1.9
Goats	37	2.4	46	2.9	46	2.7
Sheep	49	1.8	0	N/A	32	2.0
Chickens	51	2.5	79	5.8	91	5.2
Rabbits	18	3.6	5	2.4	3	2.5
Pigs	0	N/A	6	2.2	0	N/A
Donkeys	0	N/A	1	2	0	N/A
Ducks	0	N/A	15	1.9	10	2.3

Appendix Table 14

Input use (per cent)

	Rubaya (N=92)	Linthipe (N=121)	Soni (N=83)
Manure	59	37	98
Fungicide	16	Na	70
Insecticide	20	Na	66
Chemical fertilizer	4	56	52

Appendix Table 15

Tree planting niches, 1999-2001 (per cent)

	Rubaya (n=68)	Linthipe (n=42)
Crop land	41	12
Farm boundaries	12	36
Homestead	40	42
Bunds or terraces	19	N/A
Woodlots	56	19
Abandoned land	28	N/A
Dimbas	N/A	2
Village forest	0	12

Appendix Table 16

Number of meals eaten during periods of food scarcity, by wealth

	Rubaya* (N=92)	Linthipe** (N=121)	Soni*** (N=83)
Overall average	1.5	1.4	2.3
Wealthy	1.8	2.0	2.5
Average	1.7	1.4	2.2
Poor	1.3	1.3	2.4
Very poor	N/A	1.4	N/A

Significance for difference between wealth groups: *P ≤ .04; **P ≤ 0.025; ***P ≤ 0.1

Appendix Table 17

Farmer perception of their ability to change their local situation (per cent)

	Rubaya		Linthipe		Soni	
	Men (n=44)	Women (n=89)	Men (n=85)	Women (n=115)	Men (n=67)	Women (n=81)
A lot	50	34	79	70	43	35
Some	23	40	11	13	48	53
Not very much	25	19	9	8	9	11
Not at all	2	7	1	3	0	1

Appendix Table 18

Farmers' willingness for their children to become small-scale farmers (per cent)

	Rubaya		Linthipe		Soni	
	Men (n=40)	Women (n=76)	Men (67)	Women (n=88)	Men (n=66)	Women (n=81)
Girls	45	52	53	54	61	65
Boys	52	50	51	58	60	64

Note: This question was asked irrespective of whether the respondent had children of any age in Rubaya and Soni. In Linthipe, answers are only for people who had children.

Appendix Table 19

Perception of the level of social harmony in the community (per cent)

	Rubaya		Linthipe		Soni	
	Men (n=44)	Women (n=81)	Men (n=84)	Women (n=115)	Men (n=67)	Women (n=78)
Very peaceful	39	37	55	48	8	10
Mostly peaceful	34	37	27	32	88	89
Little peace	20	20	14	18	5	1
No peace	7	6	2	2	0	0

Appendix Table 20

Factors dividing the community, by gender (per cent)

	Rubaya		Linthipe		Soni	
	Men (n=44)	Women (n=89)	Men (n=85)	Women (n=115)	Men (n=67)	Women (n=81)
Education	34	27	11	14	55	62
Wealth	30	24	8	13	64	63
Land size	23	27	44	43	43	64
Religion	27	20	2	1	27	21
Gender	32	33	1	3	10	11
Working with NGOs	34	21	1	4	28	20
Tribe	9	15	0	0	3	3
Clans	11	13	N/A	N/A	3	5
Access to swamps/irrigation	41	16	8	10	35	37
Number of livestock owned	45	40	N/A	N/A	34	46
Politics	5	7	N/A	N/A	N/A	N/A
Asset ownership	N/A	N/A	8	18	N/A	N/A
Age	0	1	N/A	N/A	N/A	N/A

Appendix Table 21

Willingness of community members to engage in collective action (per cent)

	Rubaya		Linthipe		Soni	
	Men (n=44)	Women (n=87)	Men (n=85)	Women (n=115)	Men (n=67)	Women (n=81)
Very high	11	5	48	48	6	5
High	43	47	34	27	49	42
Average	25	39	9	13	43	47
Low	20	7	8	12	2	6

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