

NATURAL RESOURCES INSTITUTE



The Use of Purchased Inputs by Small-holders in Uganda

**Proceedings of a workshop
held at Mukono, Uganda**

4–5 February 1999

**Edited by Ann Gordon
and Andrew Goodland**



DFID Department for
International
Development

**USE OF PURCHASED INPUTS BY SMALL-HOLDER FARMERS IN
UGANDA**

**Proceedings of a workshop organised by the Natural Resources Institute,
Colline Hotel, Mukono, Uganda, 4-5 February 1999**

Edited by Ann Gordon and Andrew Goodland

**Funded by the Crop Post-Harvest Research Programme
Department for International Development (UK)**

Contents	Page no
Abbreviations list	
Background	1
Purpose of workshop	2
Overview of presentations	2
Conclusions and recommendations	4
Where next?	7
Papers presented:	
Modernization of agriculture and use of purchased inputs by farmers in Uganda by Dr W. O. Odwongo	8
Production credit for small-holders growing cotton: Uganda case study by Andrew Goodland and Ann Gordon	20
Production credit for small-holders growing cotton: Zimbabwe case study by Andrew Goodland and Ann Gordon	28
Credit provision for small-holder farmers: lessons from Uganda and Zimbabwe by Andrew Goodland and Ann Gordon	36
Strategies for the intensification of small-holder agriculture in Uganda by Mark Wood	43
The Production and marketing of agricultural seeds in Uganda by Fred Muhhuku	53
Constraints to agricultural technology and input use in Uganda: NARO's contribution, strategies and opportunities to enhance adoption by William Nanyeenya and Peter Ngategize	59
Private input suppliers working with the communal sector in Zimbabwe by Tonneth Gazi	70
Developing the small-holder market for fertiliser in Uganda by John Magnay	75
Annex 1: list of participants	78

Abbreviations list

ADC	Agribusiness Development Centre (Uganda)
AEATRI	Agricultural Engineering and Appropriate Technology Research Institute
AFC	Agricultural Finance Corporation (Zimbabwe)
ARDP	Action Research and Development Programme
AT (U) Ltd	Appropriate Technology (Uganda) Ltd
ATAIN	Agent Training and Input Network
BAT	British American Tobacco
CBO	Community based organisation
CDO	Cotton Development Organisation (Uganda)
CMB	Cotton Marketing Board (Zimbabwe)
COREC	Coffee Research Centre
DANIDA	Danish International Development Agency
DAP	Draught animal power
DEC	District Extension Co-ordinator
DFID	Department for International Development (UK)
FAO	Food and Agriculture Organisation of the United Nations
FARMESA	farm level applied research methods in eastern and southern Africa
FIRI	Fisheries Research Institute
FORI	Forestry Research Institute
FOSRI	Food Science and Technology Research Institute
GDP	Gross Domestic Product
GMB	Grain Marketing Board (Zimbabwe)
ha	hectare
IDEA	Investment in Developing Export Agriculture
KARI	Kawanda Agricultural Research Institute
kg	kilogram
LIRI	Livestock Research Institute
LSCF	Large-scale commercial farmer (Zimbabwe)
M	Management (ie crop management)
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MAP	Modernisation of Agriculture Plan
MRR	Marginal rate of return
NAARI	Namulonge Agricultural and Animal Production Research Institute
NARO	National Agriculture Research Organisation
NCAL	National Census of Agriculture and Livestock
NGO	Non governmental organisation
NRI	Natural Resources Institute
NSCS	National Seed Certification Services
NSIA	National Seed Industry Authority
SAARI	Serere Agricultural and Animal Production Research Institute
SDDP	Soroti District Development Programme
SG2000	Sasakawa 2000
SSCF	Small-scale commercial farmer (Zimbabwe)
TDT	Technology Development and Transfer
UCDA	Uganda Coffee Development Authority
UGEA	Uganda Exporters and Ginners Association
UNBS	Uganda National Bureau of Standards

USAID	United States Agency for International Development
Ush	Ugandan shilling
USP	Uganda Seed Project
UVAN	Uganda Vanilla Ltd
VRC	Variety Release Committee
ZFC	Zimbabwe Fertiliser Corporation
ZFU	Zimbabwe Farmers Union
ZAROC	Zonal adaptive research and outreach centre
ZOC	Zonal outreach centre

Background

The Natural Resources Institute has been conducting preliminary research on experiences with private sector provision of credit to small-holders for production inputs¹. The initial research focused on the cotton sectors in Uganda and Zimbabwe, where input credit different systems are in operation. The intention is to distil key conditions from these experiences with a view to identifying potential applications in other sectors.

The research has highlighted the extremely low input/low output nature of most farming systems in Uganda, and very low use of even the most fundamental components of improved technology ie., improved varieties (either open-pollinated or hybrid seed) and fertiliser. There are a number of factors influencing this which can be categorised under four broad headings: affordability, physical access, awareness and commercial context. Access to credit influences affordability and can certainly play a role, but it is clear that other factors are equally important. Box 1 lists some of the issues which impinge on the use of purchased inputs.

<p>Box 1: Issues affecting small-holder use of purchased inputs in Uganda</p> <p>AFFORDABILITY</p> <ul style="list-style-type: none">• production economics• cost – and cost components (eg transaction costs)• unit size• credit – and target beneficiaries (eg farmers or traders)• role of subsidies <p>PHYSICAL ACCESS</p> <ul style="list-style-type: none">• supply of seed (domestic or imported)• availability of appropriate technology (varietal testing and development)• timeliness• trader and retailer networks <p>AWARENESS</p> <ul style="list-style-type: none">• extension (decentralised extension services, NGOs)• “demonstration effect” (eg areas adjacent to Kenya or Uganda Seed Project farms)• commercial promotion• role of media <p>COMMERCIAL CONTEXT</p> <ul style="list-style-type: none">• the extent to which farmers operate in the commercial sector• farmer confidence in markets – and market instability• commercial activity undermined by handouts?
--

¹ This work is funded by the Crop Post-Harvest Research Programme of the UK Department for International Development

Purpose of workshop

The workshop in Uganda provided a forum for discussion of these issues, and helped identify priorities for further work. The purpose of the workshop was fourfold:

- (a) to identify key issues affecting use of inputs by small-holders
- (b) to identify situations and circumstances, or interventions, which facilitate increased use of purchased inputs by small-holder farmers (and conversely to identify types of initiatives which do not work)
- (c) to identify possible new strategies to increase the use of inputs by farmers, including consideration of targeting (farmer type, crop or region), and public/private NGO/commercial roles, and
- (d) to inform the development of proposals for further work.

Participants drew on practical and policy experience relating to the use of farm inputs in Uganda – providing commercial, NGO, government and donor perspectives. A full list of participants is attached at Annex 1.

Overview of presentations

The keynote address on the first evening was given by Dr Willie Odwongo, senior policy analyst at the Agricultural Policy Secretariat. He set agricultural intensification within the context of the Ugandan Government's policy for the "modernisation of agriculture". Modernisation carries many different meanings – but he stressed the need to commercialise agriculture, and the role of the agricultural sector as the "engine of growth". He described the on-going process of consultation and consensus building to elaborate this policy, and listed ten priority areas for the development of workable strategies. A number of these areas are relevant to farmer use of purchased inputs (extension, rural finance, agricultural marketing and private sector development, for instance) – but the importance of a holistic approach to these issues was stressed.

The following day, presentations by Ann Gordon and Andrew Goodland, provided background on the research and consultations carried out by NRI prior to the workshop. The experiences with small-holder input credit in Zimbabwe and Uganda provide some useful lessons, and highlight a range of mechanisms, suitable for different situations, to ensure repayment of input credit by small-holders. Low use of purchased inputs is a constraint on small-holder productivity in both countries – but small-holder farmers in Zimbabwe appear to make more use of purchased inputs than their counterparts in Uganda. Some are able to pay for these out of savings – and all benefit from more developed input distribution networks than currently exist in Uganda.

Mark Wood, of the Agribusiness Development Centre (ADC), took up the theme of intensification, drawing on ADC's experiences with maize and beans. He stressed the importance of farmers adopting a business-minded approach to the management of their agricultural activities. Action in three areas would increase farmer incomes, he

contended: technology transfer, input supply and output marketing. ADC is working with local partners to encourage small-holder adoption of high yielding varieties, fertiliser and improved crop management. It is piloting selective support to input distribution and retailer networks – to try to develop sustainable commercial systems. In the area of output marketing, ADC is testing a community-based system which focuses on improved quality and handling, as well as price information. In addition, higher yields will result in lower per unit production costs – making it easier for farmers to cope with price instability in output markets (notably low prices).

Fred Muhhuku's presentation dealt with the production and marketing of agricultural seeds in Uganda. He drew on his experience as marketing manager of the Uganda Seed Project, to explore the issues surrounding the Ugandan farmer's preference for retained seed and traditional varieties. He stressed the need for: increased farmer awareness; better varieties; supply of other inputs; policy and institutional change to support private production and marketing where appropriate, and informal non-market methods in other areas; and improved seed certification and control.

John Magnay, managing director of Magric (U) Ltd, Uganda's largest agricultural input supply company focused on the extremely low use of purchased inputs by Ugandan small-holders, and the problems faced by the commercial sector in trying to develop this market. He emphasised the undermining effect of projects (both relief and development) which distribute free or subsidised inputs to farmers. Invariably, a portion of these consignments are resold in local markets at less than cost – making it very difficult to establish a commercially sustainable distribution system based on world market prices. Transport costs are also a problem, with Uganda's landlocked status contributing to high cif prices, and poor infrastructure and the dispersed rural market adding a further 50-60% by the time agro-inputs reach the farmer.

Tonneth Gazi provided an interesting alternative commercial perspective, by describing the strategy adopted by Agricura - an agro-chemical company in Zimbabwe which has deliberately targeted the small-holder sector. A strong technical department and depots throughout the country have helped Agricura link to retailers and farmers groups, working through their own local co-ordinators, as well as NGOs, extension agents and other formal institutions serving the rural sector.

William Nanyeena's presentation focused on the lessons learnt by the National Agricultural Research Organisation on agricultural technology dissemination and transfer. He stressed a number of inter-related issues affecting farmer adoption of improved technology: the importance of zoning, to develop farmer-relevant recommendations; the role of standards and regulation; the promotion of commercial distribution networks; the need for more information on economic fertiliser application rates; the role of credit; district-level public resources and services; potential to explore scope for selective irrigation; and the use of organic fertiliser to complement inorganic fertiliser.

The presentations were followed by group discussions and a plenary session to develop final conclusions and recommendations.

Conclusions and recommendations

The two working groups addressed:

- farmer level constraints and strategies for increased use of purchased inputs, and
- issues and strategies for input provision.

Their conclusions are presented in Boxes 2 and 3.

Box 2: Farmer-level constraints to increased use of purchased inputs

Constraints	Strategies
Poor availability of inputs in rural areas	Careful targeting of donor support in the market Distribution through local stockists Lobby politicians to reduce free/subsidised inputs
Poor input knowledge - general perception, knowledge of technical and economic benefits, and criteria to determine quality of input	Use mass media (especially radio) to disseminate information Lead agency to co-ordinate information strategy
Cost of inputs	Make available price information (selected markets) Distributors to monitor/advise stockists on prices Share distribution networks to reduce costs Encourage group (bulk) purchases
Output market – Demand uncertain and low	Improve farmer market awareness and knowledge Reduce production costs so low prices less critical
Dependency syndrome - expectation of free inputs	Requires concerted effort by Government, and others, to channel/influence donor assistance
Low purchasing power	Improve farmer productivity Concentrate initially on selected crops, areas, inputs Strengthen savings mechanisms
Contradictory messages/signals	Lead agency to harmonise messages and formulate guidelines
Commercial systems undermined by well-intentioned subsidised interventions	Stakeholders should act as pressure group to draw Government's attention to negative effect of well-intentioned but misguided interventions
Pack size not commensurate with size of farming operation	Make inputs available in appropriate pack size Scope for selective use of group purchase schemes

Box 3: issues and strategies for input provision

Categories of inputs	Technical packages Planting and stocking materials Farm tools, implements and machinery Agro-chemicals
Providers/sources/channels	Government (including local Government) Private NGOs (and CBOs, and farmer organisations) Projects Donors
Issues	Strategies
Weak demand	Training and demonstrations Provision of information
Pricing	Affordability Pack size Suitability for small-holder cropping systems
Product effectiveness	Demonstrations Record-keeping and data analysis Farmer to farmer
Packaging	Labelling, seal, form and appropriate size
Product quality	Certification, labels/seals (indicate shelf-life) Inspections
Increasing volumes handled	Improve infrastructure (especially roads and telephones) Financing More effective distribution networks
Handling/storage/transport	Health and safety precautions Training Regulations Stores Financing to build up distribution and retail network
Policy and legal framework	Policy and legislation supportive of business development, financial services, product quality assurance systems, and infrastructure development

The differing perspectives represented at the workshop resulted in wide-ranging discussion. Yet once the working group presentations had been made, four critical areas emerged as key issues:

- communications
- developing sustainable commercial input distribution systems
- instability in output markets, and
- the overall “conditioning environment” which affects farmer choices and private sector activity.

Communication issues arise at all levels. Farmer-sensitisation is important – to raise awareness of input use and to encourage a more “business-like” approach to farming operations. Farmers generally have very limited knowledge of purchased inputs, and how to use them. There is a need for better information on appropriate application regimes, and crop management practices that help farmers get the most benefit from purchased inputs. Whilst some of this work has been done, there is a need to update and extend it – and to make the results available in an accessible form. Agricultural sector support is still very fragmented, with little synergy and consensus amongst the various players. The extension service is under-resourced, with considerable district-wise variation in coverage. The “modernisation of agriculture” policy has helped create a shared vision – though even this is open to different interpretations. (Odwongo’s presentation highlighted the “commercialisation” interpretation). At all levels (farmers, agricultural services and policy), communication flows and linkages are critical.

The high cost and almost absent input distribution networks were a major focus of debate. The provision of free or subsidised inputs by Government, projects or NGOs, although well-intentioned, was identified as a particular constraint to the establishment of sustainable commercial distribution systems. Government’s role should be concerned with standards, regulation, and possible credit guarantees. The importance of actions which facilitate commercial activity, and the need to avoid those that undermine private initiative, were stressed. Low volumes currently contribute to the high cost of eg., fertiliser – and considerable discussion was focused on how to provide support which would raise demand to a level where costs would fall because of the higher volumes handled. It is worth noting here that credit was not seen as a critical determinant of increased demand. However, it was recognised that credit is one tool amongst many that private distributors and retailers might nonetheless use, at their own discretion, to increase their sales to small-holders.

Uncertainty in output markets was identified as a key factor affecting input use, and this explains ADC’s focus on (a) strengthening farmer marketing strategies whilst also trying to encourage greater use of inputs, and (b) reducing per unit production costs so that lower output prices, although unwelcome, are less critical. Perishability and uncertain harvests lead to inherent instability in crop markets, but for some crops in Uganda the instability is extreme. Uganda’s location amidst several large countries subject to periodic crop failure contributes to this (significant volumes of food crops are traded informally across Uganda’s borders), and the situation is compounded by large relief purchases (particularly of maize) - again mainly for neighbouring countries.

Participants also highlighted the critical importance of the overall conditioning environment. Uganda’s commercial economy virtually collapsed in the late 70s and 80s – and in many parts of the country, small-holders retreated into subsistence activities. Commercial activity in rural Uganda is still very limited, and there is a lack of critical mass in many sub-sectors. Government policy is now firmly pro-private sector – yet it will nonetheless take time to resource and develop capacity in the “enabling” areas which are now seen as the sphere of government. Increasing levels of corruption, if they continue unchecked, may also act as a brake on economic development.

Where next?

The issues highlighted in the final session have clear implications for further work. There is a need to strengthen messages and dissemination mechanisms so that farmers can make informed choices. Some of the information is already available, or may need fairly straightforward updating, and some will require new research on crop management and input application rates. Information on strategies which make selective use of purchased inputs alongside soil and water conservation techniques, or IPM, may be particularly relevant to resource-poor farmers. Research and extension should focus on those cropping systems most relevant to resource-poor risk averse farmers.

Partnership approaches (involving commercial, NGO, CBO and public sector players) were viewed as a promising way to extend improved technology. There is already some experience and experimentation with such schemes in Uganda – but there is scope to develop this further, and to explore potential in poorer less progressive parts of the country. (The ATAIN programme has worked largely in the agriculturally more progressive Mbale area). The decentralisation process in Uganda may offer potential to create these synergies and partnerships at the local-level. Decentralised extension services are already being partially resourced from district-level donor projects and other local initiatives.

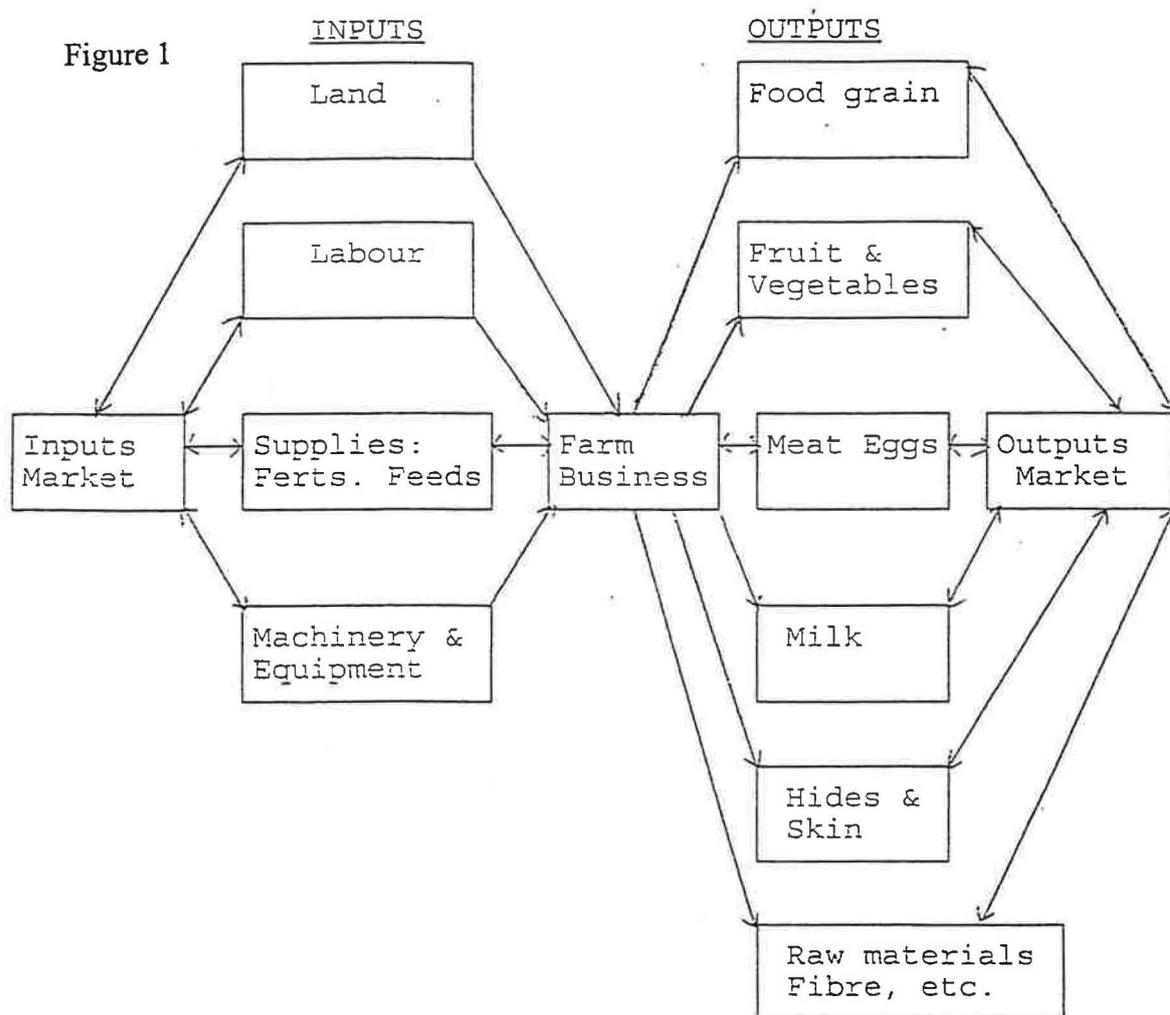
The distribution of seed and fertiliser is particularly critical. Where possible and appropriate, private sector provision should be encouraged – and the proposed privatisation of the Uganda Seed Project is an important step. The commercial sector was also seen as a potentially important source of extension – though the necessary conditions to assure impartiality of advice would have to be identified. However, under any scenario, farmers are likely to continue using retained or locally available seed for a large part of their needs – and consideration should be given to how these informal systems might be strengthened. Complementary inputs are also likely to be different for these systems, which may give a weaker response to fertiliser, for instance. The commercial sector may need better information on traditional farming systems, in order to meet the input needs of those farmers. However, for some systems and farmers, the need for purchased inputs may be minimal.

Donor support will be needed to take this agenda forward, and NRI will seek to explore further development of these areas with partners in Uganda.

Modernization of agriculture and use of purchased inputs by farmers in Uganda
by Dr W. O. Odwongo, Principal Policy Analyst, Agricultural Policy Secretariat

I. Introduction

Agricultural production system and its peculiarities may be depicted as the "Farm Business" illustrated in Figure 1 below.



Whatever the level of its advancement or development, a farm must be considered as a business because it uses resources (inputs) to produce outputs for economic purpose. A farm business usually comprises of a number of enterprises: e.g. maize, beans, coffee, cotton, livestock, poultry horticulture, etc. Each of these enterprises uses some land and some labour. The farmer may also improve his enterprises by using modern inputs, the aim being to get a greater output. If the farmer gets good prices for his/her outputs, the returns will be greater than the costs of inputs, and the farmer will have improved on the household income.

In developed agricultural systems, farmers require and use large quantities of inputs other than land and labour. Such inputs, which originate from elsewhere, must be brought to the farm in some cases by farmers themselves but usually by specialized dealers in such inputs. Likewise, the outputs of farmers must be taken to be sold or consumed in places far away from them. The farm business is thus linked backwards into the input markets and forward into output markets.

There must also be a considerable amount of investment in infrastructure in order to sustain the agricultural system. Likewise, research and extension services, farmer training, agro-input supply networks, fertilizer and chemical factories, feeder roads, etc require large investments. On the marketing side, investments are required for crop processing factories, transport fleets to distribute products, marketing institutions, selling etc.

In any country there are thousands, even millions, of farmers with different farm businesses. The magnitudes of the total inputs used and the total outputs produced can be substantial indeed. These thousands or millions of farm business, including their inputs and outputs and the related supporting infrastructure and services, make up the agricultural economy. In some countries farmers have invested considerably in their farm businesses and they use high levels of inputs which result in high outputs. In others, it is not so and low levels of output are associated with low investments and low input use. The challenge facing African countries is how to transform their agriculture from the present low input/low output systems into high input/high output systems capable of meeting the food security and nutritional requirements of a rapidly growing population and a modern economy.

It is in the context of viewing agriculture as a business as described above that we find ourselves discussing the Modernization of Agriculture Plan.

II. Agricultural Sector Policy Reforms Implemented under the Policy Agenda

Up until end of the 1980s, growth in the agricultural sector in Uganda was hampered by a series of structural constraints related to: (i) Government and parastatal monopolistic control of food and export crop marketing and pricing which inhibited incentives to improve the quality and quantity of output; ii) inadequate infrastructure facilities such as transportation facilities, bad roads, poor communications facilities etc. iii) shortages of foreign exchange for importation of critical agricultural inputs and high and unpredictable inflation and physical insecurity. In addition, agricultural growth was constrained by a series of institutional factors which included (v) ineffective and inefficient Government research and extension services and (vi) segmented, inefficient and discriminatory markets for capital, labour, and agricultural inputs. Most of these constraints have been removed under the Agricultural Policy Agenda implemented under the Economic Recovery Program implemented during the last decade.

However, although most of the reform programs implemented under the Policy Agenda were very successful in reversing the decline in the agricultural sector performance recorded during 1970s and 1980s, the sector remains largely undeveloped and unable to meet the challenges of a modern economy. There are also still a number of fundamental constraints affecting growth in the sector up to today. Some of these constraints, possible solutions and the benefits that can be derived in removing them are presented in Annex

1. I leave the detailed discussions on them for the main plenary of the workshop tomorrow.

It is in this context that the Modernization of Agriculture Plan was conceived. The plan has been set within the framework of the Government's medium term economic policy which aims at maintaining macro-economic stability with low inflation, rapid broad based economic growth and a viable external balance of payments. Specifically, the following specific targets and policies are envisaged for the medium term:-

- i) Achieve real GDP rates of 7% a year.
- ii) Maintain a competitive exchange rate
- iii) Hold inflation below 5% a year and
- iv) Maintain gross international reserves at around 5 months of imports of goods and non-factor services.

III. Rationale for Modernization of Agriculture

However, we may find it appropriate to pause and ask the question - What does modernization of agriculture mean and imply? The concept 'modernization of agriculture' has to different people a number of different meanings. It may mean specialization, monetization and commercialization of the subsistence farm, adoption of new technology such as mechanization and use of chemicals, large commercial farms, agrarian reforms and strong agro-industries etc. In the Ugandan context, the focus at least in the short term is on commercialization of the subsistence farm. But the situation is not static and in the long term perspective the focus may be different. I leave to you to discuss the possible scenarios for the unfolding of events in the long term perspective as the modernization process progresses.

World-wide experiences demonstrate that modernization of agriculture will propel the process of transformation of the economy away from agriculture to non-agriculture sectors more rapidly than focussing on any other sector. Moreover, these experiences show that once a country gets the agricultural sector growing rapidly, then the country is on the high way to mass eradication of poverty. These observations were amply illustrated in the context of Uganda in the Technical Workshop on MAP in September 1998 by the Permanent Secretary/Secretary to the Treasury as follows:-

- i) The main engine of growth has to come from technological progress through the introduction of new techniques, which increase factor productivity through higher yielding seeds and improved agronomic practices. This has the dual effect of decreasing the cost of production per unit of output and increasing output per unit input.
- ii) The higher incomes arising from technological improvements increase household incomes whose increased expenditures on non-farm outputs stimulate non-farm non-agricultural growth and increase national income from other sectors of the economy.

- iii) Also the technological change enables the agricultural sector to produce more food and allow food prices to decline. However, it is possible for farmers to absorb lower food prices because the cost of production per unit output will have declined. Thus, it is possible for farmers to absorb lower food prices, which in turn leads to the fall in poverty level as it directly improves the real incomes of all the poor living in urban areas where they are not producers of food.
- iv) The declining food prices also improve the terms of trade for the manufacturing industry and lower the real wage income of employees engaged in the manufacturing sector, which should stimulate labour intensive industrialization.
- v) Lower food prices stimulate the growth of labour intensive exports across all sectors of the economy and therefore, higher rates of economic growth. The large contribution of the agricultural sector to the foreign exchange earnings has a significant contribution for financing imports.
- vi) Increased productivity also improves the linkages between the agricultural and non-agricultural sectors of the economy through improved inter-sectoral movements of labour and capital. Also the surplus generated by agricultural growth contribute to expanding investments in the non-agricultural sector and the rest of the economy.
- vii) Modernization of agriculture will lead to rural development as it will entail investments in rural infrastructure especially feeder roads, telephones, rural electrification, market development, post offices, schools, rural health services agricultural research stations, cost effective water harvesting and irrigation infrastructure and market based rural credit institutions to provide credit to farmers and rural non-farm enterprises. These investments improve the terms of trade in rural areas mainly through reduction in transaction costs.
- viii) It is envisaged that the modernization of agriculture would also entail land reforms, which would provide security of property rights, develop land markets and increase efficient utilization of land and investments.

IV. Strategy for Modernization of Agriculture

Government strategy right from the time of conceptualization of the modernization process in 1996/97, has been to adopt extensive and consultative as well as consensus building strategy involving all stakeholders participating in the agricultural sector. In this context, following extensive review of private and public sector roles, Government has decided that in the next three to five years, its main thrust for public action, in the modernization of agriculture will be to:-

- i) finance extension services for smallholders
- ii) finance agricultural research for smallholders
- iii) finance control of epidemic diseases and pests

- iv) finance capacity building for production of foundation seed
- v) provide regulatory services
- vi) finance collection of agricultural statistical data and production and marketing information
- vii) finance the implementation of land reforms
- viii) finance capacity building of agriculture related institutions including private, NGO and rural financial institutions
- ix) set policies and regulations to foster the expansion of the private sector supply of modern inputs and services (including establishment of rural financial services)
- x) construct fish landing sites
- xi) finance development of irrigation information and capacity building of small houses in water harvesting, soil and water conservation.

In addition the Government will consider whether, and if so in what way, Government should:-

- xii) finance the establishment of rural markets for smallholders
- xiii) facilitate the establishment of non-governmental institutions to provide finance and risk insurance to smallholders.

Given the need to focus its limited financial resources the Government will not;

- supply or produce planting materials or other agricultural inputs (except for research development purposes and in emergency situations e.g. cassava mosaic).
- supply AI services or proven bulls
- process and market agricultural outputs
- subsidize or provide credit directly to farmers
- install irrigation infrastructures.

Along the above line, Government has now with support from DFID of the UK and DANIDA formed a Steering Committee under the Chairmanship of the Permanent Secretary/Secretary to Treasury to elaborate and refine the Modernization Plan within the next 12 months. Under the Steering Committee there is a technical committee comprising technical representatives of all major stakeholders. The Technical Committee is charged with the following functions in order to move the Modernization Plan forward during the next 12 months.

- i) To identify the resource envelop available for public investment in the sector during the medium term period. A tentative budget was submitted to donors in the Government Statement on the Modernization Plan during the Consultative Group Meeting here in Kampala in December, 1998.
- ii) To carry out a wide range of consultations with stakeholders in order to create a shared national vision for the sector.
- iii) To identify the appropriate roles for the central and local Governments as well as private sector in the Modernization process.
- iv) To work out a strategy and where appropriate incentives for greater private sector investment in the sector.
- v) Work out institutional arrangements required for implementation of the Plan.

The above tasks have further been divided into ten thematic task areas requiring further consultations with stakeholders and indepth analysis and studies before deriving workable strategies for the modernization plan. These areas are briefly discussed below:-

- i) **National Vision and Strategy for MAP** - The issue here is sensitization, education and mobilization of the wider public about the process.
- ii) **Agricultural Research and Training** - The main issue here is priority setting given the limited public resources which is also related to demand driven research. Another issue is technology transfer to the main users and the issue of private sector participation in agricultural research.
- iii) **Agricultural Extension** - Agricultural extension performance has generally been disappointing so the issue is to find alternative and effective approaches to extension. The other issue is the role of the various players at the national district and sub-county levels in delivering extension services in the decentralized arrangement. Related to this is the issue of funding the extension services and monitoring as well as accounting for funds in the decentralized arrangement.
- iv) **Rural Finance** - There is still the problem of designing a workable and sustainable market based credit delivery mechanism.
- v) **Farmer and Private Sector Involvement** - The whole strategy of MAP is that the bulk of the work and investment will have to be undertaken by the private sector. The main issue is therefore, how to trigger and increase private sector participation in the program.
- vi) **Strengthening of Legal Regulatory and Institutional Arrangements** - The key issues here are (i) to clearly define the roles of central Government, Local Government and Community authorities in the modernization (ii) to develop institutions with physical and human capacity to carry out the modernization

process (iii) to define the legal and regulatory framework for the different stakeholders.

- vii) **Agro-processing and Marketing** - Promotion and development of agro-based industries is a key activity. Also development and promotion of marketing opportunities, identification of markets, provision of marketing information, etc.
- viii) **Land Reforms and Management** - Make recommendations on most appropriate land reforms and management strategies for the MAP.
- ix) **Forestry and Environmental Protection** - Handle all issues related to forestry and environmental protection.
- x) **Resource Envelope and Public Investment** - Establish a realistic resource envelope for MAP.

V. Concluding Remarks

The issues pertaining to use of purchased inputs by Ugandan farmers in the modernization process are therefore, quite diverse but inter-related and mutually reinforcing and in order to derive optimal results from purchased inputs, a holistic approach to all these issues is paramount. This is the basic thrust of the modernization of agriculture process.

Annex 1:

MATRIX FRAMEWORK OF CONSTRAINTS AND STRATEGY FOR MAP

Constraints	Key Elements of Constraints	Effects	Solutions	Benefits
1. Marketing Infrastructure	<ul style="list-style-type: none"> - Poor feeder roads - Poor communications - Absence of power supply - Poor marketing facilities - Absence of processing industries - Absence of market linkages 	<ul style="list-style-type: none"> - High transaction costs - Non-competitiveness of agricultural produce - Subsistence production - Absence of market incentives for agricultural growth 	<ul style="list-style-type: none"> - Allocate adequate resources for rural infrastructure development and maintenance - Rehabilitate and develop rural infrastructure - Rehabilitate and develop rural markets - Promote agro-processing - Develop forward and backward market linkages 	<ul style="list-style-type: none"> - Market incentives to stimulate growth - Reduction in transaction costs - Improved comparative advantage for agricultural products - Increased marketed outputs - Increased farmers income - Reduction in rural poverty
2. Technology Generation and Dissemination	<ul style="list-style-type: none"> - Low input-output technology - Weak research, extension linkages - Ineffective extension 	<ul style="list-style-type: none"> - Low yield and lower area cultivated - Lack of technical know-how and adoption rate - Lower value added - Lower growth rate - Lower household income - Increased rural poverty 	<ul style="list-style-type: none"> - Develop high yielding technological package for small holder farming system through adaptive research - Effectively transfer technology and update farmers technical know-how - Strengthen research / extension - Involve private sector in extension on cost recovery basis 	<ul style="list-style-type: none"> - Efficient and high yielding modern agriculture - Increase in yield and area under cultivation - Increase in farmers income - Reduction in rural poverty - Reduced drudgery of farm work for women through labour saving technology
3. Lack of Access and Availability of Finance in Rural Areas	<ul style="list-style-type: none"> - Absence of commercial bank branches - Unwillingness of banks to finance rural people - Absence of rural institutions for credit delivery and saving mobilisation 	<ul style="list-style-type: none"> - No production credit to farmers and rural enterprises - No investment in agriculture and rural enterprises - Inability of farmers to adopt high yielding technology - Lower growth rate 	<ul style="list-style-type: none"> - Improve access of rural people for credit by establishing sustainable rural financial system - Develop capacity of rural intermediaries for credit delivery and saving mobilisation - Mobilise donor funds for rural 	<ul style="list-style-type: none"> - Viable village banks / RFLs - Increased rural investment - Rural saving mobilisation - Increased growth - Increased household income - Increased export earnings - Reduced rural poverty

MATRIX FRAMEWORK OF CONSTRAINTS AND STRATEGY FOR MAP

Constraints	Key Elements of Constraints	Effects	Solutions	Benefits
	<ul style="list-style-type: none"> - Ineffectiveness of informal agencies in rural finance - Failure of Government directed credit schemes - Absence of rural credit policy 	<ul style="list-style-type: none"> - Low income of households - Increased rural poverty 	finance	
4. Weak Grassroot Institutional Capacity	<ul style="list-style-type: none"> - Absence of village level stake holder institutions to provide bussiness advisory services - Lack of capacity of existing stakeholder institutions - Dominance of Government institutions and absence of private sector players 	<ul style="list-style-type: none"> - Lack of technical knowhow and bussiness skills - Absence of bussiness advisory services - Absence of market information dissemination - Absence of quality control services 	<ul style="list-style-type: none"> - Promote and develop capacity building of village level community based institutions for bussiness advisory services to provide technical guidance on product development, choice of technology, and quality management, bussiness skills, financial management, consultancy and market information 	<ul style="list-style-type: none"> - Mobilisation of producers - Improved capacity and technical knowhow of rural people in production - Rural entrepreneurship and bussiness enterprise culture - More investment and more growth
5. Human Resource Development in Rural Areas	<ul style="list-style-type: none"> - Poor and inadequate education, health and water facilities - Ineffective extension services - Lack of emphasis on agricultural curriculum in education - Inadequate resource allocation for functional literacy and training - Absence of focused farmers training program/ demonstration plots - Non-attraction of farming to youth and educated 	<ul style="list-style-type: none"> - Illiterate farmers and lack of technical knowhow - Absence of modernisation of agriculture - Lack of adoption of high yielding technology - Low productivity and low growth rate - Low farm household income - Increased rural poverty 	<ul style="list-style-type: none"> - Improve social infrastructure for education, health and water supply - Strengthen extension services - Promote vertically integrated production and promote private sector involvement in extension - Allocate more resources for functional literacy and training program for rural people - Develop and introduce agriculture education as part of education curriculum 	<ul style="list-style-type: none"> - Educated and Progressive farmers - Improved knowledge and productive capacity of people - Higher adoption rate of new technology and modern agriculture - Development of rural entrepreneurship and rural enterprises - Increased household income - Reduced rural poverty

MATRIX FRAMEWORK OF CONSTRAINTS AND STRATEGY FOR MAP

Constraints	Key Elements of Constraints	Effects	Solutions	Benefits
6. Policy and Legal Constraints	<ul style="list-style-type: none"> - Absence of conducive land and tenure system - Absence of incentive investment policy for promoting investment in large scale farming and agro based industries in rural areas - Cumbersome and costly licensing and registration procedures - Absence of regulatory framework for quality and certification services 	<ul style="list-style-type: none"> - Absence of competitive land market - No inheritance and property rights to women for land - Difficulties in mortgaging land as security in absence of title deeds and ownership rights - Insecurity of land tenure - No investment in rural areas - No rural industrialisation - Lack of rural employment - Rural migration - Increased rural poverty - Absence of rural enterprises to provide market linkages affecting growth, employment and income of rural people - Lack of marketability of agricultural products - Uncompetitiveness of agricultural products in world market - Reduction in market surplus - Reduced export earnings - Reduced household income 	<ul style="list-style-type: none"> - New land policy and legislation to provide free ownership rights on land and free access - Decentralise and simplify land registry and title transfer - Improve women inheritance rights and access to land - UIA to formulate incentive policies to induce both local and private sector investment in rural areas - Simplify and decentralise licensing and registration procedures - Make easily accessible facilities for licensing and registration - Establish grass root institutions for quality control and certification services - Promote vertically integrated market led production 	<ul style="list-style-type: none"> - Free access to land - Land market and competitive land price - Access to credit through land as security - Increased investment on land - Optimum use of land - More investment in rural areas - Rural industrialisation - Increased rural employment - Reduction in rural migration - Reduction in rural poverty - Development of rural micro enterprises - Quality products for local and world markets - Market-led production growth - Increased income of farmers

MATRIX FRAMEWORK OF CONSTRAINTS AND STRATEGY FOR MAP

Constraints	Key Elements of Constraints	Effects	Solutions	Benefits
	<ul style="list-style-type: none"> - Absence of enforcement of environment policy in rural areas 	<ul style="list-style-type: none"> - Soil erosion, deforestation and environment degradation - Destruction of bio-diversity - Missuse of natural resources 	<ul style="list-style-type: none"> - Appropriate land use planning - NEMA to enforce environment policy to address environment concerns and control environment degradation - Development of environment friendly and socially acceptable technologies/practices - Organise community based sensitisation programs for environment concerns 	<ul style="list-style-type: none"> - Proper and optimum land use - Conservation of environment - Coservation of bio-diversity
7. Information Constraints	<ul style="list-style-type: none"> - Absence of regular and reliable market information - Absence of bussiness advisory services - Weak research and farmer linkages for technical data - Non availability of reliable price and production statistics in rural areas - Absence of early warning system in rural areas - Lack of communications 	<ul style="list-style-type: none"> - Lack of technical and market information - Inability of rural people to decide what to produce, what to market and at what price to sell - Subsistence farming 	<ul style="list-style-type: none"> - Develop bussiness advisory service centres for provision of information services - Improve capacity of stake holder associations to provide information to their members - Strengthen district governments' statistical departments - Strengthen early warning system to provide services to rural areas 	<ul style="list-style-type: none"> - Improve access to information of rural people - Improve availability of regular and availability of information in rural areas - Improve ability of rural people to plan production and marketing of produce - Increase income of rural people

MATRIX FRAMEWORK OF CONSTRAINTS AND STRATEGY FOR MAP

Constraints	Key Elements of Constraints	Effects	Solutions	Benefits
8. On-farm and Off-farm Storage	<ul style="list-style-type: none"> - Absence of appropriate technology for on-farm and off-farm storage facilities - Lack of technical know-how and store management - Lack of credit for construction of storage facilities 	<ul style="list-style-type: none"> - Post crop harvest losses - Quality deterioration - Reduction in production and growth - Reduction in farmers income - Inability of farmers to plan marketing of crops 	<ul style="list-style-type: none"> - Generation of appropriate technology - Sensitisation of farmers on technology - Availability of credit for storage facilities 	<ul style="list-style-type: none"> - Increased production - Increased household income - Reduction in rural poverty
9. Effects of HIV Infestation	<ul style="list-style-type: none"> - Spread of HIV - Labour intensive technology - Lack of health facilities 	<ul style="list-style-type: none"> - Reduced labour availability and uncertainty of supply - Lower labour productivity - Lower household income - Increased rural poverty 	<ul style="list-style-type: none"> - Improve Health facilities in rural areas - Sensitise rural people on HIV effect - Develop capability of HIV affected families to undertake income generating activities - Provide credit to establish income generating activities 	<ul style="list-style-type: none"> - Improve labour supply - Improve labour productivity - Improve income of HIV affected families - Reduce rural poverty

Production credit for small-holders growing cotton: Uganda case study

by Andrew Goodland and Ann Gordon, Natural Resources Institute

Introduction

Smallholder access to credit is recognised as a critical constraint to agricultural development in sub-Saharan Africa. In the past, credit was sometimes provided by public sector institutions - typically parastatals with agricultural marketing monopolies, involved in input and output marketing, or state banks. In most countries in Africa, the parastatal marketing boards have now been replaced by private traders, whilst the state banks have been privatised or forced to reform and tighten their operations. This puts the onus of service provision onto the private sector.

The agricultural supply response to market liberalisation in sub-Saharan Africa has been extremely variable and often disappointing - particularly for food crops. In many areas, it appears that policy-makers overestimated the commercial response to market reform, taking insufficient account of the risk, information gaps and high transaction costs associated with small-holder marketing. This has left certain regions and crops poorly served by marketing networks and associated rural services.

Despite this, there are situations in which the private sector provides credit to small-holders - and there is increasing interest in partnership approaches involving the commercial sector, NGOs and government. NRI has been conducting research in Uganda and Zimbabwe, looking at experiences of commercial provision of credit to small-holder farmers for production inputs - with a view to identifying successful models with potential application to different situations. The initial research focused on the cotton sector in both countries.

The cotton sector in Uganda

Uganda's cotton crop is grown entirely by small-holders. Cotton is typically grown in rotation with food crops. Yields are low (approximately 300 kg/hectare): although pesticides are used, there is negligible use of fertiliser. Production is also constrained by draft animal shortages in some of the northern and eastern parts of Uganda, where cattle rustling was a problem in the early 90s. The Cotton Development Organisation is responsible for the purification and dressing of seed, which farmers now purchase.

There has been considerable institutional change in the cotton sector. Cotton production peaked in 1969/70 at nearly 470,000 bales of lint. However, after 1972/73 production declined dramatically. A Government order issued in 1964 had required the ginneries to be taken over by the co-operative unions. Gradually chronic management and financial problems arose, which together with the poor prices set by the Government, undermined farmer confidence in the crop. By 1987/88, production had fallen to just 12,000 bales. In 1993, however, the Government commenced a programme of cotton sector liberalisation. The ginneries are once more privately-run, and cotton production has started to increase again. Production this season (1998/99) is expected to be around 150,000 bales. However, small-holder access to and use of inputs is still a major issue.

Credit for small-holders growing cotton

Prior to liberalisation, cotton small-holders received inputs (seed and pesticide) on credit from the state, which were distributed through the co-operatives. This system of input delivery created a dependency on the state, and led small-holders to believe that they were receiving inputs free of charge, though in actual fact they were paying through lower farmgate prices. With the dismantling of the system, there has been concern that small-holders would be unable to access production inputs. This concern is most acute among the ginnery owners who have invested in ginnery modernisation/rehabilitation, and are dependent upon the small-holder sector for the provision of raw material for their ginneries.

Private non-financial sector initiatives to provide credit to cotton smallholders

North Bukedi Cotton Company.

The North Bukedi Cotton Company is one of the largest ginners in the country with an annual demand for 15,000 tonnes of seed cotton. The reluctance and/or inability of smallholders to pay for inputs during the 1996/7 season prompted North Bukedi to consider alternative input delivery arrangements, and as a result inputs (seed and pesticides) were provided on credit. During the 1997/8 season, some 78,000 smallholders across eastern Uganda received seed and pesticide on credit and under signed agreements to sell their produce to North Bukedi. North Bukedi also provided extension advice to participating farmers.

The results of this were very disappointing, with a very low recovery rate, and the scheme has been discontinued. Small-holders failed to honour the agreements they had with North Bukedi. The system broke down due to two main factors:

- the price offered by North Bukedi for seed cotton was lowered so that the company could recover their outlay for inputs; other ginneries were able to offer higher prices and purchase from farmers in the scheme; and
- the weather in 1997/8 was extraordinary (due to the effects of El Nino) and particularly detrimental to cotton production, with a drought during the planting season and heavy rains during harvesting; the Ugandan crop, originally forecast to be 150,000 - 200,000 bales of lint, was in fact closer to 30,000 tonnes.

Lessons from the North Bukedi experience:

1. Agreements struck between the company and smallholders were virtually impossible to enforce. Attempts to recover loans through the seizure of assets (such as bicycles) created hostility and bitterness, and proved unworkable.
2. Screening and monitoring borrowers, and enforcing repayment, becomes increasingly expensive and problematic the larger the scale of operation. Effective administration of a scheme involving 78,000 smallholders is problematic.
3. As long as there are other buyers in the market who are able to offer higher prices, such interventions are prone to failure (in the absence of enforceable agreements).

Uganda Ginners and Exporters Association (UGEA)

The bad experiences of North Bukedi (and Lonrho, which operated a forward buying scheme) during the 1997/8 season resulted in heavy losses. Other ginners and

exporters also had poor years, in part due to the low harvest. The approach to private sector provision of inputs clearly was not working, due primarily to the difficulty of enforcing repayment in a competitive market.

The response has been the establishment of the Uganda Ginners and Exporters Association (UGEA), which has been registered as a limited company. All ginners and cotton exporters are members of the association. Working closely together, the Cotton Development Organisation and the UGEA have developed and implemented a new scheme aimed at providing inputs to small-holders. The distribution of the inputs is being co-ordinated by the CDO in collaboration with the Ministry of Agriculture, Animal Industry and Fisheries.

When field work was by conducted the authors in the second half of 1998, there was considerable optimism about the scheme, which appeared to be working well, despite some initial problems. The size of the harvest, and the ability to sustain and increase output in subsequent years will be the real test of this approach. The following appear to be particularly critical to the scheme's success:

1. timely distribution of inputs on a large-scale requires a sophisticated distribution system; there were some delays in distribution in 1998, but since these were not too severe, the harvest may not have suffered greatly; and
2. input costs are recouped through a levy payable on volume of cotton ginned; to minimise levy avoidance, independent monitors have been placed at each ginnery, and border officials and local spinners briefed on the potential problem of illegal sales, although it is not yet clear whether these measures are adequate.

In addition there are three issues which have implications for the sustainability of the scheme:

- a large potential problem relates to how the scheme has been set up. Inputs are provided on credit, but the repayment is based on volume of output, rather than volume of input. The result is that the smallholders have no incentive to use the inputs prudently. For example, a smallholder may take enough pesticide to treat 10 hectares, but only treat one hectare, and find an alternative use for the remaining pesticide (used on other crops or sold). The individual farmer is not penalised for this, as the repayment is made via a flat rate deduction on the price of seed cotton, irrespective of how much input was used. Whilst extension advice and monitoring may reduce such abuses, it is unlikely that this will eliminate the problem altogether.
- the scheme is vulnerable to covariate risk, for instance if climatic conditions led to widespread crop failure and consequent mass default by the ginneries.
- the long-term financial sustainability of the scheme is difficult to assess as currently the interest rates obtained on the input loan are below commercial market interest rates, and the loan is guaranteed by the Ugandan Government. Moreover, the logistical support provided by the Cotton Development Organisation is presently provided free of charge.

Alternative sources of credit for cotton smallholders

In addition to the private non-financial sector, there are several potential sources of credit for cotton farmers:

1. from initiatives/interventions taken by the public sector to target credit to cotton farmers
2. from initiatives taken by the public sector to target credit at smallholders in general
3. from the formal commercial banking and financial sector
4. from the semi-formal micro-finance sector, including NGOs
5. from the informal sector.

Although there are several pilot schemes underway currently, and considerable interest in innovative ways to increase small-holder access to credit, none of these alternative sources provide a sustainable, reliable and widespread source of credit for smallholder activities at the present time. As a consequence, the private sector cotton ginneries have had to play a leading role in supplying credit.

Experience with input credit in other sectors

Tobacco: BAT operate a sophisticated and successful input credit scheme in a competitive market. For 1998, BAT has entered into agreements with 48,000 smallholders who cultivate tobacco on an average of 0.3 hectares.

Key lessons:

- Guaranteed prices announced before start of the season
- Law to safeguard farmers and company
- Trust between the company and smallholders built up over time
- Distribution system ensuring timely delivery of inputs and payment for produce.
- Strong extension support

Vanilla: A company called UVAN Ltd works with a vanilla growers association, and has successfully operated a input credit scheme. The basis for the success of this scheme is the close relationship and trust between the company and the association. With respect to the credit system, the transaction costs of screening and monitoring are lowered by their transfer to the association, which has the incentive to ensure that loans are repaid so as not to jeopardise the relationship with (and income from) UVAN.

Experiences of ADC:

ADC has had mixed experiences with outgrower/input credit schemes. The most common problem is the presence of multi-marketing channels. When there is more than one marketing channel, growers can often avoid loan repayment by selling their crop to another buyer - leading to the collapse of the schemes. However, ADC is currently involved in a number of innovative input schemes, which appear to have met with more success.

Small-holder access to credit - some lessons

The case study of the cotton sector of Uganda and the insights gained from other sectors can be used to identify the characteristics of an agricultural commodity system which potentially lends itself to private non-financial sector provision of credit.

1. Low degree of transferability of credit.

If repayment is to be collected at the time of crop purchase, it is important that the credit supplied must be put to the right use – i.e. for the production of the crop in question. To a certain extent, this can be achieved by providing the credit in kind, i.e., actually providing the input (for example seed, pesticides). Providing cash carries a large risk of being diverted for other expenditures.

2. Lack of alternative uses for output.

If the output has any value other than to the processor or trader providing the credit, then there is a risk that not all of the produce will be available for purchase by the credit provider. This is particularly relevant for food crops which can be consumed at the household level or sold in food markets. In this scenario, the household is ‘free-riding’ on the inputs supplied by the lender, and the lender therefore cannot capture the full benefit of the inputs.

3. Mechanisms exist to ensure recovery of the credit

Strategic default or side marketing – when the smallholder decides to sell to a buyer other than the lender – is a common problem in implementing such credit schemes. Three options are available to avoid this:

Enforcing repayment. Recovery of loans can be enforced where agreements made between a private sector lender and the smallholder borrower are legally binding and taking legal action against defaulters is possible. Collateral can be used to secure loans, and may be seized.

Creating incentives for repayment. If the borrower has a strong incentive to repay the loan, strategic default is less likely. The most common incentive to the smallholder will be the maintenance of a working relationship with the lender. If smallholders recognise the benefit of entering into an agreement with a specific private actor, then they have an incentive not to jeopardise the future benefits of maintaining that relationship.

Removing the option of strategic default. Strategic default can only happen when there is more than one buyer in the market. Where there is a geographic monopoly, non-fungibility of inputs, and a lack of alternate uses for the output, then the potential exists for a credit scheme. However, especially after economic liberalisation, this is rarely the case. Unless a monopoly can be mimicked by cooperation between buyers, strategic default is likely. This has been the approach in the cotton sector with the formation of the UGEA effectively removing the possibility of escaping repayment of the loan.

4. Private sector has incentive and means to provide credit.

The private sector will only take the initiative to develop a smallholder credit scheme if there is a benefit in doing so. Certainly, if capital investments have been made (for instance in processing facilities) there is a strong incentive. This is the case for processors (for example in the cotton and tobacco sectors).

Sufficient liquidity is a pre-requisite: access to funds to make loans to smallholders. Larger, international companies have an advantage here, as they do not have to rely on domestic sources of financing, though if they did approach the banking sector for loans, they are more likely to secure loans than smaller traders and processors.

The above four conditions appear to be essential for the success of private non-financial sector provision of credit. In addition however, there is also a set of facilitating conditions which may enhance the potential success of this approach.

Monitoring systems and extension services

Efficient and effective use of the inputs provided will increase the chances of sufficient production to pay off the loan. Appropriate use of inputs can be ensured through extension advice and monitoring of smallholders.

Lowering transaction costs.

The transaction costs associated with the operation of an input credit scheme include the costs of screening smallholders, distributing inputs, monitoring the use of inputs, and collecting the harvest. These costs are ultimately passed down to smallholders via lower prices for their output, and if they can be reduced then theoretically smallholders stand to increase their incomes (though this will depend on their bargaining power), and therefore their incentive to participate in such a scheme. Farmer groups and associations may have an important role in this respect, as they can take on responsibilities for screening, distribution, monitoring and bulking up, and provide a contact point for group extension activities.

Potential applications to other sectors in Uganda

Food crops. A wide variety of food crops are grown in Uganda, including maize, beans, sorghum, millet, rice, cassava, bananas (matooke), sweet potato, groundnuts and Irish potato. These are crops which are produced for household production and traded in local markets. Production is low input, with a heavy reliance on household labour. If processed, much of this is done at household level. Some of these commodities may be exported to regional markets, for example maize and beans.

Theoretically, traders could provide inputs, especially improved seed, on credit in return for access to the crop for marketing. Similarly, input suppliers could provide inputs on credit - particularly if this were directly linked to output marketing, or linked indirectly through an arrangement with output purchasers. However there is very little evidence of this happening.

Food crops do not appear to be good candidates for private non-financial sector credit.

- Food crops can be consumed in the household, or traded locally, so there is a significant risk for the trader of not recovering the crop/loan.
- There are many potential buyers, increasing the likelihood of strategic default.
- Traders, especially small-scale local traders, who have the advantage of local information and monitoring, may not have access to finance, given the reluctance of the commercial banking sector to lend to the agricultural sector.
- Input usage is low – hence demand for credit may also be low.

Traditional export crops

Coffee: Yields could be improved by replacing old trees or increasing the use of agro-chemicals. Credit may have a role to play in any programmes to increase productivity. The largest potential constraint to the involvement of processors and exporters would appear to be the fierce competition and large number of buyers, though as has been seen in the cotton sector, such constraints can be overcome. There is evidence of advance buying of coffee – local agents are contracted by coffee processors and exporters to make advance purchases of coffee from smallholders. The money provided from the exporters and processors, via the local agents, could in theory be channelled to purchasing inputs and to pay for labour for harvesting.

Tea: Tea production consists of large and small estates, complemented by smallholder outgrowers with land areas averaging less than 10 hectares. There are no significant alternative uses for the tea crop, and this is clearly important in the potential success of input credit schemes. Multiple buyers in the market is a potential problem: there is evidence that some of the estate factories have purchased from outgrowers to improve their capacity utilisation.

High value export crops: Recently, a number of high value crops (for example chillies, vanilla, ginger, roses) have emerged as potentially profitable smallholder crops. There is considerable potential for outgrower schemes for these crops. Both smallholders and the companies involved stand to benefit from the schemes and therefore have incentives to make the schemes work.

Edible Oils: Vegetable oils in Uganda have traditionally been derived from groundnut, sesame, cottonseed, shea and more recently from sunflower and soya bean. There are also plans to introduce oil palm. Some oilseeds may offer potential for private provision of credit. Groundnuts are traditionally used as a valuable whole food, and their cost precludes significant use in oil extraction in Uganda. Similarly, sesame is used as a food crop. For both groundnuts and sesame, the problem of the diversion of the crop to household consumption is likely to rule them out as potential crops for input credit.

Sunflower may have more potential as a candidate for input credit, and farmer interest in sunflower has increased with the introduction of small-scale processing options and high oil yielding seed. Oil palm may also be a suitable candidate for credit - particularly as there is no tradition in Uganda of household-level processing or direct food-use of the fruit.

Conclusions

Market liberalisation and the provision of credit.

The use of purchased inputs by smallholders remains low in Uganda. Smallholders, who were previously dependent upon inefficient state systems for the provision of inputs, are now increasingly dependent upon the private sector. Credit has an important role to play in increasing access to inputs. The commercial banking sector may eventually provide loans for agriculture, and small holders – but this will take time. Likewise for the semi-formal micro-finance sector: in time they may return to the agricultural sector, but it is currently regarded as high risk. Legislative support to recognise the semi-formal micro-finance institutions may help, plus the sharing of

experiences. The removal of marketing monopolies and the introduction of competition place considerable strain on the operation of input supply-output marketing linkages, by greatly increasing the scope for strategic default by farmers. However, these problems can be overcome (see cotton and tobacco).

Private non-financial sector credit versus alternative sources of credit.

The private non-financial sector has taken the lead in the provision of inputs in several sectors. Clearly though, this approach is not appropriate to all commodity systems, and the study has attempted to identify some key conditions that need to be in place for such an approach to work. Alternative sources of credit, notably the commercial banking sector and semi-formal micro-finance institutions, are currently reluctant to lend for agricultural activities, though there are several initiatives underway to try and overcome this. However, these schemes are medium to long term programmes. Hopefully, they will lead to the creation of viable and sustainable delivery systems which will be applicable to the whole of the rural economy, not just specific commodities.

However, the private input credit schemes do have potential for the short term at least, and it may be possible to identify other sectors where the private non-financial sector approach could work. Private provision of credit, linked to output marketing, may in fact offer considerable advantages over alternative sources:

- It is the interest of the lender to ensure that good quality inputs are used, and that these inputs are used so as to maximise their effectiveness. Credit may therefore be linked to monitoring and extension services (for example see tobacco and vanilla above) which serve to increase productivity and hence incomes for smallholders. These income-enhancing services are generally not available from alternative sources of credit.
- It is also in the interest of the lenders to deliver inputs on time; commercial bank loan application and disbursement procedures are often time-consuming and therefore risk late provision of inputs.

However, it is also important that non-financial institutions benefit from the experiences of the financial institutions. When non-financial entities get involved with credit provision, they need to be aware of the risks and risk-avoidance mechanisms. If not, then they could incur significant losses (as did both Lonrho and the North Bukedi Cotton Company during the 97/98 season).

The input credit schemes reviewed here have considerable potential in several commodity systems in Uganda, though these are exclusively for non-food crops. The schemes both increase availability of and access to inputs. They offer scope for wider application because:

- they can operate in a competitive market.
- incentives exist to provide inputs on credit to smallholders and for smallholders to use those inputs efficiently.

Screening, monitoring and enforcement issues are addressed using mechanisms which are effective and minimise transaction costs.

Production credit for small-holders growing cotton: Zimbabwe case study

by Andrew Goodland and Ann Gordon, Natural Resources Institute

Introduction

Smallholder access to agricultural services (financial services, inputs, extension, output marketing) is recognised as a critical constraint to agricultural development in sub-Saharan Africa. This is especially the case for those countries which have dismantled or reformed public sector institutions which previously had service provision responsibilities. These parastatal organisations typically had monopolies on the provision of inputs and the marketing of agricultural produce. Their withdrawal has put the onus of service provision onto the private sector.

The agricultural supply response to market liberalisation in sub-Saharan Africa has been variable but often disappointing, particularly for food crops. In many areas, it appears that policy-makers overestimated the commercial response to market reform, taking insufficient account of the risk, information gaps and high transaction costs associated with small-holder marketing. This has left certain regions and crops poorly served by marketing networks and associated rural services.

Despite this, there are situations in which the private sector provides credit to smallholders - and there is increasing interest in partnership approaches involving the commercial sector, NGOs and government. NRI has been conducting research in Uganda and Zimbabwe, looking at experiences of commercial provision of credit to small-holder farmers for production inputs - with a view to identifying successful models with potential application to different situations. The initial research focused on the cotton sector in both countries.

Private sector cotton companies in Zimbabwe have taken initiatives to provide services to smallholder cotton farmers. By linking the provision of credit, input supply and extension advice to the marketing of seed cotton, the companies have contributed significantly to the recent increase in smallholder cotton production. Their approaches provide lessons for other smallholder sub-sectors and demonstrate the potential for private sector involvement in the provision of agricultural services, which have been threatened by fiscal tightening and state withdrawal associated with economic reform.

The cotton sector in Zimbabwe

During the past decade there has been a marked shift in the pattern of cotton production. Large-scale production, with high levels of inputs and mechanisation, has declined, whilst smallholder production has grown. Smallholders typically cultivate cotton on small unirrigated plots with high labour inputs. This increase in smallholder production (which by the 1996/1997 season accounted for 72 percent of a total of 273,000 tonnes of seed cotton harvested) can be attributed to a number of factors, including: the perception of cotton as a drought tolerant crop; renewed confidence in securing cash income for seed cotton; and improved production services. The total number of smallholder cotton producers had reached approximately 200,000 by 1998. (By contrast large-scale commercial farmers were using profits generated by cotton to invest in more lucrative irrigated crops - notably flowers and fresh produce for export).

Yields in the smallholder sector are much lower than those in the large scale farming sector, averaging 740 kg/ha in 1996/1997. Low yields are a result of a combination of factors, including: rainfed production; poor soils; limited access to inputs; and poor crop management.

Prior to 1994, the Cotton Marketing Board (CMB) had a monopoly on the purchase of seed cotton. Since then, the CMB has been privatised (although the Government have retained a 25% share) and has become the Cotton Company of Zimbabwe (subsequently referred to as 'Cottco'). Since 1994, anyone is allowed to purchase seed cotton, and by 1998 there were three cotton companies: Cottco, Cotpro, and Cargill.

Credit for smallholders:

Credit for smallholders increases access to inputs, and therefore has a role to play in increasing smallholder productivity. However, small-holder access to credit is limited, and in practice smallholders use their own savings, or depend on remittances from relatives to make cash purchases. In times of extreme need, farmers may forward sell their crop to traders, but these "green loans" are provided on terms which are very poor for the farmer.

The commercial financial sector has minimal involvement with smallholders due to the perceived high risks of rain-fed crop cultivation, and the inability of smallholders to meet banking requirements, including the provision of collateral. For these reasons there is a very low banking presence in rural areas. The Agricultural Finance Corporation is a parastatal institution set up specifically to provide credit to the agricultural sector. It has had a mixed history, and has not been able to provide financial services to smallholders on a sustainable basis. Subsidised credit was available to all smallholders during the 1980s, though the high default rate and cash flow constraints have forced AFC to become far more disciplined in their approach to smallholder lending. Consequently, since the late 1980s there has been a steady reduction in the number of clients and in the amount loaned and AFC now has a much smaller clientele, though more reliable. AFC now plan to become an agricultural development bank and were expecting the license to be granted in late 1998. This will enable AFC to mobilise savings. With their extensive network in rural areas, the Agricultural Bank of Zimbabwe, as it will be known, should be well placed to provide financial services to the agricultural sector.

Other sources of credit and financial services, such as non-governmental organisations, have not reached smallholders to any significant extent.

Private sector provision of credit:

The cotton companies have taken an active role in supplying services, including credit, to small holders. The reasons for this can be attributed to:

1. The increased share of production by smallholders has meant that all three cotton companies are dependent to some extent on securing a supply of seed cotton from these producers. They have therefore sought means to increase the supply from smallholders by providing production services (input supply, credit and extension).

2. Excess ginning capacity within the country has heightened competition between the cotton companies, which have sought means of securing access to seed cotton. One way of achieving this is to link the marketing of seed cotton to the provision of production services.
3. The general paucity of agricultural services available to smallholders from other sources, especially those in remoter areas, has left the cotton companies with little option than to become involved in production credit and input supply.

Two of the three cotton companies (Cottco and Cotpro) have provided services to smallholders through input credit schemes. Input credit schemes involve the provision of production inputs on credit to farmers by the cotton companies, which recover the loans by having exclusive purchase rights on seed cotton produced by those farmers. The challenges of providing input credit to smallholders are the same as for all credit activities:

1. Screening potential borrowers to assess their creditworthiness and likelihood of repayment;
2. Providing credit in the right form and at the right time;
3. Monitoring to ensure that the credit is used productively;
4. Ensuring repayment of the loan

Avoiding default is the principal aim of the creditor. Default can be due to the genuine inability of a borrower to repay or it can be strategic. 'Strategic default' occurs when the borrower defaults on a loan intentionally. This may occur when the borrower believes that repayment can be avoided without jeopardising future income or access to credit. 'Strategic default' can occur where there are multiple buyers and 'side-marketing' is possible. 'Side-marketing' refers to farmers taking credit from one buyer but avoiding repayment by selling to another. For example, prior to the full liberalisation of seed cotton marketing, this was not a problem as the CMB was the only buyer of seed cotton. However, with three cotton companies now competing in the market, each being supplied by farmers and marketing middlemen, the problem of side-marketing has emerged. Currently, two of the three cotton companies are operating credit schemes. The experiences of the three cotton companies are summarised below.

Cotton Company of Zimbabwe

The Cotton Company of Zimbabwe (Cottco) is the largest company in the cotton sector, accounting for around 70% of seed cotton purchases and processing. Cottco was formed from the privatisation of the Cotton Marketing Board (CMB) in 1994. Cottco's input credit scheme started in 1992/1993 season after the severe drought of 1992 and money was made available from the World Bank to finance the scheme.

The scheme uses a number of mechanisms to minimise default:

- Credit is extended in the form of physical inputs (seed, fertiliser and pesticide) to farmer groups. The whole group is penalised if one member defaults, so there is an incentive for peer policing to ensure repayment. Groups are self-selecting, though all new members have to be able to demonstrate that they have a good track record in cotton cultivation. The size of groups has declined during the lifetime of the scheme.

- Considerable effort is made to forge close relationships between the company and the participating smallholders. Local Cottco agents are in year-round contact with smallholders, and additional services are provided by the company, including extension advice.
- Monetary rewards are given to groups with high repayment rates. Defaulters are followed up quickly and assets, such as cattle, can be seized. A debt collector has been contracted for this purpose.

In 1998, 50,000 smallholders were in the scheme. The repayment rate for the 97/98 season was 98 percent. In addition to those smallholders in the input credit scheme, many other smallholders purchase inputs from Cottco. Farmers also benefit from technical advice, for instance a weekly radio broadcast for cotton growers. The scheme is becoming increasingly sophisticated. In an expansion of the scheme, Cottco has recently introduced individual cash loans to farmers with a good history who are achieving high production. Furthermore, the Cottco scheme is insured. The risks covered are: death; permanent disability; sickness; and general default. Participants in the scheme are automatically covered as soon as they draw inputs from the scheme.

Although the Cottco experience has been largely positive, at the outset it was dependent on soft loans from the World Bank (channeled via the Zimbabwean Government). Without access to these funds, the scheme would have had to charge significantly higher interest rates during its crucial start-up phase.

Cotpro

Cotpro's input scheme is similar to Cottco's, though on a smaller scale with 5,000 farmers in 1998. It too uses a group lending approach and incentives for high repayment rates. The company has developed a network of distribution/collection points in areas where the scheme operates, and employs a number of local agents to implement the scheme. The scheme has been very successful, with full recovery of loans (up to 1998). Cotpro plan to expand the scheme modestly (up to around 8,000 smallholders), believing that the administrative and logistical burden of a larger scheme would threaten its successful operation. Unlike Cottco, Cotpro has not benefited from international donor funds, and has instead used funds from a number of different sources, including internal company funds and loans from the Development Division of AFC. Interest rates charged to smallholders are higher than those charged by Cottco, but significantly lower than prevailing market rates.

Cargill

Cargill does not operate an input credit scheme, and has no plans to do so. Company officials regard input credit as unnecessary because their supply requirements can be met by large-scale producers and from smallholders which are outside the other companies' input credit schemes. In addition, Cargill staff wish to avoid the significant administrative burden they perceive from operating such a service. Instead of being offered credit, farmers can purchase inputs for the following season when they sell their seed cotton to Cargill, without any obligation to sell the next season's crop to Cargill. Such a system has the advantage of not indebting smallholders, who in the current economic climate (November 1998 year-on-year inflation was 35%, and market interest rates were over 40%) may be reluctant to take credit for fear of long term indebtedness. High inflation also makes advance purchase of inputs attractive to those farmers who can afford to do so.

Conclusions from input credit schemes in the cotton sector

The credit schemes of both Cotpro and Cottco appear to be successful in terms of repayment and both companies have been able to secure a significant proportion of their seed cotton requirements through their input credit schemes. The total number of smallholders currently benefiting from the schemes numbers approximately 55,000 - out of an estimated 200,000 small-holders producing cotton. In Zimbabwe, many farmers are clearly able to grow cotton without credit, since most farmers use their own resources to purchase inputs.

The challenges of offering credit have been met through a combination of strategies:

- Screening of potential borrowers is performed by the group members who realise that they stand to lose if an unreliable farmer joins their group. In addition, both Cotpro and Cottco employ local agents who have local knowledge and are therefore in a position to assess the credentials of loan applicants.
- Close monitoring of the farmers throughout the season and links with the extension services (Agritex) ensure that the smallholders are putting the inputs to good use, thereby increasing the chances of loan repayment.
- Tying in extension services with the input credit scheme serves both to increase the productivity of those inputs, and also helps to create a closer relationship between the company and the smallholder, and smallholder loyalty to the particular company supplying credit.
- Incentives are offered for good repayment, whilst defaulters are dealt with swiftly.
- Generally, a combination of instilling financial discipline and weeding out potential defaulters has created a reliable clientele.

Future of the schemes

Neither Cottco nor Cotpro charge market interest rates in their programmes. This casts doubt over the long term sustainability of the schemes. Furthermore, the schemes have been operating during a period of relatively good production conditions, and therefore the companies involved have not had to confront the problem of mass default from severe crop failure (as there was in the 1991/2 season). Severe droughts are a fairly regular occurrence in Zimbabwe and so it would seem that it is only a matter of time before this problem will need to be addressed. Rolling the debt over to the following year is one possible response, though this would require the companies to find additional funds. Nevertheless, Cottco were able to recover from poor loan repayment experienced in the first year following liberalisation - suggesting that there may be sufficient liquidity or access to loans to cover poor harvests.

Key conditions for the success of input credit schemes.

The success of the input credit schemes in the cotton sector raises the question of whether such an approach could be applicable to other agricultural sub-sectors. The experiences of the cotton sector in Zimbabwe, together with the findings from related research by the authors in Uganda, reveal a set of desirable conditions for input credit schemes.

1. Low degree of transferability of credit: if the credit can be used for a different purpose (for instance, cash is highly fungible), there is a chance that it will be put

to a non-productive use, increasing the risk of default. Providing credit in the form of inputs minimises this.

2. Lack of alternative uses for output: when the output can be disposed of in a number of ways (for example, household consumption, local marketing or household processing), this reduces the likelihood that it will be used to repay the loan. Cotton, and other non-consumable and export crops, have limited value to smallholders.
3. Mechanisms are available to ensure the recovery of credit, for instance the use of groups and other incentives to encourage repayment and discourage default.
4. The private sector has an incentive and means to provide credit: *incentives* from having a need or benefit to operate a scheme, for example to maintain the utilisation rates of fixed assets such as ginneries; *means* from having access to sufficient funds to operate the scheme.

Input credit and smallholders in Zimbabwe

Input credit has been tried in a number of agricultural sub-sectors in Zimbabwe, with mixed results (see Box 1).

Box 1: Smallholder crops and input credit: experiences and potential.

High value horticulture crops (including babycorn, paprika): Outgrower schemes have been used to produce high-value horticultural crops for export markets. Such schemes are elaborate input credit schemes, with far higher involvement of the company in crop cultivation. Production generally requires intensive use of inputs, including irrigation which is not available to most smallholders in Zimbabwe. For small plots, small-holders may use bucket irrigation - and some companies involve large numbers of small-holders, each growing very small volumes.

Maize: Household consumption and local marketing have thwarted the successful operation of input credit for maize production in the past. The Grain Marketing Board is now proposing to launch a new scheme modelled on the cotton sector. However state intervention in maize markets may dampen private sector incentives to participate in input credit.

Soyabean: despite interest in promoting smallholder production of soyabean, oil processors have no incentive to launch input credit schemes as they can secure sufficient supplies from the commercial sector, where soya is grown for animal feed.

Groundnut: one input credit scheme is operating. The company involved (Reapers) has overcome the potential problem of household consumption by developing close ties with smallholders. With close monitoring of smallholders, and by instilling a sense of loyalty to the company, the risk of default is minimised.

Sorghum: Chibuku Breweries used to offer input credit for red sorghum. However, this was discontinued because, being the only major buyer, the brewery saw no need to operate the scheme to assure its supplies. The company does still distribute seed from its depots. Little use is made of agro-chemicals in sorghum production.

Alternative approaches to increasing smallholder access to inputs.

The experiences of the cotton sector demonstrate that even though input credit schemes are available, the majority of small-holders (around 70 percent) purchase inputs with cash from retailers or cotton companies. Access to inputs has two elements: firstly that farmers have the means (cash or credit) to obtain the input; and secondly, that the inputs are available. The cotton schemes address both of these elements. Other schemes focus on the availability issue.

The non-governmental organisation, CARE, has a programme which guarantees short-term input loans made by distributors to rural retailers, who in turn sell the inputs to smallholders. The performance of the programme is very encouraging. In its first year (1996/97) about Z\$4 million worth of inputs were sold to farmers and 95 percent of repayments have been made on time.

A private company, Agricura, which manufactures and distributes agro-chemicals, has specifically targeted smallholders for its products. The chemicals are packaged in small quantities to suit smallholder production, and a network of agents, who are paid on commission, spread awareness of the company and organise field days for farmers to purchase inputs and receive guidance on their usage.

Conclusions

In the absence of alternative sources of agricultural services, the role played by the cotton companies in increasing access to inputs is significant, especially the input credit scheme of Cottco. Cottco is largest single source of credit for smallholders in Zimbabwe, even though it is not a financial institution. It has developed its own methodology for lending. Micro-finance institutions could learn from Cottco's approach, whilst Cottco might benefit from software developed by micro-finance institutions - to manage the scheme as it becomes increasingly sophisticated. Cottco have recently started to provide cash loans to individuals, thereby becoming more akin to a micro-finance institution.

In other sectors, theoretically there is potential for both input suppliers and output purchasers to be involved in input credit schemes. There are difficulties: unless input supply is explicitly linked to output marketing, recovery may be difficult. Input companies have therefore focussed their credit scheme efforts at the retailer/agent level (for instance CARE programme). Alternatively, input suppliers have sought to increase the availability of inputs to smallholders (see Agricura above), without providing credit. Output buyers (processors, exporters) have been more reluctant to be involved with credit schemes. The situation in Zimbabwe, with a sizeable large-scale commercial sector means that only in certain commodity sectors (such as cotton) is dependence on smallholder production critical, and therefore there is little incentive to launch input credit schemes. None of the large agro-processors have a need to embark on input credit schemes as they can access all their raw material from the commercial farming sector.

Financial discipline appears to be strengthening in Zimbabwe, and has certainly improved much over the past decade, as demonstrated by the improvement in performance of the AFC and Cottco schemes. Good financial discipline significantly

increases the chances of success of operating input credit schemes, and even raises the possibility of transferring the approach to commodities where side-marketing or household consumption is a real possibility (for instance for food crops).

Despite the success of the cotton input credit schemes, there is a question mark over their sustainability because of their dependence on below-market interest rates. There has been no experience of charging market rates - though it should not be assumed that the schemes could not operate at the higher rates. Of more concern are the general economic conditions in Zimbabwe at present. High inflation and interest rates do not encourage rural finance. Savings rates are currently negative (in real terms). High nominal interest rates discourage smallholders from taking credit: investment in assets is seen as preferable, where it is an option. Purchasing inputs at the time of sale of seed cotton may become more popular, though storage of inputs may pose some problems.

The cotton company schemes have clearly extended and expanded access to inputs, but credit is only part of the solution to increasing input use. Many small-holders in Zimbabwe are able to purchase inputs without credit - and the availability of inputs in rural areas is at least as important as credit.

Credit provision for small-holder farmers: lessons from Uganda and Zimbabwe

by Andrew Goodland and Ann Gordon, Natural Resources Institute

Introduction.

The agricultural supply response to market liberalisation in Africa has been extremely variable, but often disappointing – particularly for food crops. For some crops and regions, it seems that policy-makers over-estimated commercial willingness to become involved in the marketing of small-holder production. Perceived risk, poor information and high transaction costs have contributed to an often weak commercial presence in the more marginal or remote areas. Yet the parastatals that formerly provided output and input marketing services, sometimes with a credit component, have been largely dismantled. This leaves a critical gap in the provision of agricultural marketing and associated rural services.

Smallholder access to agricultural services (financial services, inputs, extension, output marketing) is recognised as a critical factor in achieving productivity gains. State withdrawal puts the onus on the commercial sector to provide these services – and there is particular interest in partnership approaches which build on the competences of commercial, non-governmental and public players.

NRI has been conducting preliminary research on the conditions necessary for private provision of credit to small-holders. The initial research has focused on differing experiences from the cotton sectors in Uganda and Zimbabwe – where private cotton companies are involved in small-holder credit programmes – with a view to identifying other sectors or situations where these models could be applied.

Uganda and Zimbabwe have both recently been through periods of market liberalisation. Private companies in the cotton sectors of both countries have taken initiatives to provide agricultural services to cotton smallholders. The approaches taken in each country are markedly different, despite similarities in the problems faced. However, in both cases there are considerable grounds for optimism, with smallholder cotton production increasing, in part because of the credit schemes. Input credit schemes involve the provision of production inputs on credit to farmers by companies, which recover the loans by having exclusive purchase rights to the produce of those farmers. The schemes in both countries are still in their infancy, and questions remain over their sustainability, though they provide many lessons for the successful operation of input credit schemes in cotton and other sub-sectors.

Cotton sector development in Uganda and Zimbabwe

There are some parallels between the development of the cotton sub-sectors in Uganda and Zimbabwe, but also differences that help to explain the characteristics of the input credits schemes.

Similarities:

- Both Uganda and Zimbabwe have a long history of cotton production.

- Both countries have recently liberalised their cotton sectors. Prior to 1994, state parastatals held monopolies on the marketing of seed cotton. Market liberalisation has resulted in competitive purchasing markets.
- The market and state reforms have led to changes in local availability of inputs (seed, fertilisers and pesticides) for small-holders
- The small-holder sectors of both economies are poorly served by financial institutions (commercial banking sector, non-governmental organisations, parastatals), and there is little access to credit for small-holder crop production.
- The cotton sectors of both countries have received considerable support in recent years to regenerate the industries. In Zimbabwe, severe drought in 1992 had disastrous consequences for the whole agricultural sector. In Uganda, years of inefficient management of the cotton sector had dramatically reduced output and smallholder interest in growing the crop. In both cases, World Bank funds have been allocated to the cotton sector to aid recovery.

Differences:

- The structure of the agricultural sectors is different in the two countries. Zimbabwe has a significant large-scale commercial farming sector, accounting for about 1/3 of national cotton production in 1998.
- The agricultural sector in Zimbabwe is more developed than in Uganda, with good infrastructure, a well developed agro-processing sector, and relatively high input usage. However, some of these services are geared towards the large-scale commercial sector, which has far higher productivity than the smallholder sector.
- Uganda has a large number of cotton ginners (over 30), ranging from small operations with a single ginners, to larger international companies with networks of modern ginners. In Zimbabwe there are only three ginning companies, and the sector is dominated by the privatised Cotton Company of Zimbabwe. Given that Zimbabwe's production is also much higher than Uganda's, the structure of the ginning sector is considerably more concentrated in Zimbabwe.
- In Zimbabwe, small-holder cotton production increased in importance throughout the 80s, whereas recovery has begun in the mid-90s in Uganda.
- Zimbabwe is a significantly higher income country than Uganda, and commercial services are more developed in almost all sectors.

Different approaches to input credit

In both countries private companies have developed input credit schemes. The incentives to operate input credit schemes are similar in both countries: all companies are dependent to some extent on seed cotton from smallholders to maintain ginners utilisation rates; excess capacity in the ginning sector gives companies an added reason to seek ways to secure access to smallholder seed cotton; and, the general paucity of production services for smallholders threatens seed cotton production.

The input credit schemes have evolved differently, so that for the 1998/1999 season the schemes in the two countries have significantly contrasting approaches. The universal problem with input credit schemes is defaulting farmers, especially those who intentionally sell to an alternative buyer to escape repayment of their loan (known as 'side-marketing').

Uganda:

The withdrawal of the state from the distribution of cottonseed for planting was recognised by ginners as seriously jeopardising seed cotton production, and therefore threatening the ginning sector. The initial reaction of one of the larger ginneries was to launch an ill-fated input credit scheme. The scheme proved disastrous as the majority of smallholders defaulted on their loans, due to a combination of side marketing and a poor harvest (on account of El Nino-related weather effects). Farmers disregarded the agreement they had entered into with the cotton company and sold to other ginners offering higher prices. The cotton company making the loans found it impossible to enforce the purchase agreements, and attempts to seize assets proved unworkable.

In order to remove the possibility of side-marketing, the Uganda Ginners and Exporters Association (UGEA) has been formed, with compulsory membership of all cotton ginners. For the 1998/1999 season the UGEA has financed the input credit scheme from a Bank of Uganda loan. In developing and operating the input credit scheme, a critical role has been played by the Cotton Development Organisation (CDO), a parastatal formed when the sector was liberalised, to provide co-ordination and regulatory services. The CDO has coordinated the distribution of cottonseed and pesticides. Smallholders are free to sell their seed cotton to any ginner. The ginners are responsible for loan repayment, and these costs are met through a levy payable against volumes of cotton ginned by each ginner. (Volumes are assessed by independent monitors assigned to each ginnery). Average (not individual) input costs will be factored into the price paid to farmers. The problem of side-marketing has therefore been overcome by removing the option of selling to alternative buyers: all ginners are members of the UGEA so it is impossible for a farmer taking credit to sell to buyers outside of the scheme. Levy avoidance by individual ginners has been reduced by the presence of monitors, and dialogue with border officials and spinning factories, where ginners may try to make illegal sales.

Zimbabwe:

Unlike Uganda, there has been no cooperation between the three ginning companies in Zimbabwe. Out of the three companies, two operate input credit schemes (the Cotton Company of Zimbabwe (Cottco), and Cotpro). Both companies have a similar approach for overcoming the problem of side-marketing:

- All borrowers belong to groups of cotton smallholders. Default by one member of the group brings retribution to the whole group, which may be subsequently excluded from the scheme. This increases incentives to repay.
- Groups performing well receive cash rewards.
- If defaulting occurs, the companies act swiftly and come down heavily on defaulters, seizing assets when necessary.
- Local agents of the cotton companies are in year-round contact with smallholders, building closer relationships and a sense of loyalty to the company.
- Additional services are provided in addition to the input credit. Extension advice may be provided, and the Cotton Company has recently introduced cash loans. Again, these additional benefits of 'belonging' to a company help to strengthen relationships and loyalty.

Judging performance of input credit schemes

Schemes in both countries are still in their infancy. In Uganda, the performance of the UGEA scheme cannot be fully judged as its first season of operation has yet to be completed.

Judgement criteria	Countries	
	Zimbabwe	Uganda
Repayment	Cottco: 1997/1998 season repayment rate: 98% Cotpro: 1997/1998 season repayment rate: 100%	First season of operation yet to be completed
Coverage	For 1998/1999 season: Cottco: 48,000 smallholders Cotpro: 5,000 smallholders This represents about 25% of small-holder cotton farmers – generally farming on communal or resettled land (small plots, unirrigated, and typically on marginal land).	For 1998/1999 season. Cottonseed distributed to around 300,000 smallholder farmers, typically farming on small unirrigated plots. The scheme is intended to reach all cotton farmers (except those enrolled in a separate organic scheme)
Efficient use of inputs	Although no data are available, inputs are likely to be used efficiently. <ul style="list-style-type: none"> • Input use is closely monitored and extension advice is provided. • Farmers pay for inputs so have good reason to use them wisely • Inputs are supplied at cost price (cheaper than local market prices due to bulk buying by cotton companies and no retail margin. 	Again, no data are available. However, inputs are provided on credit, but the cost deducted uniformly from farmgate prices – regardless of the volume of inputs supplied to individual farmers. This weakens the incentive to use inputs efficiently. Combating this, monitoring and extension advice is provided.
Subsidies	Cottco: funds for the input credit scheme have come from the World Bank at below market interest rates. Cotpro: partly reliant on low interest Agric Finance Corporation loans	UGEA uses donor funds loaned at below market interest rates – and the loan is guaranteed by the Govt. CDO do not charge for the logistics support provided (Govt donor funds used for this)
Contribution to cotton sector development	Small-holder credit contributes to increased production – but significant numbers of producers do not use it	Production credit almost certainly a critical component in cotton sector recovery
Wider development impacts	Potential to expand financial services available to cotton farmers (eg savings schemes) – with wider development impacts Group approach helps build community-level capacities	Whilst cotton production may increase farmer incomes, the present input scheme does not contribute to wider farmer benefits relating to eg., group capacity-building and financial discipline

Why have the schemes evolved differently?

In Uganda the ginner decided that co-operation was needed to overcome the problem of side-marketing. Credit schemes implemented prior to this co-operation met with spectacular failure. In Zimbabwe, co-operation between the cotton companies has not proved essential. Instead, a set of other mechanisms has been developed for the successful operation of the schemes.

The development of the credit schemes has been affected by various factors:

- The Cottco scheme in Zimbabwe started prior to liberalisation, when the parastatal (Cottco's predecessor) still operated a crop purchase monopoly. Farmers participated in the scheme for two years before liberalisation, and this may have contributed to the successful continuation of the scheme when new companies entered the market. (There were initial problems with default immediately after liberalisation, but Cottco moved quickly to tighten up procedures).
- Financial discipline appears to be stronger in rural Zimbabwe, with farmers increasingly recognising the obligation to repay loans. Asset seizure in Zimbabwe has the desired effect of forcing people to repay, whilst in Uganda it has caused outrage and soured relationships between ginners and farmers. In Uganda, there has perhaps been more recent experience and expectation of loan amnesties, and weak follow-up by NGOs and state lenders (whose credit programmes ran at a loss). In addition, it was politically difficult to enforce loan repayment given that the poor harvest was largely attributable to extreme weather conditions.
- The use of groups in Zimbabwe has been beneficial to the input credit schemes. In Uganda there appears to be general scepticism towards groups, possibly due to bad experiences in the past. The capacity to run and facilitate such groups is almost certainly weaker in Uganda at the present time.
- The Zimbabwe schemes involve many incentives for good performance. Perhaps the greatest incentive is the opportunity to remain in the input credit schemes, which implies that they recognise the benefit of access to inputs. In Uganda, farmers rarely use fertilisers, and even pesticide use in cotton cultivation is not universal. They may perceive less benefit from participation in input credit schemes – hence the short run response of (effectively) compulsory participation (ie input charges are factored into seed cotton prices, regardless of participation).

Co-operation between ginners in Uganda may be possible because of the fairly level playing field they face. In Zimbabwe, Cottco effectively has a head start over the other ginners – and stands to gain little from sharing information with the others (though, of course, the latecomers would benefit from the information Cottco has on the credit and production records of individual farmers).

Moreover the UGEA mechanism in Uganda may be appropriate there because it is less demanding of skills and experience in providing services to small-holders. A group approach, for instance, would call for rapid learning on the part of the ginning companies, and co-operation with the stretched public and NGO services available in rural areas to facilitate and train groups. The relatively recent history of loan amnesties and opportunities for strategic default (intentional default, unlikely to jeopardise future income or access to services) would almost certainly exacerbate loan repayment. The UGEA mechanism could therefore be viewed as an imperfect pragmatic response to an immediate need to provide inputs to farmers, without which there would be little cotton production, and the newly rehabilitated ginneries would be uneconomic.

Although co-operation can be used to combat side-marketing, it also has some drawbacks. Cooperation dampens incentives for the individual ginners to provide additional services to farmers, for instance extension advice, as farmers have no commitment to sell to a specific ginner. However, it may be possible for the ginners

to provide cotton extension services collectively – and in so doing, realise certain economies of scale too. However, ginneries do stand to benefit from creating close relationships with growers, and although there is no evidence of it yet, theoretically ginneries could compete on additional service provision as well as on price.

Lessons from these experiences

The input credit schemes in both countries have led to increases in cotton production. There has been a steady increase in smallholder seed cotton production in Zimbabwe during the period the schemes have been operating, whilst in Uganda estimates for this year's harvest are significantly higher than in recent years. Although repayment figures are not yet available from Uganda, the scheme has reached large numbers of farmers. In Zimbabwe, the Cotton Company is the largest provider of credit to smallholders - far larger than the parastatal Agricultural Finance Corporation.

The success of the schemes suggests that it may be beneficial to explore potential applications in other countries or commodity sectors. It is useful then to summarise the conditions that are conducive to the development of input credit schemes in which repayment is linked to output marketing.

Incentives

Companies providing credit will recognise the risks and costs involved. These will vary depending on the production and market conditions pertaining to individual crops, and other factors relating to company presence in rural areas, the development of other rural services and capacities, and farmer experience of other credit schemes. Companies will have an incentive to provide credit if the benefits outweigh the costs. Examples may include situations where:

- the trade is particularly profitable, making it worthwhile to assure supply sources and bear some risk (high value horticultural exports, for instance)
- there is a need to assure supplies to maintain plant utilisation at economic levels (cotton ginneries, for example)
- more assured supplies will help reduce other risks or costs faced by the buyer (by increasing market share, for instance)
- farmers have no other means by which to produce the desired crop

Farmers participating in such schemes risk indebtedness or asset seizure, and will be locked into sales agreements. Their willingness to participate will be partly dependent on:

- a clear understanding of the potential benefits of participation
- the desirability of securing market access
- inability to acquire necessary inputs from other sources or by other means
- the package of benefits on offer (for instance, inputs, transport, extension)
- the terms on which production credit is offered (input and output prices, and interest rate)
- the associated transaction costs (for instance, time spent travelling or in meetings, filling out forms) and skills required (eg., book-keeping)

Unfortunately farmers may also be willing to participate if they perceive potential for strategic default. The onus is on the provider to anticipate situations in which this might arise (for instance, where a crop can be consumed on-farm or marketed locally), to put the necessary mechanisms in place to avoid it (see below), and to make sure that farmers are aware that strategic default will not be possible.

Means

Companies operating input credit schemes need access to funds to finance the schemes. Operation of large-scale input credit schemes requires a considerable outlay over several months or a year (or even longer with perennial crops or livestock). Commercial banking sectors in both Uganda and Zimbabwe are reluctant to provide financing for small-holder agricultural activity (though there are some promising pilot projects developing more robust methodologies for lending to small-holders). In the cotton sectors in both countries, use has been made of international donor funds, but this avenue may not be available to smaller private companies (unless they co-operate, as has happened in Uganda). Larger companies may be able to use their own funds.

Mechanisms

The experience in cotton demonstrates the variety of mechanisms that may be used to operate and strengthen input credit schemes which link repayment to crop purchase:

- co-operation between buyers
- group lending
- close monitoring
- extension services
- developing good company-farmer relations
- offering incentives for repayment
- strict treatment of defaulters (asset seizure, legal action, group penalties)
- lending “in-kind” to reduce diversion of inputs to other uses
- policing potential “leakages” (crops being sold across borders for instance, or inputs being sold in local markets)

The appropriate mix of mechanisms depends on the characteristics of the commodity sub-sector (for instance, the alternative outlets or uses for the output), the level of financial discipline of small-holders, and the presence of supporting institutions (such as a central co-ordinating authority, extension services, and experienced facilitators of farmer groups).

Clearly applications to other sectors and country situations would require careful appraisal, but the experiences in the cotton sectors in Zimbabwe and Uganda provide some very useful pointers on enabling conditions and approaches appropriate to particular circumstances.

Strategies for the intensification of small-holder agriculture in Uganda

by Mark Wood, Agribusiness Development Centre, Kampala

Many farmers in Uganda do not regard farming as a business. They do not expect to make money from it. It is referred to as “digging”. It is a low input, low output system, and farmers wishing to increase production tend to expand planted area rather than intensify. Returns to labour are low, and sometimes negative. (See Figure 1).

The USAID funded (IDEA) project Agribusiness Development Centre, has done considerable work on the intensification of maize and bean production. This has focused on the use of improved seed, fertiliser and crop management, possibly with small quantities of chemicals, to increase yields and reduce costs of production. Figure 2 gives indicative data on the performance of two packages: improved seed and crop management; and improved seed, fertiliser and crop management. Figure 3 highlights how each component of the improved package contributes to farmer income. With improved technology in maize production, higher yields result in a fall in unit production costs from 140/- to 60/- per kilogram.

In Uganda there has been much talk about the need to *modernise* agriculture. *Modernisation* clearly has many components – but making agriculture more commercial is an important part of this process. Figure 4 shows how improvements in technology transfer, input supply and output marketing can increase farmer incomes, and help small-holders make the shift into commercial farming. IDEA works with the extension services and NGOs to expose farmers to these technologies - using small demonstration plots (to compare traditional and improved systems), field days and farmer site supervision to reach approximately 120,000 farmers per annum. (See Figure 5). IDEA has not focused on the use of credit to achieve these changes – instead it has encouraged farmers to draw on their own resources, and to make these investments a high priority. IDEA stresses the *business management* aspects of farming.

Rural areas are poorly served by farm input networks and farmers usually lack information on purchased inputs. An additional focus for IDEA has therefore been to try to bring inputs physically within reach of farmers, by providing support to the input supply chain: wholesaler importers, district distributors and village stockists. The support provided under ATAIN (Agent Training and Input Network) comprises:

- mediation between the parties concerned
- a loan guarantee (on which there has been no call so far)
- training (product knowledge, safe use and handling, marketing, record-keeping and business management).

ATAIN facilitates trade between five regional distributors and village stockists, by guaranteeing small loans (made in the form of inputs advanced) to the stockists by the distributors (See Figure 6). There has been no call on this guarantee so far, and stockists are not aware that the guarantee exists. There are roughly 180 stockists participating in the scheme – and all have benefited from the guarantee.

The stockists also provide critical extension on the products – and the product training provided to the stockists has proved to be one of the most popular components of the project. Just as stockists are able to be extensionists, some government extension agents have become stockists as well. If these distribution systems can be sustained, the challenge will be to maintain objectivity in the advice provided by stockists.

Should stockists choose to advance inputs to their customers, without first receiving full payment, ATAIN has no role in this transaction. (Certainly such arrangements occur – and village-level stockists are well-placed to assess the default risk before entering into such informal agreements). Figure 7 gives indicative data on stockist margins. An estimated 30-40,000 farmers have benefited from improved access to inputs.

Despite these achievements, and the fact that ATAIN is operational in one of the most agriculturally progressive parts of Uganda (Mbale and Kapchorwa), small-holder demand for inputs is still very low (around 500 tonnes of fertiliser/season).

IDEA is also working on output marketing to enhance farmer confidence that his or her harvest will be sold at a fair price. Figure 8 outlines the nature of the marketing support provided.

The success of these pilot schemes illustrates the potential for “modernisation” of small-holder agriculture in Uganda – and underlines the importance of co-ordinated action on technology transfer, input supply and output marketing.

Figure 1:
Traditional Technology

	Yield Kg/ha	Gross Margin	Return to labour
Maize	1500	40 000	500
Beans	600	-9 000	-145

- * Poor varieties
 - Disease sensitive
 - Low potential
- * Late planting
- * Low plant population
- * Late weeding
- * Poor pest control
- * Unmanaged intercrop
- * Poor post harvest
- * Low quality
- * Disorganised marketing
- * High unit cost

Farmer solution
plant more with credit
if necessary.

Figure 2:
Improved Technology

Low Input technology (seed +M)

	Yield Kg/ha	Gross Margin	Return to labour
Maize	2400	126 000	1150
Beans	600	195 000	1600

High Input technology (seed + Fert + M)

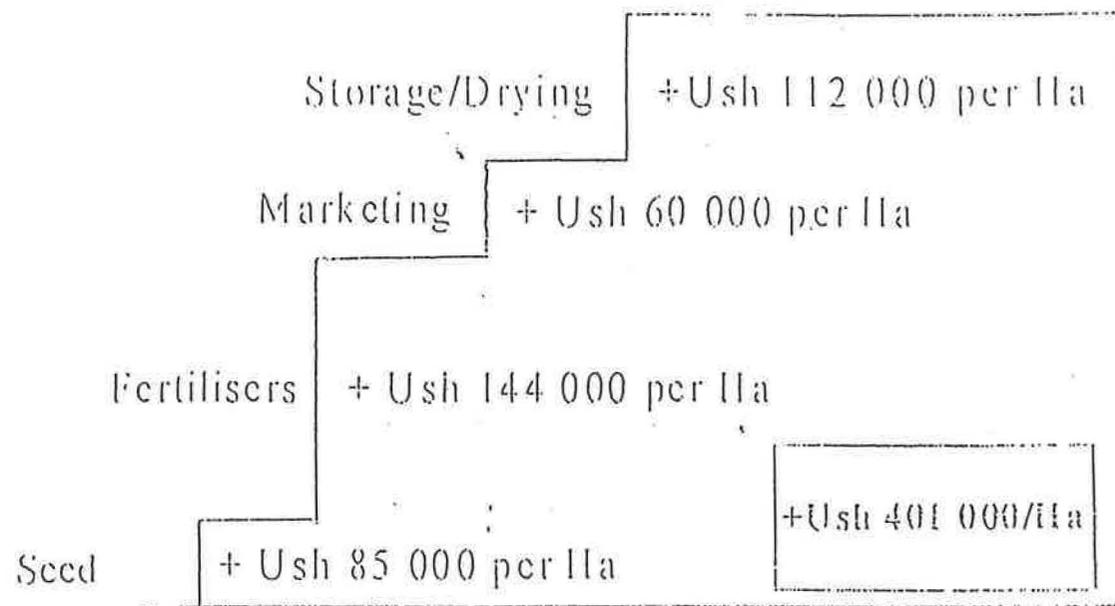
	Yield Kg/ha	Gross Margin	Return to labour
Maize	4800	291 000	1800
Beans	2200	304 000	1700

Farmer Solution

- * Plant the same area
- * Achieve higher yields
- * Lower unit cost of production

Figure 3: How Improved Technology Affects Farmers' Incomes

Farming out of Poverty



Basic Maize Yield - 1500 kg per ha (6 bags/acre)

Research

Figure 4: Improved Technology in Commercial Farming

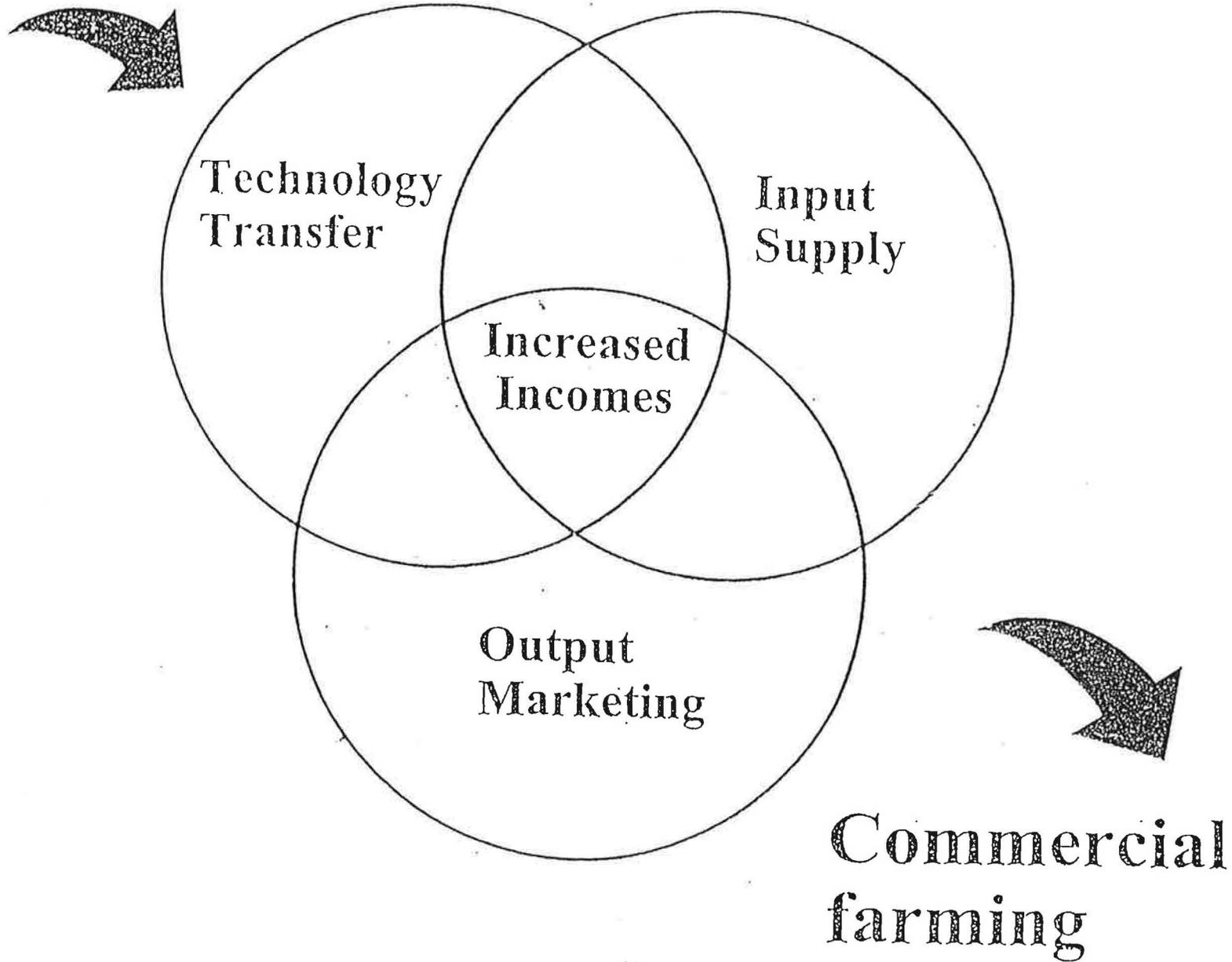
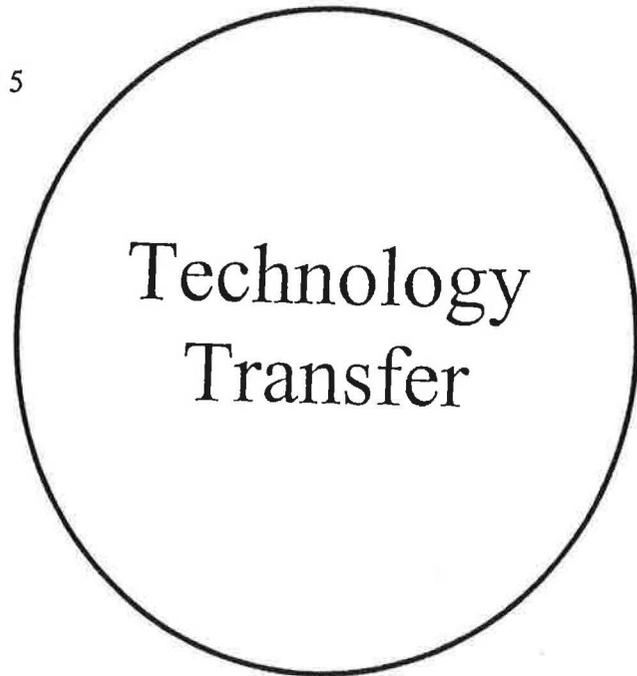
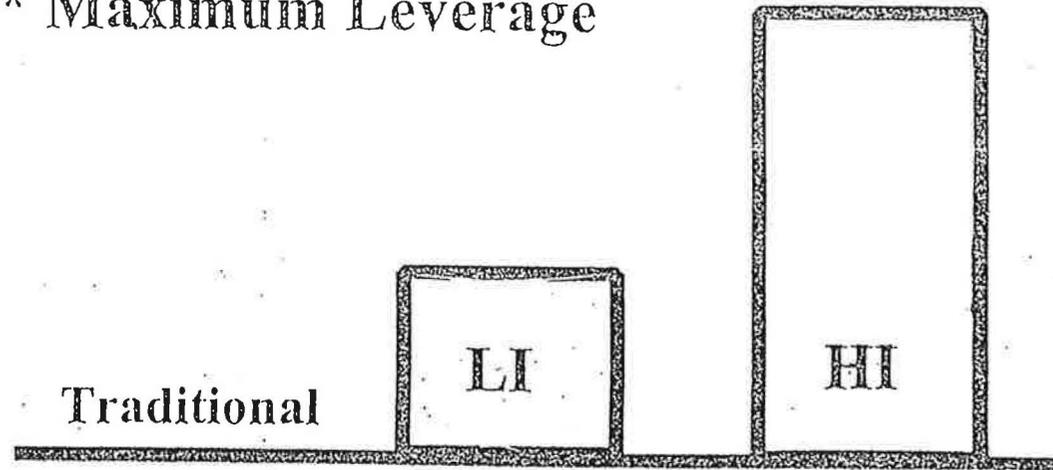


Figure 5

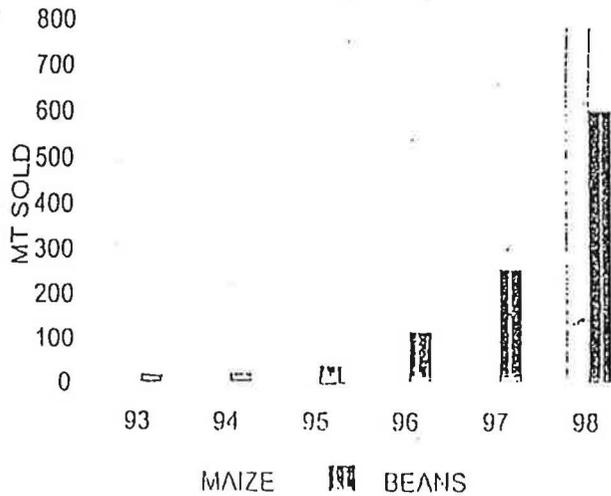


- * Based on research
- * Highlights Hi and Lo Input technologies
- * 16 Districts
- * 3700 demo sites in 1998
- * 400 site supervisors
- * 120 000 farmers per annum
- * Maximum Leverage



USP INTERNAL SEED SALES

1993 - 1998 (PROJ)



Increased demand for :
Seed
Fertiliser
Crop Chemicals

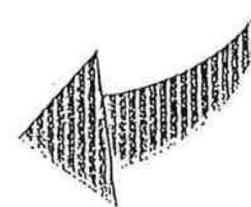


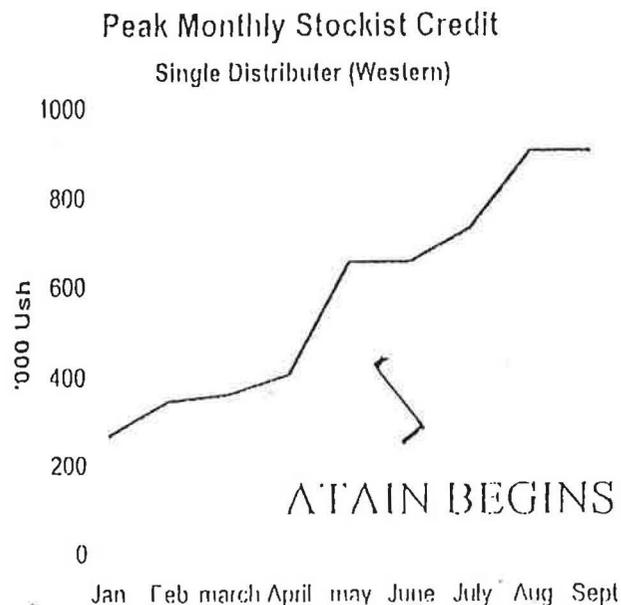
Figure 6

Agent Training and Input Network

**Bring inputs within reach of farmer
Physically and financially**

- * Support Wholesale importers
- * Support Distributors at District level
- * Support Stockists at Village level

**Training in business; marketing;
product knowledge and safe use and
handling**



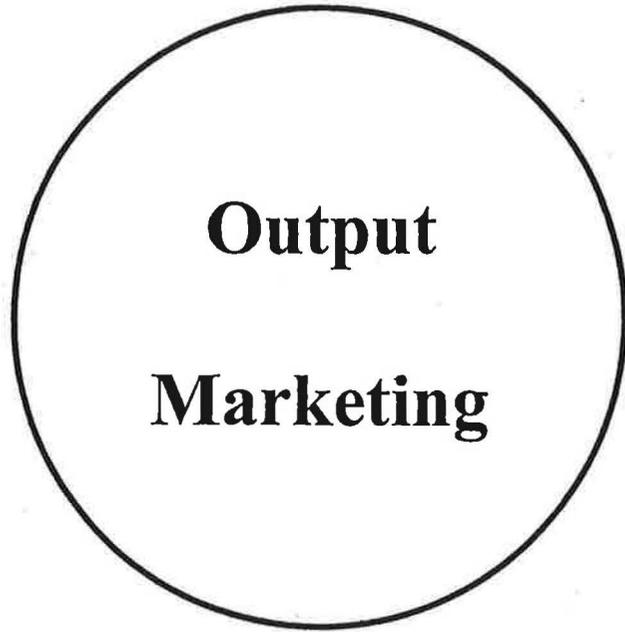
- * Provide financial guarantee between distributor and stockist (ATAIN)
- * 177 village stockists trained for 5 distributors
- * 67 stockists under guarantee program
- * Influence policy where possible

Figure 7

ATAIN Stockist Sales and margins

	Sales < 1 million	Sales > 4 million
Number of farmers served	30 - 50	over 300
Income from sale of inputs	741,000	7,150,000
Direct Cost	627,000	6,070,000
Indirect Costs	90,000	225,000
Total Costs	717,000	6,295,000
Net Profit (shs/season)	24,000	855,000
NP%	3%	12%

Figure 8



**To Enhance Farmer
Confidence that harvest will
be sold at fair price**

Community Based Marketing System (CBMS)

- * 25 Community based marketing centres
- * Farmers trained in producing **quality**
- * Buying centres trained to handle **quality**
- * Produce packed at village for export
- * Transport direct to exporter
- * Product sold forward by implementing NGO
- * Price by grade announced daily on radio
- * Price premium 10-20% paid to farmer
- * 3500 mt sold - 100 million Ush in direct price premiums alone.
- * All direct costs borne by transaction
- * Supported by direct USAID grant as a pilot

Support Exporters

- * Provide staff training
- * Monthly industry forecast meetings
- * Market information
- * Market contacts
- * **Producer connections**

The production and marketing of agricultural seeds in Uganda

by Fred Muhhuku, Marketing Manager, Uganda Seed Project

INTRODUCTION

There are about 2.5 million farm families in Uganda who must use seed from one source or another. The vast majority of them are small-scale farmers. Uganda has favourable agro-ecological conditions which permit the cultivation of a diverse range of crops. In theory, this offers enormous opportunities for seed companies. In practice, however, the use of improved seeds has eluded the majority of farmers. For example, it is estimated that the annual seed requirement for maize is about 10,000 tonnes, while for beans it is about 90,000 tonnes. However, seed supplied from the formal seed sector is only about 1,500 tonnes and 1,000 tonnes respectively! The situation is the same for all the crops. What then is the problem?

USE OF IMPROVED SEEDS

Seed is the most critical agricultural input. Farmers are well aware of this and have always used seeds since the advent of crop farming. They are capable of producing their own seed, or getting it from neighbours or some other local source. They seldom go out to buy seeds except in the event of some unfavourable weather conditions leading to crop failure, or a prolonged dry spell. Only large-scale, commercial farmers tend to deliberately look for and buy seeds.

The use of improved seeds (coupled with better management practices) would greatly increase farm productivity by smallholders. However, for farmers to buy seeds and keep on buying them, such seeds must have characteristics that are consistently superior to those seeds the farmer has always had. These include the following:

- The seeds must be “technically” effective,
- They must be of dependable and reliable quality,
- They must be locally available just when the farmers need them,
- The price must be “reasonable”, and
- The seeds must be conveniently packaged.

Technical effectiveness

Improved seeds must not only be regarded as better than the existing farmer-saved seeds, but they must be proved to be better by the farmer himself. Quite often recommendations are based on results obtained at the Research Stations and performance standards are biased towards broad adaptation rather than local adaptation and suitability for resource-poor smallholders. In fact local conditions on the farm, including cultural practices and micro-ecological conditions, may so differ that the “improved” seed actually performs worse than the existing cultivars commonly used. Sometimes the new variety may be too demanding for the farmer in terms of say, labour, need for fertilisers or chemical sprays, etc. Should the farmer fail to fulfil these demands the variety flops. In such a case, the farmer will not buy the variety again.

It is also known that the demand for industry supplied seed of self pollinated crops such as beans, or open-pollinated crops like non-hybrid maize is only sufficient for periodic replacement of cultivars, usually less than 10% of total needs (ADC/IDEA Project, 1996). Yet these are the varieties currently produced by USP. Only recently have we started producing hybrid maize seed. In the case of beans, the informal seed distribution network is obviously the most important channel in Uganda. Moreover, studies have shown that the quality of seed obtained in this way is of acceptable standards and offers no economic disincentive to the farmers (ADC/IDEA Project, 1996). This system is also capable of supplying the many types of bean cultivars usually demanded by Ugandan small farmers.

Quality dependability and reliability

The quality of seed cannot generally be identified by sight, smell or touch. The earliest a farmer can judge the quality is often at crop maturity or harvest. If the variety does not live up to expectations a lot of damage will have been done. This will require tremendous effort to undo so the farmer can buy the seed again.

The issue of seed quality in Uganda certainly leaves a lot to be desired. Many varieties are very old (for example, groundnuts: *Red Beauty (1966)*, beans: *K20 (1972)*). Genetic quality is difficult to guarantee in such cases, unless there is a deliberate, rigorous maintenance breeding scheme. Physical and physiological quality have also not always been assured mostly because of the grossly inefficient state run seed schemes. Other contributory factors are: inefficient input delivery systems, poor infrastructure, the hot, humid climate, and low levels of literacy among farmers.

Price relationships

The farmer normally takes into account the relationship between the price of the seed and that of the produce. The actual price of the seed itself and the physical production from the variety are not enough to convince the farmer if he perceives the price of his produce to be low.

In Uganda the prices of agricultural produce are *regarded* as low, although they are probably among the highest in the World! This results from poor production techniques which lead to very low yields. The prices also fluctuate wildly. Increased aggregate production of a particular crop actually leads to a fall in the price of that commodity. This tends to adversely affect the ability and willingness of farmers to buy improved seed. Pioneer (1990, p4) states that “....sales and profits from non-hybrid seed are heavily dependent on commodity prices.....and are subject to year-to-year fluctuations”.

The actual price of seed for a particular crop is itself a function of its *multiplication factor*. This is the ratio of seed yield over seed planted (yield per acre/seed rate). Thus a crop with a low multiplication factor or a high seed rate will inevitably have a high seed price and will be too expensive for farmers. Unless the product has a high market value, the farmers will not buy the seed. This is the case with groundnut and bean seeds.

Timeliness of seed delivery

Demand for seed is highly seasonal, and if the farmer cannot get the seed on time he risks losing the season. Attempts to hold carry-over stocks [by the farmer, or the seed

trader, or even USP] are beset by quality problems! With rudimentary seed processing equipment, and a poorly developed seed distribution network it is not possible to avail seeds to the farming community in time for each season. The result is that farmers will find alternative sources of seed.

Although seed production and processing should be driven by market demand, no effort has been made to make an assessment of the actual demand for various seeds in this country. Regular market surveys are crucial for production planning and would enhance timely delivery of the right seeds, and in the right quantities. In fact many times USP finds itself with surplus seed stocks which it disposes of as grain at low prices leading to big financial losses.

The Uganda Seed Project is unable to quickly respond to market changes, and to supply the full range of seeds needed. Farmers have a vast range of crops to choose from and many do grow a bit of each. This makes it nearly impossible for the USP to provide the full range of seeds, some of which are required in uneconomical quantities.

Seed, like other agro-inputs, is adversely affected by the existing inefficient and fragmented input delivery systems. Coordination and integration of input and output marketing systems would result in economies of operation and improved customer service. Uganda has liberalised the marketing systems but the private sector has yet to live up to the challenge. Issues of dishonesty, sale of fake products, overcharging, poor customer relations, etc still abound. At the same time, control and regulatory mechanisms hardly exist.

Seed packages

The size of the seed package offered for sale influences the ability and willingness of farmers to buy the seeds. USP has traditionally packed seeds in 25 & 10 Kg packets which are obviously too big for smallholder farmers. An attempt has been made to address this and now we offer 5 & 2 Kg packets, but not without problems. There is no local production of these packaging materials, and USP does not have appropriate machinery to pack the seeds. All the 2Kg, and some of the 5Kg, packs are packed by hand. Yet we realise that it would even be better to have 1Kg & 1/2Kg packets in order to meet the requirements of the majority of our farmers.

INSTITUTIONAL FRAMEWORK

The process of developing improved seeds, producing/processing them, and making them available to farmers is handled by various institutions, including NARO, USP, and the Extension Service of MAAIF. Though such an arrangement could have the advantage of specialisation (W. Ntege-Nanyeenya, *et al*, 1997), in practice, fragmentation and lack of coordination have had negative effects on farmers' willingness to use improved seeds. Each institution has had its share of problems, all of which have affected the farmers' willingness to purchase improved seeds.

An effective extension service enhances procurement of seeds by farmers through provision of technical guidance, and provides feedback to the other institutions on the performance of the seeds under farmers' conditions. This feedback guides NARO in

developing more acceptable varieties. At present, however, the extension service is in a coma!

TECHNOLOGY PACKAGES

Improved seeds, by their nature, have to be accompanied by other “technologies” if their potential is to be realised. These include: better agronomic practices, use of fertilisers, better control of pests and diseases, etc. Farmers need to be made aware of these requirements and to have easy access to them. Smallholder farmers do not often get information about them, nor do they have access to them. They may also not afford them. This greatly affects their willingness to buy improved seeds. There is a need to develop low-input technologies for smallholder farmers.

THE POTENTIAL FOR INCREASED USE OF IMPROVED SEEDS

The potential for increased usage of improved seed appears to be quite good, especially for maize (both OPs & hybrids), hybrid sorghums and sunflower, and for groundnuts. The potential also exists for Upland Rice although it is a relatively new crop. It also appears that the private sector could play an important role in the production and distribution of maize seed (ADC/IDEA Project, 1996). To exploit this potential, a number of issues need to be addressed.

Increased farmer awareness

This appears to be the most fundamental intervention to increase the demand for improved seeds generally. Demonstrations by IDEA Project, SG2000, and other NGOs have shown very encouraging results. Studies have shown that different members of the family play different roles in the production process, so there is a need to target extension messages to reach those responsible for each aspect (ADC/IDEA Project, 1996). Another important avenue for increasing farmers’ awareness of the benefits of using improved seed is the use of Radio programmes.

The USP has actively participated in the demonstration activities of IDEA Project, SG2000, and other NGOs. It has also encouraged DECAs and Agents to set up demos whenever possible, especially during agricultural shows and mobilisation seminars. Radio programmes have also been aired in various local languages. Posters and pamphlets have been extensively distributed.

Better varieties

For selfing crops, groundnuts and upland rice have the potential for increased usage. In the case of groundnuts, the existing variety is old, low yielding and susceptible to *rosette virus*. And yet groundnuts is a fairly commercial crop with a sizeable internal market. A good variety could be marketable even to smallholder farmers. Upland rice is a new crop in Uganda with a good steady market. USP has not been able to supply sufficient quantities of seeds of the existing varieties.

Though beans have become fairly commercialised in Uganda, it is unrealistic to expect high demand for seeds from the formal seed sector. The emphasis should be on the introduction of new varieties with export potential and improved resistance to diseases.

The potential for using hybrid seed even by small scale farmers is known (eg. Zimbabwe). The case for hybrid maize seed is well established. In Uganda the potential also exists for sorghum and sunflower hybrids. Sorghum is an important food crop with a regional market, and a better yielding hybrid is likely to be taken up even by smallholders. Sunflower is an industrial crop with great demand, but the current variety *New Sunfolia* is a disappointingly low yielder. A high yielding hybrid could attract demand.

Input supply

As earlier stated, maximum benefit can only be obtained from improved seeds if the necessary inputs are used. The cost and ease of availability of these other inputs is of crucial importance in stimulating demand for improved seeds. The demos referred to earlier also included these inputs and farmers showed a lot of interest. Extension work should cover whole packages rather than seeds alone.

Government has already pulled out of supplying agro-inputs and left it to the private sector. The latter needs to actively engage in promoting and demonstrating the importance of these technologies. The war against fake products has to be jointly fought by both the private sector itself and the government regulatory services.

Policy and Institutional changes

Uganda is also promoting the private sector in the seed industry. The industry has been fully liberalised and several companies have been licensed to deal in seeds. The sole state seed scheme, the USP, is to be fully divested. This means that the activities of production, processing and marketing are to be privatised. It also means that the regulatory functions are to be consolidated into an autonomous (or semi-autonomous) body called the National Seed Certification Services (NSCS). These are all provided for in the *Agricultural Seed and Plant Statute, 1994*. But even as the formal process of privatisation drags on, most of the seed production and marketing are now in the hands of private individuals and companies. Already a nascent network of private seed traders set up in 1995 has greatly increased seed sales albeit occasionally being let down by production constraints.

The private sector is expected to play a leading role in hybrid seeds and horticultural seeds, and generally to enhance the use of improved seeds by farmers through more efficient production and marketing mechanisms. Liberalisation may also lead to development of smaller, more specialised companies catering for particular crops or regions. However, private seed firms are not expected to engage in seed production and marketing for selfing crops, such as beans, on a large scale due to absence of sufficient financial incentives. Government should continue to promote informal, non-market methods of seed production and distribution for these crops, although the private sector could still boost the system by forming strong producer/buyer linkages.

There is still a need to update and streamline the said *Seed Statute* and to put in place clear policies to guide the seed industry. Formal establishment of the National Seed Industry Authority (NSIA) would create a body responsible for evolving such policies. Suitable policies should identify the roles of the public and private sectors in order to cater for interests of the majority of farmers.

Improved seed certification and control

A strong and motivated certification service is necessary to ensure seed quality at the point of sale which would boost the farmers' confidence in buying improved seeds. However, seed certification standards need to be adjusted/eased in order to service informal, local-level seed production by NGOs and farmers' groups. In Zambia, the Seed Certification and Control Institute has a department responsible for the informal seed sector.

As stated above, the NSCS has been established by law in Uganda. Unfortunately the body has yet to be actually set up. It seems that in the process of downsizing the Public Service, seed certification was regarded as an unnecessary burden and the NSCS was dropped from the Ministry structure. This is of course unfortunate and it is hoped the error will be rectified.

BIBLIOGRAPHY

ADC/IDEA, 1996, *Seed usage baseline study* (USAID-funded), Kampala.

Ntege-Nanyeenya, W., M. Mugisa-Mutetikka, W. Mwangi., and H. Verkuijl, 1997, *An Assessment of Factors Affecting Adoption of Maize Production Technologies in Iganga District, Uganda*.

Pioneer, 1990, *Uganda Seed Project Proposal*, Pioneer Hi-Bred International Inc.

Constraints to agricultural technology and input use in Uganda: NARO's contribution, strategies and opportunities to enhance adoption.

by William Nanyeenya, socio-economist, Monitoring and Evaluation Planning Unit, NARO Secretariat, and Peter Ngategize, Programme Leader - socio-economics, and director, COREC

BACKGROUND

Introduction

The population of Uganda is estimated to be 20 million (1995) with an annual growth rate of 2.6 per cent. The country has a total area of 241 038 square kilometers of which 197 097 and 43 942 square kilometers is land area, and water and swamps, respectively. A large proportion of land, over 75 per cent of the country, making up about 18 million hectares is available for cultivation, pasture or both. About 4.6 million hectares (42 per cent) of the potentially arable land is currently farmed. In Uganda agriculture is almost entirely rainfed with only 3 000 ha (0.07 per cent) of cultivated land being irrigated. The proportion of irrigated land is very small compared to an estimated 410 000 ha of land that need irrigation in Uganda. Agricultural production in Uganda is characterised by smallholders operating low input low risk crop-livestock intergrated systems. The average farm size is 2.5 to 3.0 hectares. There are an estimated 2.5 million smallholdings.

The Roles and Functions of MAAIF in Agricultural Technology Development and Transfer (TDT)

The Ministry of agriculture animal industry and fisheries (MAAIF) is mandated to play a central role in the delivery of the national economic development mission which currently targets eradication of poverty and modernisation of agriculture. In order to address this national objective, the MAAIF mandate is geared towards attaining the following agricultural sector objectives:

- Ensure the supply of adequate and balanced food in all parts of the country and at all times
- Ensure the supply of raw materials to meet the needs of local agro-industries
- Stimulate production for import substitution
- Diversify production for export
- Improve rural incomes and quality of life , and
- Conserve soil, water, forest and other resources for improving and sustaining agricultural productivity.

The Roles and Functions of NARO in Agricultural Technology Development and Transfer (TDT)

The National Agricultural Research Organisation (NARO) is a semi-autonomous organisation under MAAIF established by an act of parliament of 1992. The objects of NARO are:

- To streamline, coordinate, conduct and promote mainly adaptive and applied research in livestock, fisheries, forestry, crops, mechanisation and appropriate technology, and food science.
- To ensure dissemination and application of research results

In light of the agricultural modernisation objective, NARO is geared to place more emphasis on the dissemination function. To this effect, NARO will backstop District decentralised agricultural extension services by providing technical guidance, capacity building, training and financial support to district and sub-county programmes in the field. In order to establish effective linkage with the field some District Farming Institutes (DFIS), selected from each agro-ecological zone in Uganda are being transformed into Zonal Adaptive Research and Outreach centres (ZAROCs). In addition zonal outreach centres (ZOCS) will be established for:

- Conducting adaptive and demonstration trials,
- Production of seed, planting materials, livestock breeds and fish fry, and
- Multi media communication and skills improvement to extension staff and farmers.

The National Agricultural Research Organisation currently has nine research institutes/centres namely:

Forestry Research Institute (FORI)
Fisheries Research Institute (FIRI)
Coffee Research Centre (COREC)
Agricultural Engineering and Appropriate Technology Research Institute (AEATRI)
Kawanda Agricultural Research Institute (KARI)
Livestock Health Research Institute (LIRI)
Food Science and Technology Research Institute (FOSRI)
Serere Agricultural and Animal Production Research Institute (SAARI), and
Namulonge Agricultural and Animal Production Research Institute (NAARI).

For purposes of this presentation, agricultural technology and inputs are broadly defined to include: crop varieties, livestock breeds and feed ingredients, fish fry types, chemical inputs (pesticides, fertilisers, fungicides, drugs and vaccines *inter alia*), farm tools, equipment, implements, and farm machinery, and water for production.

The agricultural TDT spectrum is composed of the various stages from the time of technology generation at the research institutes, to application of the research results into practical working forms by the targeted clients. Technology generation is a

process where research outputs are produced using local developed “home grown” materials or those adapted from similar environments hence requiring less elaborate adjustment or refinement to suit local requirements. Technology development entails bulking, multiplication and distribution of the technology in question, varieties, stock or prototypes of limited quantities and of particular standards/attributes specified by the researchers, to structure them appropriately for the end-users.

Technology dissemination refers to access to technology by the ultimate beneficiaries through a range of technology uptake pathways including: NARO's direct link to beneficiaries through adaptive and demonstration trials, MAAIF, NGOs and CBOs, religious organisations and the private sector. The functioning of channels through which the users access the improved agricultural technologies is affected by physical infrastructure, input and output market conditions, and policy and support systems like credit. This process ensures that there is a continuous supply of technology to the users in the form, place and time acceptable, accessible and relevant to the requirements of the users, and meeting the stipulated attributes.

In Uganda, agricultural TDT is more operationalised and developed in the crops sub-sector. This TDT is structured as a seed programme which includes plant breeding, variety release, seed production, seed processing, seed certification, seed marketing and extension. In order to have the functions of these components successfully implemented they must be interlinked. Plant breeding work is done by NARO whose new varieties are released by a Variety Release Committee (VRC). The VRC is composed of relevant directors in NARO and MAAIF, representatives from seed dealers, Ministry of Trade and Industry and Produce Marketing Agencies.

Seed production, processing, certification and marketing is carried out by Uganda Seed Project (USP) of MAAIF. The USP deals in seed of beans, maize, sesame, sunflower, groundnuts, soyabeans, finger millet, sorghum and upland rice. Breeder's seed is obtained from crop-based institutes (KARI, NAARI, and SAARI) following presentation of attributes of the new varieties to VRC based on on-farm trial results. The seed is then moved through stages of foundation, registration and certification by USP. The USP has seed multiplication and processing capacity at Kasese, Masindi and Kisindi which is supplemented by seed outgrower schemes. The agriculture seeds and plant statute of 1994 provides for registration of seed producers, importers, and exporters and establishment of a National Seed Certification Service (NSCS) as an independent regulatory body.

UGANDA'S CURRENT STATUS OF TECHNOLOGY ADOPTION AND INPUT USE: A CHALLENGE TO MODERNISATION OF AGRICULTURE AND POVERTY ERADICATION

There are direct and implicit indicators of low technology and input usage in Uganda. These indicators are manifested through national aggregate production, area and yield figures and household or farm level performance indices.

On an aggregate scale, the current “capacity utilization” of 42 percent of Uganda's arable land against national demand for food and raw materials for agro-industry and export market is an indication of inefficient farm power input development in terms of tools, implements and farm machinery. Uganda's farm power utilization structure is a

manifestation of primary and secondary tillage, and a crop husbandry system dominated by human muscle as the main source of power using largely simple hand tools. For instance: 93 percent of households use hand hoes; 87 percent use pangas (machetes); 5 percent use ox-ploughs; and 2 percent tractors (see Table 1). For most crops in Uganda it has been observed that farmers' yields are in most cases less than a third of their potential (see Table 2). This is a result of a set of complex causes, principal among them being the dominant use of local varieties and heavy dependency on preserved seed from previous harvests. The contribution of certified seed (see Table 3) from Uganda Seed Project to Uganda's seed requirements ranges from 0.1 per cent to 2.7 per cent for sesame and maize, respectively.

Table 1: Status of Household input Use in Uganda, October 1993

Input Type	Households Reported (%)
Improved Maize Seed	27.0
Improved Bean Seed	44.0
Hoes (round eye)	93.0
Wheel Barrows	5.0
Tractors	2.0
Ox-Ploughs	5.0
Knapsack spray pumps	5.0
Pangas (machetes)	87.0
Milking Cans	2.0
Watering cans	1.0
Pruning knives	24.0

Source: NCAL, 1993

Table 2: Comparison of Potential and Realised Farm Yields for Common Crops in Uganda, 1993

Crop	Farm yields (Metric tons per hectare)	Research yields (Metric tons per hectare)	Yield gap (%)
Maize	1.8	8.0	66
Beans	1.0	3.0	77
Finger Millet	1.6	5.0	68
Cassava	9.0	50.0	82
Sweet Potatoes	4.0	30.0	87
Irish potatoes	7.0	35.0	80
Matooke	6.0	35.0	83

Source: Adapted from Tukacungurwa, 1994.

Table 3: The Contribution of USP to Uganda's National Seed Requirements, 1996

Crop	Seed requirements	USP Seed supply	USP's contribution (%)
		(Metric tons)	
Maize	14 600	396	2.7
Beans	30 750	116	0.4
Finger Millet	1600	16	1.0
Ground nuts	15 600	101	0.7
Sorghum	2710	57	2.1
Sesame	1720	1	0.1

Source: Compiled from Uganda Seed Project Commercial variety list, 1996; Production statistics from Statistics Department, MAAIF and Sales records, USP.

Adoption of Longe 1 the improved maize varieties was estimated to be about 40 and 44 percent by Ntege-Nanyeenya *et al* 1997, and NCAL 1993, respectively. Crop technologies are released in the form of a production technology package comprising planting architecture, population, disease and pest control, soil moisture and nutrient requirements.

In most cases crop management components of the package like spacing, thinning, weeding frequency and harvesting that do not involve use of purchased inputs are adopted by farmers (Ntege Nanyeenya *et al.*, 1997). Results from NCAL 1993 indicate availability of knapsack spray pumps to households at 5 percent. This suggests that chemicals administered by pumps would not be adopted widely either.

With regard to water requirements, the irrigated area of 0.07 percent (Nanyeenya and Odogola, 1998) of total cultivated area confers a critical constraint to crop development which compounds the already existing low plant nutrient regime into an acute production constraint.

Although there has always been a general belief that Uganda is endowed with fertile soils, continuous cropping and poor soil conservation measures have caused depletion of some important nutrients. This notwithstanding Ugandan consumption of fertilisers of 0.1 kilograms per hectare (Tukacungurwa 1994) is reported to be the lowest in the world.

CONSTRAINTS AND SHORTFALL IN TECHNOLOGY AND INPUT USE

A number of studies have been conducted to assess technology uptake constraints (Tukachungurwa 1994; NARO 1995; Ntege-Nanyeenya *et al* 1997; Nanyeenya and Kisauzi 1998; and NARO 1998b). The technology needs identified were classified as: hardware and physical fixed inputs; variable inputs consumed during the course production; information and technical skills; and needs relating to policy, socio-economic and agro-ecological constraints.

Hardware and Fixed Asset Needs

For the hardware and materials category the following were observed: insufficient farm power implements for land opening, planting, weeding, harvesting and transport (increasing drudgery to farm operators); lack of energy conservation equipment for

cooking, and post-harvest crop processing; and lack of exclusion technology like fences.

Living Capital (Biological Infrastructure) and Variable Input Needs.

The following were identified as priority needs under living capital and variable inputs category: lack of improved seed, planting materials, fish fry and livestock breeds; lack of quality feeds for poultry and fish; lack of agro-chemicals and artificial insemination services.

Information and Technical Skills

Key issues in this category are: inappropriate soil and water management; lack of veterinary diagnostic services to confirm/establish livestock diseases; and insufficient skills in crop and livestock husbandry.

Policy, Socio-economic and Agro-ecology Constraints

In the area of policy, socio-economic and agro-ecological constraints the following were cited:

- Weak support systems and poor marketing arrangements to counter wide seasonal price changes, and absence of reliable farm credit mechanisms curtails input distribution and technology adoption.
- Lack of a regular fertility programme, and existence of climate and soil conditions with which some harvests are realised even without using modern technology leads to stagnant soil nutrient status. Nevertheless, heavy rains that are sometimes received lead to leaching and soil erosion.
- Participation of Government through projects and NGOs in input marketing at subsidised rates to final consumers makes input trade less attractive to private operators who must recover costs and earn profits. Farmers affected by “relief dependency syndrome” and private traders keep out because of the disincentives and distortions created in the market.
- Lack of input standards for Uganda in the case of implements and tools, and regulatory mechanisms for the distribution channels of all agro-inputs has led to abuse of the liberalisation policy that allows importation and domestic marketing of inputs by the private sector. This has led to adulteration and/or sale of fake seed, acaricides and pesticides. The danger of this practice is that on realising that such technology does not meet their expectations, farmers subsequently disadopt them.
- The dominance of subsistence production is in itself a disincentive for the use of purchased inputs and modern technology. Besides, the misconception that rural farmers are poor and cannot therefore afford purchased inputs, makes policy makers and scientists evolve least-cost though not necessarily most optimal recommendations for most technical interventions. This does not take into consideration credit arrangements, benefit-cost relationships and group procurement alternatives. The opportunities for commercialisation are hence hampered.
- “Protection of the environment syndrome” promotes prohibitive or restricted use of chemicals and efficient farm machinery without bearing in mind the critical

application levels which are very far from the almost zero application which currently apply in Uganda. Environmental protection bias has led to many diagnostic studies proposing breeding for tolerant varieties to pests, diseases, drought and use of biorationals and ethnoveterinary products at the expense of other supporting elements of integrated crop and livestock management.

- Low priority ranking of agriculture within district budgets. This is manifested by the financial allocations to extension programmes and facilitation provided to the extension workers.
- In most diagnostic and research intervention programmes on technology adoption and input use, the contribution of support systems in agricultural TDT is often accorded low recognition and hence subsequently marginalised in the corrective structures. Streamlining of agricultural TDT puts uneven reliance on research-extension-farmer linkages at the expense of support systems like input distribution, standards and regulations, and credit schemes. In most cases, this linkage concentrates on material and hardware forms of technology and leaves behind the consumables, information and skills required for the former to attain their genetic and engineering potentials.
- Absence of information on marginal rate of return (to supplement varieties released) especially on fertiliser use, results in recommendations based on technical rather than economic efficiency. Besides being wasteful such recommendations are often not profitable.
- In some areas of South-west, Western and Central Uganda cultural hinderances and lack of promotional policy for draught animal power (DAP) technology hampers its wider adoption.

MEASURES AND ATTEMPTS BY NARO TO IMPROVE TECHNOLOGY AND INPUT UPTAKE

Low adoption and input use has been a concern of NARO. In 1995, Action Research and Development Programmes (ARDP) were implemented to foster dissemination through training, demonstrations and publications, and production of basic planting materials for primary seed producers. The commodities covered by ARDP were cassava, groundnuts, beans, multipurpose tree species, sweet potatoes, Irish potato, smallholder dairy, sesame, fish (aquaculture), and forest products. In addition, the programme delivered services in tsetse control and packaging of fishing gear.

NARO conducted a technology assessment survey in 1995 to establish technology needs and intervention options for food crops, namely bananas, cassava, finger millet and beans as part of an FAO sponsored strategy for sustainable agricultural production and food security in sub-Saharan Africa.

In 1998, NARO participated in the National Programme for Planting and stocking materials seed establishment and multiplication, of MAAIF. This project covers coffee, and high value horticultural crops, fish fry, sericulture, elite herds and nucleus breeding scheme, and national bull stud. The aim of the study was to increase

propagation of highly productive plants and animals, and increase awareness, production knowledge and skills to producers.

An assessment of factors affecting maize production technology adoption (Ntege-Nanyeenya *et al* 1997) revealed that credit utilization was very low (17 percent), and herbicide and fertilizer adoption as well as draught animals were nearly nil. It was also reported that farmers' groups, literacy, use of hired labour (farm power availability) and rented land tenure (profit-oriented production) significantly affected farmers' decision to adopt. A follow-up stakeholders workshop (Nanyeenya and Kisauzi 1998) which comprised farmers, local administrators, chiefs and policy makers, NGOs and government extension staff, to validate findings, and evolve action plans to implement the recommendations, endorsed by the stakeholders, came up with the following.

- Training and demonstration of herbicide and animal draught power utilization were proposed to address critical labour demands
- Taking advantage of SG2000-IDEA-SUKURA maize and bean seed, and diammonium phosphate and urea fertiliser repackaging, was identified as a focal area to spur adoption of production packages. SG 2000 is an international NGO working in thirteen districts in Uganda, linked to input importers like MAGRIC and packaging agents (Balton)
- Benefit -cost considerations as additional criteria for variety release
- Provision of simple field soil testing kits to district field staff, and availing of soil amendment recommendations on a more location specific terms (rather than blanket regional recommendations)

STRATEGIES AND OPPORTUNITIES FOR ACCELERATION TECHNOLOGY ADOPTION AND INPUT USE IN UGANDA: RECOMMENDATIONS AND POLICY IMPLICATIONS

NARO's focus in TDT, experiences of technology dissemination by government and non-government agencies, and farmers' endowments and circumstances suggest that the following strategies could be exploited:

1. In order to ensure adoption of production technology as a package ZAROCs and ZOCS should be used to demonstrate technology package *vis-a-vis* stepwise adoption and traditional practices by farmers. This will augment NARO's efforts to strengthen technology dissemination to the relevant uptake pathways in the field.
2. Standards for agricultural implements and tools and enforcement of regulations for agricultural inputs should be put in place to avoid use of fake inputs. Despite the existence of the Uganda National Bureau of Standards (UNBS), in reality standards and regulations are put in place upon request by the line ministry concerned.
3. The role of the private sector in input distribution should be encouraged to increase their outreach in rural areas (as opposed to government and development agencies which subsidize the input distribution on an unsustainable basis and even

cause a disincentive to the private operators). In order to have long-run benefits and success, market forces should guide the input business. Output market constraints such as storage and market information should be addressed. This will also establish/strengthen the research-extension-farmer- market linkage. Input demand is derived demand that is explicitly affected by output demand.

4. Studies on critical application levels and marginal rates of returns (MRR) should be incorporated in the variety release criteria.
5. The potential for integrating credit information into input delivery systems should be studied and viable options promoted taking examples from IDEA project, Sasakawa Global 2000 and Soroti District Development Programme (SDDP) oxenization credit schemes.
6. District decentralized budgets should provide financial backing to extension and agricultural development activities. Secretaries for production and environment should work closely with extension and input dealers to demonstrate technology and input attributes and benefits.
7. The option of supplementing rainfed agriculture with appropriate irrigation systems should be explored. The experience of smallholder irrigation projects, and farm level applied research methods in eastern and southern Africa (FARMESA) could be utilised.
8. The use of inorganic or chemical inputs does not preclude the use of organic ones. Within crop-livestock integrated systems the synergistic benefits should be explored to enhance soil fertility by use of livestock manure. Manures improve the soil structure and even make inorganic fertilisers work better. Bio-rationals and ethnoveterinary concepts should be studied so as to rationalise their advantages.

BIBLIOGRAPHY

- Anon., 1992, *The National Agricultural Research Organisation (NARO), 1992*. Statutes supplement No. 7 to the Uganda Gazette No. 51. Vol LXXXVI 4 December 1992.
- Anon. 1993, *The agricultural chemicals (registration and control) Regulations, 1993*. Statutory instruments supplement No. 23 to the Uganda Gazette, No. 55 vol. LXXXVI, No 31 December 1993, Entebbe.
- Anon., 1994, *The Agric. Seeds. Seeds and Plant Statute, 1994*. Statutes Supplement No.7 to the Uganda Gazette, Sept. 1994, No.41 Vol. LXXXVII No.7, Entebbe.
- The Food and Agriculture Organisation of the United Nations (FAO) 1973. *Fertiliser Legislation*, Soils Bulletin 20, Rome: FAO
- The Food and Agriculture Organisation of the United Nations, (FAO) 1987. *Agriculture: Toward 2000* July 1987, Rome: FAO.

Ministry of Agriculture Animal Industry and Fisheries (MAAIF), 1993. *Uganda National Census of Agriculture and Livestock, Vol V: Agricultural Inputs, Machinery, Implements and Labour*.

Ministry of Agriculture Animal Industry and Fisheries (MAAIF), 1998. *National Programme for Planting and Stocking Material, Seed Establishment and Multiplication*. January 1998 Entebbe.

Ministry of Natural Resources, 1992. *The National Environment Action Plan for Uganda*.

Nanyeenya, W. and Kisauzi, D 1998. *Proceedings of a workshop on adoption of maize and beans production technologies. Implications for agricultural research, extension and policy*, July 1998.

Nanyeenya, W. and Odogola W.R. 1998. *An Inventory of Agricultural Technologies in Uganda*. A Report Prepared for FARMESA Project, NARO.

The National Agricultural Research Organisation (NARO), 1995. *Agricultural Technology Assessment Survey Report for Uganda*.

The National Agricultural Research Organisation (NARO), 1998. *Presentation to Sessional committee on agriculture, September 1998*.

National Agricultural Research Organisation Secretariat, 1998b. *Report on the Technology Development and Transfer Survey*, Entebbe: NARO

National Agricultural Research Organisation Secretariat, 1998, *Factors Affecting Adoption of Longe 1 Maize Variety Out*. NARO Bulletin Vol.4 No.10 October 1998, Entebbe: NARO.

National Seed Certification Service, undated, *Seed Certification Handbook of Uganda*, Kampala.

Ntege-Nanyeenya, W., M. Mugisa-Mutetikka, W. Mwangi., and H. Verkuijl, 1997, *An Assessment of Factors Affecting Adoption of Maize Production Technologies in Iganga District, Uganda*.

Tukacungurwa C. 1994. *A Review of the Use of Fertilisers in Uganda*. December 1994, Kampala.

Uganda Government, Uganda Working Group 9A, Agricultural Policy Committee, 1991a, *National Agricultural Strategy and Plan vol ii., Priorities and Programmes*. The Hague, Netherlands: ISNAR.

Uganda Government, Uganda Working Group 9A, Agricultural Policy Committee, 1991b, *National Agricultural Strategy, Organisation and Management*. The Hague, Netherlands: ISNAR.

Uganda Seed Project, 1995. *Strategic Framework for Basic Food and Nutritional Security in Africa: 1995-2005*, Science and Technology Exhibition 23 to 25 July 1995, Lugogo, Kampala.

The World Bank, 1993. *Uganda Agriculture. A World Bank Country study*. The World Bank, Washington, D.C.

Private input suppliers working with the communal sector in Zimbabwe

by Tonneth Gazi, Sales Manager, Agricura, Zimbabwe

Introduction

Agriculture dominates the Zimbabwean economy despite the fact that its contribution to the Gross Domestic Produce (GDP) is less than 20% (15% in 1997). Almost 75% of the population (12 million) depends on agriculture as a source of income. It accounted for between 40% to 46% of the export earnings between 1995 and 1997.

In Zimbabwe, the natural growing season is generally confined to the rainy months. The season lasts from mid-October to April. It is critical for farmers to acquire their agricultural inputs before the season starts.

Zimbabwe's farming sectors

The agriculture sector in Zimbabwe is divided into three distinct sub-sectors: large-scale commercial farms; communal farming areas (including resettlement areas); and small -scale commercial farms.

1. Large Scale Commercial Farms are located mainly in natural regions I, II and III, where there are about 5,100 farmers on 11 million hectares on the land. Farmer numbers have been falling because of the land redistribution programme.
2. Communal Farms occupy about 18 million hectares, mainly in natural regions IV and V. There are about 1 million households on 16 million hectares.
3. There are about 52,000 households on 3.3 million hectares of resettlement land. With the second phase of resettlement, more households are expected to be resettled on the land being acquired by the Government. The Government buys land from Large Scale Commercial farming areas, and resettles farmers from communal areas.
4. There are about 9,000 Small Scale Commercial farmers on 1.2 million hectares.

Historically the Large Scale Commercial farms were reserved for whites while Communal Lands and Small Scale Commercial farms were for blacks. The resettlement areas were introduced after independence in 1980 to redistribute land.

Before independence, agricultural policies were focused more on Large Scale Commercial farms, which were fewer. After independence, the thrust one of affirmative action for Communal Farmers by supporting them and resettling them in high potential zones.

Crop production

Zimbabwe produces a variety of crops in its different sectors and zones. In terms of value (market share) the three main crops, in order of importance, are tobacco, cotton, and maize. In terms of strategic importance, maize comes first as it is the staple food. Tables 1 and 2 show the importance of selected crops to the different farming sectors.

Table 1: Market share of different farming sectors for major crops (1997)

Crop	Sector				
	L.S.C.F	S.S.C.F	Communal	Resettlement	Total
Maize	28%	3%	57%	12%	100%
Cotton	22%	3%	67%	8%	100%
Tobacco	96%	-	1%	3%	100%
Groundnuts	2%	6%	83%	9%	100%
Coffee	100%	-	-	-	100%
Soya Beans	98%	-	2%	-	100%

Table 2: 1998/99 Cropping season forecasts in communal areas

Crop	Area (ha)	Yield (t/ha)	Production in tonnes
Maize	1 016 762	1.39	1 412 060
Cotton	217 166	0.90	196 116
Burley tobacco	2 957	1.01	2 992

Financial institutions serving the small-scale sector

The Agricultural Finance Corporation (AFC) is the only financial institute providing loans to small holders. In the last three years the following amounts have been disbursed to the Small Scale sector to purchase inputs:

Z\$120 million in 1996
 Z\$115 million in 1997
 Z\$106 million in 1998

Financial services available to the small-scale sector have declined because:

1. the Government would like parastatals to be self-supporting (which partly explains the AFC's proposal to take on commercial banking activities, as "Agribank");
2. to curb the high default rate in the small holder sector, AFC had to introduce a policy of lending only to non-defaulters since 1996, resulting in the decline in loans granted;
3. high interest rates in 1998 have further deterred small-holder borrowers.

Commercial companies financing the small-holder sector

The Cotton Company of Zimbabwe is one of the major players in the Cotton Industry. Its core business is to buy cotton from producers. It has over 32 depots throughout the cotton growing areas, where farmers deliver their produce, and minimise transport costs. In order to increase productivity in the small holder sector, the Cotton Company has introduced the input credit scheme. Farmers in the small-scale sector are required to form groups of 10 members so that they can be supplied with inputs. Farmers are required to pay the loans at the end of the season and to market their

cotton through Cotton Company depots. Good performers are promoted to “Gold Class” members. Roughly 6,000 farmers in this category borrow cash (rather than inputs in-kind) – and it is intended that loans to this group will be taken over by a commercial bank, with which the Cotton Company is running a pilot scheme currently.

Cotpro is another ginning company. It has followed the Cotton Company’s lead in developing a small-holder input credit scheme. It appears that many farmers prefer to sell their produce to buyers who are assisting with inputs. The competition has increased – forcing the cotton companies to adopt new approaches or risk losing market share.

Role of private input companies in the supply of inputs to the small-holder sector

Major players in the supply of inputs to the small holders in Zimbabwe are as follows:-

1. Agricura (Pvt) Ltd.
2. Windmill (fertiliser and crop chemicals constitute major activity)
3. ZFC (fertiliser and crop chemical constitute major activity)

Agricura is the largest crop chemical company in Zimbabwe. Its major activities are formulation and distribution of Animal Health products, Home and Garden products, and crop chemicals. Products are marketed to all sectors in Zimbabwe and exported to other countries in Southern Africa. The box below lists its strengths in input supply.

Input supply company strengths: Agricura’s experience

1. Depots throughout the Country.
2. Strong Technical Department.
3. Product distribution network – Retailers/stockists.
4. Wide range of chemicals i.e. crop chemicals, Animal Health products and Home and Garden.
5. Group system for the small holder sector – supported by co-ordinators.

Reaching the small-holder sector through agencies and community leaders

There are a number of opportunities for input companies to collaborate with other agencies working in the rural sector, to improve outreach. Such agencies include:

- Agritex and Veterinary Extension Workers
- Agricultural Finance Corporation
- Co-operatives
- NGOs eg World Vision, Christian Care, Citizen Network, Lutheran World Federation, and
- The Cotton Company and Cotpro.

Small-holders can also be contacted through community leaders (local chiefs, political figures such as councillors, school heads, group chair-person for e.g. AFC loans or extension groups, and women's groups).

Key issues affecting small-holder use of purchased inputs

1. Education – illiteracy.
2. Infrastructure not in place – roads, telephones, finance.
3. Lack of distribution outlets to supply inputs.
4. Government extension services inadequate. Resources or manpower inadequate.
5. Draught power – not available on time.
6. Local beliefs or spirit mediums not accepting new technology.
7. NGO's giving financial assistance to small holders and co-ops without enough capacity-building. Money is misused, with negligible effect on production.
8. Financial institutions' recovery methods are poor and defaulters increase.

Situations and circumstances which facilitate increased use of purchased inputs by small-holder farmers

1. Discussion groups.
2. Field days and demonstrations covered by local and national papers.
3. Government and Commercial companies to sponsor training e.g. sending farmers to Cotton Research Institute for Pest Scouting Courses.
4. Recovery of bad debts should be left to financiers and the state should not interfere. Repayment rate would improve and more funds would be made available.
5. NGO's should liaise with commercial companies on the supply of inputs to farmers. Cash should not be given to farmers but in the form of inputs.
6. Processing of products e.g. ginning, spinning, oil extraction should be done at local level to enhance productions, creation of employment and economic growth. Cotton buyers in Zimbabwe are improving on this. Prices to producers will improve and will increase productivity.
7. Instructions on the product usage should be written in local languages.
8. Competitions on the safe use of chemicals should be encouraged at primary school level – these are future farmers e.g. Agricultural Chemical Industry Association in Zimbabwe have sponsored students at universities.
9. Group buying, Group responsibility for debts – need for personnel to co-ordinate activity of Group members. Selection of right people at district level is key.

Strategies to increase the use of purchased inputs

1. The road network system should be improved in the Communal sector especially in areas where there is production. If farmers produce and are able to market their products this will motivate them.
2. Traditional leaders and political leaders should be involved in new ventures.
3. Women's Groups should be encouraged. Women accept new concepts faster than their counterparts.
4. Minimum tillage should be encouraged where there is draught power shortage – encourage use of herbicides.
5. Tillage units supplied by the state and NGO are reasonably priced on a per hectare basis. These should be encouraged and will improve productivity.

6. Commercial companies should improve their distribution network, to ensure timely availability of the right-priced, right products, in the right pack sizes.
7. A guarantee facility to be made available to farmers by the state and NGOs for the supply of inputs. Commercial companies want security for credits offered. NGOs can provide grants to agri-dealers who stock inputs.
8. Public sector to reduce interest rates to encourage investment.

In Zimbabwe the standard of living for the small holder farmers has improved. Commercial companies have improved on distribution network of agri-inputs. They have Technical Sales Representatives who are based at major agricultural centres who provide back up services for products marketed.

Developing the small-holder market for fertiliser in Uganda

by John Magnay, Managing Director, Magric (U) Ltd

Throughout the last twenty years, there have been on-going problems facing the commercial sector in their efforts to develop the small-holder market for farm inputs in Uganda. Table 1 illustrates the low volumes of inputs currently sold on the Ugandan market. (Note that volumes imported into Uganda are higher than those indicated because of re-exports to neighbouring countries).

Table 1: Ugandan market for purchased farm inputs

hoes	1.6 million	
pangas	250,000	
axes	125,000	
sickles	100,000	
ox ploughs	1,500	
tractors/ploughs	200	(mostly institutional purchases)
vegetable seed	3 tonnes	(95% of seed used is farmer-retained)
field crop seed	2,500 tonnes	(includes NGO purchases)
chemicals	na	(very small quantities)
fertiliser	10,000 tonnes	

Whilst purchased inputs are used in relatively low volumes by most small-holders in Africa, a comparison with other African countries shows that Ugandan market is currently significantly smaller than that in other countries in the region. Table 2 compares official imports of fertiliser for five countries in Africa. Admittedly some of these inputs are used in the plantation sector – but small-holders in these countries also find that fertiliser use is essential

Table 2: Fertiliser imports for selected African countries (1998)

Uganda	10,000 tonnes	
Kenya	150,000 tonnes	
Tanzania	120,000 tonnes	
Zambia	120,000 tonnes	
Malawi	50,000 tonnes	(1998 imports were low; 80,000 t is more typical)

Most of Uganda's fertiliser is used in the plantation sector – which is itself relatively small. Table 3 gives a breakdown of fertiliser use by sector. In all sectors except maize and "other" (i.e. small-holder sectors), demand is growing modestly at about 10-15% per annum. Whilst the market for maize and "other" crops is currently around 2,000 tonnes per year, the potential here is much greater. Demand for fertiliser on these crops could easily reach 20,000 tonnes or even 50,000 tonnes –

given the right conditions. In Rwanda, for instance, where land pressure is much greater, farmer numbers are fewer but imports are much higher. In Uganda, many farmers still have surplus land, and see its use as a preferred route to increased production – rather than intensification.

Table 3: Fertiliser use by sector, Uganda

Sugar	2,500 tonnes	
Tea	3,000 tonnes	
Tobacco	2,000 tonnes	
Coffee	250 tonnes	
Rice	250 tonnes	
Maize	1,200 tonnes	(might be an overestimate)
Other	800 tonnes	

Private sector attempts to develop the Ugandan market have been stalled by successive projects, which have undermined commercial incentives. Examples include:

- The Agricultural Development Project
- The Rural Farms Schemes
- The Coffee Rehabilitation Programme
- Uganda Hardware Project
- Relief projects in Uganda and in neighbouring countries
- JICA-KR2.

These projects have distributed free or subsidised inputs which have made the establishment of commercial distribution networks, based on world market prices, virtually impossible. The Uganda Hardware project destroyed the local market for hoes, and one of the other projects imported the most expensive fertiliser ever seen in Uganda, but made it available to farmers at prices well below commercial levels. In many cases the inputs (even when destined for neighbouring countries) have found their way back onto the local market in Uganda, being sold at less than cost price. The commercial sector has, of course, connived in this, by taking up project contracts to supply such inputs – but this is essentially a strategy to cut its losses within the context of an otherwise bleak outlook for market development.

Short-term projects which supply farm inputs are a major constraint to the development of sustainable commercial marketing channels. Such projects are also popular politically, which makes it all the more difficult to build consensus around the need to limit them. Of course there are other difficulties too. The small-holder sector is dispersed – so collaboration with the extension services would be needed to reach this target group. The ADC and SG2000 projects provide good examples of how this can be achieved. Some might argue that the co-operative movement represents a natural partner in this activity – but generally it ill-served the needs of its farming constituency, and would almost certainly be stronger today, if that were not the case. Viable distribution systems must be trader-driven, and must address the needs of the

market. In Zambia, for instance, 70,000 tonnes of fertiliser was distributed to small-holders, in small packets, through commercial channels.

To sum up, the limitations on input market development are:

- sector support projects
- size of market
- the relatively high cost of imported goods in Uganda
- transport costs
- knowledge amongst farmers
- relief projects
- output markets – creates demand for input (output market also unstable)

Transport costs are particularly problematic – both because of the low volumes (hence high per unit cost) of imports, and because of high costs between Kampala and rural stockists (which may add 50-60% to the Kampala price). The development of the mobile phone network will undoubtedly contribute to improved information on prices and at least reduce the speculative element in pricing which exploits the poor information flow.

There is evidence of growing awareness in Uganda of the importance to develop sustainable commercial input distribution networks. The commercial sector is certainly prepared to take risks, and make investments, providing the commitment to commercial distribution is there amongst policy-makers and politicians too. Two years without a major input supply project would be sufficient to make inroads on the establishment of commercial networks to supply inputs to small-holders.

Annex 1: list of participants

Constante B.Bazirake	Ministry of Agriculture, Animal Industry and Fisheries
Donal Brown	DFID – Natural Resources Programme, Uganda
Omer Dvir	Balton (U) Ltd
Tonneth Gazi	Agricura, Harare, Zimbabwe
Andrew Goodland	Natural Resources Institute, UK
Ann Gordon	Natural Resources Institute, UK
John Harding	Commodity Export International
Gaudensia Kenyangi	USAID
Joseph Kikafunda	National Cereals Research Programme
Dan Kisauzi	NARO
Rota Laker-Ojok	AT (Uganda)
George Lukwago	UCDA
John Magnay	Magric Ltd.
Fred Muhhuku	Uganda Seed Project
Rosetti Nabbumba	Economic Policy Research Centre
William Nanyeenya	NARO
Philemon Nganda	AT (Uganda)
Peter Ngategize	NARO
Willie Odwongo	Agricultural Policy Secretariat
Geresom Okecho-Ochwo	Cotton Development Organisation
Jopheth O. Y. Omoding	Ministry of Agriculture, Animal Industry and Fisheries
Daniel Wanzala	Uganda National Farmers Association
Mark Wood	Agribusiness Development Centre
Nganda Yusoy	Njuba Times, Business Correspondent