Crop-Based Farming Systems and Diverse Livelihoods in Uganda

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LADDER Working Paper No. 7

January 2002

ABOUT LADDER

LADDER is a research project funded by the Policy Research Programme of the UK Department for International Development (DFID) that seeks to identify alternative routes by which the rural poor can climb out of poverty. LADDER is working with nearly 40 villages and 1,200 households in Uganda, Tanzania, Malawi and Kenya to discover the blocking and enabling agencies in the institutional environment facing rural people that hinder or help their quest for better standards of living for themselves and their families.

This working paper represents work-in-progress and the reader is advised that it has not been subjected to academic quality control, nor edited for errors of fact or interpretation. The paper forms part of a mosaic of research findings that will contribute towards an overall picture of rural livelihoods and micro-macro links to poverty policies in the case-study countries. The findings and views expressed here are solely the responsibility of the authors and are not attributable to DFID.

All available Working Papers and Village Reports can be downloaded from the project website: http://www.uea.ac.uk/dev/odg/ladder/, which also details other information about the project. For any further enquiries, please email j.mims@uea.ac.uk.

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Summary

This paper reports an analysis of agriculturally based livelihoods in Uganda carried out as part of the LADDER research project[1]. Research activities took place in Jan to May 2001 in and three districts in central and eastern Uganda: Mubende, Kamuli and Mbale. The focus of the research is on agents of change in rural livelihoods, in particular the role of local and national level policies and institutions in facilitating or blocking the efforts of rural people to find their own routes out of poverty.

There is a paradox apparent in high potential agricultural areas and there are many of these in Uganda. Though high potential and productive there are typically high population densities in these areas associated with a high degree of land fragmentation. In hillside areas particularly, the move towards more intensive cultivation and cropping is leading to severe land degradation and yield declines. Thus, despite the inherent potential of the land, a high proportion of farming households are land-constrained and resource poor as a consequence.

There is every indication that farmers aspirations in rural areas are in line with the objectives of the PMA, i.e. they want to move from largely subsistence-based towards more commercially-oriented farming. However, most are too poor to embark on this road. Rather in the most intensively populated areas there is evidence that households are diversifying away from farming as land-fragmentation increases and reliance on agriculture as a sole income source becomes less viable. The implications of livelihood diversification for the PMA are not necessarily negative as agriculture will always be an inherently good option in high potential areas and most farmers are strongly committed to farming. There is some evidence that off-farm income is being re-invested in agriculture and this may be an important route to agricultural "modernisation" for the poorer households. Thus policies that facilitate diversification away from agriculture in the short term are, paradoxically, quite likely to benefit the sector in the future.

It is also clear that most farmers will continue to be largely subsistence oriented for some time and that many of their production problems relate to subsistence farming. They are in need of non resource-demanding solutions to a range of resource degradation (e.g. soil erosion and fertility decline) and pest and disease problems affecting subsistence crops. Many of these "solutions" are not yet available. Much targeted research is still required in the challenging area of low-input subsistence farming. It is imperative that the PMA recognises that there is a big job to be done in helping and improving subsistence agriculture in order to help farmers fund the move

[1] The LADDER project (Livelihoods and Diversification Directions Explored by Research) is funded by the Policy Research Programme of the UK Department for International Development.

into more commercial agriculture. There is insufficient recognition of the current and future importance of subsistence farming and its role in the modernisation process in current policy. The strategic direction of the NAADS restructuring proposals on subsistence farming is also discussed and a number of areas of concern are identified that need full consideration if the new fully decentralised and privatised NAADS service is to serve the poor subsistence farmer well.

1. Introduction

Farming is the primary occupation of most rural people in Uganda and the main source of household income. Changes in the nature of farming activities represent one major route for livelihood transformation in these areas.

The paper begins with a summary of the research methods employed followed by a general description of Ugandan natural resources locating the research sites within an agroecological framework. We then identify the features of the farming systems that appear to be most important in determining livelihood outcomes and also the patterns of recent change in farming-based livelihoods. There is then a detailed consideration of the extent to which current and planned policy relevant to the agriculture sector is likely to facilitate future sustainable improvements in these livelihoods.

2. Research methods

Three districts (Mbale, Kamuli and Mubende) were selected and three villages were chosen from each of the three districts. The research combined both secondary and primary information. Secondary information was mainly obtained from a review of diverse literature, including key government of Uganda policy documents such as the PEAP, the PMA and the NAADS core document. Primary data from the field were both qualitative and quantitative. Key informant interviews and focus group discussions were carried out in each village and at District level. These were semi-structured and organised around particular themes relevant to the research (e.g. recent change in village agricultural activities). A questionnaire-based survey was also conducted in the villages to obtain data on income, aspirations and other aspects of people's livelihoods that could be subjected to statistical analysis. Within each village, a PRA wealth-ranking exercise was conducted, resulting eventually in the identification of three wealth groups (well-off, middle and poor) that acted as the sampling frame for a stratified random sample. A list of names of all households in each village was produced and used to place each household in one of the three wealth groups. From the wealth groups, 10 households were randomly chosen from each of the well-off and middle groups, and 15 households from the poor group, resulting in a sample size of 35 households for each village. Hence, 105 households were sampled in each district, and 315 households sampled across the three districts.

Wealth ranking enabled the research team to capture a wide range of livelihoods within a village. More households were selected from the poorer group in order to access more information about the poor since they are given insufficient attention in many sampling procedures, and yet they are the core of government efforts to fight poverty. While care was taken to make the samples as representative as possible within the 9 villages, no claims are made about the statistical representativeness of sample findings with respect to populations in the districts that were studied nor for Uganda as a whole.

3. Agriculture and natural resource endowment in Uganda

Agriculture contributes a major part of Uganda's economy, employment (80%), GDP and export earnings. Nationally, there has been a trend of increased production in the Ugandan agricultural sector but achieved largely from increasing cultivated land area rather than improving unit area productivity (World Bank, 2001). Agriculture accounts for 42% of GDP (GOU, 2001). According to the results from the 1999/2000 Uganda National Household Survey (UNHS) 35% of the population is poor (Appleton, 2001). This translates into 7.7 million Ugandans living below the absolute poverty line.

The rich natural resource endowment of Uganda, in particular its humid tropical climate and large areas of fertile volcanic soils, distinguishes it from most other East African countries (CIAT, 1999). These resources give Uganda the potential for high agricultural productivity and this forms part of the justification for the current policy emphasis on technology driven intensification and commercialization in rural small-holder agriculture (see section 4 below).

There is great agroecological diversity within the country with thirty-three agroecological zones (AEZs) recognised in the latest classification, though this has been simplified to fourteen (CIAT, 1999). Altitude has the strongest influence on climate and ranges from 610m a.s.l. in the Rift Valley to 4324m a.s.l. on Mount Elgon.

Though this research was carried out in only three districts, five of the 14 zones are represented and together these account for approximately 30% of the country's land area and many of the most densely populated and intensively utilized areas (Table 1). In addition many of the features of the hillside farming systems and livelihoods found in the study sites are similar to other parts of Uganda. For example the southwest highlands within the densely populated Kabale district, though the latter has a different AEZ classification. For logistical and security reasons, some large and important districts and AEZs, particularly in the north, were not represented in the sampling. In spite of this, the sampling was successful in capturing study villages contrasting in a number of key livelihood determining characteristics. These were population density, land use intensity, AEZ, farming system, quality of infrastructure, strength and competence of local administrations and access to markets.

Table 1. Some characteristics of the agroecological zones represented by the research sites.

District	Sub-county/village	Agroecological zone	Soils	Rainfall	Population density (persons/ km^2)	Major crops (and livestock)	Ugandan land area under same AEZ in km^2, (%)
Mbale	Butiru/Bukhasusa Bududa/Bunabuso	Mount Elgon High Farmlands	Very productive	unimodal: > 1200 mm/yr,	High: 345	Banana, beans, maize, groundnuts, coffee	969, (0.5)
	Butiru/Buwopuwa	Jinja and Mbale farmlands	Very productive	bimodal: > 1200 mm/yr	High: 456[1]	Bananas, sweet potato, beans, maize, coffee	16,302 (9.1)
Kamuli	Kinamwanga/Kidera Buyende/Kiribairya Kagulu/Iyingo	Southern and Eastern Lake Kyoga Basin	Variable	bimodal: > 1200 mm/yr	Moderate: 129	Finger millet, banana, maize, rice, cassava, cotton	10,154 (5.7)
Mubende	Kasambya/Kabbo	South-western grass farm-lands	Generally good	bimodal: < 1000 mm/yr	Quite low: 64	Bananas, beans, sweet potatoes, maize, cassava	11,659 (6.6)
	Bulera/Kalangaalo Madudu/Kansambya	Western mid-altitude farmlands	Very variable	bimodal 1000-1200 mm/yr	Quite low: 78	Bananas, maize, beans, sweet potatoes, cassava, groundnuts. Cattle very important in parts.	15,307 (8.6)

Source: LADDER Survey, and Wortmann and Eledu (1999).

[1]Most densely populated rural AEZ in Uganda

4. Summary of the policy environment in Ugandan agriculture

The major policy processes affecting the agricultural sector can be divided into two groups: those already fully or partially implemented and those that are beginning to be implemented or piloted. The Economic Reform Programme (ERP), decentralization policies and the Poverty Eradication Action Plan (PEAP) fall into the first group. The Plan for Modernization of Agriculture (PMA) and the National Agricultural Advisory Services (NAADS) fall in the second group. For those policies already implemented it is possible to look at the extent to which they are delivering their objectives and the effects they are having on rural farmers. With those policies just beginning to be implemented such reflection is not yet possible but they can be looked at alongside an analysis of the current environment of opportunities, constraints and aspirations in which farmers operate in Uganda today. Questions can be asked of these new policies: Will they redress the imbalances, fill the gaps, provide incentives and support to farmers and remove obstacles in ways that facilitate rural people in transforming their livelihoods? Will the proposed institutions be an improvement on those they replace?

Targeting the poor is central to all the current major policy processes in the country including the PEAP and the PMA. This is an essential objective in a country with 35% of the population classed as living below the poverty line (Appleton, 2001). Ultimately this must be a major criterion against which policy is assessed.

4.1. Economic Reform Programme (ERP)

The effects of the implementation of the Economic Reform Programme (ERP) in the late 1980s and early 1990s can be seen today in the agricultural sector. In common with many countries in the region the private sector was encouraged to take over as the main suppliers of agricultural inputs, credit and marketing services once the parastatals withdrew (Wiggins, 2000). There have been some positive impacts from this, particularly in the marketing of the major cash crops coffee, cotton and tobacco (Djikstra and Van Donge, 2001; Balihuta and Sen, 2001). However, the institutional analysis carried out in this research illustrates that this strategy was only partially successful (James *et al*, 2001). Generally in the villages studied in this research small scale coffee and cotton producers have suffered, as farmers access to reliable markets for these cash crops has been poor. In addition the complex and largely privatised system of local taxation appears to be having a particularly insidious effect on the ability of farmers to market any of their agricultural produce on fair terms. Ellis and Bahiigwa (2001) discuss this finding in some detail but it is worth restating the point that unfair local taxation regimes can easily stifle attempts by poor farmers to move from subsistence into market oriented farming and so conflict directly with the PMA (see below).

4.2. Decentralization

This far-reaching programme of reform was initiated in 1992. The1997 Local Government Act began the process of devolving political, financial and planning responsibilities to District (LC5) and sub-county (LC3) level. The premise is that service provision and development activities are more likely to be responsive to local demands and feed-back if they are under the control of local government.

The danger is that problems or inefficiencies associated with central Government could increase several fold as additional administrative tiers of local government are set up and/or given greater control of resources. Indeed a PMA monitoring exercise carried out in October 2001 in the 24 districts that received the PMA grant in fiscal year 2000/2001 found out that

districts allocated resources in the "most convenient" manner, largely due to late disbursement of funds by the central government.

Non-sectoral conditional grants are being made available through the PMA for LC3 administrations to use on whatever they believe will best enhance poverty eradication. By not forcing local administrations to spend predetermined amounts on particular sectors this approach should allow a much more sensitive allocation of resources to where the need is greatest. It is also very likely, however, that sectors that are somehow out of favour or poorly represented will receive few resources and suffer as a consequence. This appears to be the case with the current agricultural extension system particularly and the impact of this is discussed below.

4.3. The Poverty Eradication Action Plan (PEAP)

The PEAP was launched in 1997, and revised in 2000.[2] It aims to reduce mass poverty in Uganda to 10% by 2017. It has four main goals:

(i) creating a framework for economic growth and structural transformation
(ii) ensuring good governance and security
(iii) directly increasing the ability of the poor to raise incomes
(iv) directly increasing the quality of life of the poor.

Implemented under the PEAP and of profound importance for the future of the agricultural sector in Uganda is the Plan for Modernization of Agriculture, the PMA. The PMA is expected to contribute to the achievement of the third goal of the PEAP.

4.4. The Plan for Modernization of Agriculture (PMA)

Implemented under the PEAP the PMA mission is to "eradicate poverty by transforming subsistence agriculture to commercial agriculture." It is a holistic, strategic framework for eradicating poverty through multi-sectoral interventions enabling the poor to improve their livelihoods in a sustainable manner.

The PMA vision is a future agricultural sector with the following qualities:

(i) Competitive with lower unit production costs of production and marketing
(ii) Technology based by adoption of improved farming practices
(iii) Diversified with higher value and higher demand for all agricultural products
(iv) Export oriented but at the same time ensuring food security in all households
(v) Capable of increasing productivity of land and labour

The PMA has a strong poverty focus based on data drawn from the Uganda Participatory Poverty Assessment Project (UPPAP) carried out in 67 communities in 9 Ugandan districts. The PMA is being implemented through decentralised planning processes which are expected to identify the key constraints at the local Government level and help to remove these constraints through "joined-up" public sector interventions.

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[2] The PEAP represents the Uganda version of the Poverty Reduction Strategy (PRS) process that is required of all countries that wish to take advantage of HIPC initiatives.

4.5. The National Agricultural Advisory Service (NAADS)

The NAADS programme is one of the five core programmes under the PMA. The vision for the NAADS is as "a decentralised, farmer-owned and private sector serviced extension system contributing to the realisation of the agricultural sector objectives" (NAADS, 2000). The primary objective in restructuring NAADS is to facilitate the implementation and success of the PMA. Thus the macro policy objectives are clear but it is also unambiguously stated that the advisory services provided by the new body should be demand-driven.

The coming discussion will, where appropriate, refer back to the effects or likely effects of these policies and proposals with a focus on the PMA and NAADS restructuring.

5. Characteristics of study sites

The AEZ classification outlined above cannot capture the detail and variability of farming systems below the district level. Table 3, modified from James *et al* (2001) has been compiled from qualitative data collected at village and sub-county level and from PMA documentation. In all villages in Mbale and Mubende districts, farmers' crop cultivation is the most important livelihood activity (Table 2). This is followed by various non-farm activities which include trading and off-farm activities such as brewing, brick-making, cutting timber, etc. Livestock is the third most important source of income. Crop farming is also clearly important for many in the coastal villages in Kamuli district with one village, Kinamwanga, ranking farming above fishing in importance in group discussions. Production constraints elicited from farmers in focus group discussions have also been summarised for each village in Table 3 and these are discussed in detail in section 6.

Table 2: Income Portfolios (%) of the three districts

Income Source	**Mbale**	**Kamuli**	**Mubende**
Crops	53.5	7.1	56.9
Livestock	5.9	5.3	7.2
Fisheries	0.0	36.1	0.0
Other NR	5.7	11.2	6.2
Non-farm	33.1	38.9	29.1
Remittances	1.8	1.4	0.6

Source: LADDER Survey

Table 3. Farming systems and livelihoods of sample villages. Modified from Francis and James (2001).

Village	***Farming System of district***	***Major Crops grown***	***Major livestock farmed and fish types caught***	***Main production constraints:***	***Main off-farm livelihoods***
Bukhasusa	Montane	Banana, maize, beans, sweet potatoes, finger millet, groundnut and coffee	Pigs, poultry, goats and cattle.	Yield decline caused by drought, crop and livestock disease, poor access to and high cost of inputs, lack of Extension advice, soil erosion and fertility decline, land fragmentation.	Sale of labour, banana vending, bicycle transport (produce)
Buwopuwa	Lowland	Maize, beans, bananas, cotton, millet, cassava, sweet potatoes, sorghum and millet	Pigs, chickens, goats, and a few cattle (disease has greatly reduced numbers)	Yield decline caused by land over-use, drought, pests & diseases, inferior seed. Cattle lost through disease. Lack of access to manure and chemical inputs. No help from Extension Service.	Sale of labour, brick making, bicycle transport (people and produce), brewing, produce vending
Bunabuso	Montane	Coffee, bananas, maize, beans, horticulture (tomatoes, cabbage, onions), sweet potatoes	Dairy cows, pigs, goats chickens	Yield decline due to soil exhaustion; fragmentation; poor access to and high cost of inputs; pests and diseases; unreliable weather, collapse of marketing co-ops.	Sale of labour, shops, brick making, bicycle transport (people and produce), brewing
Lyingo	Banana/ finger-millet /cotton	Maize, sweet potatoes, cassava, finger millet, ground-nut, beans, and cotton	*Livestock*: Cattle (meat), goats, chickens and ducks *Fish*: Nile Perch, *Rastrineobola argentea*, Tilapia	Drought, crop disease, poor access to inputs, labour, markets.	Sale of labour (fishing and agricultural), fish trading, transport (bicycles and boats) shop keeping, petty trading
Kiribairya	Banana/ finger-millet /cotton	Maize, sweet potatoes, cassava, finger millet, cotton, sorghum, groundnuts, beans	*Livestock*: Cattle (meat), goats, chickens and ducks *Fish*: Nile Perch, *Rastrineobola argentea*, Tilapia, Lung fish	Drought, crop and cattle disease, poor access to inputs, labour, markets; no help from Extension Service.	Sale of labour – to fish and to work on other farms, fish trading, transport (bicycles and boats), petty trading brick making, firewood harvest, brewing
Kinamwanga	Banana/ finger-millet /cotton	Maize, cassava, sweet potatoes, finger millet, cotton, sorghum, groundnut, beans	*Livestock*: Cattle (meat), goats, chickens and ducks *Fish*: Nile Perch, Tilapia	Drought, crop and cattle disease, poor access to inputs, labour, markets; no help from Extension Service.	Sale of labour – to fish and to work on other farms, fish trading, transport (bicycles and boats), petty trading brick making, firewood

Village	***Farming System of district***	***Major Crops grown***	***Major livestock farmed and fish types caught***	***Main production constraints:***	***Main off-farm livelihoods***
Kabbo	Banana/ coffee	Bananas, maize, beans, Irish potatoes, sweet potatoes, ground-nuts, cassava, coffee, vegetables.	Cattle (milk and meat), chickens and goats	Yield decline due to decreasing soil fertility and intensive cultivation, drought, pests and diseases, high cost of inputs.	Agricultural labour, produce trading, shop keeping, brewing, selling of clothes, petty trade, hunting
Kansambya	Banana/ coffee	Maize, beans, sweet potatoes, Irish potatoes, cassava bananas, finger millet, sorghum, coffee	Cattle (milk and meat), chickens and goats	Yield decline due to drought, pests and diseases. Poor access to improved seed and other inputs.	Agricultural labour, produce trading, shop keeping, brewing, brick making, transport activities, hunting
Kalangaalo	Banana/ coffee	Maize, sweet potatoes, beans, Irish potatoes, bananas, groundnuts, cassava, coffee, vegetables	Cattle (milk and meat), chickens and goats	Declining soil fertility, drought, land fragmentation, pests and disease, poor access to inputs and mechanization.	Agricultural labour, government workers, produce trading, shop keeping, brewing, brick making, transport activities, builders

The communities in Kamuli District were purposively selected to capture rural people with livelihoods based around fishing. Despite the reported importance of crop farming in Kinamwanga, the income data indicate that crop farming contributes only 2.6% of household income. Non-farm activities are the main activity (46%) followed by fishing (37%). For fishing communities in Kamuli, although fishing is deemed the most important economic activity, income data show that non-farm activities contribute slightly more (39%) than fishing (36%).

Given the special contribution of fishing and relatively minor role of crop farming in Kamuli the discussion in this paper will focus on Mbale and Mubende Districts.

5.1. Land holdings, Mbale and Mubende

Land-holding and income data are presented for each wealth group in the study villages in tables 4&5 with a summary at District level in Table 6. Size of land-holding was a major criterion used by villagers in the wealth ranking and its link with wealth shows up clearly in the data in both Mbale and Mubende villages.

Table 4. Land-holdings in Mbale and Mubende.

Wealth group	Mbale	Mubende
	Area owned (acres)	
Rich	8.5	9.2
Middle	3.0	4.2
Poor	1.5	3.2
Total	3.9	5.5
Diff. (p) between wealth groups:	<0.000	<0.000

Source: LADDER survey data

Table 5. Area owned by district

Area Owned	District			Total
	Mbale	Kamuli	Mubende	
	%			
Less than 0.5 ha.	37.1	67.6	21.9	42.2
0.5-1 ha.	24.8	11.4	14.3	16.8
1-2 ha.	15.2	11.4	26.7	17.8
2-3 ha.	6.7	2.9	14.3	7.9
3-4 ha.	4.8	1.0	9.5	5.1
More than 4 ha.	11.4	5.7	13.3	10.2
Total	100.0	100.0	100.0	100

Source: LADDER survey data

In Mubende the mean acreage owned by the “poor” households does not drop below 2.2 acres. In Mbale, however, two of the three study villages mean area owned is less than one acre. The significance of the severe land fragmentation experienced in this district is discussed in detail below.

Comparisons within Mbale

In Bukhasusa the average land-holding of "poor" farmers is 0.6 acres and in Buwopuwa it is 0.9 acres, in both cases likely to be barely enough to provide for household needs. These are mean figures and there are a large number of "poor" households with less than 0.5 acres or even no land at all. Buwopuwa is located on the drier plains where the Teso farming system dominates. Productivity is constrained by moisture availability here and cropping is less intensive than in the hills. Hence land holdings are on the large side for the District: 5.4 acres on average. Bukhasusa is located higher up in the Mount Elgon foothills where moisture and soils are conducive to intensive productive agriculture. Very intensive systems have developed, population densities are high and land fragmentation has led to an average land-holding of 1.3 acres. Bunabuso is similar in location to Bukhasusa with similar intensive systems and high population densities though farm sizes are somewhat larger than in Bukhasusa.

Generally farmers farm most of the area they own with a general tendency for the medium and poor farmers to rent additional land.

5.2. Household income Mbale and Mubende

On average the Mbale sample households had 30% more crop derived income and 60% more total income than the Mubende sample. Of the Mbale villages Bunabuso appears to be the richest with mean incomes of USH 4.31 million compared with USH 1.50 million and USH 1.15 million for Buwopuwa and Bukhasusa, respectively (income data by village in Appendix 1). For Mubende villages, the richest appear to be Kalangaalo with a mean income of USH 1.69 million, compared with USH 1.41 million and USH 0.92 million for Kabbo and Kansambya, respectively. The latter result tends to give credibility to a widely held view by district officials that Madudu sub-county, in which Kansambya village is located, is the poorest sub-county in Mubende district.

Table 6. Crop and total income in Mbale and Mubende

Wealth group	Annual crop income	Total annual income	Annual crop income	Total annual income
	Mbale		**Mubende**	
Rich	1,770	5,100	1,057	2,130
Middle	1,130	1,990	875	1,405
Poor	470	760	478	798
Total	1,060	2,370	803	1,444
Diff. (p) between income groups*:	<0.001	0.020	0.001	<0.000

Source: LADDER survey data

*An analysis of variance was carried out to look for significant differences between group mean incomes. p = probability value.

Crop and livestock based income accounted for, on average, 59% of total income in Mbale and 64% in Mubende suggesting that non-farm income generating activities are relatively more important in Mbale. Table 7 summarises villagers' perceptions of their first and second most important activity for the three Mbale villages.

Table 7. Livelihood diversification in Mbale district

	VILLAGE											
	Bukhasusa				Buwopuwa				Bunabuso			
	main current activity		Second main activity		main current activity		Second main activity		main current activity		Second main activity	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Farming (crop, crop+lvst)	29	81	6	17	28	80	5	14	20	61	11	33
Brewing	1	3	2	6	1	3	5	14			2	6
boda boda or trading gen	1	3	1	3	2	6	3	9	4	12	2	6
remittances	2	6			2	6	5	14			7	21
sell labour	2	6	6	17	1	3	5	14	1	3	3	9
teaching or other prof	1	3	2	6			4	11	3	9	2	6
livestock farming					1	3	1	3	5	15		
none			15	43			4	11				
artisanal			3	9			3	9			5	15
renting											1	3

Source: LADDER survey data

In Bunabuso the pattern of activity is somewhat different from the other Mbale villages with only 61% of respondents giving farming as their main current activity compared with 81% and 80% in Bukhasusa and Buwopuwa respectively. Boda boda, general trading and other forms of off farm income generation are particularly common in Bunabuso, perhaps linked to the particularly high land pressure in this area. It is interesting to note that this village does appear to be better off than its more farming dependent neighbours, perhaps as a result of this diversification.

5.3. Aspirations: Mbale and Mubende

When Mbale farmers were asked what they would like to do most in the next five years, in almost every case and in all villages, they replied they would like to remain in farming. A very common response was that people felt farming was what they knew best and, if there was improved access to inputs, planting materials and better management advice they would like to intensify and perhaps move into cash cropping. In Mubende farmers have a similar wish to stay in farming and to expand and/or intensify their farming activities in the future. The wish expressed most frequently was to start cultivating cash crops such as vegetables, coffee, groundnuts, etc. Many would also like to obtain an exotic cow and move into small-scale dairying. As in Mbale lack of sufficient land[3] and capital and access to inputs seem to prevent the majority of people from realizing their ambitions. It was rare in either district for respondents to express a wish to diversify away from farming, even though in all districts, non-farm activities contribute at least 25% of total household income, the highest being in Kamuli at 36%.

5.4. Recent livelihood change

Most respondents mention some major livelihood change over the last five years.
Whereas the environmental and socio-economic landscape may not appear to be changing very fast, the lives of individuals and households clearly are. There are a number of more or

less predictable changes in their asset status and likely activities as well as the effects of less predictable outcomes such as sickness and other livelihood shocks. The most common reason given for a change in livelihood activity over the last 5 years was one related to age or the major life events: either acquiring land on leaving home or marriage, losing assets when obliged to pay bride prices for married daughters and loss of land with old age as it is passed on to children or sold because the villager no longer has the strength to work it.

Just as age and sickness are given as major agents of decline in livelihood activities, disease in livestock and crops were cited many times as contributing to the decline in agriculture. Soil fertility and lack of planting material were also mentioned by some farmers. It is likely that the effect of the large 'social' changes in peoples lives partly obscure, in the minds of villagers at least, many of the external shocks and changes caused and influences of policy that we are eager to illuminate. The fact that many still mention pests and diseases and productivity (soil fertility) decline as major constraints suggests they are particularly significant.

Beer brewing and boda boda are two popular activities households seem to have expanded into over the last 5 years. A number have also begun to receive remittances from household members working outside the area in that period.

6. Production constraints

The picture the preceding section gives of rural Uganda is of a nation of small-holder farmers largely dependent on subsistence agriculture but keen to move into more intensive market-oriented farming if the opportunity arises. Despite the inherent productivity of their land, most are suffering a combination of production-related problems that policy will need to address if agriculture is to be the foundation for economic growth. Farmers most frequently report problems of declining yield and offer the following explanations, most of which were also identified in the UPPAP.

Throughout the three districts (Kamuli included):

- Increased incidence of pests and diseases affecting both crops and livestock.
- More intensive farming, land fragmentation and reduced fallow causing a decline in soil fertility and productivity of the land.
- Lack of access to and/or high cost of agricultural inputs (notably improved seed and planting material, fertilizers and pesticides) and mechanization.
- No or very little help from or contact with the Agricultural Extension Service. This service seems largely to have ceased functioning in recent years.
- Unreliable weather, mostly periods of drought in the growing season but also very destructive intense rainfall events in some areas.
- Loss of marketing co-operatives and poor access to markets.

Area specific concerns:

- Land fragmentation, particularly in Mbale where population densities are several times those in the other districts studied.
- Soil erosion, again particularly in the Mbale hillsides communities.

Many of these concerns, in fact all but co-operatives and market access, relate directly or indirectly to the poor and worsening agricultural service. The constraints listed are common

phenomena in Sub-Saharan Africa (SSA). Combined with the trends of increases in population and land-use intensity and decreases in farm size these represent major challenges for many farmers, particularly the poor and vulnerable most of whom are suffering multiple production constraints.

Agricultural productivity in terms of production per unit area, is declining in much of Uganda and if current and future policy is to turn this around it has to address the production constraints listed above. Agricultural service provision (i.e. extension and advisory services) could, if effective and well-resourced, address the majority of the listed constraints. The successful implementation of NAADS will be crucial in fulfilling this role and elements of the proposals are discussed below. Land fragmentation is, however, particularly important in Mbale and other intensively farmed Ugandan hillside areas and is so extreme that the viability of intensifying production in these areas should be considered. The next section examines the land fragmentation phenomenon and considers whether existing and proposed policy provides the support poor farmers with very small land-holdings need.

6.1. Land fragmentation

This is a particular concern in Mbale in this study and in much of the fertile hillside areas of south-west Uganda, notably in Kabale and surrounding Districts, where land is typically divided between male children on inheritance. The productive potential of these areas is very high due to favourable soils and rainfall regimes and this has allowed high population densities and intensive production systems to develop. When the soils are producing at their best it is possible to meet household food requirements from very small parcels of land, often less than 1 acre. However, when land-holdings drop below about 0.5 acres or when substantial productivity decline occurs (it is clear, from focus group discussions, that this is the case in many areas) it becomes difficult to meet household food needs, despite the high inherent productivity of the land. Many farmers are clearly struggling with their farming in this way.

6.2. The high potential/severe constraint paradox

Counter-intuitively it is possible to find farmers are struggling the most in areas with inherently very high productive potential.

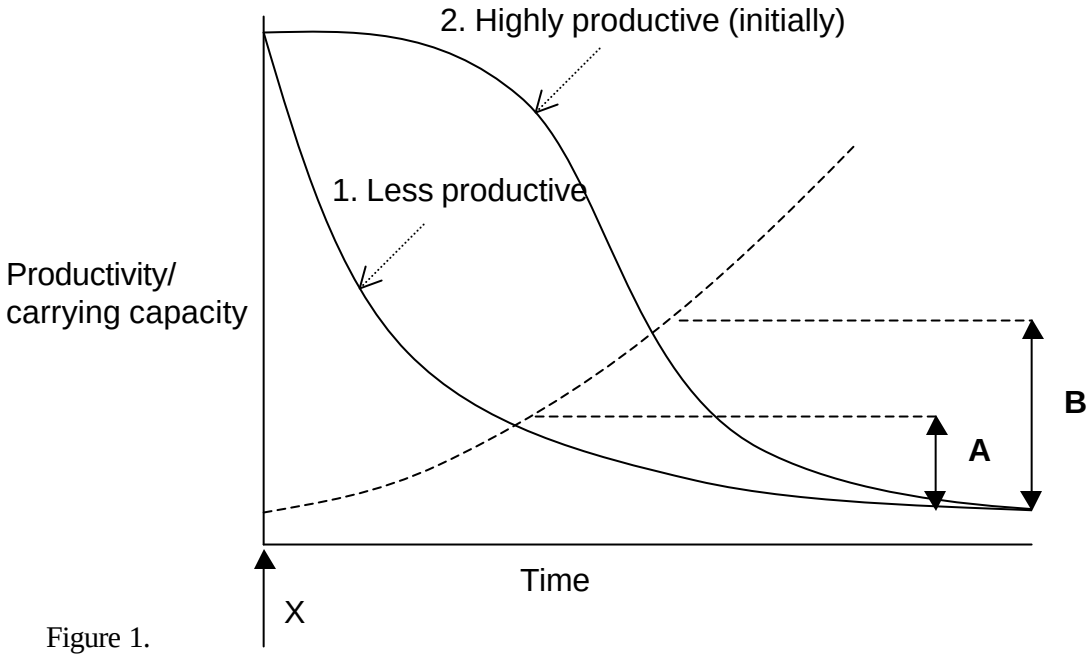

Figure 1.

Figure 1 attempts to explain this by representing the theoretical declines in productivity in two areas of land differing in initial productive potential. Area 1 is not particularly high potential, soil may be shallow and/or organic matter and nutrient reserves poor. Productivity declines steeply from the first season of cultivation, year X, when a population begins to settle the area. Then there is a period of more gradual productivity decline eventually stabilizing at a low level but one that can more or less be sustained indefinitely by soil processes. The same line could also be taken to crudely represent the carrying capacity of the environment in terms of the number of people it can support – this declines with decreasing system productivity. The dotted lines represent the population increase that develops exponentially from the time of settlement. By the time population reaches the carrying capacity of the land (i.e. land becomes a major constraint, households only have sufficient for household needs and there is strong resistance to further land fragmentation) the steepest productivity decline has already occurred. From this point forward, further increases in population cannot be supported by the NR base so strategies of non-farm income generation or out-migration develop. Although farmers are constrained by their environment, high densities of people dependent on farming have not developed and further declines in productivity are relatively modest and gradual (A). This scenario can be applied to large parts of SSA with poor soils and dry climates and perhaps also to some of the villages in this research e.g. Buwopuwa and its drier Teso type farming system.

The second scenario applies to the inherently more productive areas in Uganda e.g. Bunabuso and Bukhasusa in Mbale. Productivity (and carrying capacity) of the land remains high for many years after the first settlement and this allows population densities to increase and farm size to reduce to a far greater extent than in scenario 1. Eventually, however, mining of soil reserves, the increasing land use intensity and associated degradation lead to productivity decline. At some point the carrying capacity of the land is reached, as with scenario 1, and the

population begins to struggle with farming. There are two important differences, however, between the two scenarios that suggest that the numbers of people and the magnitude of the production constraints are likely to be much greater under scenario 2. Firstly, farm sizes are much smaller and there are many more people on the land. Secondly, carrying capacity has been reached at a point where the productivity is still steeply declining and still has a long way to go (represented by B in figure 1). Thus we can see, somewhat paradoxically a potentially more difficult situation developing in the more productive areas where large numbers of poor farmers are trying to scrape a living on small parcels of land still rapidly declining in productivity. The research suggests that this somewhat pessimistic analysis is not far from reality in many of the high potential areas in Mbale District. An analysis of income portfolios across the Districts suggests that already in Mbale farmers are having to rely strongly on off-farm income sources: 40% in Mbale compared with 20% in Mubende where pressure on land resources is much lower.

Whilst there is no way of increasing the amount of available land there are technical options for maintaining and/or improving agricultural productivity. The PMA recognises that land scarcity is a major constraint in the areas of highest potential productivity and its central theme is the promotion of technologies for increasing agricultural productivity. Clearly the successful delivery of appropriate technologies and associated inputs and training are essential if the land constraint is to be overcome. The results of this research indicate that even farmers with less than 0.5 ha land sell, on average, 23% of their crops but this is not the same as growing a cash crop - most crops are primarily grown for home consumption and so should still be classed as subsistence crops. The returns from the sale of a cash crop may make the adoption of resource demanding technologies and/or external inputs feasible but it is quite rare for farmers to invest resources, particularly cash, in subsistence (or predominantly subsistence) production. There is a danger, therefore, that the high input path to improved production will not be open to those farmers engaged in this type of production.

Box. 1. IDEA in Mbale.

This is an NGO promoting reduced tillage and pesticide use in maize production. Herbicides are used to clear the land of weeds rather than digging or ploughing, both of which can expose hillside land to severe erosion. High yielding maize seed is sown after herbicide application with basal and top dressings of fertilizers. Selective herbicides are applied once more to control weeds before the maize canopy closes and further weeding is not required. Small-holders in the Mbale hillsides were initially targeted with this technology as they were suffering severely from soil erosion. However there was no uptake as farmers were not able to devote large plots of land to cash crops - they needed all they had for subsistence crops. Neither could they afford to purchase the herbicides and improved seed required to practice the reduced tillage system. After several years of frustration the NGO began promoting the technologies among the wealthier commercial farmers growing maize in the lowland plans around Mbale. Several farmers have found the technology particularly cost effective and are achieving maize yields of over ten tonnes per hectare.

Source: Key Informant Interview

Their assets are currently insufficient to resource a move into market-oriented agriculture. Indications are that many of the middling and poorest households in this study, the vast

majority of the rural population, are in this situation. An example of an intensification initiative promoted by an NGO IDEA that suffered precisely this problem is given in Box 1.

Currently there is little if any access to agricultural support and advice for these people. The PMA and NAADS proposals recognize this but they may also need to acknowledge that many farmers will need assistance with their subsistence production, in non resource demanding ways, before they can venture into input driven, market-oriented agriculture.

6.3. Diversification and agricultural intensification

Most respondents in Mbale and Mubende claimed they would rather consolidate their farming activities than diversify away from farming. This suggests that in many cases farmers have had to diversify in order to survive and not because they particularly wanted to. This conclusion is backed up by the data on land fragmentation. It is technically very difficult to consistently grow sufficient food for a typical Ugandan household on 0.25 ha land. Thus for a quite large and increasing number of households, diversification off farm is a route they must take. It seems likely that, unless given unrealistic levels of support, it is far easier (and more likely) for most farming households to diversify away from farming than intensify and re-orient to cash-cropping. Whether resources generated off farm are likely to be invested in agriculture ultimately seems to depend on the likely risk and return from farming versus returns from investment elsewhere (Evans and Ngau, 1991). In many parts of Uganda the potential returns from investment on farm could be high so there is no reason why agriculture should not benefit from diversification. For the >50% of the population in Mbale District currently tied to subsistence cropping it might be that facilitation of their involvement in off farm activities will provide many with the resources they need for a move to the more intensive market oriented cropping envisaged by the PMA. Critically, however, these opportunities outside of agriculture have to exist before farmers are able to “modernise” and this is rather different from the conventional notion that small-holder agriculture can first transform itself and then drive the development of marketing and processing opportunities and the development of a rural service sector.

In summary it seems that anything that can be done to facilitate livelihood diversification is likely to benefit agriculture and may provide resources and impetus for a degree of agricultural intensification.

6.3. Agricultural Service Provision

The need for strong and effective agricultural support services is recognized by policy-makers and has been expressed at all levels from farmers upwards in this study. The institutional analysis carried out as part of this research reveals that currently the Research and Extension services are considered to be among the least helpful institutions. In some cases they are even classed as unhelpful. Part of the explanation for this poor perception must be due to the fact that throughout the country the extension service has all but ceased to function (in one village sample nobody had encountered an extension officer since 1985). As Extension constitutes the main conduit of information and advice, villagers feel they are getting little help from research institutions.

This steep downturn in service delivery coincides rather ominously with the initial phases of decentralization. District agricultural officials in Mbale report that extension activities are given a low priority by District Administrations and funds to the service cover salaries but allow for nothing else. Officials on the District Councils accept this as a problem but

complain themselves that the funds they have control of are barely sufficient to cover their sitting allowances. The extension service is generally staffed by competent officers, the older ones very experienced but lacking recent training, the younger members (many recent graduates in Mbale District) finding it difficult to establish themselves in their posts under conditions of low payment and poor resources. It would seem, on the face of it, unfair to write off the service simply because its officers are not paid, trained or otherwise supported sufficiently to do their job. NGOs recognise this and frequently make use of "semi-dormant" extension officers, facilitating their travel and providing training and additional allowances. Under these circumstances the extension network can be very effective (e.g. the work carried out by the Mount Elgon Conservation and Development Project, Mbale) but farmers' access to support depends on there being an NGO active in agricultural extension in their village. In general, coverage is low and the co-ordination between NGOs with different funding sources and objectives is typically very poor. With the continuing trend of reduced donor support for local level NGOs it would seem unwise to dismiss or dismantle the extension service unless there is an alternative with the potential to provide relevant coordinated support country wide. It is in this light that the elements of the PMA and NAADS restructuring proposals need to be critically assessed.

The NAADS restructuring

In common with the PMA, NAADS emphasises agricultural intensification and commercially oriented farming. Again, as with the PMA, it may need to more explicitly acknowledge that most farmers will, in the short-term at least, be most concerned with constraints to subsistence agriculture and their needs are most likely to be in this area. The commercially-oriented minority in any farming community will doubtless find it easier to articulate demand and pay for services. However, there is a danger that, as it is in this commercial direction that the policy makers want agriculture to develop, the needs of subsistence farmers (the poor majority) might be less well met. The NAADS proposal does recognise this, at least in part, and there is a commitment to finance services to subsistence farmers entirely from public resources. However, the public resourcing of the service will have to increase many-fold if this commitment to support poor subsistence farmers is to be fulfilled. Though the mechanism for this has been carefully mapped out it will require hitherto hard to achieve levels of efficient, transparent, well-funded and organized administration, particularly at the District and Sub-county levels. There is a sense of the principles of decentralization and privatization being pursued to a rather over-optimistic extent in these proposals.

NAADS and Research

The 'supply-driven' element to service provision may also become important.

Much of the job of an agricultural service provider is to transmit information that already exists in some form to the farmer, rather than generate new information through research. The information may need to be simplified, screened or otherwise repackaged to make it more accessible but new research is not required to provide this part service. Indeed the PMA does recognise that a number of technologies have been developed at research institutions, but have largely remained on the shelf. What is needed is a mechanism that makes them available to farmers. A great deal of the advice and support relevant to intensive commercial crop farming is of this type. There remains, however, a need for basic and applied research in agriculture in Uganda, particularly for subsistence crops grown on small farms under low input conditions. It is technically very difficult to sustain intensive subsistence production with few or no inputs. Many of the past failures in extension and poor uptake of promoted management options can be blamed on advice that was based on assumptions concerning the

production environment (biophysical and socio-economic) that were invalid or simply wrong. Real solutions may be complex, only partial or they may need time and research investment to develop. The uncertainty, costs and time involved in generating effective advice for low input farming are all likely to lead to the privatised service being reluctant to enter into contractual obligations with subsistence farmers and to a tendency to concentrate on commercial farmers and farming. This tendency would be reinforced if the funding for services to subsistence farmers is less secure. Again the example described in Box 1 demonstrated this point.

The mechanisms for commissioning and funding this research, some of which should be long-term, and the forming of research outputs into locally specific advice are not convincingly mapped out in the current policy documents. Whilst there does need to be a mechanism for adapting and refining research outputs and advice to fit with the local and even field-specific environment a lot can be said for co-ordinating and centralizing some aspects of these services. For example, in this research one of the strongest demands expressed by farmers was for help in dealing with some major crop pests and diseases e.g. cassava mosaic virus and Sigatoka disease in bananas. Clearly it would be impractical for numerous privatised bodies all to tackle such issues independently. Probably few of the new service providers will have this type of long-term technical research capacity. This implies that the research institutions and in particular the National Agricultural Research Organization (NARO) will retain this role nationally and that two way information flows between this institution and the many private service providers, NGOs, etc. must function well, particularly if subsistence farmers are to be better served. The difficulties in successfully maintaining and co-ordinating these flows and linkages between NARO and other research organizations and large numbers of different service providers appear, on paper, to be greater than the existing, albeit poorly functioning, research/extension system.

The role of farmer groups and fora

The proposal recognises the requirement for a major improvement in the representation and empowerment of poor subsistence farmers. It describes farmer groups as “the core institutions of the NAADS Programme” and proposes that farmers with common interests and/or similar socio-economic characteristics should form into groups that prioritise and articulate their demands to sub-county and District “farmer fora”. These fora will further prioritise demands and then commission service providers. The fora also manage all aspects relating to costing, monitoring and evaluation of the advisory services. This proposal is radical and intrinsically viable though the envisaged system appears rather complex. There are several stages in this process where the original farmers' demands are summarised, prioritised and passed on by others. At each stage there is a danger that the commercialization imperative of the PMA and different agendas of those wielding power on the groups will disadvantage the poorer less empowered farmer. In addition, although it would be unfair to assume these new groups and administrations will be hijacked by individuals intent on corruption and personal gain it would be naive to assume the potential for such problems will be any less than with the current systems. It does seem that there are many points of entry for under-representing poor farmers and malpractice with the NAADS and this must be cause for concern.

7. Conclusions

In summary, the underlying assumption of both the PMA and NAADS is that, although most rural people are currently engaged in subsistence farming, with support, the majority can move into more intensive market-oriented agriculture. The picture emerging from this

research is that most farmers want to do this. However they are currently experiencing so much difficulty with their subsistence farming that the majority are a very long way from even contemplating the investments necessary to begin intensification. The NAADS proposal appears to underestimate the size of the 'ready to intensify' market sector and there is a danger that resources allocated to the poorer more vulnerable majority may be woefully inadequate. There remains a need for well-formulated research in the agriculture sector based on a recognition of the resource constraints under which small-holder subsistence farmers operate. Yet there is a danger that research will be under-emphasised in the new NAADS as it demands levels of access to research capability, long-term funding and efficient linkages with existing research institutions that are somewhat optimistic.

The agricultural intensification focus of PMA is well placed in Uganda but this research suggests its vision of how this will develop and how long it will take needs to be more flexible. Rural livelihoods are diversifying away from agriculture in areas where land pressure is intensifying and the effects of this seem to be overwhelmingly positive. Although most people would prefer to remain in farming they benefit from diversifying and resources generated off farm are just as likely to be reinvested in farming activities as elsewhere, particularly as most people's aspirations appear to revolve around farming. Paradoxically perhaps, policies associated with the PMA need to facilitate the diversification of the majority of households, particularly in intensively farmed areas, away from agriculture to generate some resources that could then allow them to take the intensification route.

The success of the NAADS in its current proposed form is far from certain. All the signs are that the required effective, well co-ordinated agricultural service with strong links to research and an explicit undertaking to focus on the needs of poor subsistence will be difficult to deliver via the current proposals. Although less radical it may make more sense to address the undoubted weaknesses of the existing Extension Service but build on its strengths: good coverage, largely competent personnel, and a potential to deliver advice and research expertise to Ugandan subsistence farmers.

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Appendix 1 Income profiles for study villages (source: LADDER survey data).

Income Portfolios (%) for Mbale villages

Income Source	Bukhasusa	Buwopuwa	Bunabuso
Crops	62.3	47.5	50.6
Livestock	4.4	11.1	2.3
Fisheries	0.0	0.0	0.0
Other NR	2.9	8.1	6.1
Non-farm	29.7	30.0	39.6
Remittances	0.7	3.3	1.5

Income Portfolios (%) for Kamuli villages

Income Source	Iyingo	Kiribairya	Kinamwanga
Crops	17.7	0.9	2.6
Livestock	7.9	4.5	3.5
Fisheries	42.6	29.8	35.8
Other NR	0.6	21.9	11.3
Non-farm	28.8	42.0	45.8
Remittances	2.4	0.8	1.0

Income Portfolios (%) for Mubende villages

Income Source	Kabbo	Kansambya	Kalangaalo
Crops	51.8	70.4	48.6
Livestock	11.7	5.0	5.1
Fisheries	0.0	0.0	0.0
Other NR	4.9	4.7	8.8
Non-farm	31.4	19.5	36.4
Remittances	0.2	0.5	1.1