CROP PROTECTION PROGRAMME

Linking the demand for and supply of agricultural information in Uganda

R8281 (ZA 0557)

FINAL TECHNICAL REPORT

ANNEXES

15 February 2003 – 31 March 2005

Barry Pound
The Natural Resources Institute
31st March 2005

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ANNEX 1

LOGFRAME for the project "Linking demand for and supply of agricultural information in Uganda"; revised in September 2003 following the mid-term review of the project by Dr Malcolm Blackie

Narrative Summary	Indicators of Achievement	Means of Verification	Risks and Assumptions
Goal			
CPP *Benefits for poor people generated by application of new knowledge on crop protection.* ***LPP*** *Benefits for poor people generated by the application of new knowledge on the sustainable management of livestock in semi-arid and rangeland production systems* *Benefits for poor people generated by the*	***CPP*** *By 2005 improved crop protection methods promoted by at least three target organisations for the benefit of poor farmers and, as measured against baseline data, contributing to one or more of the following:* • End-user satisfaction • Increased and/or stabilised production • Increased productivity (land, labour or capital) • Enhanced marketing opportunities. ***LPP*** 1. By 2007, where primary demand identified in poor people engaged in smallholder mixed livestock farming in East and Southern Africa and South Asia, evidence of one or more of: • Sustainable increase in production, productivity and survival of livestock • More, cheaper, safer livestock consumed • Increased contribution of livestock to crop production • Reduced drudgery, particularly for women • Improved employment opportunities • Increased capital assets • Increased capital assets 2. By 2007, where primary demand identified in poor people in	Reports of target organisations Project reports Programme and external evaluations National, bilateral and multilateral surveys of indicators of improved benefits (productive capacity, food security, wealth, nutrition and environment). National and local surveys of production, employment, food markets, nutrition DFID evaluations GCIAR reports	*Enabling environment (policies, institutions, markets, incentives), for widespread adoption of new strategies and practices* *Poor people invest benefits to improve livelihoods* *Climatic conditions are not atypical*

application of new knowledge on the sustainable management of livestock in high potential production systems.	pastoral areas in East Africa and South Asia, evidence of: • Stabilised balance between people and domestic livestock • Greater income from domestic livestock • Sustained environmental resource base 3. By 2007, where primary demand identified in poor people engaged in smallholder milk production in East Africa and Latin America, evidence of one or more of: • Sustainable increase in production of milk and milk by-products • More, cheaper, safer milk products consumed • Improved employment opportunities • Increased capital assets • Increased capital assets	FAO reports	

Purpose	OVIs	MOVs	
CPP Promotion of strategies to reduce the impact of pests on crops, and improve quality and yield, for the benefit of poor people	By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions for the benefit of poor people	Programme annual Reports Project Final Technical Reports	Local and national target institutions have adequate resources to take-up and promote research outputs
LPP New technologies and strategies developed to improve survival and productivity of livestock species in semi-arid environments, promoted and disseminated	By 2005, for poor smallholder milk producers, small stock keepers and pastoralists in East Africa, • Empowered institutions which represent the needs of poor people and processes by which they access information described • Effective and trusted target institutions identified at the project site level • Effective dissemination strategies in place • Local level impact of research outputs on livelihoods • Research products appropriately packaged for dissemination to various beneficiaries	Target Institution Reports Dissemination publications, extension leaflets etc. Endorsement of outputs by development fora Reports of workshops	
Strategies to improve the production and productivity of milk production of milk producing livestock maintained in high potential production systems, promoted and disseminated	By 2005, at least 2 approaches that promote the uptake of technologies by target institutions and their adoption by smallholder milk producers in East Africa, These are likely to include the following approaches: • Identity of resource-poor milk producer communities in one or more project locations and indicators for assessing their livelihood status • Log of indigenous knowledge on milk production practices • Toolbox of new/old strategies • Identity of empowered institutions which represent the needs of poor people and processes by which they access information • Main processes that promote adoption of new ideas by end users	Reports of target institutions e.g. NARS	

	• Assessment of pro-poor impact of research on-farm • Research outputs appropriately packaged for various beneficiaries		
Outputs	**OVIs** **[For 2 Pilot Districts]**	**MOVs**	**Assumptions**
Output 1: Working within the NAADS programme, develop demand discovery mechanisms that identify demand from a much more inclusive range of intermediate and end users than is currently the practice. Demand identified is appropriate to local conditions, and is based on end-user local knowledge and their enhanced understanding of current technical and market opportunities, and anticipated future trends.	1.1 Limitations of present NAADS demand assessment system (including concerns about the inclusion of cross-cutting issues) widely available to stakeholders by 18 months. 1.2 Stakeholders aware of demand mechanisms that are more inclusive, and dis-aggregated by end- and intermediate-user needs, by 18 months 1.3 Information end users in pilot Districts aware of available technical and market opportunities by end of year 2 1.4 Information sources within Uganda have clear understanding of intermediate user's requirements by end year 1	Reports of partner NGOs in pilot districts	NAADS is able to consolidate lessons learned Public Service Ministry allows change to private service delivery Genuine collaboration and sharing within "Output Teams" Private sector environment doesn't inhibit collaboration Climatic and political conditions allow the full participation of
Output 2: Improved tools and mechanisms developed to support the supply of appropriate information and technologies in forms useful to intermediate and end users across the food chain. Particular emphasis on tailoring information to specific user needs and the inclusion of necessary socio-economic options and data to enable local evaluation**.**	2.1 Comprehensive system for the translation of research outputs from national and relevant international sources into formats which explicitly include information necessary for the social, economic, and gender related factors necessary for location specific technical recommendations in place through collaboration with Uganda-based organisations by the end of the project by end year 2 2.2 Service providers using a range of information formats, including those targeted at disadvantaged or minority groups, after 18 months 2.3 End users receiving high quality, comprehensive information appropriate to their needs from multiple (complementary) sources by end of project	NARO reports and extension materials	

Output 3: A limited range of options, appropriate to local conditions and responding to farmers' needs, identified and tested, emphasising, but not exclusive to, outputs from DFID research programmes. Information from this work to form part of Output 2.	3.1 DFID and other research programme outputs form part of repertoire of service providers by end of project 3.2 New methods for information delivery tested (e.g. "Toolboxes") by end year 2 3.3 Socioeconomic analyses of research outputs routine amongst participating scientists.	NAADS and service provider reports	farmers of different categories.
Output 4: Institutional mechanisms for integrating supply and demand for information developed	4.1 Mechanisms integrated into strategy implementation by NAADS and the new NARS by end of project	NAADS/NARO reports	
Output 5: Lessons learned evaluated, documented and disseminated to policy and implementation components of key target institutions within the national agricultural research and extension system of Uganda, and to interested parties outside Uganda	5.1 NAADS and NARO M&E systems show that lessons from the project are being incorporated into institutional processes and procedures from end year 1 onwards 5.2 Articles and papers on project experience available electronically and in hard copy nationally and internationally from end year 1 onwards	Articles, papers, website materials	

Activities	OVIs / milestones	MOVs	Assumptions
1.1 Inception workshops to identify partners, focus sites in two pilot Districts and to define overall project roles, responsibilities and working practices.	Workshops held by end of month 2	Workshop minutes	Security, or other civil factors, do not prevent movement of staff and attendance of workshops and field work NARO/NAADS/ and NGO partners are able to provide staff/facilities for collaboration
1.2 Review of existing demand identification and prioritisation mechanisms for production information used by farmers, and service providers.	Review completed by end of month 4	Project quarterly report	
1.3 Participatory assessment of demand mechanisms against criteria developed with NAADS	Assessment completed by end yr1	Assessment report	
1.4 Development of improved demand identification mechanisms	Improved mechanisms available by end of yr 2	Project reports	
2.1 Identification of the different levels and types of service providers, and participatory assessment of their current information sources (how they are accessed and how appropriate they are to the users and to the type of information being disseminated).	Assessment completed by end yr 1	Assessment report	
2.2 Identification of existing and newly emerging "information managers" in Uganda, and participatory assessment of their current information sources and channels, and of their viability as sustainable private enterprises	Assessment completed by end yr 1	Assessment report	
2.3 Support to ongoing initiatives to improve information supply through: - identifying existing initiatives in and outside Uganda, and building linkages to these; - advice on the format and content of information to improve accessibility to end-users, - making CPP and LPP project outputs available in an appropriate formats for service providers and end users	Ongoing throughout project. Database and toolboxes available by end yr 2	Innovative Dissemniat-ion materials	

2.4 Development and documentation of recommendations on improved mechanisms for information supply, based on - in-country experience in Uganda - experiences elsewhere.	Network/news-letter articles published and available electronically by end of project	Articles and website	
3.1 Review of the status of the research outputs from relevant CPP/ LPP projects to determine their readiness for dissemination and the extent to which they have already entered uptake pathways	Review completed by end yr 1	Review	
3.2 Training of farmer groups and service providers in the two pilot Districts in the participatory evaluation of technologies	Trained groups in place by end yr 1	Project reports	
3.3 Based on demand in the two study districts, conduct participatory evaluation and adaptation of CPP and LPP technologies that respond to farmers needs, through on-farm testing, involving farmers and service providers at different levels.	On-farm trials started by 2004 rains.	Trial protocols	
3.4 CPP/LPP project staff consultations conducted, leading to the development of accurate and appropriate recommendations	Contacts with project staff from month six onwards	Project reports	
3.5 Documentation of the outcome of technology validations, and incorporation of findings into the appropriate information supply tools.	Results of trials documented by end of 2004/2005 seasons	Trial reports and information supply tools	
4.1 Mid-term workshop with key stakeholders and target institutions to consolidate the findings of Outputs 1-3, and refine activities for outputs 4 to 6.	Workshop held by month 18	Workshop proceedings	
4.2 Based on the outcome of 4.1 and the NAADS communication strategy being developed by other consultants and NAADS personnel, formulation of institutional mechanisms for integrating the supply and demand components of the information system, across the food chain.	Integration plan developed by end of year 2	Plan	
5.1 Setting up of a M&E system for the project that integrates into the existing M&E systems of NAADS and NARO.	M&E system in place by end month 9	Project reports	

5.2 Implementation of the M&E system for the project and feeding of its findings into the project process.	M&E influences 18 month review	Workshop proceedings	
5.3 Production of policy briefs on main findings of the project	Policy briefs available by end of project	Policy briefs	
5.4 Dissemination of the findings in Uganda	Lessons disseminated by end of project	Disseminat-ion materials	
5.5 Dissemination of findings to interested audiences outside Uganda through articles in wide circulation newsletters and networks (e.g. LEISA Newsletter, AgReN network and CGIAR)	Articles produced for newsletters/ networks by end of project	Newsletters/ networks	

ANNEX 2

Aide Memoir (without Appendices)

for the visit of Barry Pound and Barbara Adolph[1]
to develop a research proposal for a project on

Supporting uptake pathways for agricultural information and technologies ("Linking demand and supply of agricultural information in Uganda")

10-16 November 2002

Background: A Project Memorandum with the title: *Promoting maize protection methods through improved uptake pathways* was prepared for the DFID Crop Protection Programme (CPP) in June 2002. CPP advisers decided that the ideas contained within it merited the development of a project with a broader technology base (rather than just focusing on maize crop protection), and with NAADS as the key partner. Dr. Dan Kisauzi subsequently discussed the idea with the Director of NAADS, who supported the outline proposal. The technology base should reflect priority demand from farmers, and could therefore include technology areas within the remit of the CPP, the Crop Post-Harvest Programme and the Livestock Production Programme. A meeting with management staff from all three Programmes on 4th October 2002 confirmed their interest if the project proposal met their criteria.

CPP agreed to fund an inception phase involving preparatory visits in the UK and a visit by Barry Pound and Barbara Adolph of one full working week in Uganda to develop the project proposal with NAADS and other Ugandan partners. It was agreed that following the visit, a presentation will be made to CPP, CPHP, LPP Programme Managers and other interested parties on December 6th. On the basis of feedback from the presentation, a Project Memorandum will be prepared and submitted to the CPP and other Programmes so that a final decision on project go-ahead and funding can be made in January 2003.

Objective of visit: To agree on an expansion of the existing Project Memorandum by developing the outline of a project to link supply and demand for agricultural technology in pilot districts of Uganda, thereby providing NAADS and its partners with effective and practical methods and systems for information flows between food chain end users (farmers, processors, traders and others), service providers and technology sources. NAADS would be the primary direct beneficiary from the project, with NRI acting as service providers to NAADS.

Activities: Meetings were held with stakeholders in the technical and market information flow systems in Kampala, Entebbe, NARO research stations and ARDCs, and in two NAADS pilot Districts (Soroti and Tororo). A workshop with potential partners and collaborators was held to explore the overall framework of the project. A list of those met is given in Appendix 1, and the proceedings of the workshop is given in Appendix Two.

[1] Natural Resources Institute, Chatham, Kent ME4 4TB, UK (b.pound@gre.ac.uk and b.adolph@gre.ac.uk)

Main points emerging from the discussions and from the workshop:

- There are many ongoing dynamic initiatives related to the information flow system (for both technical and market-related components) within Uganda (see Figure 1). All of those met expressed support for the aims of the project, and a willingness to work collaboratively with it.
- The project has to look forward, and to anticipate the challenges that will be presented during the shift from public to private implementation of service provision. The dynamic situation calls for a responsive project that learns, responds to and disseminates lessons as they arise.
- There is no comprehensive system for the packaging and supply of technical information from NARO and other sources to the multiple intermediate and end users of that information. The intervention by the proposed project to address this (bearing in mind initiatives already underway – e.g. the OUTREACH and Partnership Initiative, and COARD) was welcomed across different types of institutions (research, extension, NGOs, private companies and local government)
- A start has been made in validating technologies (through ARDCs, NAADS technology development sites and other initiatives), but there is ample scope for expanding the testing of research results from within and outside Uganda under local conditions (especially in response to locally identified priorities).
- A number of examples were given by the NARO Head of Cereals about feedback to research from export markets, millers and individual farmers. This feedback is ad hoc at present, while an effective information system requires a more structured feedback system that is rapid, comprehensive and reliable and has a real influence on setting the research agenda.
- A number of impressive initiatives are underway to support the shift towards the commercialisation of Ugandan agriculture (including IDEA, FOODNET, KULIKA, Small Enterprise Development Project etc.). Several of these are using radio in innovative ways to create awareness among businesses and farmers about market and technical opportunities. All expressed a willingness to work with the proposed project so that the lessons learned and models developed by them can be included in capacity building and activities at different levels of the information flow system.
- NAADS has commissioned NGOs to validate farmer-group formation and prioritisation of demand in the 6 pilot Districts. The process for farmer articulation of demand has a number of weaknesses which the project would address, including strategies to increase farmer awareness of the available technologies, value addition and market opportunities as a component of the demand process. It is also clear from discussions that there is less clarity about the mix of delivery methods that are appropriate to different types of information end user (e.g. male and female farmers, traders, processors etc) and different types of technologies (e.g. seed, IPM, implements). The proposed project would look at this aspect of supply.
- Appointment of private service providers to Districts has been delayed, but it is understood that when this happens these will have a mixture of experience and capacity. Some (e.g. Sasekawa Global 2000, NIDA, IDEA) may have the capacity to provide technical and market information – presumably on a commercial basis – to other service providers who interact directly with farmers and others in the food chain at sub-county level. All actors (and particularly the private service providers at sub-county level) will

need to be capacitated in the overall information flow system, and in the use of its components to access, interpret and use information from the demand and supply sides. While the proposed project would only have the resources to implement this capacity building in the pilot sub-counties in 2 Districts, the model and content for that capacity building process would reside in NAADS. As with other aspects of the project piloted in the two Districts, there would be networking with the other Districts so that the lessons learned and tools developed could be adopted if appropriate.

- It may be that this capacity building can also be extended to service providers outside the NAADS system, and eventually to those farmer groups that are motivated to access and influence the information flow system themselves.
- A quality control system for service providers is part of the NAADS strategy. The project will use this system to monitor service delivery in the two pilot districts, and will feed back any lessons from this process to NAADS. Experiences from other M&E initiatives (e.g. COARD – farmer participatory M&E of extension services) will be considered for incorporation.
- Linking the demand and supply components of information in a responsive way requires good communication mechanisms between institutions. It is understood that an MOU exists between NAADS and NARO, and that a communication strategy is being developed by NAADS. This project provides the opportunity to test and validate the strategy as applied to 2 pilot Districts. Horizontal linkages between service providers at the sub-county levels will also provide opportunities for joint learning (especially if they see mutual commercial benefit to that learning). A third component of linkages that the project might address is the linkage at District level, and the tensions between public bodies (local government, NAADS co-ordinators, District extension staff etc.) who are driven by a public service agenda, and private service providers and farmer groups that operate under conditions driven by the economic environment.
- An analysis of the 6 NAADS trailblazing Districts carried out in the workshop using a set of criteria developed by the participants identified two groups of Districts – those which enjoyed comparatively favourable institutional conditions and linkages (Mukono, Serere, Kabale and – to a lesser extent - Tororo), and those with less favourable situations (Arua and Kibaale).
- Matching of supply and demand of information for the support to the commercialisation of farming in Uganda is central to NAADS, and we understood that they welcome the proposed project's support to this area. NAADS is willing to contribute the costs of a Project Manager, including support costs (transport, computer, allowances). The Project Manager would be located within the NAADS Secretariat, and therefore be in a position to integrate project findings into institutional learning and action. The Project Manager would need to command the respect of, and be able to influence and negotiate with, senior staff in the range of institutions involved in the information flow complex. He or she needs to be dynamic, open minded and analytical, with an appreciation of the agricultural, social, economic, institutional and policy issues that are involved.
- Senior individuals in NARO have expressed support for the project, and willingness in principle for NARO to be a primary partner in the project. This would greatly facilitate the component of the proposed project concerning the flow of technical information from formal institutional sources to farmer-interface service providers. However, authority for

NARO's formal partnership in the project must be obtained through the Director General of NARO.

Next steps and action points

1. Using the information collected on this visit, an **outline proposal** will be developed by **22nd November** and sent to NAADS Director, NARO DG and DFID NAADS adviser. Copies will be sent to other stakeholders who have contributed during the visit in case they have comments or corrections to make. **Responsibility: NRI (Barry Pound and Barbara Adolph)**
2. NAADS and NARO will **respond with comments** on the outline proposal to NRI by **1st December. Responsibility NAADS and NARO**
3. A **presentation** will be made of the proposal (modified in response to any NAADS/NARO comments) to the Programme Managers of the Crop Protection, Crop Post Harvest and Livestock Production Programmes (and Dr Kisauzi) on **6th December. Responsibility: Barry Pound and Barbara Adolph.**
4. On the basis of the presentation the Programme Managers will ask NRI to **develop a full Project Memorandum** by the **end of December: Responsibility: Barry Pound and Barbara Adolph with some input through email from NAADS, NARO and other stakeholders as appropriate**
5. The 3 DFID programmes will **decide on funding support** to the project in consultation with their Project Advisory Committees if appropriate by **end January 2003. Responsibility: DFID Research Programme Managers**
6. If funding is approved the first activities of the project could start by March 2003.

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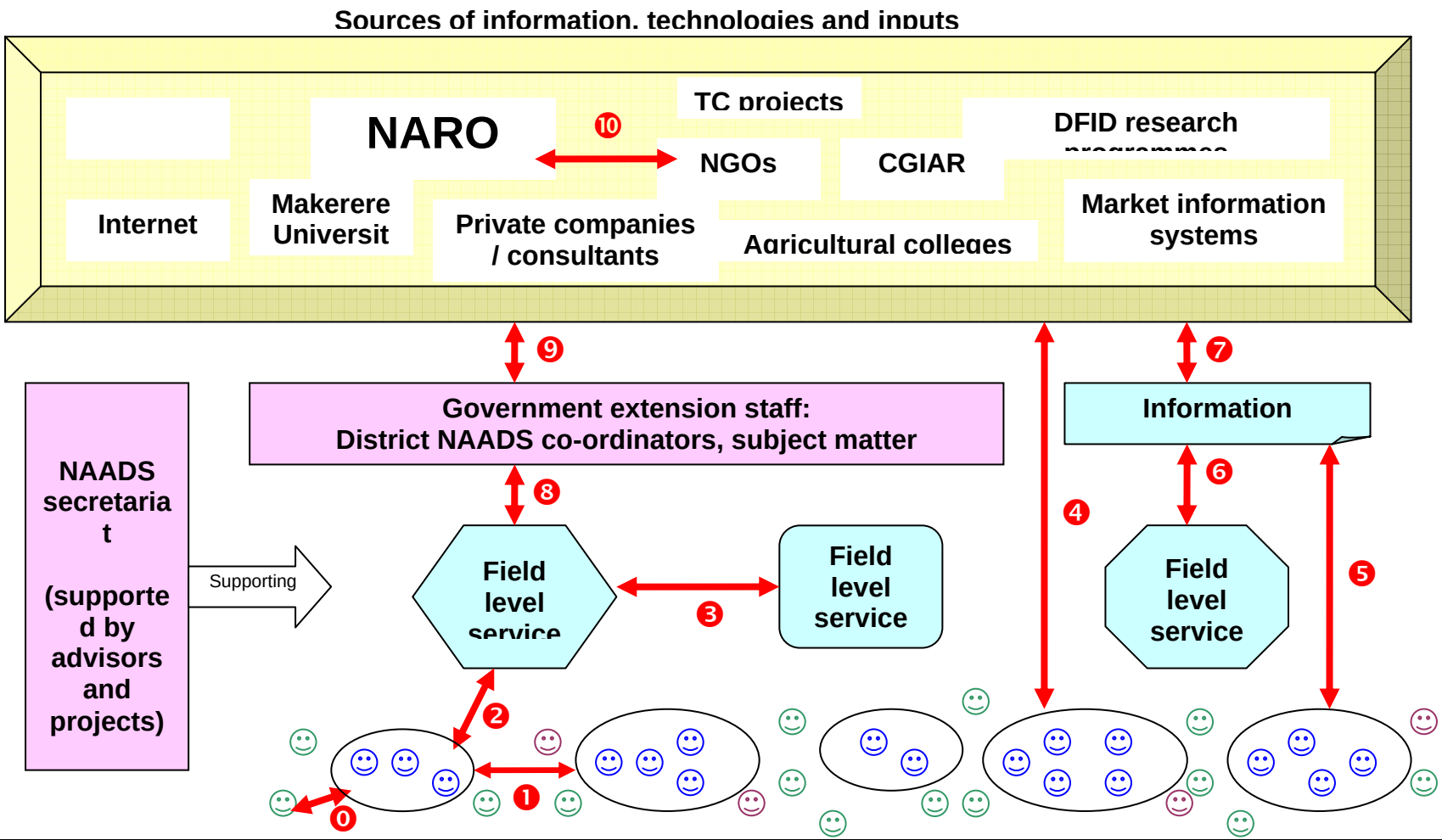
Figure 1 AKIS system in Uganda (generalised / not comprehensive)



ANNEX 3

REPORT OF THE FEEDBACK SESSIONS HELD IN ARUA AND TORORO

(7TH -12TH MARCH 2005)

by

William Draa Edaiku

Grace Agwaru

Narisi Mubangizi

22nd March 2005

1.0 Introduction

As a means to give a meaningful conclusion to their field activities in the two districts of Arua and Tororo, the three linking project supported MSc. Agricultural Extension/Education students from Makerere University planned for a week long exercise for feed back giving in the two study districts. This exercise was aimed at validating and enriching the findings and recommendations of the studies besides acting as a form of accountability to the various categories of respondents and stakeholders.

Consequently, this exercise took place between the 7th to 12th March 2005 and involved a total of five meetings (two in Arua (one at district and one at sub-county level, and three in Tororo (one at district and two at sub-county level) were held. In Arua district, the second sub-county level meeting (planned for Kijomoro on the 8th March 2005) could not take place because the date coincided with the Women's day celebrations. However, an arrangement was made to ensure that the sub-counties that were supposed to attend were represented during the district level meeting. Consequently the district level meeting had the sub-county NAADS coordinators and representatives of the farmers' forum of Manibe and Midia in attendance.

2.0 Procedure

Each of the five meetings involved all the three students presenting their objectives and methodology in brief and then the key findings and recommendations. To ensure logical flow of the presentations, William would begin with presentation on demand assessment, then Grace on information dissemination approaches and lastly Narisi on service providers' needs and client responsiveness. After all the three presentations members present would be requested to comment, ask or suggest as many times as they wished on any part of the presentation. After all the suggestions/comments or questions, the students would again in the same order respond to the issues raised about their presentations.

The table below indicates the numbers of participants (disaggregated according to sex) during the meetings in the different venues. The participants at the district level included the district NAADS coordinator, the district production coordinator, the district farmer forum chairperson, the district agricultural officer and representatives of private service providers. At the sub-county level the participants included the sub-county NAADS coordinators, chairpersons LC3, members of the sub-county farmers' forum, representatives from farmers' groups engaged in the three studies and LCI representatives from the villages where Grace a and William had carried out their studies.

Table 1: Number of participants at the different venues

District	Venue	Number of males	Number of females	Total
Arua	Arua district H/Qs	06	02	**08**
	Uleppi sub-county	08	04	**12**
Tororo	Tororo district H/Qs	06	01	**07**
	Kisoko sub-county	12	19	**31**

	Nawanjofu sub-county	05	12	**17**
Total		**37**	**38**	**75**

3.0 Outcomes of the exercises

3.1 Issues from William Draa's presentation on the NAADS demand assessment process

Box 1: Issues on William's study

(A) Involvement of politicians in NAADS

1. Participants at the sub-county level wondered who (whether the farmers' forum or the local council) would select the NGOs to facilitate NAADS demand assessment and FID processes at sub-county level in case the powers for doing so were delegated from the district to the sub-county level? A key suggestion in line with this was that this could be done by the sub-county farmers' forum procurement committee assisted by sub-county technical committee. The members of District M&E committee would be required to provide support.
2. There were also questions related to whether and how politicians should be involved in NAADS activities. One politician during the Uleppi sub-county level meeting noted that, in NAADS activities, politicians were sidelined on the premise that they interfere with the program, which he however noted was unfounded. The Sub county Coordinator Uleppi concurred and submitted that the "loose statements" by NAADS Secretariat staff at the beginning that politicians should not be involved led to antagonism between politicians and NAADS instead of cooperation.
3. In Tororo it was noted that there seemed to be political good will at the top and not at the grass roots.

(B) Requirements for group membership

1. Whether the study had come up with any recommendations/suggestions about how the poor farmers whose involvement in NAADS is constrained by group fees and 2% co-funds can best and conveniently pay these dues to join the NAADS groups.
2. Some farmers could afford the payment to join groups but did not just appreciate the value of knowledge.
3. There were also the drunkards who were reported not to be in any group and may require rehabilitation before being engaged in gainful economic activities.
4. Some participants cited lies by some politicians to farmers as having raised farmers' expectations of money and inputs from NAADS and when these could not be realized farmers lost interest in NAADS groups.

(C) Stakeholder collaboration

1. The need for NAADS and NARO as key stakeholders to work together to ensure that farmers' needs generated from the NAADS demand assessment process form the research agenda was emphasized.
2. The need to capture and harness farmers' innovations was also emphasized. It was noted that there were certain practices that farmers had actually modified to suit their circumstances for instance the spacing of Serenuts, however, such modifications were rarely known to the other stakeholders. It was therefore suggested that appropriate mechanisms to ensure that farmers' innovations and views are catered for in research be put in place.

Box 1: continues

(D) Enterprise selection

1. It was noted that the enterprise selection process was lengthy and not clear to farmers such that even what came out after following the process was not what the farmers expected. It was therefore suggested that facilitation should guide farmer to select enterprises where there have comparative advantage.

(E) Marketing of farm produce

1. The issue of the market for farmers' produce arose and actually one farmers in Kisoko sub-county in Tororo complained that she had eleven bags of groundnuts (Serenut II) in her store and had failed to get market from last season. It was noted that marketing of groundnuts had been done through the sub-county channel to supply other farmers in the district and that market was getting saturated. The farmers are only willing to sell their crop at 100,000/= per bag at the price they bought their seed stock. It was therefore recommended that farmers needed to begin determining the prices to sell their produce at depending on whether they would be making a profit rather than wanting to sell at the price at which they bought seed. However, it was agreed that the problem of produce marketing needed a strategy up to the national level.

(F) Agricultural Credit and farmer adoption of modern technology

1. It was noted that farmers were getting stuck with knowledge, because they lacked the other components to help them take off. Most of the participants in both districts were not sure of what had happened to the micro-finance component of the PMA. Some wondered whether the micro-finance and credit component was going to link up with NAADS or function independently of NAADS.
2. It was further noted that in case the credit was ever to come, emphasis needed not only to be put on the interest rate but also on the grace period. Some participants in the Kisoko sub-county meeting actually felt that there would be no problem with any interest rate so long as the grace period was appropriate for farming investments.
3. Adoption of the practices promoted by NAADS was also reportedly limited because of the huge price tags attached by the service providers during accountability. These huge price tags attached on the materials were reported to be stopping some farmers from trying to access credit from other institutions since they felt that they could not recover the money even if they adopted such practices.

3.2 Issues about Grace Agwaru's presentation on research information dissemination approaches

Box 2: Issues on Grace's study

(A) Farmer involvement in groups and trainings

1. In both districts it was generally agreed that the majority of poor farmers and youth were not in farmers' groups. It was noted during the district level meeting in Tororo that they as a district had actually been trying to capture the poor farmers but in vain because such people never bothered to come for meeting even when called. There was however a feeling by some members in Tororo, that those not in farmers' groups were actually those who were not very interested in farming probably engaged in other non-farm activities.
2. It was reported in Arua that most farmers from areas near town were not in groups because they were engaged in other non-farming businesses
3. Some farmers especially the poor and illiterate ones were not joining groups because they thought that such groups would be led by the elite ones and consequently benefiting such rather than all the group members. In light of this one member suggested for the need to have the illiterate and poor farmers form their own groups.
4. Some also expected to receive loans so when they did not get these, they broke away
5. It was noted that actually most of the poor farmers who were not in farmers' groups did not have land. The question was however, how such poor farmers were going to benefit from the findings of the study.
6. In light of Grace's recommendation on the appropriate number of farmers to be involved in a theory training and demonstration session, it was noted that NAADS performance relative to such recommendation could not be objectively assessed because only a few of the members registered in NAADS groups were active.
7. In response to the observation that farmers had reported that they were not attending trainings because of the distant venues, the chairman farmers' forum Kisoko noted that they had tried to deal with this by establishing 2-3 training venues in each parish, but still farmer turn up was very poor.
8. In response to the study's observation that farmers were complaining of too many and confusing training program, the sub-county NAADS coordinator for Kisoko noted that this was actually healthy. He noted that NAADS wanted the farmers to be specialized rather than going for everything on offer.

(B) Performance of NAADS relative to other approaches

1. It was noted during the meeting in Kisoko sub-county in Tororo that NAADS performance could not be compared with that of the other approaches like farmer field school because of the very wide coverage of the former compared to the latter. It was therefore suggested that instead of the study focusing on the comparison, it would rather advise on how the service providers under NAADS could effectively train the large numbers of farmers' groups or probably come up with the number of groups that a service provider can effectively handle.

Box 2: Continues

(C) Categorization of farmers

1. In Tororo, it was reported that contrary to Grace's observation that female headed households were the poorest, there were some male headed households where the men had taken on drinking and could not even utilize the resources like land that were at their disposal. It was suggested that for such people rehabilitation would be necessary before they can be engaged in any economic activities.

2. In one sub-county level meeting in Arua, women were reportedly suppressed by culture, -for instance they could not engage in business unlike their counterparts in the other parts of the country, they cannot, take up leadership positions in present of men unless coerced. These cultural limitations were reported to have led to women being poor and consequently dominated by men. The issue of land ownership being culturally restricted to men at the disadvantage of women and youth was reported to be negatively affecting the adoption of technologies learnt especially by women. It was reported to be affecting women's investment in farming as there was no security guaranteed to such women if they invested on land that belonged to their husbands. This seemed to be in line with the study's findings that at household level, men were likely to ultimately benefit more than women even if the women formed the majority of the participants in the trainings of the different approaches.

(D) Farmer adoption of technologies promoted by the different approaches

1. It was noted in Tororo that farmers' adoption of the practices was very low because of poor farmer to farmer adoption. It was noted that service providers were concentrating on the technology development sites and not on what individual farmers were doing. It was therefore felt that if things continued the way they were being done, there would continue to be very good technology development sites but the technologies being promoted not being adopted by the individual farmers.
2. There was however, a feeling by some of the participants that farmers were stubbornly refusing to adopt some of the practices being promoted but disguising themselves that they were lacking capital to take off. An example of row planting of groundnuts was given where it was noted that little or no capital would be required to practice this but farmers had not put it into practice. It was therefore suggested that the study could have gone further to find out why farmers were not putting in practice the things they were learning.
3. In response to the study's observation that there were many more demonstrations on crop related technologies than there were on livestock, it was noted during the district level meeting in Tororo that it was actually NAADS which had championed the establishment of the few livestock demonstrations because the public extension service system lacked the capacity to procure the materials needed to establish the livestock demonstrations. It was also noted that most farmers were interested in crop technologies because they were cheaper. Besides, livestock keeping was being constrained by lack of land and wrangles amongst neighboring farmers due to livestock related problems.

Box 2: continues

(E) Private service providers' performance

1. In Arua, service providers were noted to have enough time for their trainings since the contract duration was based on the number of days of actual work as stipulated in the contracts. There was however, a suggestion that contracts could go beyond and stipulate the number of person hours actually spent training farmers and doing other advisory related activities.

2. Service providers noted that those NGOs involved in farmer institution capacity building should be followed up because one of the reasons mentioned few farmers in groups and poor attendance in trainings was wrangles and dissatisfaction in groups, high expectation especially since they had previously been promised money and other benefits by politicians, which they didn't get. All this needs further group development.

3. In response to the study's recommendation for the need to used skilled community based farmers so as to address the problem of few service providers as had been reported In Nawanjofu sub-county, the farmers noted that they were happy with the recommendation but asked about how such community based people would be identified and later on facilitated.

(F) Information access by farmers

1. In response to the fact that farmers were not using the radio to a large extent, it was noted most of the farmers actually had radios but because of poverty, they could not afford to buy dry cells as the little money they had could be used for the essential household items like food, paraffin and salt.
2. It was reported that there had been little emphasis to market information, however there were now attempts to also focus on this important element of commercial agriculture. This seems to reinforce the study's observation of farmers' limited access to market and post harvest handling information.

3.3 Issues about Narisi Mubangizi's presentation on the needs and client responsiveness of private service providers under NAADS.

Box 3: Issues about Narisi's study

(A) Private service providers' characteristics

1. During the meeting at Uleppi sub-county in Arua, it was noted that very few female extension service providers was a concern. However, it was attributed to the fact that agricultural subjects were perceived to be for males just like nursing is mainly for females. It was noted that in order to encourage more females to take on such technical subjects like agriculture, schools and institutions in the region needed to be brought to the level of the rest in the country in terms of facilities.
2. In Tororo, it was noted that the number of female service providers reported by the study was less than the one existing at the time of the study. However, the low number of female extension service providers was also seen as a concern. The low number of female service providers was just like in Arua attributed to the low number of females taking on agricultural related subjects. How to bring in more female service providers was reported to still be a challenge.
3. In response to the study's observation that most of the service providers had no working experience outside NAADS, the Tororo district NAADS coordinator noted that delayering which was supposed to have released the experienced public extension staff had not taken place and consequently the high number of inexperienced service providers.

(B) Private service providers' problems

1. Realizing translation of information from English to the local language was a problem for most service providers as found out by the study it was suggested that farmers be involved in the process of translating the information. The district production coordinator for Arua during the district level meeting noted that under the linking project, they had once hired a consultant to translate information into the local language but when this was taken to the farmers they crossed most of the things and came up with a new one which they were very happy with.
2. Closely related to the above problem of translation was the concern that farmers were having a language problem with the service providers not born from their locality. This was reported in Arua because of the so many dialects. It was further noted that farmers had a negative attitude towards service providers not born from their area. It was therefore suggested during the Uleppi sub-county level meeting that NAADS could use the community based service providers to help combat the above two concerns. Use of the community based service providers was however noted to call for relaxation of the formal qualifications that were currently being emphasized in the selection of the service providers.
3. In response to the observation on service providers' limited capacity in terms of transport means and information processing equipment, the district NAADS coordinator for Tororo noted that this was a problem of service providers' poor

Box 3: continues

planning. He wondered how a service provider earning 400,000 shillings per month as professional fee could fail to raise 100,000 for a bicycle. He noted that some of the service providers did not know how to bargain with the procurement committee, but other wise money to cover all their costs including those in information access and processing are supposed to be catered for once the service providers give adequate explanation.

4. To the claim by some service providers that there was corruption at the sub-county level, the district NAADS coordinator for Tororo noted that they had also heard about it. He however noted that even if it were to be true it was possible that it was being propagated by the service providers due to competition in winning contracts. The service providers also present in the very meeting concurred with the coordinator that it was possible that some of their colleagues were bribing the farmers' forum officials in order to win contracts.
5. In response to the recommendation on the need to follow up the remuneration of field staff under firms, it was noted that there was a drive to register service providers, some came and many did not come. Those who did not register, run to the firms so if they are cheated from there they will learn the hard way. The Tororo district NAADS coordinator however noted that the firms had been instructed to negotiate and agree with their staff on how much they would pay them and stick by that agreement.

(C) Information access by private service providers

1. In response to the issue that accessing information from some of the sources depended on personal friendships between the service providers and people at the source, it was reported that some service providers were timid to get ask for information from offices. It was noted that some come like to the district headquarters and go back without stating what they want not until someone asks them what they are looking for.
2. In response to the lack of linkage between service providers and the information sources mainly research, the center manager for Abi ARDC during the district level meeting noted that a new project named Agricultural Research and Extension Network (ARINET) had been initiated to ensure information sharing between the different players in the extension and research systems. The Arua district production coordinator also noted that the linkage between research and NAADS was provided for in the technology development component of NAADS, but this was not working as expected.
3. The lack of cooperation between private service providers and public extension staff was considered noted not be a surprise and to a large extent expected. It was noted that because NAADS came in because the public extension service providers were not labeled not to have performed, it was very annoying to them to again be consulted by the better private service providers looked at as better performers.

Box 3: continues

(D) Information quality assurance

1. The Tororo district NAADS coordinator noted the number of service providers whose information was not checked before being passed onto farmers might even be as high over 70% compared to the study's observation of 52%.
2. The Tororo district agricultural officer noted that the recommendation on the need for a standard training manual for each enterprise was very important and needed to be emphasized.

4.0 Conclusion

Overall the feedback giving activity was a worthwhile and exciting engagement for the three students and different stakeholders involved. It further enriched the students' findings and recommendations besides validating some of the finding and promoting the spirit of accountability to the different stakeholders involved in the study.

5.0 Acknowledgments

The three students wholeheartedly thank the linking project and its staff for the financial and moral support. The students would also want to thank their academic supervisors for their constructive criticism and advice at the various levels of the studies. A lot of thanks also go to the different stakeholders at both the district and sub-county levels for their support to and active involvement in the studies. The students also thank the farmers' group leaders and their members for being there for them during the times of need.

ANNEX 4

Report of the Output 3 activities planning meeting for the project

"Linking demand for and supply of agricultural information in Uganda"

Mukono ARDC, 3 and 4 December 2003

Barbara Adolph, NRI, and Jovia Manzi, Linking Project

18 December 2003

Background and purpose of the workshop

The research project "Linking the demand for and supply of agricultural information in Uganda" attempts to support NAADS and NARO in developing systems and processes for "packaging" outputs from agricultural research for intermediate and end users, in particular service providers, extension staff and farmers.

The underlying assumption of the project is that farmers require detailed information about various aspects of a technology, in order to decide whether or not they are interested in trying it out or even adopting it. Some of this information is very location specific, such as prices of inputs, suitability for particular types of soils and climate, labour requirements, etc. This information is generally not available in the required detail and format (i.e. easy to read, with lots of illustrations).

The Linking project attempts to address this gap by piloting processes for information packaging. Project output 3 reads: "Process *piloted to test a limited range of options*, appropriate to local conditions and responding to farmers' needs, identified and tested, emphasising, but not exclusive to, outputs from DFID research programmes." The limited range of options identified for this output (in consultation with Ugandan stakeholders) are:

a) Use of draught Animal Power (DAP) for ploughing and weeding
b) Sweet potato production and marketing
c) Integrated Pest Management (IPM) in grain legumes, including pigeon pea
d) De-worming of goats using *Mucuna pruriens*

On-farm research has been carried out in Uganda or elsewhere on all these four technologies, and they have shown to be effective. However, there is no comprehensive extension material available specifically for Tororo and Arua districts that contains the type of information required by farmers (see list on the last page of the workshop programme). Therefore there is a need to:

(A) Compile whatever information is already available about these technologies;
(B) Fill any remaining gaps with on-farm research.

This workshop will bring together people from NARO, NAADS, Makerere University, NGOs and the private sector who are interested in doing adaptive on-farm

research on these for technologies in order to fill the gaps mentioned above. There will be three elements to the workshop:

I. Agree on strategy, roles and responsibilities, to collect information about the different aspects of the technologies;
II. Agree on a work plan, budget and roles and responsibilities for carrying the on-farm research component
III. Agree on a process for compiling / writing up results

In addition, the workshop will give participants the opportunity to meet with experts who have developed the technologies in order to get first-hand information and advise on trial design.

Objectives of on-farm activities (project output 3)

Test appropriateness of technologies for local conditions
Identify and fill gaps in knowledge about technology
Produce extension materials for different intermediate and end users of the technology

Document this process to feed into NARS / NAADS procedures for information material development

The technologies selected are pilots for this process!

Workshop tasks for all groups

1. Select a team leader for each site and technology
(desired attributes: Knows the technology, email / computer access, time to do work, good communication skills, good writing skills)
2. Define what technology / aspect of technology to focus on (e.g. sweet potato – only orange fleshed varieties or all? Focus on market or production or disease control or several of those?)
3. Select number and location of sites and farmer groups
4. Develop detailed plan of activities
   - What to do
   - When to do it / complete
   - Who to do it
   - How much it will cost
5. Agree on communication mechanisms and reporting procedures

Activities for all groups

(1) Compilation of available information on the technology against checklist (desk job) => identify gaps
(2) Trial planning and preparation
   - site selection

- briefing of villagers / farmers groups
- requisition of inputs (e.g. mukuna pods)
- trial protocol development
- monitoring and evaluation (M&E) procedures

(3) Trial implementation (including timing / milestones) and M&E

(4) Documentation / filling of gaps in fact sheets

(5) Extension material development and testing

(6) Extension material multiplication (printing) and distribution

(7) Writing of site report (process focused), including lessons learnt and recommendations

Information required for data sheets on technologies

(based on a format developed by the COARD project)

Generic particulars / descriptions of new technology (for all technologies)

1. Name of technology
2. Enterprise / commodity for which technology was developed for
3. Importance of enterprise / commodity (regionally focused)
4. Other or common name(s)
5. General description of the technology
6. Importance or role of new technology
7. Specific characteristics of the technology, e.g. for crops:
   - Days to maturity
   - Maturity period: Long, medium, early
   - Height at flowering, maturity etc. in cm
   - Response to organic / inorganic fertilisers
   - Management requirements
   - Plant types / growth habit (e.g. erect, climber, runners, etc.)
   - Description of plant or plant parts, e.g. flowers, leaves, seed, grain, stem, fruits, tubers, etc. for colour, size, shape, taste, scent or other important attributes
   - Yield (kg/ha), under on-station and on-farm conditions
   - etc.
8. Reasons for release of technology (benefits / advantages of new technology)
9. Potential direct beneficiaries of the technology by resource access / wealth group
10. Economic benefit analysis / profitability / gross margin
11. Non-economic benefits of the technology (e.g. enhances soil fertility)
12. Suitability for different soil types and climates (agro-ecological zones)
13. Potential environmental impact (positive and negative)
14. Resources required for implementing the technology, including
15. Labour requirements for different stages

16. Availability of inputs such as seeds, implements, etc. (source of supply, packaging size, price)
17. Risks involved (production risks, health risks, etc.)
18. Local and regional market information, including prices for outputs
19. Marketing arrangements (co-operatives, groups, direct buyers, etc.)
20. Other institutional aspects (requires technology group action among farmers? If yes, what type?)

Workshop outputs

Team formation and team leader selection
The following teams were formed for the different technologies:

Technology	**Team leader**	**Arua**	**Tororo**
DAP	Agobe Francis	Oba Livingstone Edema Peter	Olege Dominic
Sweet potato	Turyamureeba Gad	Anguzu, Dickens Mbalule Moses	n/a
De-worming of goats	Ejobi Francis	Candia Alex	Waata Fiona
IPM in legumes	Delve Rob / Kankwatsa Peace (? – not sure about this – or was it Fiona?)	Bamaru Jimmy	Ereng John

Generic information for technology data sheet
It was agreed that each group would use the checklist (**Error! Reference source not found.**) as a guide to compile information for each of the four technologies. The following process was agreed:

1. The groups will check for which topic / heading information was already available, from where (what source), who will collect it and send it to…
2. … the team leader or a selected person from the team, who will then compile this information according to the headings.
3. Any remaining gaps will be identified in the process, and
4. Trials and trial monitoring activities will be designed in such a way that the missing information can be collected.

The teams started with activity one, but were unable to finish it due to time constraints. Team members agreed to type up their notes and send them to Jovia, or, if that is not possible, to send her a photocopy of the handwritten notes.

Draft work plans (presentation to plenary)

Legume IPM group

Topic:
Participatory testing and comparison of different IPM packages in groundnuts to determine the most economical and suitable for farmers' conditions

Treatments:

- Two groundnut varieties: (1) red beauty and (2) Serenut III
- IPM (Experimental plan to be further discussed with farmers)
  - Farmers' practice / spray inorganic
  - No spray
  - Farmers' concoctions

Implementers / stakeholders:

- A2N Tororo
- CIAT
- Partner farmers

Team leader: Fiona Watta

Trial sites and groups:

1) Wachaki FFS, Petta sub-county and
2) Mari Pa Were FFS, Kisoko sub-county

Notes: These activities will also be done in Arua on pigeon peas

Workplan for IPM trials (2004 A)

Activity	**Month**	**Week**				**Responsible person**
		1	**2**	**3**	**4**	
Introductory meeting	January 2004			X		A2N, CIAT, farmers (F)
Planning meeting	January 2004			X		A2N, CIAT, F
Site inspection	February 2004	X				A2N, F
Land preparation	February 2004	X	X			F
Procurement of seed (groundnuts)	February 2004	X	X			A2N
Procurement of planting materials (robes, chemicals, measuring tape, spray pump, weighting scale)	February 2004	X	X			A2N
Planting (site 1 & 2)	February 2004				X	A2N, CIAT, F
Developing M&E criteria	March 2004	X				
Monitoring, record keeping, documentation	January to June 2004					A2N, CIAT, F
Management of experiments	February to June 2004					Farmers
First field day	April 2004	X				A2N, CIAT, F
Exposure visit to SAARI	April 2004		X			A2N, CIAT, F
Field day, harvest, PHH	May 2004					A2N, CIAT, F
Cost-benefit analysis, way forward	May 2004					A2N, CIAT, F
Reporting / Production of extension materials	June 2004					A2N, CIAT

Discussion:

- This plan only shows one season, but two season of trials will be done

Draught Animal Power (DAP) group

Technologies under DAP

- Ploughing
- Planting
- Weeding
- Spraying
- Irrigation
- Transport
- Zero / conservation tillage

Main areas of concern for the trials:

1. Ploughing
2. Planting
3. Weeding

Workplan for DAP trials

Activity	Time	Responsible persons
Procurement of implements and agro-inputs (both districts)	January 2004	SAARI Team leaders
Identification of sites	January 2004	Team leaders
Group sensitisation	February 2004	Team leaders
Farmer training (including livestock management)	February 2004	SAARI trainers
Land preparation	February / March 2004	Team leaders Farmers
Trail setting	March / April 2004	Team leaders Farmers
Weeding	April / May 2004	SAARI, Farmers, team leaders
Fertiliser application	April / May 2004	Team leaders, farmers
M&E	January onwards	SAARI, farmers, team leaders
Field days	April / May 2004	All involved
Documentation	August to October	SAARI
Fact sheet composition	August to October	SAARI
Extension materials	December 2004	SAARI

Goat de-worming group

Topic:
De-worming of goats with Mucuna pruriens

Team leader: Dr Francis Ejobi

Trial sites:

1) Osukuru S/C, Tororo
2) Pajulu S/C, Arua

Workplan for goat de-worming trials

No.	Activity	Month	Responsible person
1.	Identification of sites, FG and partners	January 2004	FW – Tororo GA – Arua
2.	Baseline - Sensitisation	January 2004	FE, KW, Ext.-T, CA, Ext. - A
3.	Purchase and management of goats	March 2004	FW – Tororo GA – Arua
4.	Planting Mucuna	March – July 2004	FW, CDW CA, Ext
5.	Preparation of experimental protocol	June 2004	FE, FW, CA
6.	Field trials	July to October 2004	FE, FW – T FE, CA – A
7.	Develop, test and distribute extension materials	November to February 2005	FE
8.	Evaluation and documentation	January 2004 to March 2005	FE, FW, CA

FW = Fiona Watta
FE = Francis Ejobi
CA = Candia Alex
Ext = Extension worker from Veterinary Department

Discussion:

- The trial period is too short – perhaps no visible result during a four months period (July to October)
- Problem is mucuna supply. If mucuna pods can be brought in from elsewhere, it would be possible to start earlier
- Sensitisation of farmers also takes a while, because it is a new technology
- Participating farmers can use two of their own goats for the treatment, and the project can provide a third goat as an incentive, to become the property of the participating farmer after the trial
- Need to be more specific with the work plan – it is now difficult to assign particular names or budgets to the activities

Sweet potato group

Areas of focus

- Testing of new varieties with farmers (including orange fleshed)
- Control of potato weevil
- Processing sweet potatoes into dried chips for food security (but only if farmers are interested in this!)

Trial sites:

1) Vurra S/C
2) Manibe S/C (both Arua)

Farmer selection:

- Two farmer groups per S/C
- Work with existing groups whose membership does not exceed 30
- Groups will be gender balanced / sensitive
- Participation of farmers in all activities, including participatory planning and evaluation

Workplan for sweet potato trials

No.	Activity	Month
1.	Collect and compile information	December 2003
2.	Fill information gaps and development of draft extension materials	January 2004
3.	Selection of farmer groups	January 2004
4.	Planning survey	January 2004
5.	Brief farmers	January 2004
6.	Conduct survey	February 2004
7.	Analyse survey data	February 2004
8.	Design on-farm trials with farmers	February 2004
9.	Procure inputs	February 2004
10.	Implement trials	March – April 2004 August – November 2004
11.	Monitor trials	March – November 2004
12.	Evaluate trials	July 2004
13.	Documentation and filling gaps in fact sheets	January 2005
14.	Revision of extension materials	January 2005
15.	Multiply extension materials and distribute	February 2005
16.	Write site report	February and March 2005

Key budget lines:

1) Transport (fuel, service, hire)
2) Communication (air time, fax, email, net-surfing, ordinary mail, radio announcements)
3) Field allowance (safari day allowance, night allowance)
4) Stationary
5) Photocopying and photography
6) Secretarial services (typing, printing, binding)
7) Farm trial inputs plus spares (seed vines, processing machines / “chippers”
8) Farmers’ lunch provision
9) Staff time for partners
10) Facilitation allowance

Note: The last two points are to be debated, because it was agreed that no honoraria would be paid to people already receiving a salary.

Discussion:

- The site report needs to be completed at the latest by February 2005, because the project end in March 2005 and the findings from the different sites need to feed into the final technical report (= the official project completion report for the donors)

Budgets and field work arrangements

Budget per team

The following funds are available for output three activities (all numbers in Pound Sterling; exchange rate as of November 2003: 1 £ = 3200 Ugandan Shilling) from December 2003 to March 2005 (= 16 months):

Budget item	Arua		Tororo	
	Year 1 (04/03-03/04)	**Year 2 (04/04 – 03/05)**	**Year 1 (04/03-03/04)**	**Year 2 (04/04 – 03/05)**
Total budget per site (as per project contract)	6,150 £	6,150 £	6,150 £	6,150 £
Already spent for implements, seed and Mukono workshop				- 600 £ - 1,200 £
Remaining per site	5,700 £	5,700 £	5,700 £	5,700 £
Per technology for 16 months	2,850 £ (= 5,700 £ x 2 years / 4 technologies)		2,850 £ (= 5,700 x 2 years / 4 technologies)	
Sweet potato budget for Tororo distributed between 7 teams	3,257 £ (= 2,850 £ / 7 teams + 2,850 £)		3,257 £ (= 2,850 £ / 7 teams + 2,850 £)	
In Ugandan Shilling per technology per site	10,422,400 £		10,422,400 £	

These are **averages** for each technology and district – it is well possible that **some require more and others less** than this average. The total cannot be exceeded (project budget is limited and cannot be increased). Items / activities to be covered with this budget are as follows:

- Any workshops / meetings to be held in the districts or in Kampala (the Mukono workshop has already been deducted)
- Trial materials (including spare parts) and their transport to trial sites
- Any training undertaken (e.g. training of local artisans in plough repairs)
- Staff honorarium where applicable (for those not employed already)
- Per diems / travel allowances
- Travel within district and elsewhere (fuel, vehicle maintenance or hire)
- Surveys (e.g. on local knowledge, market survey)
- Extension material development, production, multiplication and distribution
- Field days for farmers
- Communication (phone / email / fax)
- Any other activities required to test technologies and develop extension materials

Allowances and fund transfer arrangements

In order to avoid jealousies and injustice between team members, it was agreed that all staff working on the project would be paid 40,000 Ugandan Shillings per day for nights spent away from home, and 10,000 Ugandan Shilling safari allowance for WHOLE days spent in the field. It was also agreed that no honorarium would be paid to staff already employed and receiving a salary.

It was agreed that funds for Arua (including for CEFORD and Mr Oba) would be sent to Abi ARDC, and other Arua partners will be paid by Abi. For Tororo, funds will be sent to Africa 2000 Network (including those for Dominic Olege). Only Dr Ejobi and Franci Agobe will be paid directly by Jovia, because they are neither based in Arua, nor in Tororo.

Considering that some meetings may be lengthy when working with farmers, participant thought it was inevitable to provide lunch for farmers attending project sessions. It was however agreed to attempt to limit working with farmers to a few hours a day. If sessions exceed that limit, it was agreed to provide lunch in the form of snacks and food, depending on local availability.

Partnerships and agreements

Participants agreed that they needed letters of formalising the partnership for their employers so that they are aware of their involvement in the Linking project activities. Letters will be sent to the following employers to inform them about the project activities and the level of involvement of different staff members:

- The Dean Faculty of Veterinary for Dr Ejobi Francis
- Local government to the production coordinator for Dominic Olege
- Africa 2000 Network and CEFORD
- ARDC Arua

Field visit on 4 December 2003

Participant were divided into two teams, namely (1) DAP and (2) sweet potato technologies and they visited Namarele [AEATRI] and Namulonge sweet potato programme. The Dap team was headed by Francis Agobe and the sweet potato team by Moses Mbalule. The purpose of the visit was:

- To get as much information as possible regarding the specific technologies
- To use the generic fact sheets to collect information if it was available
- To get samples of extension materials that have be already been developed

Summary of findings

Sweet potato group

- The sweet potato programme is already developing extension materials. It is sponsored by COARD and participants were informed that in order to get samples of the extension material, there was need to first seek permission from COARD.

- Dr Robert Mwanga, the programme coordinator, requested that the generic fact sheet should be sent to him, so that he could fill in all the relevant information they have for the project (note added on 18 December: The fact sheet headings were sent to him on 17 December).
- One of the new things the team discovered during the visit and thought would be a good technology for the Arua site was preservation or storage of sweet potato tubers for along time using local materials. Storage period as long as 3 months are possible.

The team leader Moses Mbalule promised to send details of the visit in due course.

DAP groups

1. Implements fabricated from the Institute include:
    - Ox-ploughs
    - Planters
    - Weeders
    - Knife rollers, sub-soilers and reapers for zero tillage or conservation tillage
2. Specifications
    - Ox-plough – made of mild steel and medium carbon steel, weighs 28 kgs, costs 85,000 Shs and two bulls of any breed can pull it. Note: it is hopped in the future that it could modified in such a way that the plough can be used for planting, weeding and spraying
    - Weeders – can weed row planted crops, e.g. beans, maize, ground nuts, it costs 155,000 Shs, weighs 32 kgs and has 5 weeding tines. Other weeders include manual weeders for lowland rice
    - There are two planters that are manually pulled, cereal planter costing 40,000 Shs, and upland rice planter for 40,000 Shs. There are also two types of Jab planters, a single hopper for only planting costing 40,000 Shs and a double hopper for planting and fertilizer application costing 55,000 Shs
    - Zero tillage – there is an ox-drawn planter imported from Italy

The organisation has also technologies for people with disabilities and among these are maize shellers, cassava and potato crabers. Besides DAP technology, the team discussed bio-gas technology and wind mill operations. They also found out that another source of agricultural and DAP implements near Namarele is Magric.

Next steps / way forward

1. The workshop notes will be sent to all participants before Christmas.

2. Each team will start filling in the fact sheet headings from available extension materials and research reports, and identify any gaps in knowledge as per the list of headings. These gaps will be addressed as a priority in the on-farm work.

3. As the teams were unable to complete the preparation of full work plans and budgets, it was agreed that they would do so by 15 December 2003 (submit to

Jovia by email or post). Most of the activities will commence in January and the project is going to try to see that funds are available by then.

4. The Linking project team agreed to send draft Memoranda of understanding to Abi ARDC, CEFORD, A2N, Livingstone Oba, Serere / Francis Agobe and Francis Ejobi / Makerere University. Once these have been agreed, two MoU copies signed by the NRI team leaders will be sent to them, one of which is to be returned to NRI. It was agreed that no legally binding contracts are required – MoUs will be sufficient.

5. It was agreed that funds need to be made available as soon as possible – ideally from 2 January onwards. Jovia and Barbara will try their best to arrange for transfer of funds from NRI to the project account before Christmas, so that Ugandan partners can ask Jovia for advances (against work plan) from January onwards. (Note added on 18 December: Funds have been sent to Uganda on 16 December and should be available from 5 January onwards).

6. Dickens (CEFORD) and Fiona (A2N) will check with their organisations what the charges are for their staff time, and for administrative fees / overheads (it appears A2N charges 10% overheads, but only if they manage the whole budget). Payments will be made against an agreed workplan and budget on a quarterly basis. For each quarter, proof of utilisation for funds spent is required in order to receive the next instalment.

Participants of the planning meeting in Mukono, 3 and 4 December 2003

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ANNEX 5

Workshop to explore institutional linkages to improve information flows
Facilitated by Barry Pound, Chris Garforth and Jovia Manzi
Acacia Inn, Kampala, Uganda
7th September 2004

1. The need to "institutionalise" linkages in demand and supply

Output 4 of the "Linking" project is to *develop institutional mechanisms for integrating demand and supply of information*. The idea is to see how the lessons and ideas emerging from the project can be built into the structures and processes of the agricultural knowledge and information system (AKIS) in Uganda. This will contribute to the ability of the AKIS to meet the changing needs and opportunities of Uganda's farmers in a sustainable manner.

The workshop brought together 23 people with extensive and varied experience of agriculture, research and advisory services in Uganda. They included researchers from NARO headquarters, national and zonal research institutes, Makerere University and International Agricultural Research Centres based in Uganda; staff from the National Agricultural Advisory Services Programme headquarters and District co-ordinators; private sector advisory service providers; and chairmen of district farmers' fora.

The workshop was expected to produce:

(1) a shared understanding of the mechanisms currently in place for articulating demand for and supplying agricultural information, of what arrangements exist for linking these mechanisms, and of the gaps in these linkages;

(2) ideas on ways to address the gaps in institutional terms, in ways which can be elaborated and where possible tested within the limits of project resources before February 2005.

2. Analysis of current linkages and gaps

The participants built up a comprehensive picture of the current arrangements, both formal and informal, for linkage between demand and supply. This was based on recent research in Uganda, including several of the papers presented at the conference on Integrated Agricultural Research for Development the previous week. Participants added to this picture from recent initiatives and experience in their various organisations.

Recurrent themes in this analysis included difficulties various actors face in getting access to relevant information; and at the supply side, the lack of targeting of research programmes and the lack of resources, procedures and incentives for packaging technology and information in appropriate forms.

Farmers do not always have the knowledge and information they need to express demand for agricultural information: they may, for example, request advice on a particular commodity because they have heard there is a market for it, without knowing whether it will do well in their conditions. On the other hand, they may give low priority to advice on soil nutrient management if they do not recognise it as a serious problem.

Service providers find it difficult to get uptodate technical and economic information on enterprises they are contracted to give advice on. Internet services are expensive and often not available locally. Manuals – their preferred sources of technical information – are few and far between. They feel their contracts do not include time and resources for accessing and compiling information.

Suppliers and packagers of information do not know enough about farmers' constraints and contexts to be able to target their research and dissemination of information appropriately. Much of this information could be synthesised from service providers' end-of-contract reports and from discussions with farmers during the enterprise selection process – but it is noone's responsibility to do this.

Information gaps for both farmers and service providers include markets and post-harvest issues, gender roles, economic benefit, risk, group organisation and effective use of locally available inputs.

3. Action to improve linkages

The workshop concluded that there are four main areas where new or adjustment to existing mechanisms could make significant improvements in the linkage between demand and supply:

- empower farmers to articulate needs for information on a more informed basis
- encourage the packaging of research outputs into appropriate forms
- improve horizontal linkages between actors at each level, and
- create procedures and incentives to facilitate knowledge seeking and sharing.

Empowering farmers to articulate demand for information

Farmers can only ask for information if they are aware of the production and market potential of enterprises in their area. *Enterprise selection* for NAADS should be informed by economic analysis of the current and potential market, and of the range of costs and returns farmers might expect. *Service provision contracts* should include a requirement to provide farmers with realistic financial and risk estimates, alongside technical production information. To do this, service providers will need access to market and economic analyses: these could be incorporated into the fact sheets and manuals produced by researchers and intermediaries.

Local notice boards are a simple yet effective vehicle for getting information on market prices into local information and communication networks. These can be maintained by farmer groups, farmers' fora, local governments or service providers.

Farmers and service providers also need information on quality requirements for markets: at the moment, nobody has taken on the task of making this available: it is perhaps something that FOODNET could take on board as it develops its information service in the future.

Improving the packaging of research outputs

The workshop welcomed the work of the *Standing Committee* which is developing standards for dissemination of agricultural information. This committee can play an important role in making sure research outputs are routinely packaged into usable information for service providers and other users. *A competitive mechanism* for demand-driven packaging of material could be introduced: the Standing Committee would invite bids for packaging of specified topics and choose the winner from competing bids. This will encourage quality and innovation. The Committee would eventually divest itself of this responsibility, and the service would ultimately be paid by those requiring the packaged information.

Information is being generated at various levels, but capacity for packaging and disseminating/using this information is weak. Packaged information needs to be in different forms for use at different levels. *Capacity building* for packaging of information materials should be built among research institutes, higher education institutions and service providers. *Contracts with PSPs* should include sufficient money to fund information collection and packaging for their advisory services to farmers. It was also suggested that *researchers' pay* could be linked to dissemination.

At the same time, those packaging information need feedback on how well dissemination materials are working in the field. No comments are getting back to researchers on the content and format of information that users have received. Procedures are needed to generate this feedback and to facilitate the periodic updating of information.

Strengthening horizontal linkages

Just as farmers get a lot of information and advice from other farmers, so too can service providers and researchers learn by sharing and exchanging information with their peers. *Mechanisms* for encouraging this to happen include publications aimed for specific professional audiences, websites, conferences and exchange visits. *Funding* mechanisms could require that a number of institutions work together, so that information and knowledge is shared in the process of carrying out a research or advisory assignment. Formal *partnerships* between institutions could be set up, with Memoranda of Understanding which specify mechanisms for sharing information and carrying out joint activities. In most cases, however, making horizontal linkages is not in the job descriptions of managers.

Within the AKIS, PSPs are particularly isolated from one another: it is difficult for them, individually, to be proactive in seeking out other for sharing and exchange of information. A *professional association* would provide the institutional structure for such linkages to develop.

Improvements in horizontal linkages will only happen if all parties see that there are benefits to investing time in them. The following three steps were suggested: identify a *clear reason* for the linkage that all parties will see as beneficial; identify the mechanisms that are appropriate in that particular case; *sensitize* the actors and identify their contributions. Experience suggests that linkages require *leadership* and champions who will keep the mechanisms going and advocate for peers to participate in them. There are obviously resource implications in any of the suggested linkage

mechanisms: these could be minimized through using communication technology for "virtual" meetings and instant messaging.

Benefits of better horizontal linkages will include *synergy* in the use of resources so that more can be achieved with current levels of funding, *reduced duplication* of effort, a stronger voice in *advocacy* among professionals and *economies of scale* through linking a larger pool of people – making more types of training worth while, for example. *Quality assurance* could also be strengthened by the sharing of expertise among researchers and among service providers.

Facilitating knowledge seeking and sharing: enabling information to move
Several suggestions were made for making it easier for people such as PSPs, researchers and trainers to find information they are looking for. *Knowledge depots* are places – physical or virtual – where all relevant information on agriculture in an area is deposited. Two existing examples are (a) ARDCs and DATICs, and (b) the Internet. However the usefulness of the Internet is limited by the lack of websites with appropriate information. Resources are needed to ensure that such depots are kept up to date and that it is easy for users to find what they need.
There is also possibly a need for *intermediary information managers* – private companies that would seek information and package it for service providers. These, however, would require a funding mechanism. In the long term, service providers would pay for the information to enable them to fulfil their contracts and remain competitive. The use of public funds to get this process started should be considered, but with care so that potential private sector initiatives are not deterred. There should be a clear policy on which types of information and information service should be publicly funded and which should be regarded as private commodities which users will pay for.
Resource centres at district level would seem to make sense; however these can be costly and local governments, with many competing demands on their resources, may not wish to fund them.
Internet cafés are a good mechanism for information provision and they are becoming more widely available throughout Uganda, at least in urban areas. However, there is no point in people using them if there are no websites where they can find relevant information easily and quickly.
The workshop considered what *incentives* there are for actors in the AKIS to seek and to provide information. NAADS covers the farmer-PSP interface, but the researcher-PSP interface is much less clear. PSPs need funds to access information and they need this to be written into their contracts. Capacity building for PSPs would be quite a big incentive for them to make information move. In some contracts, the handing over of manuals actually triggers payment. Where competition is strong, as in Arua from this year, PSPs who cannot demonstrate they have appropriate information as a basis for providing training and advisory services may not be considered. Researchers should not need incentives to move information because it is part of their job: however, they do need resources to do so. At the moment, PSPs who do acquire information materials from research institutes do so at cost or less, which means that funds are not flowing back into the production and distribution of such materials and the private sector has no incentive to step in to provide this service.
Capacity building through formal education, training and continuing professional development is an essential ingredient in improving the quality of information seeking and provision within the AKIS. The workshop discussed what institutional mechanisms are needed to stimulate and facilitate capacity building. The most overriding consideration should be *profit*: someone with a degree receives more pay than someone with a diploma. *Tied donor funding* is another mechanism, though not for the long term. Use of *honoraria* or lunch allowances for trainers is another existing mechanism, but this is considered unsatisfactory. Rather, trainers should be given professional fees, even if they are civil servants – their employing department or organisation should be able to introduce mechanisms for dealing with this. PSPs should pay part of the cost of capacity building as they derive a large part of the benefit.

4. Next steps

The research team is circulating this summary widely to stakeholders and to managers within the main AKIS organisations, and will follow this up with discussions with those in a position to take the ideas forward. It is hoped that the inter-institutional working group on dissemination of agricultural information will take forward the suggestions on information packaging.

ANNEX 6

Linking project briefing paper

Analysis of mechanisms and procedures to assess farmer demand for advisory services in NAADS: A case study in Arua and Tororo districts, Uganda

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Summary

National Agricultural Advisory Services (NAADS) is spearheading agricultural extension services in Uganda towards publicly funded, demand-driven, and farmer controlled advisory services, with private sector involvement in the delivery of services. However, there is a concern that the needs of poor farmers are not sufficiently addressed by NAADS, and that the facilitation process does not provide farmers with adequate information to make an informed choice. The objective of this study was therefore to analyse the processes in determining farmer demand for advisory services and technology development used in NAADS, and to make recommendations to policy makers and implementers. The study used a qualitative approach in eight villages in Arua and Tororo districts in Uganda. A literature review, reconnaissance visits, key informant interviews, case studies and observation of group sessions were carried out to assess the process along a range of defined criteria. Wealth grouping was used to stratify village households based on villager-defined criteria. The results show that even the very poor farmers were included in the groups. However, participation in NAADS groups was skewed towards better-off households because (a) membership fees discriminated against the poor, (b) insufficient information about NAADS and c) doubts about benefits of NAADS among poor farmers. Farmer-to-farmer mobilisation needs to be enhanced and need assessment procedures should be transparent and deliberately foster farmer empowerment. Facilitation during the participatory planning process needs to provide more information about the market potential and natural resources implications of each enterprise to enable farmers to make an informed choice.

Problem addressed

The process of needs assessment and the resulting demand for advisory services and technology development are the starting point for publicly funded, privately delivered and demand-driven advisory services in Uganda. Under the NAADS system, NGOs are following a participatory planning process to facilitate the identification of viable enterprises through farmer representatives. Farmers form groups, identify priority enterprises and related constraints and opportunities, which are aggregated at sub-county level. These priority enterprises and constraints are used to define the terms of reference for private agricultural advisory services providers. However, there is a concern that the needs of poor farmers are not sufficiently addressed by NAADS because (1) these farmers are not adequately represented in farmer groups and fora, (2) even if represented they do not influence decisions priority setting, and (3) the enterprise identification criteria indirectly discriminate

against the poor. Similarly, there is a concern that farmers do not have access to sufficient information in an appropriate format to enable them to make an informed choice, which might make them vulnerable to external influences, such as the interests and priorities of the facilitating NGOs. Understanding such shortcomings and identifying ways of addressing them is crucial, as the demand assessment process is the first step in the intervention chain under privatised extension delivery in Uganda.

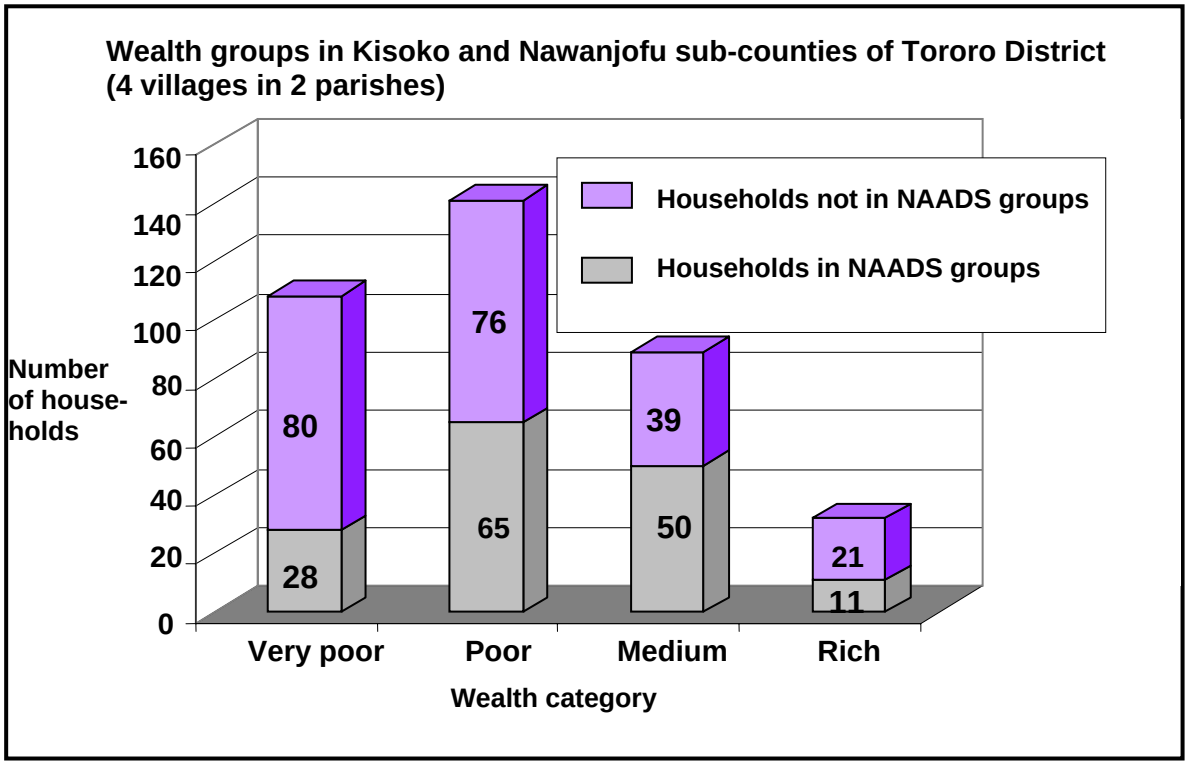
Methods

The five criteria were used to assess the effectiveness of the participatory planning process: (a) inclusion of the poor, (b) participation of farmers in decision making, (c) transparency of the process, (d) alignment between farmers' and NAADS criteria and (e) the extent to which cross-cutting issues were addressed in the process. Relevant information was collected through key informant interviews with NAADS secretariat staff and co-ordinators, farmer forum, local council officials, local government and NGO staff, and through interviews with farmers groups and individual households, using checklists.

Arua and Tororo districts were selected, because they are among the first six districts to implement NAADS and are located in different agro-ecological zones. Two sub-counties facilitated by different NGOs were selected from each district to observe a range of different interpretations of the NAADS guidelines. From each sub-county a parish was randomly selected for wealth grouping, using villager-defined criteria. In each parish two villages were purposely selected. Two volunteer households were purposely identified for case studies - one that was member in a NAADS group and the other that was not.

Findings and recommendations

(a) Inclusion of the poor
Wealth grouping showed that even the very poor farmers are found in NAADS groups, but participation in NAADS groups is skewed towards the better off farmers due to (a) membership fees discriminated against the poor, (b) insufficient information about NAADS and c) doubts about benefits of NAADS among poor farmers. There were more women in groups than men.



(b) Participation of farmers in decision making

There was not much difference between priority enterprises of NAADS and non-NAADS households – probably because NAADS' impact on production pattern was still relatively limited by the time the study was conducted. Most households grew food crops for both food security and income. However, the match between household priority enterprises and sub-county priorities varied between sub-counties ranging from low in Kijomoro, average in Kisoko and Nawanjofu to fairly high in Ullepi. In all sub-counties chicken and livestock (goats and cattle) are forms of savings.

Sub-county and household priority enterprises in selected sub-counties of Arua and Tororo district during 2003/4

Sub county	Sub-county priority enterprises	Household priority enterprises	Comments
Kijomoro	*Groundnuts, *Arabica* coffee, mangoes, goats, fish farming	Cassava, beans*, groundnuts, maize tobacco	Low match (1/6)
Kisoko	*Groundnuts, bananas, pineapples , boats piggery, poultry	Cassava, millet, *groundnuts, sweet potatoes, maize, rice	Low match (2/6) Pineapple grown
Nawanjofu	*Maize, *groundnuts, banana, pineapple, poultry, goats	Cassava, millet, *maize, *groundnuts, sweet potatoes, cotton	Medium match (3/6), pineapple is grown
Ullepi	*Cassava, *groundnuts, *pigeon peas, *goats, mangoes, apiculture	*Cassava, *groundnuts, *pigeon peas, cowpeas, sesame , millet	Fairly good match (4/6), goat keeping a traditional livelihood activity

Key
***** enterprises appearing among household and sub county priorities

(c) Transparency of the process

About 50% of men and 22.2% of women respondents found that the procedures were clear, but 33% did not attend needs assessment sessions due to other commitments. Thus, the procedures for prioritising needs were not understood by some farmers. One farmer said "*we wanted groundnuts but we got pigeon peas instead may be NAADS did not have ground nuts seeds that why ….*" In some cases there was evidence of farmers' choices for enterprises and technology needs being influenced by the facilitating NGOs.

Farmers' assessment of the clarity of enterprise selection process

Clarity of enterprise selection process	Male respondents	Female respondents	Total
Clear	3	2	5
Not clear	1	4	5
Did not attend selection session	2	3	5
% of respondents who said they clearly understood the process	50	22.2	33.3

(d) Alignment between farmers' and NAADS criteria

Food security and income are important criteria for farmers in selecting agricultural enterprises. However, the NAADS enterprise selection criteria give more weight to profitability of enterprises without considering direct food security attributes of the enterprises and cultures. This has resulted in high value enterprises such livestock, poultry, coffee, being on top of the national NAADS priority list, compared to low value food crops such as cassava, millet, cowpeas. The different approaches and criteria used for farmer demand assessments by NAADS and NARO are leading to a dichotomy between the needs identified by these two key organisations.

(e) Addressing cross-cutting issues

The emerging enterprises were generally commodities (either crops or livestock), and cross-cutting issues such as marketing and natural resource management were not considered as advisory themes as such. Cross-cutting issues are difficult to grasp for facilitators because they are new concepts to service providers and local government staff. Although aspects of soil and water conservation were reflected in some of the Terms of Reference (TOR) for service provision, the objectives and indicators were not clear due to low capacity of the staff involved.

Conclusions and recommendations

In light of the findings the following recommendations emerge:

- Continuous mobilisation emphasising farmer-to-farmer mobilisation and use of local structures such as elders and local councils should be enhanced.
- Flexile forms of paying membership fees and affirmative action for the marginalized farmers and youth are recommended to increase their inclusion in NAADS group.
- Appropriate enterprises for the weak that do not require large cash investments and have low risk would attract the poorer farmers to join groups should be promoted.
- The NAADS criteria need to be reviewed to take into consideration household food security needs and value addition of traditional food crops, such as cassava.
- Procedures for needs assessment should foster farmer empowerment. Farners need to have access to sufficient information during the planning process to make an informed choice. This can be achieved through training of farmers and through longer interaction time with new groups, which reduces as groups matured.

- ❖ NAADS Coordinators, farmer fora and local government staff need to be guided in supported in ways of developing TOR for service provision that address cross-cutting issues such as natural resources management and marketing of agricultural produce.
- ❖ A strategy for collaboration between NAADS and NARO in research and extension priority setting has been developed, but requires to be operationalised in the field.

Acknowledgements

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Further reading

Draa Edaiku, W. (2004) Analysis of mechanisms and procedures to assess farmer demand for advisory services in Uganda: A case study in Arua and Tororo Districts, Uganda. Thesis submitted in partial fulfillment of the requirements for the award of degree of Master of Science in Agricultural Extension Education. Kampala: Makerere University.

Draa Edaiku, W., Semana, A. and Adolph, B. (2004) Comparing the processes used for assessing farmers' demand for research and advisory services in NAADs and NARO. *Ugandan Journal of Agricultural Sciences ,* Vol. 9, No. 1

ANNEX 7

Needs and client responsiveness of private service providers under the national agricultural advisory services (NAADS) system: A case study of Arua and Tororo districts in Uganda.

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Purpose of Briefing paper

This brief synthesis of the above mentioned study aims at providing a basic insight about where and how service providers obtain agricultural information, their existing capacity in terms of financial and physical resources, their problems and extent to which they are responsive to farmers' service quality description criteria.

Audience / target group of this paper

This paper is aimed at the different actors in the NAADS implementation process- officials in the NAADS secretariat, NAADS coordinators at district and sub-county level, technical agricultural service providers and farmers' forum representatives. This paper could also be useful to public extension staff, researchers and other information producers and processors.

Abstract

The National Agricultural Advisory Services (NAADS) program of Uganda, which aims at establishing a demand-driven, farmer owned and controlled public sector funded but private sector serviced extension system, has been operating in Uganda since 2001. However, the existing capacity of the private sector to deliver such services and the extent to which this private sector has responded to farmers' advisory service quality requirements are not clear.

Therefore a descriptive cross sectional study was conducted in Arua and Tororo districts to assess the existing PSPs' capacity, their information sources, their problems and the extent to PSPs were responsive to farmers' advisory service quality description criteria. The study involved both qualitative and quantitative methods to collect data from a variety of respondents ranging from farmers, PSPs to NAADS coordinators.

Almost (over 95%) all the 43 PSPs who participated in the study were males educated up to diploma level but with limited working experience outside NAADS. Most of the PSPs especially individuals were constrained in terms of financial resources and transport facilities. PSPs accessed technical information from many sources like school/college notes, textbooks, radio, manuals, NARO, district level departments and public extension staff. There were no deliberate efforts by the information sources to target the PSPs while the existing information quality assurance procedures followed no uniform format/guidelines and henceforth not clear. PSPs' major problems in both districts included inconsistent fund flow, poor/lack of transport means, inadequate information, no information sharing among PSPs with public extension staff, lack of resources (finance and material) and difficulties in translating the information.

Farmers described quality advisory services as possessing a number of attributes of theoretical training, result/method demonstrations, PSPs personal behaviour and crosscutting issues. Farmers were generally satisfied with PSPs' performance on most of the above attributes with individuals performing better than the firms.

Problem statement

NAADS has been operating in Uganda since 2001. It aims at establishing a demand driven-farmer owned but private sector serviced extension system that contributes to the transformation of the subsistence farming to a profitable commercially oriented one. However, whether there exists adequate capacity of private service providers to access and utilise accurate and up to date information sources is not clear. Where and how these PSPs obtain the technical information to address farmers' advisory service needs is not clear. How the quality of such information is assured before it is passed The lack of a clear linkage between research/information sources and PSPs and absence of clear procedures through which such a linkage can be established brings in more confusion as to where and how PSPs access information. Besides the sources of PSPs being confusing, how the quality of the information therefrom is assured before it is passed on to farmers is not clear considering the fact that the most common quality assurance mechanisms are expost- facto mainly technical audits.

On the other hand for the system to be farmer owned, it must respond to farmers' advisory service needs in terms of both quantity and quality. However, farmers' advisory service quality judgment criteria are not yet clear and so is the extent to which the private service providers are responding to such so far. It was therefore pertinent that answers for these issues be objectively sought to inform the implementation process

Method used

The study was carried out in Arua and Tororo districts. These two districts were selected because they are among the six NAADS pilot districts, therefore it was thought that there would be more experience with NAADS in these districts than in any of the districts considered under NAADS after the trailblazing. Three and four sub-counties from Tororo and Arua districts respectively were selected. Two of the sub-counties in Arua and one in Tororo were among the pilot ones for the same reason as to why the districts been chosen. On the other hand two other sub-counties in each district were second phase sub-counties to find out whether the newly added sub-counties had learnt anything from the experiences in the pilot sub-counties.

Data collection involved both the quantitative and qualitative approaches, the latter providing information to develop instruments for the former. The qualitative approach involved number of focussed group discussions with farmers' groups, sub-county farmer fora representatives and PSPs (both firms and individuals). The quantitative phase on the other hand involved use of the information obtained from the various focussed group discussions to develop semi-structured questionnaires for service providers and rating scales group scoring sessions with farmers' groups. The PSPs' questionnaires emphasized information sources and importance attached onto each and problems faced in accessing and processing such information. They also focused on PSPs' needs (financial and physical assets) besides determining PSPs' perceived importance of farmers' advisory service quality judgement criteria. On the other hand the group scoring sessions involved farmers' groups that had interacted with specific

PSPs using a scale of 1 to 6 to rate such PSPs' performance on the identified advisory service quality judgement criteria. The date from the focus group discussions was analysed based on themes while that from the quantitative phase coded, entered into the Statistical Package for Social Scientists (SPSS) and analysed to obtain frequencies, averages and other statistical significance measures.

Findings

PSPs' characteristics

The results indicated that private service provision was a male dominated venture with 41 (over 95%) of the 43 PSPs (19 (6 individuals and 13 from firms in Tororo) and 24 (10 individuals and 14 from firms in Arua) involved in the study being males. Much as the majority (52.6% in Tororo and 83.3 % in Arua) of the PSPs were educated to diploma level, most of them (89.5% in Tororo and 91.7% in Arua) had either never worked outside NAADS or had done so for a maximum of a year, indicating minimum working experience of the PSPs outside NAADS. This may imply that a large number of qualified and experienced people are still trapped in the public extension service system because of the delayed delayering.

PSPs' Information access

The major sources of information accessed by the PSPs were in the order of frequency of use; school/college notes, textbooks, manuals, various district production departments, NAADS coordinators and newspapers for Tororo. On the other hand, school notes, radio, textbooks, public extension staff and newspapers were the most commonly used in Arua. It was reported that there was no deliberate efforts by any of the sources to target the PSPs and consequently information access from these sources was mainly through pre-existing personal friendships. Most of the information sources including manuals from different sources school/collage notes, NARO and textbooks were perceived to be important (average score of over 3 out of 5) in both districts. However, farmers, input dealers, public extension staff, NGOs, radio and NAADS coordinators were perceived less important in both districts.

The frequency of use of the information sources seemed to depend on ready availability with sources like school/college notes, newspapers, radio and textbooks being most frequently used and NARO though perceived very important being among the least frequently used.

Information quality control

The existing information quality assurance mechanisms before farmer consumption were found to be unclear with no specific procedure, benchmarks and format followed. About 53% (10 out 19) of the PSPs in Tororo and 38% (9 out 24) of those in Arua, had never had their information checked before being passed on to the farmers. Those PSPs whose information had ever been checked reported that the major aim during the checking was to identify and remove complicated terms, spelling and technical errors. Supervisors and fellow service providers in both districts and Sub-county NAADS coordinators in Arua were the main people involved in checking the information before being passed on to farmers.

However, about 30 % (4 out of 15 in Arua and 3 out 9 in Tororo) of the PSPs that had heard their information checked by other people did not know what had actually been done during the process implying that they were neither involved in the process nor did they receive any feedback after the checking. The effectiveness of such quality assurance procedure (checking by the above mentioned persons) is further doubted when one considers the fact that some of the people involved may lack adequate technical competence to assure the quality of such

information. What was/is done in the process of checking the information is equally worrying as to whether it can truly assure the quality of the information to be consumed by farmers.

The suggestions for effective quality assurance seemed to point at the need for combined efforts among all the stakeholders - PSPs, NAADS administrators, researchers and farmers in the quality assurance process.

PSPs' existing capacity

Financial capacity

Looking at the PSPs financial needs, individual PSPs reported to be more constrained than firms. This was indicated by only 40% of the individual PSPs that reported to be able to prefinance their NAADS activities compared to none of the firms. Over 70% of those individual PSPs that were able to prefinance their activities could do so to the tune of 1,000,000 shillings compared to about 40% of the firms that could even afford to inject in between 6-10 million shillings in case NAADS money delayed.

Transport facilities

Looking at transport facilities, the individual PSPs still appeared to be more constrained than the firms. Much as almost all individual PSPs (5 out of 6 and 9 out of 10 in Tororo and Arua respectively) thought that motorcycles were the most appropriate means of transport, only two in each district owned the motorcycles while the rest had bicycles or no transport means at all. On the other hand, all the three firms in Arua and six in Tororo besides feeling that motorcycles were the most appropriate means of transport owned them plus some having bicycles for their community workers and/or mobilizers. The individual PSPs reported to be unable to accumulate enough money to buy assets like motorcycles because of the short (3 to 6 months) and unreliable NAADS contracts.

Information processing equipment

Individual PSPs still appeared to most hit in terms of ownership and/or access to information processing equipment like computer and its accessories. However 50% (3 out of 6 in Tororo and 5 out of 10 in Arua) individual PSPs tended to overlook the necessity of information processing equipment with the reasoning that they could use the services in town for a fee. A closer look at the PSPs situation indicates that they may not even afford such services in town as exemplified by this revelation from an individual PSP in Arua;

> *When I want to take my training manual of about of 20 pages, for typesetting I have to think of something like 30,000 shillings, but this is already more than the operational costs (5% of the professional fee of 400,000 shillings).*

PSPs' problems

PSPs faced a variety of problems throughout the process of information access, processing and utilization mainly pointing at PSPs' limited financial capacity, and the missing/weak link between them and information sources and processors. The major problems faced by both individuals and firms in both districts included poor/ inconsistent fund flow, poor/lack of transport means, inadequate information, competition among service providers and between public extension staff, lack of resources (finance and material) and difficulties in translating the information.

The coping mechanisms with the problems indicated PSPs' inability to independently deal with most of the problems while the suggested solutions indicated PSPs' desire to depend on some external systems, NAADS and government inclusive besides being indicative of limited knowledge of their relationship as a private entity to NAADS and henceforth what to and not to expect from NAADS.

Farmers' advisory service quality description criteria and how PSPs respond to these criteria

Farmers' advisory service quality description attributes.

Farmers emphasized a number of attributes of theoretical training, demonstrations, service providers' personal behaviour and cross cutting attributes as key ingredients of quality advisory services. Key among the theoretical training attributes were; farmers' free/uninterrupted participation in training, trainings being conducted by knowledgeable service providers, training being held as near to farmers' residences as possible, provision of writing materials, presentation of the subject matter in a logical order and in the local language for farmers to understand. On the other hand, the key attributes of result/method demonstration were accessibility and visibility of the plot, involvement of both farmers in the planning and management of the plot, presence of a signpost at the demonstration site and layout of the demonstration plot to enhance visual comparison of the practices in question. Key among PSPs personal behavioural attributes as perceived by farmers were; the need for the PSP to respect farmers, time keeping by the service provider, the need for the service provider to follow up individual farmers in their gardens besides the PSP possessing an accessible office or place of residence where farmers can contact him/her in case need arises. Among the crosscutting attributes of quality advisory services, proper mobilization, proper monitoring and follow up of the activities, existence of a good relationship between farmers and PSPs, joint planning involving both the farmers and PSPs before actual advisory service delivery were noted to be the key ones.

There were generally no significant differences between farmers' and PSPs' perceived importance scores of most of the items. However, there were big differences between the first and second phase sub-county farmers in terms of the perceived importance of advisory service quality description attributes closely linked to NAADS principles of a farmer paid for and controlled extension system. Such items that indicate inadequate understanding of the NAADS principle like the need for provision of lunch and transport refund during training were highly regarded by farmers in the second phase sub-counties but poorly regarded in the pilot ones. On the other hand those items that indicate farmers' internalisation of NAADS principles of a farmer owned and control system like the need for PSPs to be accountable to farmers was poorly regarded in the second phase sub counties but highly regarded in the pilot sub-counties. This difference between the two sets of the sub-counties in both districts may indicate that the farmers from first phase sub-counties have to a larger extent internalised NAADS mandate and approach unlike their counterparts in the second phase sub-counties.

Farmers' perception of PSPs' performance on the advisory service quality description attributes

Farmers who had interacted with the particular PSPs in question seemed to have been satisfied with the performance on most of the items in each of the four broad advisory service quality description attributes. There were no significant difference between PSPs' performance in the two districts save for the result and method demonstration related attributes on which PSPs' performance was better in Tororo than in Arua. Individual PSPs were found to have performed

better than firms on most of the attributes in both districts. This difference could be attributed to the bureaucratic tendencies in firms unlike individuals whose performance largely depends on they, themselves.

However, there were some items on which PSPs' performance as perceived by the farmers that had interacted with them was very poor. Such items included presence of signposts on demonstration sites, joint planning between farmers and PSPs, follow up of individual farmers by PSPs and accountability of the PSPs to farmers. Poor PSPs' performance on the above items could be attributed to individual differences among PSPs in terms of competence and personality, PSPs resource and time constraints besides poor planning by the service providers, farmers and NAADS administration.

Recommendations

PSPs may need to be organized into a formally organized body which can advocate for their concerns besides acting as a link through which the PSPs can link up with other stakeholders like information producers and processors. This organ just like any professional body could have an ethical code of conduct, which could be useful in advisory service quality assurance.

The PSPs-research/information source linkage may need to be looked at and possibly initiated and/or strengthened. As a prerequisite for this, PSPs need to be organised into a broader body and then NAADS could help create and monitor the linkage between the two institutions.

To ensure that the information passed on to farmers in form of advice of good quality, it may be important that PSPs prepare training manuals (specifying content and method of delivery) before they begin training farmers. These training manuals may need to be reviewed and certified by technical people before they are used by the PSPs. To ensure that this kind of arrangement works, the contracting process may need to be done at least two months to the time of farmer training so that PSPs have adequate time to search for information and develop the manuals. Considering the limited financial capacity of the PSPs, they may need to be given some advance as soon as the contracts are signed to enable them prepare these training manuals.

The identified farmers' advisory service quality description attributes may need to be further validated and thereafter incorporated in the PSPs monitoring and evaluation guidelines so that the services delivered are in line with farmers' quality requirements.

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May the almighty God reward abundantly

ANNEX 8

Assessing Approaches for Dissemination of Research Results to Farmers within their Livelihood Situations in Tororo and Arua Districts, Uganda.

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Summary

This study sought to identify and describe the approaches used by research and service providers in technology dissemination to target different wealth categories of farmers, to identify the information that is required by these farmers and to assess the effectiveness of these dissemination and feedback mechanisms. Six case organizations, namely Agro tech, A2N and SG2, in Tororo, CEFORD, Abii, and Techno serve in Arua, were selected based on their avowed principle of involving grass root farmers in all stages of the project cycle. This study employed a cross-sectional survey design involving face-to-face individual and group interviews.

The findings of the study indicate that organisations have tended to follow the seasonal calendar, have integrated curricula, and work through farmers groups. CEFORD, SG2 and A2N use staff within the organisation as well as public extension, Abii, Agrotech and Technoserve only use their staff while CEFORD uses farmers in addition. Materials used are generated by the projects while in A2N the job is done by. Trainings tended to concentrate on theory with limited demonstrations. Trainings by Abbi and A2N took place in the village and so attracted more farmers than those by other projects at parish and sub county. Only a small proportion of the targeted households in the village have been reached: Agrotech (12%), SG2 (8%) and A2N (33%), Technoserve (48%), CEFORD (10%) and Abii (13%). Generally, the 'very poor' farmers were the least reached.

Major livelihood objectives were obtaining income and improving standard of living, yet information availed was lacking in market information for all farmers, and drying and storage for the very poor. Farmers' information needs were mainly production, marketing and inputs related. Information on farming practices like row planting, spraying, spacing was available among some farmers yet no formal means available for farmer participation in extension. Sharing of information was limited to time of training with no mechanism for feedback to farmers.

The key issues that need to be addressed by the information dissemination approaches include access to information and use of demonstrations, content, top down communication channels, and incentives and opportunities for key stakeholders to work together. Farmers' needs are multi-dimensional and so sharing and learning among organizations should be encouraged and should ensure equitable access of information. Mechanisms that encourage use of feedback and communication should be utilized in training.

Problem statement

Farmers are still faced with such problems as soil degradation and pest damage, and while they are conscious of their needs, their ability to operate within local farming systems in the face of severe constraints requires new knowledge and information from outside the community, (Garforth, 2001; Asingwire, 2001). In response to this, research has come up with a number of technologies that would be beneficial to farmers if put into use.

As shown, (NRI, 2002; Semana 2002), past failure to address the challenges of extension has often led to production and dissemination of technologies that do not adhere to farmers' livelihood situations. The available information from research remains unutilized because it is not appropriately packaged due to the emphasis on large scale farming or not adequately disseminated to grassroots communities that need it; for example through use of mass media, (Ademola, 2001; Breth, 1999 & 1987). Programs providing market information often benefit traders more than farmers yet the latter form the majority of Uganda's population with most of them, (70%) subsistence farmers (NAADS 2003; Kyamanywa, 1998; NAADS, 2000; PMA, 2000). For example, large-scale farmer field school programs in Soroti and Busia districts reached fewer than 5% of farms (FAO 2002/03). Recent programs like NAADS and NGO (Non government Organization) approaches are now realizing the need to focus on farmers' livelihood situations. Embedded within the NAADS program is the strategy to reach the rural poor communities, who form the majority and most disadvantaged sector of Uganda's population. Nahdy, (2001).

NAADS is still new and so is still faced with a number of challenges. These include among others, identifying gender disaggregated information needs and sources for the different farmer types, (NAADS 2000; MAAIF 2002). According to Ademola (2001) these challenges have at times led to failure of approaches that have succeeded in other parts of the world.

This study therefore sought to evaluate the approaches that have been used by research, intermediate users and farmers in information dissemination, so as to establish the extent to which the mechanisms used are appropriate for the farmers' livelihood situations. Among the key questions this study wanted to answer are the following:

1. How do the different farmers obtain the information they need for their farming activities?
2. Have the different projects/programs/institutions had any specific mechanisms for targeting specific audiences?
3. Do the farmers have any preferences on how they should be reached/served?
4. Do the channels/format influence exchange of information or not?

Methodology

Site and partner selection

This study employed a cross-sectional survey design involving face-to-face individual and group interviews. Data was collected in Kisoko and Rubongi sub-counties, Tororo district and Manibe, Kijomoro and Vuura sub counties of Arua districts in the period February to May 2004. Interviewees included research managers, NAADS coordinators, extension workers, service providers and farmers' groups operating in the six locations within the AGR[2] , A2N[3],

[2] Agrotech Consultants
[3] Africa 2000 Network

SG2[4] project areas in Tororo and ABI[5]), CEF[6]), and TEC[7] in Arua. Six villages, each of which was associated with a national effort to provide agricultural advisory services to smallholders, were used as study sites. These were Abongit, Awaya, Achilet C, Ambophile, Alio, and Yivu, in which AGR, A2N, SG2, TEC, CEF, and ABI were respectively operating. Within each category, farmers were purposively selected on the basis of being in a group or having attended any training with the responsible organization in order to capture their view of the issues discussed, to provide information on technologies that were disseminated to them during trainings and the extent to which this had been useful to them. District coordinators for the NAADS program and department of agriculture were purposively selected to provide information on the programs operating in the respective districts and approaches used by these programs. Coordinators and field officers from each project were also selected.

Wealth ranking of farmers

Wealth ranking was conducted with the help of key informants who comprised of Local Council 1 representatives, representatives of the development groups and some elders in the village. This involved informal discussions to create a good atmosphere for participation as well as use of flash cards to identify the different households and arrange them into the wealth categories. These wealth categories formed the framework for selecting farmers for subsequent focus group discussions. .

Data collection

Data was collected through focus group discussions with key informants and farmers, and individual interviews with district and project staff, as well as farmers. Within each village, a total of four group discussions were held, each meeting involving between 8-15 farmers. The first meeting involved key informants. The next three included the very poor, poor and average wealth categories of households, each category in a separate meeting to ensure a free atmosphere for participation. Individual interviews involved 75 farmers drawn from Arua and Tororo Districts.

Data analysis

Quantitative data was analyzed using frequencies to enable the comparison of data from the different categories as well as projects. Qualitative data was clustered by themes and disaggregated by wealth and/or project to depict the situation as described by the farmers and illustrated with figures and tables.

Results

Categories of farmers targeted by the projects

Farmers were ranked into three wealth categories namely very poor, poor and average. In Tororo very poor (30%), the poor (52%), and the average (18%) were identified. Female-headed households formed 18% of the farming households with most of them, 62%, very poor. In Arua 21.17% were very poor, 52.9% poor and 25.93% average, female headed households were still dominant among the very poor. (See Table: 1 for wealth ranking criteria)

[4] Sasakawa Global 2000 Network
[5] Abbi Agricultural Research Development Centre
[6] Community Empowerment for Rural research
[7] Technoserve Uganda limited

The record of households indicates that few farmers are in groups compared to the total household population. Within the groups in Tororo the majority of the farmers fall in the poor category while in Arua average category dominate. All groups targeted by the projects are composed of at least any two of these categories, thus making it difficult for the projects to focus technologies suited to each category. It is also noteworthy that though the majority of the households are male headed, it is actually the women who dominate the group composition. This finding is in line with those by Sanginga, Lilja and Tumwine (2001) on participation in farmer experimentation groups in Kabale and would thus suggest the groups are relatively mature going by the U-shaped participation curve of males and females as observed by the Kabale study. It nevertheless raises questions about mechanisms for distribution of benefits within member households when read against findings by Majda, (1999) that men are the major beneficiaries of technologies.

Table 1 Criteria used in the villages of *Abongit B, *Awaya and *Achilet C to identify wealth categories of farmers

	Wealth category		
Criteria	**Very poor**	**Poor**	**Average**
Land	<0.5	0.6-3 acres	>3 acres & can afford to rent
Livestock	Lack	1-3 (cows/goats)	>3 cows/goats
Shelter	Poor grass thatched hut	Good grass thatched hut/ semi permanent house	Semi permanent/permanent house
Food	Lack	1-2 meals a day (Food available part of year)	>2 all year
Clothing	Lack	Fair	Adequate
Educate children	Nil	Primary	University
Source of income	Dependants Farming (minimum)	Casual labor, formal employment, Kiosks in village	Formal employment, Progressive farmers, Market within /out of village
Characteristics	Sick, female headed	Main labor force	Group leaders, mainly male

Source: Focus group discussion (March 2004)

Findings also indicate that few farmers were reached through trainings by all the projects: AGR (12%), SG2 (8%) and A2N (33%) of the households in Tororo per respective village meanwhile in Arua, TEC (48%), CFD (10%) and ABI (13%). TECH, AGR and ABI mainly reached out to the average category while SG2 and A2N and CFD targeted the poor. All projects were not able to meet the interests of the very poor. This does not seem to address the problem of inequitable access to agricultural advisory services in rural communities to the disadvantage particularly of the rural poor who have remained outside the monetary economy, mainly producing for subsistence and the concern for recent approaches to address this situation (PMA 2000; Blackie 2002). The fact that all approaches target groups often constituting members from several villages at times over three, and that achievement is counted on number of groups reached, needless to say has made it difficult for the organizations to realize the extent to which they have reached households at the grass roots.

Approaches used in information dissemination

As stated by Rivera, (2000) and ATC, (2000), no single approach best suits extension development and so it is not surprising that the approaches share several features. First, all these approaches use groups as their entry point and achievement increases with increasing number of groups and group members reached. In addition, according to classification of approaches by Ademola (2001), all the six organizations have employed the Problem Solving Approach that involves defining the approach from the viewpoint of the people, participation of target groups in planning and implementation of the project as well as phased planning and implementation. Similarly, all the approaches have advocated for what Axinn (1987) describes as the Extension Acquisition System under which farmers are organized in groups, or individuals can go beyond the village and seek out information.

Mobilization and teaching are two major areas in the training programs. During mobilization, extension staff/service providers communicate by letter to the group chairperson about the group training. Occasionally, SG2 has made announcements in church from where those concerned can inform the rest. Most farmers preferred being informed at home since it was more reliable, but this requires more resource persons.

A closer look at the individual approaches, however, indicates some differences as shown below.

a) Available research information

Over and above the information from NDS, SG2, A2N, TEC, CEF, and ABI, farmers also accessed information through fellow farmers, parents, public extension, and workshops. Information from extension was most preferred in the hope that new technologies had been released. The information received was production related covering such subjects as row planting, weeding, pest and disease control and livestock management.

Across projects, farmers had little information on post-harvest processes and virtually nothing on value addition. Information on post harvest handling was limited to 'time of harvest and drying' with hardly any reference to the 'how' in the case of drying. Farmers collaborating with AGR were more conversant with breeding and seed selection information, while A2N associates had relatively more information on post harvest activities. The very poor seemed to have received most information with the poor recording the minimum information available. However these responses did not indicate that most of the very poor had attended trainings. On the whole farmers in Tororo seemed to have received more information compared to their counterparts in Arua.

A2N and SG2 curricula were narrow compared to the rest so the farmers found it easier to master technologies taught. However the introduction of expensive fertilizers and pesticides as part of the curriculum saw most farmers unable to further experiment and later adopt technologies introduced . Notably, TECH and AGR had a wide scope of technologies which the training did not fully encompass.

b) Methods used

Methods used were limited to theory and field demonstrations to the exclusion of mass media, visual aids and other reading materials. Trainings by SG2, CEF, TEC and AGR included class sessions in which all the aspects of the enterprise were studied before proceeding to the field. Sometimes there would be an intervening period of several days or months between the class training and the field practice.

Farmers preferred to receive this information through class discussion and then field practical. They were also of the view that field practical be done within one week of the training when they can still remember what they learnt. Use of mass media, reading materials and visual aids was also welcome. A2N and ABI on the other hand work on the principle that the field is the classroom. Their target farmers had more field exposure since all activities were implemented in the field.

Projects often operated beyond the village of study. Due to the limited staff all projects contracted staff from outside the organization to boost existing human resource especially in extension. In a bid to utilize available physical and human resources, trainings were conducted at parish and occasionally at sub-county centers. A2N and ABI greatly differed from this having had all their trainings at village level. Trainings in all projects involved many farmers. According to Mills (1977), 25 trainees per instructor is the maximum number for the classroom type of instruction and 8-12 is the maximum number for demonstrations that are followed by practice.

Farmers' objectives for involvement in agricultural activities

The farmers' objectives may be described as aimed at expanding the five different capital assets (financial, human, natural, social and physical) as suggested by Scoones (1998). All farmer wealth categories were primarily involved in agriculture to increase their financial and human capital assets. Farmers sought to improve their ability to pursue different livelihood strategies through enhancing their food security, health, clothing and children's education. Most farmers also sought to enhance their social status by raising animals for meeting their bride price obligations. The farmers collaborating with A2N, probably due to the increased sensitization to natural resource management also indicated a desire to increase their natural capital through such activities as renting land, soil management. The poor in the AGR and A2N villages had interest in house construction. While land is very limited in Tororo, the 'very poor' in all the projects were not involved in soil improvement practices since they deemed them expensive. Only the average farmers in A2N thought their activities would lead them to have security for loans.

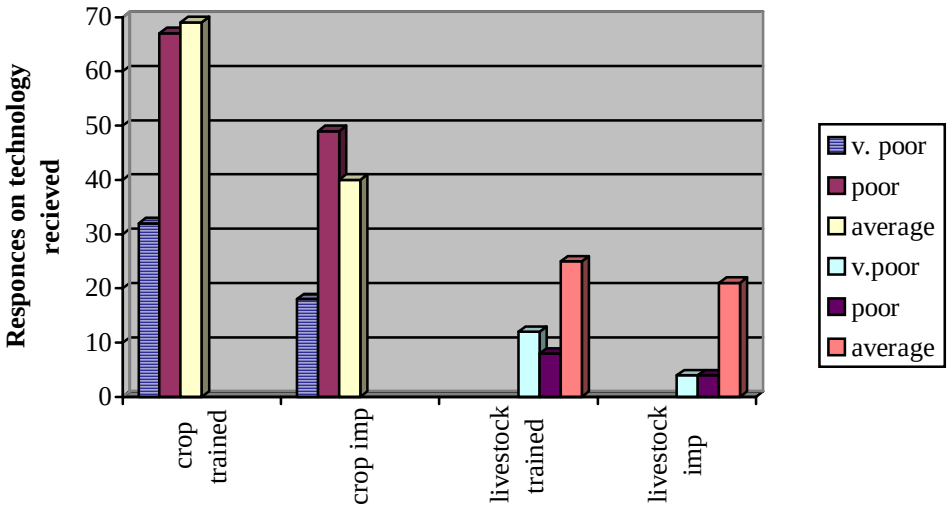
Information needs of farmers targeted by the projects

Across the projects, the most commonly cited information needs related to pest and disease control, availability of inputs and marketing. Information on pests and diseases was crucial for all farmers because some of the pests like termites had become resistant to the pesticides available. On the other hand the low soil fertility status may go some way in explaining the interest in improved production inputs and hence the need to look for markets essentially for farmers to at least offset the relatively high production costs. It is also important that farmers are exposed to more technologies from where they can be able to select what is suitable to them.

Effectiveness of dissemination and feedback mechanisms

Effectiveness of these mechanisms was measured on percentage of farmers that were in contact with extension and those that implemented technologies taught. The figure below indicates that there was a bigger move towards dissemination of crop technologies compared to livestock technologies.

Fig. 1 Comparison of information on crop and livestock technologies recieved and implemented by the trained households per category.



Source: individual interviews Tororo and Arua. May 2004

Individual interviews also indicated that more farmers took up implementing more of crop than livestock technologies although the fields were small ranging between 0.25-0.5 acres per crop technology Individuals concentrated on implementing cheaper agronomic practices leaving out aspects on fertilizer usage and post harvest while marketing of produce was limited to the village markets. Livestock technologies were not widely taught and where this was done, emphasis tended to be on construction of shelter at times using materials like cement and iron sheets which farmers considered expensive. Farmers therefore tended to take up technologies that were less expensive and easier to manage..

Trainings at sub-county and parish level attracted fewer participants per village than those at village level, also for sub-county trainings it was farmers living nearest that attended.

Follow-up activities in all projects included visits by extension workers to farmer groups or individual gardens. Of the few farmers that had received training, only a small percentage reported to have been visited. ; 59% highest by A2N and least visited 20% in Abbi. AGR and TEC had got a provision for a technical team from NAADS to visit the project areas on a quarterly basis while CEF had farmer facilitators at village level. Farmers collaborating with these organizations accordingly had opportunity to provide feedback on technologies practiced to the extension workers during training, group and home visits. This information could in turn be provided to research for further analysis and feedback, however the follow up process in all projects did not seem to have in place mechanisms for information to flow from farmer to research and vice vasa.. All projects did not put priority in following up farmers after they trained them. Except for those working with FFS, farmers complained that visits were done only when external visitors were coming to monitor the project.

Conclusion

The conclusions highlight key areas that will need focus if we are to have an effective information flow system. They provide an account of approaches used, access to information to different wealth categories of farmers and available mechanisms information flow**.**

1. The approaches used in the study have tried to disseminate useful information to farmers using participatory methods that included group discussions, as well as, field demonstrations. However, teaching methods did not exploit available formats and channels in order to capture understanding/attention of all categories of farmers.
2. Poor category formed the bulk of the farmers in the groups targeted in Tororo while the average category formed the bulk of the farmers in the groups targeted Arua. Very Poor households were less than proportionally represented in the groups compared to general population.
3. There was an inverse relationship between wealth status and access to information on seed selection with relatively less information on drying and storage for the very poor. All wealth categories had limited access to market information and overall, the average category had relatively more access to info.
4. Overall, information needs were highest for pest and disease control, soil improvement, marketing and availability of inputs. Average class felt relatively less need for non-crop production related info.
5. There is no clear mechanism for feedback of information from farmer to research and vice versa

Recommendations

1. Based on the above conclusions this study would like to recommend the following that stakeholders can further discuss in order to come up with action points relevant to each of them. Mechanisms should be put in place to avail and promote use of available extension formats and channels for example through organized workshops, seminars and establishment of databases in institutions.
2. Mobilization should target marginalized wealth categories and/or policy makers should have a parallel arrangement to target the Very Poor.
3. Extension should network with other disciplines so as to trap skills which might not have been acquired during the basic academic training.
4. The process of needs assessment should focus on the different wealth categories since access is not wealth category neutral, while encouraging information sharing among farmers for technologies well-known by some farmers.
5. There is need for research, extension and farmers to come up with clear mechanisms for feedback of information.

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ANNEX 9

Appendix 2 of the Report on the Working Group on the Coordination of Development and Dissemination of Information Materials for Service Providers and Farmers; 18th October 2004

FACTSHEETS FOR PRESENTATION OF RESEARCH OUTPUTS

Livestock

1. Name of technology:
2. Enterprise / commodity for which technology was developed for:
3. Purpose of enterprise / commodity (regionally focused):
4. Other or common name(s):
5. General description of the technology:
   - Maturity period [gestation period or slaughter age]
   - Live weight at slaughter age
   - Carcass weight
   - Milk/ egg yield
   - Resistance to disease /pest
   - Twinning ability/ littering capacity
6. Merits of new technology:
7. Disadvantages:
8. Potential direct beneficiaries of the technology by resource /wealth group:
10. Economic benefit analysis / profitability / gross margin / cost of technology
11. Non-economic benefits of the technology (e.g. enhances soil fertility):
12. Suitability for different farming systems and climates (agro-ecological zones):
13. Potential environmental impact (positive and negative):
14. Resources required for producing technology and implementing the different stages of producing technology:
15. Labour requirements for different stages:
16. Availability of inputs such as seeds, implements, etc. (source of supply, packaging size, price):
17. Risks involved (production risks, health risks, etc.):
18. Local and regional market information, including prices for outputs:
19. Marketing arrangements (co-operatives, groups, direct buyers, etc.):
20. Other institutional aspects (requires technology group action among farmers? If yes, what type?):

Specific recommendations on livestock

i. Management of livestock [poultry, small ruminants, pigs and cattle]
   - Housing
   - Feeding

ii. Control and management of important livestock diseases and parasites
   - Name of disease or pest
   - Diagnosis of diseases: symptoms and how to recognise them
   - What causes the disease
   - Preventative measures recommended
   - Treatment options (step-by-step / how to do it), includes frequency, application method and dosage of drugs.
   - Materials required for treatment options and their local availability and costs (including any implements)
   - Likely efficacy of different treatment options and risks associated with them
   - Safety precautions during control

iii. Handling of livestock products

iv. Record keeping

Agricultural Engineering

1. Name of technology [implement, equipment, irrigation, water storage structures, water harvesting, and biogas digesters]:
2. Enterprise / commodity for which technology was developed for [crop variety, feed processing, milk processing, drying]
3. Purpose of enterprise / commodity (regionally focused):
4. Other or common name(s):
5. Purpose [water harnessing and utilisation, angry harnessing and utilisation:
6. General description of the technology:
    - Specifications
        - Size
        - Weight
        - Power requirements
        - Materials used
    - Maintenance requirements of the technology
        - Materials involved
        - Parts that need frequent attention / replacement
        - Period of maintenance
        - Local source of spare parts
        - Livestock training required
    - Description of the technology
        - Figure drawn or photograph labelled showing the important parts
        - Layout of the system [where applicable]
        - Functions of the parts
    - Performance parameter
        - Output [capacity] in Kg/hr, bags/hr, ha/hr, m3/hr, l/hr
        - Fuel consumption l/hr, l/unit output
        - Labour requirements [persons for effective operation
        - Total head [Suction & delivery] in meters. This is applicable to pumps only
        - Drying temperatures in degrees centigrade –applicable to dryers only
        - Drying times in hours – applicable to dryers only
        - Products/commodities to be used –applicable to dryers only
        - Percentage of damaged crops- weeders
        - Percentage of damaged seeds – for threshers/ shellers
    - Operation
        - Describe how the technology works
        - Step by step procedures
    - Environmental aspects
        - Effects on soil
        - Effects on air e.g. smoke
        - Effects on people e.g. sound, strain
        - Effects on animals [oxen]
    - Gender and cultural aspects
    - Safety precautions
    - Other requirements
        - Training of oxen
        - Training of operators, users
7. Merits of new technology:
8. Disadvantages of new technology:
9. Potential direct beneficiaries of the technology by resource access / wealth group:
10. Economic benefit analysis / profitability / gross margin cost of technology:

11. Non-economic benefits of the technology (e.g. enhances soil fertility):
12. Suitability for different farming systems and climates (agro-ecological zones):
13. Potential environmental impact (positive and negative):
14. Resources required for implementing the technology, including:
15. Labour requirements for different stages:
16. Availability of inputs implements, etc. (source of supply, packaging size, price):
17. Risks involved (utilisation or handling risks, production risks, health risks, etc.);
18. Local and regional market information, including prices:
19. Marketing arrangements (where it cab got, co-operatives, groups, direct buyers, etc.)
20. Other institutional aspects (requires technology group action among farmers? If yes, what type?)

Forest Sector

1. Name of technology:
2. Enterprise / commodity for which technology was developed for:
3. Purpose of enterprise / commodity (regionally focused):
4. 4. Other or common name(s):
5. General description of the technology:
    - Forestry [Trees]
        - -purpose of tree
        - -growth characteristics
        - Years of maturity [days- agro forestry trees]
        - -Maturity period
        - Age at flowering/ fruiting
        - Management requirements
        - Habitat conditions
        - -Description of plants / plants used [in case of utilisation]
        - Yield in [in case of agro forestry, where there is intercropping with plants]
    - Agronomic practices / growth requirement and management practices
        - Nursery practices
        - Land preparation
        - Planting material
        - Planting (date, method, seed rate, depth, spacing etc.)
        - Planting regime (mono-cropping, mixed / intercropping, shading etc.)
        - Other management aspects (e.g. pruning, staking)
        - Weed management
        - Use of soil management e.g. organic / inorganic fertilisers, green manure (time of application, type of fertiliser, application rate, frequency and method of application)
    - Common pests and diseases
        - List of pests and diseases
        - Description of the pests [photograph if available/visual display of the pest/symptoms
        - Importance of the pests and diseases
        - Symptoms / damage of the disease
    - Control of pests and disease

      A] Chemical control of pests and diseases
        - Name of pest and disease to control
        - Chemical to use
        - Local availability and price of chemical
        - Dosage / application rate in kg / ha
        - Timing and frequency of application
        - Method of application (including safety precautions)

      B] IPM methods
        - IPM options for integrated disease management

- IPM options for integrated insect pest management
- Control of rodents

C] Cultural control methods

D] Others- Host resistance

- Harvesting and post-harvest handling
  - Harvesting methods and handling
  - Post-harvest losses control (insect pests, rodents, diseases etc.)
  - Value addition-Processing, packaging and storage
- Marketing
  - Products
  - Price
  - Product promotion/ how to market their product
  - Product utilisation
  - Market outlets/place/infrastructure
- Divers (roles) utilisation (service and product

6. Merit of new technology:
7. Disadvantages of new technology:
8. Potential direct beneficiaries of the technology by resource access / wealth group:
9. Economic benefit analysis / profitability / gross margin/ cost of production and the technology itself:
10. Non-economic benefits of the technology (e.g. enhances soil fertility):
11. Suitability for different farming systems / soil types and climates (agro-ecological zones):
12. Potential environmental impact (positive and negative):
13. Resources required for producing and using or implementing the technology:
14. Labour requirements for different stages:
15. Availability of inputs such as seeds, seedlings, implements, etc. (source of supply, packaging size, price):
16. Risks involved (production risks, health risks, etc.):
17. Local and regional market information, including prices for outputs:
18. Marketing arrangements (co-operatives, groups, direct buyers, etc.):
19. Other institutional aspects (requires technology group action among farmers? If yes, what type?)

Fisheries Sector

1. Name of technology:
2. Enterprise / commodity for which technology was developed for:
3. Purpose of enterprise / commodity (regionally focused:
4. Other or common name(s):
5. General description of the technology:
   - Fish type
     - Days to harvest size
     - Average weight at harvest time
     - Management requirements -Production system

       i. Capture fisheries
          - Conservation

       ii. Aqua culture
          - Yield [Kg /sq.m / given time]

       iii. Fry production
          - Number of fry / female brood stock /given time
6. Merits of new technology:
7. Disadvantage of the new technology:
8. Potential direct beneficiaries of the technology by resource access / wealth group:
9. Economic benefit analysis / profitability / gross margin:

10. Non-economic benefits of the technology:
11. Suitability for different farming systems and climates (agro-ecological zones):
12. Potential environmental impact (positive and negative):
13. Resources required for implementing the technology:
14. Labour requirements for different stages:
15. Availability of inputs (source of supply, price):
16. Risks involved (production risks, health risks, etc.):
17. Local and regional market information, including prices for outputs:
18. Marketing arrangements (co-operatives, groups, direct buyers, etc.):
19. Other institutional aspects (requires technology group action among farmers? If yes, what type?):
20. Specific recommendations for fisheries

i. Pond construction and maintenance
   - Site selection
   - Pond planning
   - Pond design and construction
   - Pond preparation for stocking
   - Pond maintenance

ii. Seed production
   - Brood stock management
   - Hatchery design
   - Egg production and incubation
   - Fry nursing and management
     - Temperature control
     - Water quality
     - Aeration
     - Live food production
     - Fry harvesting
     - Fry conditioning
     - Fry packaging and transportation
     - Fry stocking

iii. Management of fish
   - Capture fisheries / lake
     - Monitoring water environment /quality
       - Pollution
       - Siltation
       - Nutrient flow /balance
       - Transparency
       - Invasive weeds
     - Fish stock management
       - Stock size and changes
       - Stock distribution
       - Sex ratios
       - Fish habitats- where they feed, where they breed, where they have nurseries
       - Age at first maturity
       - Fecundity [numbers of of eggs/female/weight]
       - Food [abundance and distribution]
       - Effects of fishing methods and gear and time
       - Deciding the right size and age for harvesting
     - Harvesting and post-harvesting handling
       - Determining the effects of fishing methods and gear on the quality of fish

- Determining the right period / time for harvesting
- Methods and facilities for handling harvested fish from Lake to landing
- Labour requirements for each fishing method
- Labour requirements per are of pond
- Hygiene- maintenance of it
- Methods for processing
- Methods of packaging and storage

- Aquaculture /fish farming
  - Management of fish
    - Determining the type of to grow [based on resources available and market demand]
    - Determining production systems
      i. Monoculture
      ii. Polyculture
    - Preparation of fish for stocking
    - Stocking rates
    - Pond fertilisation
    - Fish feeds and feeding
    - Monitoring growth
    - Determining time to harvest
    - Control of predator
    - Control of population especially tilapia
    - Fish health monitoring
  - Management of water
    - Control of water level
    - Water quality monitoring – dissolved oxygen, levels of acid [pH], nutrient balance, water temperature, water colour, light penetration, silt and suspended matter
  - Fish harvesting and post-harvest handling
    - Determining the right time for harvesting
    - Fishing methods and gear
    - Fish processing
    - Fish marketing
  - Record keeping
    - cost of establishing ponds
    - cost of inputs
      i. fry and transport
      ii. fertilizer and lime
      iii. feeds [quantity and cost]
      iv. fishing gear
      v. growth [weight/length]
      vi. tools or equipment
      - salaries / wages
      - quantity harvest
      - value of harvesting
      - cost of processing
      - cost of transport to market
      - value of tax

v. Other observations
- disease incidences
- mortality

vi. Source of seed

vii. Environmental concerns
- establishment of ponds in wetlands is restricted by law

- accidental introduction /stocking of fish in areas not intended is controlled [law requires commissioners permission to move or import fish]
- certain species of fish restricted

Food Science

1. Name of technology
2. Enterprise / commodity for which technology was developed for
3. Purpose of enterprise / commodity (regionally focused)
4. Other or common name(s)
5. Purpose of the technology
6. General description of the technology
7. Merits of new technology
8. Disadvantages
9. Potential direct beneficiaries of the technology by resource access /wealth group
10. Economic benefit analysis / profitability / gross margin
11. Non-economic benefits of the technology
12. Potential environmental impact (positive and negative)
13. Resources required for implementing the technology,
14. Labour requirements for different stages
15. Availability of inputs implements, etc. (source of supply, packaging size, price)
16. Risks involved (production risks, health risks, etc.)
17. Local and regional market information, including prices for outputs
18. Marketing arrangements (co-operatives, groups, direct buyers, etc.)
19. Other institutional aspects (requires technology group action among farmers? If yes, what type?)

Specific recommendations on food science and technology

a. Nutrition aspects

- Reasons for utilising a particular food

ii. Food and nutrition security aspects

- Products
- Value addition of foods
- Reasons for adding value and benefits

iii. Production of safe and wholesome food products
iv. Food hygiene aspects
v. Marketing and product development

Crops

1. Name of technology
2. Enterprise / commodity for which technology was developed for
3. Purpose of enterprise / commodity (regionally focused)
4. Other or common name(s)
5. General description of the technology

- Days to maturity
- Maturity period: Long, medium, early
- Height at flowering, maturity etc. in cm
- Response to organic / inorganic fertilisers
- Management requirements
- Plant types / growth habit (e.g. erect, climber, runners, etc.)
- Description of plant or plant parts, e.g. flowers, leaves, seed, grain, stem, fruits, tubers, etc. for colour, size, shape, taste, scent or other important attributes
- Yield (kg/ha), under on-station and on-farm conditions
- etc.

6. Merits of new technology
7. Disadvantages of new technology
8. Potential direct beneficiaries of the technology by resource access / wealth group

9. Economic benefit analysis / profitability / gross margin
10. Non-economic benefits of the technology (e.g. enhances soil fertility)
11. Suitability for different farming systems, soil types and climates (agro-ecological zones)
12. Potential environmental impact (positive and negative)
13. Resources required for implementing the technology, including
14. Labour requirements for different stages
15. Availability of inputs such as seeds, implements, etc. (source of supply, packaging size, price)
16. Risks involved (production risks, health risks, etc.)
17. Local and regional market information, including prices for outputs
18. Marketing arrangements (co-operatives, groups, direct buyers, etc.)
19. Other institutional aspects (requires technology group action among farmers? If yes, what type?

Specific recommendations on released new crop varieties

I. Agronomic practices / growth requirement and management practices

- Nursery practices
- Land preparation
- Planting material
- Planting (date, method, seed rate, depth, spacing etc.)
- Planting regime (mono-cropping, mixed / intercropping, shading etc.)
- Other management aspects (e.g. pruning, staking)
- Weed management
- Use of soil management e.g. organic / inorganic fertilisers, green manure (time of application, type of fertiliser, application rate, frequency and method of application)

ii. Common pests and diseases

- List of pests and diseases
- Description of the pests [photograph if available/visual display of the pest/symptoms
- Importance of the pests and diseases
- Symptoms / damage of the disease

iii. Control of pests and disease

A] Chemical control of pests and diseases

- Name of pest and disease to control
- Chemical to use
- Local availability and price of chemical
- Dosage / application rate in kg / ha
- Timing and frequency of application
- Method of application (including safety precautions)

B] IPM methods

- IPM options for integrated disease management
- IPM options for integrated insect pest management
- Control of rodents

C] Cultural control methods

D] Others- Host resistance

iv. Harvesting and post-harvest handling

- Harvesting methods and handling
- Post-harvest losses control (insect pests, rodents, diseases etc.)
- Value addition-Processing, packaging and storage

v. Marketing

- Products
- Price
- Product promotion/ how to market their product
- Product utilisation

Market outlets/place/infrastructure

ANNEX 10

A Checklist For The Evalution Of The Adaptive Research Process For Output 3 Technologies

Jovia Manzi and Barbara Adolph, Linking Project, 25 January 2005

You participated in an adaptive research process with the Linking Project. We were trying to address the information needs of farmers and service providers by using a checklist ("fact sheet headings") of information on agricultural technologies. When we found gaps in knowledge, we undertook activities such as surveys and trials to fill these gaps, in order to develop extension materials. The process can be summarised as follows:

Draft Process for adaptive testing of technologies

1. Collect information/literature relevant to the technologies
2. Evaluate that information against the fact sheet headings and identify any gaps in knowledge, bearing in mind that we want to be confident that our recommendations will be relevant to the conditions of the target area
3. Meet with a sample of farmers and service providers to further identify any other gaps in the information needed by them in order to assess and use the technology
4. On the basis of the missing information, design activities that will provide information to fill the gaps (surveys, studies, on-station/on-farm trials etc)
5. Conduct the activities, with the participation of relevant stakeholders
6. Provide feedback to farmer groups and confirm the results of the activities
7. Based on the results, develop draft extension materials in formats useful to service providers and different types of farmers
8. Test the extension materials with farmers and service providers, and modify as necessary
9. Finalise, print and disseminate extension materials

We would like to know from you how this process worked, and how it could be improved. Therefore we have developed a checklist of questions. When Barbara is visiting you next week, she would like to discuss these questions with you. However, we thought it would be useful to send them out before, so that you could start thinking about them and take notes.

1. Given your experience in participating in the adaptive research testing of technologies under output 3,

- What do you think went well and why?
- What do you think didn't work well and why?
- How would it have worked better in view of having the process appreciated or adopted in the agricultural knowledge transfer system in Uganda (e.g. by NAADS /NARO)
- How cost-effective was the process? Could it be done with less resources?

2. A number of collaborating institutions participated as multi – disciplinary teams to find solutions to the information gaps on the respective technologies and this may have had implications in terms of achieving what was expected in the adaptive research process. From your own perspective:
   - Who should be responsible for the process: researchers who developed the technology, those who are disseminating it (NAADS, NGOs, agric. Extension) or farmers / farmers' organisations? Who (what organisation / institution) should do what in the process and why?
   - In terms of cooperation, what works and what doesn't? What were the difficulties and advantages in working across organisational boundaries?
   - When would it be appropriate to do the adaptive process/ at what stage would it be appropriate to begin with it - when the technologies are just released, promoted or even have been adopted?
   - How can this partnership be best handled in terms whose responsibility is it as regards to the resources? i.e financially, technically and providing time etc
   - What do you think is the role of the private sector in contributing to filling the gaps in knowledge, in regard to the local context (e.g. providers of inputs and implements)

3. Give suggestions on how to deal with technologies from outside NARO – e.g. the goat de-worming – how can such technologies be best adapted to the Ugandan circumstances?

4. In view of your experience regarding this adaptive research process, how do you think it could it be improved/ modified in our agriculture information system so that it is more appropriate for information generators and users?

5. How best can it be institutionalised such that it is an integral activity with the already existing agricultural information system?

ANNEX 11

Experiences with De-worming goats using Mucuna

Documentation and assessment of the adaptive research component of the project:

"Linking demand for and supply of agricultural information in Uganda"

Jovia Manzi, Barry Pound and Barbara Adolph

February 2005

Preparatory Step 1: Identification of the pilot topics for testing the process

Goats are one of the main livestock production priorities in Arua and Tororo Districts. It is an important source of income and meat, in addition to traditional ceremonies for all categories of farmers. During the NAADS demand assessment process it was expressed as one of the priority enterprises for advisory services by farmers. However, most service providers focused on breed improvement, improved management and pest and disease control, but with no specific activities on goat de-worming even though farmers had mentioned worms as one of the problems.

One of the technologies Linking project had identified from LPP projects was de-worming of goats using *Mucuna pruriens* in India. This appeared relevant to the demand of farmers. This was a new technology needing testing to see whether it fitted in our local conditions.

Preparatory Step 2: Formation of multi-institutional teams

During a stakeholder's planning workshop that took place in Mukono ARDC on 3-4 December 2003, participants agreed on the different individuals with expertise in the Districts of operation and based on these, team members and team leaders were selected. For Tororo District, Dr. Fiona Waata a veterinary professional from Africa 2000 Network was selected to coordinate implementation of field work, while in Arua Dr. Alex Candia (the Sub-Count NAADS coordinator Pajuru Sub-County) assumed leadership for Arua District. However, this being new research, knowledge about local ethono-botanical plants that were used to worm treatment in goats was necessary and given that Dr. Francis Ejobi from Makerere University Faculty of Veterinary Medicie. He was selected to be the overall team leader to coordinate the research both in Arua and Tororo.

Preparatory Step 3: Reaching a common understanding with team members on the reasons, aims and methods of the research

During the above workshop the objectives of on-farm activities were discussed. These applied to all teams and the objectives were:

- To test appropriateness of technologies for local conditions
- To identify and fill gaps in knowledge about the technology
- To produce extension materials for different intermediate users and end users of the technology

- To document the adaptive research process to feed into NARS/NAADS procedures for information material development

It was agreed that each group would use a checklist for generic information for technology data sheet as a guide to compile information for each technology. The following process was agreed:

1. The groups will check for which topic / heading information was already available, from where (what source), who will collect it and send it to…
2. … the team leader or a selected person from the team, who will then compile this information according to the headings.
3. Any remaining gaps will be identified in the process, and
4. Trials and trial monitoring activities will be designed in such a way that the missing information can be collected
   - Compilation of available information on the technology against a checklist
   - Trial planning and preparation
     - site selection
     - briefing of villagers / farmers groups
     - requisition of inputs
     - trial protocol development
     - monitoring and evaluation (M&E) procedures
   - Trial implementation (including timing / milestones) and M&E
5. Documentation / filling of gaps in fact sheets
6. Extension material development and testing
7. Extension material multiplication (printing) and distribution
8. Writing of site report (process focused), including lessons learnt and recommendations

Preparatory Step 4: Development of workplans, budgets, reporting procedures and Memoranda of Understanding

During the workshop each team drafted a work plan and budget. These were finalised when participants returned to their respective districts.

Participants agreed that they needed letters of formalising the partnership for their employers so that they are aware of their involvement in the Linking project activities. Hence Memoranda of Understanding were drafted and sent to the district local government Arua, Africa 2000 Network and Makerere University. Signed copies were sent to the project and the other copies remained in the Districts. The memoranda of understanding spelled out members' responsibilities and the projects' commitment to working together.

Procedures for releasing, accounting and reporting on activities were discussed with participants and we agreed to follow NRI quarterly reporting schedules. Participants agreed that all the funds for implementing the activities in the district should be managed by the Abi Centre Manager and hence funds for Alex Candia were channelled to the Arua Abi ARDC account on a quarterly basis upon the project receiving an approved accountability and requisition for next quarter. Funds for implementing goat de-worming activities for Tororo

were channelled through Africa 2000 Network, and for Dr. Francis Ejobi directly to his personal account.

Implementation Step 1: Collect information/literature relevant to the technologies:
Given that this was a new technology, all the information necessary was new. The team obtained extension materials from India. However, they first had to establish whether *Mucuna pruriens* is found in both districts. Fortunately the plant was grown in both Districts but more widely in Tororo where it was being promoted for soil fertility improvement by Africa 2000 Network and in Arua about six species of mucuna were being tried at the Abi ARDC.

Implementation Step 2: Evaluation of information against fact sheet headings and identification of gaps in knowledge:
In Uganda, there was no information regarding the use of *Mucuna pruriens* for de-worming goats. But, there was some information on the prevalence and incidence of gastro-intestinal parasites in goats in the study site in Tororo.

Implementation Step 3: Meet with a sample of farmers and service providers to further identify gaps in the information needed by them in order to assess and use the technology:
The initial sensitization meeting to create general awareness about the technology and identify gaps was carried out at Kabosa parish and was attended by 36 farmers (19 male and 17 females). A number of meetings were held with farmers and the following gaps were identified:

- Ignorance on the technology, as it has not been tried out in Tororo and the neighbouring districts (information gap)
- Cost- benefit analysis of the technology (economic viability, i.e. use of mucuna viz-a-viz use of de-worming drugs)
- Labour requirements
- Supply and availability of mucuna
- Alternative uses of mucuna
- Use of other available options for de-worming of goats
- Use of the technology on other livestock species i.e. cattle, sheep (since in most rural settings they are grazed together)
- Application of the technology
- Comparison of the technology with indigenous technical knowledge

Other gaps identified

- The different types of worms that infest goats
- Causes of worm infestation
- Administering the treatment, frequency, mode of application, dosage rate
- Description of *Mucuna* spp to use, and which part to use for de-worming (i.e leaves, pods…)
- Application of technology to other livestock types
- Dosage for prophylactic and curative purposes

Implementation Step 4: On the basis of the missing information, design activities that will provide information to fill the gaps:

1. Identification of study sites two sites were identified namely Kabosa and Ochegen FFS, both in Kwapa parish, Kwapa sub county. The total number of households in

these two farmer field schools was 33 while the total number of goats within these households was 203, with an average of 6 goats per household.

2. Introductory meeting in three sites to take stock of the number of goats. Of the three sites, two were selected (Kabosa and Ochegen) to take part in these trials
3. One link farmer was identified that would lead other farmers to participate in the project
4. Establishment of 1 acre of mucuna at the DATIC.
5. Design the trial protocol as described below:
    - Objective: To test the efficacy of *Mucuna pruriens* against mixed natural gastro-intestinal helminths in local goats
    - Hypothesis: The trichomes of *Mucuna pruriens* possess *in vivo* anti-helmintic activity in local goat populations
    - Methodology: Materials for field: weigh balance, faecal sample bottles, 10% formalin, ear tags, ear tag applicator, albendazole, gunny bags, paper bags, water-proof marker pens, thermometer, stethoscope, record book, knife, sugar, flask, cool box, ropes, drenching gun/bottles, aluminium foils, camera
    - Experimental animals and group allocation: 60 adult helminth infected female goats, allocated randomly to 3 experimental groups using age, and weight as the blocking factors *(NB: ask owner if goats were dewormed recently; exclude those with history of deworming).* Give animals numbered ear tags
        - Group 1 (n=20) each will receive 20 mg/kg body weight of *M. pruriens*, single dose, orally
        - Group 2 (n=20) positive control, each will receive albendazole, single dose, orally
        - Group 3 (n=20) negative control, untreated, give placebo
    - Preparation and administration of trichome mixture:
        - scrape trichomes off the pods using a sharp knife,
        - Weigh to correspond with required amount for goat (20 mg/kg b.wt.)
        - grind and mix with warm water (approx. glass full), stir, add some sugar 2 tea spoonfuls
        - drench goat carefully
        - graze animal as usual
        - give water once daily through out experimental period
    - Post treatment monitoring: Day 0 (pre-treatment), then days 1, 2, 4, 8, and 15
    - Parameters to be monitored are rectal temperature, pulse, respiratory rate, helminth infection (epg) of each experimental animal. Collect faecal samples directly from anus (*at least 5 pellets per animal!!)* and preserve in 10% formalin till analysis.
    - Key outcome measured: load of gastrointestinal parasites expressed as epg
    - Lab analysis: determine epgs using the MacMaster technique (for individual parasite spp and total epgs). Submit as “blind” samples to lab analyst
    - Estimation of antihelmintic efficacy: Calculate percent faecal egg reduction (%FECR).
    - (% FECR) = (1-(T2/T1 x C1/C2)) x 100, where T and C are epg means for treatment and control groups, and 1 and 2 designate the counts before and after treatment respectively.
    - Statistical analysis: Do a log-transformation if data is skewed. Performance ANOVA

Implementation Step 5: Conduct the activities, with the participation of relevant stakeholders:

Goat Enterprise Baseline Survey was carried out both in Tororo and Arua Districts.

Baseline in Tororo:
The baseline survey was conducted on 13 July 2004 in Kwapa sub-county, Tororo district. It was conducted as a component of the trials on the efficacy of *Mucuna pruriens* as a dewormer in goats in Uganda. The survey was conducted by Dr Francis Ejobi from the Faculty of Veterinary Medicine, Makerere University, Dr Fiona Wata and Mr. Kateregga both from Africa 2000 Network, Tororo. Mr. Crispin Ekisa, a member of Kabosa Farmers Field School, was co-opted into the survey team as a guide.

The main objectives of the survey were, (i) to understand the goat management practices in the area where the trials will be conducted, and (ii) to assess the load and species of gastro-intestinal parasites present in goats in that area.

An interview guide was developed and used to capture the required data. The households interviewed were identified by Mr. Crispin Ekisa. The inclusion criteria was that, (i) households that were members of Kabosa Farmers Field School, and (ii) households that kept at least two goats. Household-to-household interviews were conducted. A total of 12 households were interviewed. The respondents included the husband or wife or son or daughter or combinations of these persons. The interviews were conducted in Ateso, the local language spoken in the community.

In each household where the interviews were conducted, faecal samples of goats kept were collected directly from the anus, and kept in a cool box with ice packs. It was a dry season in the area at time the samples were collected. A total of 23 samples were collected. The samples were analysed in the Preventive Medicine Laboratory at the Faculty of Veterinary Medicine, Makerere University. The species of parasites as well as degree of infection (expressed as eggs per gram of faeces) were determined using the McMaster Counting Technique. The degree of parasite infection was graded light or moderate or heavy according to guidelines developed by Hansen and Perry (1994). 4. Results

The key findings were:

- The management practises of goats were by large similar in all the households interviewed.
- All the households kept the Small East African breed of goats.
- No special housing facilities were provided for goats. The goats were housed at night mainly on the kitchen veranda.
- The goats were mainly tethered, and watered individually
- The day-by-day management of the goat was by all family members. When children are at home, they are more involved in looking after goats. The daily activities involved (i) in the morning tethering the goats in the fields, (ii) changing the tether places, usually 2 to 3 times in a day, (ii) providing water to the goats, (iv) returning goats home in the evening, (v) cleaning the veranda where the goats are housed at night. It was noted that women were more involved than men in the management of goats. One reason given was that the men are most of the time way from home.
- The goats were bred by natural services. Households without bucks could either borrow them from their neighbours or could take their does to neighbours with bucks for mating.
- Gastro-intestinal parasites were mentioned as a major disease in goats in the area. Abortion and respiratory conditions were also mentioned by some respondents. All the

respondents knew the clinical presentation of worm infection in goats. The most frequently mentioned clinical signs were loss of weight, diarrhoea, inappettence, and a rough hair coat. Some respondents occasionally de-wormed their goats using commercial de-wormers. Most of these drugs were provided by untrained people. Some respondent also sought for healthcare of there goats from a traditional animal healer resident in the area.

- There was no problem in the marketing of goats. The marketing outlets included (i) open air markets, (ii) goat business men who buy goats from farmers homes, and (ii) exchange of goats for a heifer or a bullock or a cow or even a bull.
- None of respondents used *Mucuna pruriens* or any other plant material for deworming goats.

Laboratory results
The species of parasites and the degree of infection (expressed as eggs per gram of feaces) found in the samples analysed. The common parasites found were *Heamonchus contortus*, *Stronglylides papillosus*, Bunostonum species, *Cooperia species*, Oesophagostonun species, *Nematodirus filicolis*, Trichostonglus species and *Monieza expanza*. Mixed infection was common. The epgs varied with the species of parasite. The highest parasite load of 1,450 epg was recorded for *Moniezia expansa.*

It was concluded from the Tororo baseline that we can begin the trials with *Mucuna pruriens*. However, we recommend a replication of trials in the rainy season when we expect even a higher worm burden.

Baseline in Arua:

The baseline survey was conducted on 10th and 11th September 2004 in Pajulu sub-county, Arua district. It was conducted as a component of the trials on the efficacy of *Mucuna pruriens* as a dewormer in goats in Uganda. The survey was conducted by Dr Francis Ejobi from the Faculty of Veterinary Medicine, Makerere University and Dr Alex Candia, Veterinary Officer in-charge of Pajulu sub-county, Arua district.

The main objectives of the survey were:

- To share information with the goat farmers about the technology of deworming goats using *Mucuna pruriens*, and
- To understand goat management practises in the area where the trials will be conducted.

The key method employed in the survey was focus group discussions with farmer groups (FGs). Two (2) focus group discussions were held. The first focus group discussion was held on 10th September 2004 with Monzokokoba FG. The meeting was held at the home of Mr. James Ariongi in Kebu village, Urugbo Parish. The meeting was attended by a total of 22 goat farmers (10 women and 12 men).

The second meeting was held on 11th September 2004 with Aliangaka Farmers Group. The meeting was convened at the home of at Mr George Avua , Onivu village, Yivu parish. It was attended by a total of 29 goat farmers (8 women and 21 men). A discussion guide was used to capture the required data. The discussion guide inquired on broad areas including housing, grazing system, gender roles, diseases, veterinary services, indigenous knowledge in goat healthcare, and marketing of goats and goat products. The discussions were conducted in

Lugbara, the local language spoken in the community. Mr Simon Edroru was the translator for the first meeting, while Mr Livingstone Oba was the translator for the second meeting.

The findings presented here represent data captured from both FGs. The findings are reported in the order and sections as captured from the discussion guide. The key findings were:

- Goats are managed by tethering and zero-grazing. However, farmers perceived zero grazing as a better system than tethering in respect of disease prevention and control. Farmers were trained in the basic skills in goat husbandry by the Uganda Land Management Project (ULAMP).
- In the tethering system, the goat is housed at night either inside the kitchen or in the veranda of the kitchen.
- In both the tethering and zero-grazing systems, goats were provided with water in basins. This was mainly done in the dry season. In the rain season, however, goats are not usually provided with water for drinking. Some farmers from the Aliangaka FG take their goats in the dry season to the swamp for watering.
- The gender roles in the management of goats varied, though some roles were not gender specific. When all the family members are at home, it is usually the children who take care of goats.

  The major roles of men are:
  (i) Buying ropes for tying the goats
  (ii) Guarding goats against thieves and wild animals
  (iii) Assessing the health status of the goats in absence of women and children, tethering goats
  (iv) Constructing the goat shed (for zero-grazing)
  (v) Selling goats
  (vi) Planting fodder (for zero-grazers)

  The major roles of women are:
  (i) Cleaning the goat shed
  (ii) Providing water to the goats
  (iii) Collecting fodder for zero-grazed goat
  (iv) Tethering goats
  (v) Bringing goats back home in the evening

  The roles of boys and girls are:
  (i) Collecting water from the spring wells for the goats
  (ii) Tethering goats
  (iii) Providing water to the goats
  (iv) Cleaning the goat shed
  (v) Returning tethered goats in the evening home
  (vi) Changing the tether sites
- The average number of goats per household in the Monzokokoba FG was 3, while in the Aliangako FG it was 4. Farmers kept mainly female goats. Both local and exotic breeds of goats were kept. Exotic bucks were introduced to the area by the ULAMP for crossbreeding with the local does.
- Breeding was done only by natural service. A farmer could borrow a buck from a neighbour or friend or relative for breeding purposes.
- In Manzokokoba FG, the common goat diseases ranked in order on economic importance were worms, mange and eye infections, while in Aliangako FG, the

common diseases were worms, pneumonia, mange, eye infections, abortion and cassava peels poisoning.

- The veterinary services were not easily available. There were few veterinary service providers in the area. Modern veterinary drugs were reported to be unaffordable, and not easily accessible. Only few farmers de-worm their goats using commercial antihelmintics. Members of Aliangako FG had received training on goat husbandry from the district veterinary extension staff. However they reported that the training provided was not adequate.
- Use of herbal remedies in goat healthcare was perceived as a cheaper alternative to modern (western) veterinary care. However, the practice of traditional medicine in goat healthcare was very limited in the community. None of the farmers used *Mucuna pruriens* for deworming goats.
- Marketing of goats and goat product was not a problem at all. However, members of Aliangaka FG complained of the low prices offered by the middlemen. Both the wife and husband decided on when to sell goats.

Conclusions

- Goat farmers in Pajulu sub-county, Arua district perceive gastro-intestinal worms as major disease in goats.
- Some member of both Manzokokoba and Aliongako FG will be included in the trials.
- The trials with *Mucuna pruriens* should take into consideration gender aspects.

Trial activities:

Mucuna was planted both in Tororo at the DATIC and in Arua at Abi ARDC. The mucuna in Tororo was ready much earlier than the one in Arua because in Tororo they easily secured seed whereas in Arua , there were some delays. When the mucuna was ready as described in the trial protocol the treatments were done. Faecal samples of the goats were taken before treatment to ascertain the parasite burden of the goats and also at intervals after treatment.

The samples were analysed at Makerere University.

ANNEX 12

Concept note submitted to LPP
Field Trial on the Efficacy of Trichomes of *Mucuna Pruriens* against Natural Mixed Infections of Internal Parasites in Goats in Uganda

By

Dr Francis Ejobi (Team Leader, Faculty of Veterinary Medicine, Makerere University, Uganda)
Dr Alex Candia (Field co-ordinator, Arua District, Uganda)
Dr Fiona Wata (Field Co-ordinator, Africa 2000 Network, Tororo District, Uganda)

1. Background

In November 2004, a field trial was conducted on the efficacy of trichomes of *Mucuna pruriens* as a dewormer in goats in Uganda. LPP funded that trial through the project "Linking demand and supply of agricultural information in Uganda" – R8281. The main objective of that trial was to test and validate use of trichomes of *Mucuna pruriens* as a cost-effective and environmentally friendly technology to be disseminated to poor goat keepers in Uganda. This was against the background that trials conducted in Dharwad district in India showed that trichomes of *Mucuna pruriens* were effective in the control of internal parasites in goats (Conroy and Joshi, 2002).

Farmers in the selected areas had already identified goat enterprises as a priority area for research and extension support through the National Agricultural Advisory Services (NAADS), and internal parasites as a main area of concern. The initial trials wee carried out with farmer groups under farmers own conditions of management. The farmers provided the goats for the trials.

The trials formed part of a wider adaptive research process being tested by the project, that is responsive to farmers own priorities and that leads, where appropriate, to the production of extension materials that answer farmers needs for information on both technical and managerial (social, economic) aspects of technology.

The results of the Ugandan trial were statistically analysed using SPSS programme to test if there were significant differences in the faecal egg counts between the treated and control groups. The analysis considered individual species of parasites, as well as groups of parasites (i.e, tapeworms, flukes and round worms). The results did not show a consistent pattern in the faecal egg counts in the treated and control groups, and no statistically significant differences in the faecal egg counts could be demonstrated. Two reasons could explain this observation: First, there were many missing variables for individual parasites, hence the power of the test was weak for statistical analysis, and second, some farmers especially in one trial site had dewormed their trial goats with chemical commercial dewormers and they did not disclose this information to us at the beginning of the trial. Because of the inconsistent results, we are unable to develop extension materials, and to disseminate this technology to goat keepers.

2. Weakness of the previous trial

The previous trial design considered only faecal eggs counts as the outcome for statistical analysis. From a practical point of view, farmers easily appreciate and adopt a technology if they can see tangible outcomes like live weight gains, reduced kid mortalities, improved birth weights of kids, and reproductive parameters (like shorter kidding intervals, improved twining

rates, etc). These attributes were not considered in the previous trial design because of the timeframe in which it was conducted.

3. Proposal and Justification

We propose, as part of the extension of the "Linking" project – R8281, to conduct a follow-up trial in order to address the weaknesses of the previous trial. The proposed trial will take into consideration outcomes of live weights and reproductive parameters in addition to faecal eggs counts. This would generate more conclusive results on which we can base our decision to disseminate this technology to goat keepers in the study locations.

The goat keepers who participated in the previous trial are willing and motivated to participate in the proposed re-trial. Mature pods of *Mucuna pruriens have* already been harvested and stored in preparation for the re-trial. We can therefore start the re-trial as soon as possible since the goat owners are already sensitised, and the Mucuna trichomes are readily available.

4. **Proposed activities and time schedule**

The re-trial will be conducted in two sites, i.e., districts of Arua and Tororo, Uganda.

Activity	**Time**
1. Meetings with goat keeper who participated in the first trial to explain the results and need for a re-trial; verify availability of goats; take faecal samples of goats to be recruited to verify that they actually have worms	March 2005
2. The trial (15-day faecal collection period: days 0, 2, 4, 8 and 15)	April 2005
3. Monitoring of weights and reproductive parameters (goats will be weighed twice a month for a period of 3 months). The 3- months monitoring period is based on the premise that generally it is recommended to deworm goats after every 3-4 months)	April – June 2005
4. Data analysis	July 2005
5. Development and dissemination of extension messages with farmers and extension staff	August and September 2005
6.Final report writing	October 2005

5. Proposed Budget

The total estimated budget for the two sites is **£6,800**. This estimate is based on the cost of the previous trial which was £6,200. The additional £600 is included in the proposed budget to cater for the monitoring activities. The two field co-ordinators will travel in their respective districts to the field twice in a month to weigh the goats and to note other parameters of interest to the re-trial. The Team Leader will also travel to the field once in the 3 months of monitoring to supervise and appraise the monitoring activities.

6. Reference

Conroy, M.A. and Joshi, A.L. (2002). De-worming for improving the productivity in goats. Natural Resources Institute/BAIF Development Research Foundation. *Technical Bulletin 2/2002*.

ANNEX 13

Draught Animal Power Practices in Tororo And Arua Districts

Developed with Collaboration of Linking Project Farmer Groups of OFFAKA and MANIBE in Arua and AKIPIT in Tororo District Local Government, SAARI and Oba Livingstone, Edema Peter of ABI ARDC

INTRODUCTION

1.0 DRAUGHT ANIMAL POWER (DAP) TECHNOLOGY

The field practices for which DAP technologies are available include the following: Land preparation, planting, weeding, and ridging/heaping potatoes, ground nut lifting and transport.

Whereas these technologies are available in Tororo it is land preparation that is popular, while for Arua ploughing is popular in areas of Vurra sub-county only.

The purpose of the project is to document available information identified, and fill missing gaps in form of training material for use by farmers and service providers.

This training material will help to enhance the potential benefits that accrue from DAP technology which include among others preparing land (primary and secondary), planting, weeding, harvesting and transporting of on-farm/off farm produce and products.

Identified gaps

1. Line planting using a Weeder or ox-plough
2. Planter use
3. Weeder use
4. Economic benefit analysis for service providers
5. Group approach to manage implements
6. Availability of implements relative market prices
7. Training practices for farmer

2.0 AVAILABLE DAP OPTIONS IN UGANDA

DAP technology	Implement	Source	Price[1]
Ploughing	Sugura plough	SAIMMICO, Local market	150,000
	Zim plough	SAIMMICO, Local market	170,000
	Tool bar plough	SG 2000	235,000
Harrowing	Spike harrow	SAIMMICO	200,000
	Tool bar plough	SG 2000	235,000
	Cultivators (Consul)	Local market	200,000
Planting	Jab planter	AEATRI	
	SAARI planter	SAIMMICO	250,000
	Ploughs & weeders can also used for planting		

Weeders	SAARI type 1 attachments	SAIMMICO	90,000
	SAARI type 2	SAIMMICO	90,000
	Tool bar	SG 2000	235,000
	Cultivators (Consul)	Local market	200,000
Ridging	Ridgers	SAIMMICO	220,000
	Plough	SAIMMICO	170,000
Groundnut lifting Irish potato lifting	Lifter attachment	SAIMMICO	20,000
	Lifter attachment	EAATRI	20,000
	Lifter complete	SAIMMICO	14,400
Transport	Ox-cart with steel wheel	SAIMMICO (1 tonne)	600,000
		AEATRI (0.5 tonne)	400,000
	Ox-cart with tyres wheel		250,000
		SAIMMICO (1 tonne)	500,000

[1] Price as per December 2004.

3.0 WHO NEEDS TO UNDERTAKE DAP?

Any category of a farmer can undertake DAP. However, for a farmer to make profits from DAP utilization, the farmer at the beginning of DAP activities should have the following attributes: At least 2-hectare piece of land; own or hire oxen and implements; trained oxen; and knowledge and skills on DAP.

Farmers may be categorized on land holdings as small-scale farmers (1 to 2 ha); medium scale farmers (5 to 20 ha) and progressive/small scale commercial farmers (over 20 ha).

It should be noted that all these categories can benefit, but the medium and progressive can employ more than one technology due to their capacity.

4.0 TRAINING PROGRAM ON DAP

Training needs identification: A service provider/trainer needs to conduct training needs assessment and prioritize areas of high interest of his client.
Ample time should be given (3 to 5 days) to mobilize, sensitize and conduct the needs assessment using various tools appropriate.

Develop a work plan for the training: This will include the topics to address the felt needs; timing of training, resources, facilitators, duration and it should be participatory. It should take 1 to 2 days.

Develop a programme for follow up trainings: Mobilize human, animal and material resources.
Implementation of the training programme should take 1 week for both farmers and trainers.

Planning to implement the work plan: This should include training venue, duration of the training, training materials or Aids, farmers to be trained, contributions from farmers and externals/organizers. This should take one day.

Implementation of the work plan (Training sessions): Training farmers with animals should be given one month or more depending on learning ability.

Training to weed: if animals have been initially trained, 5 to 7 days intensive training program is required.

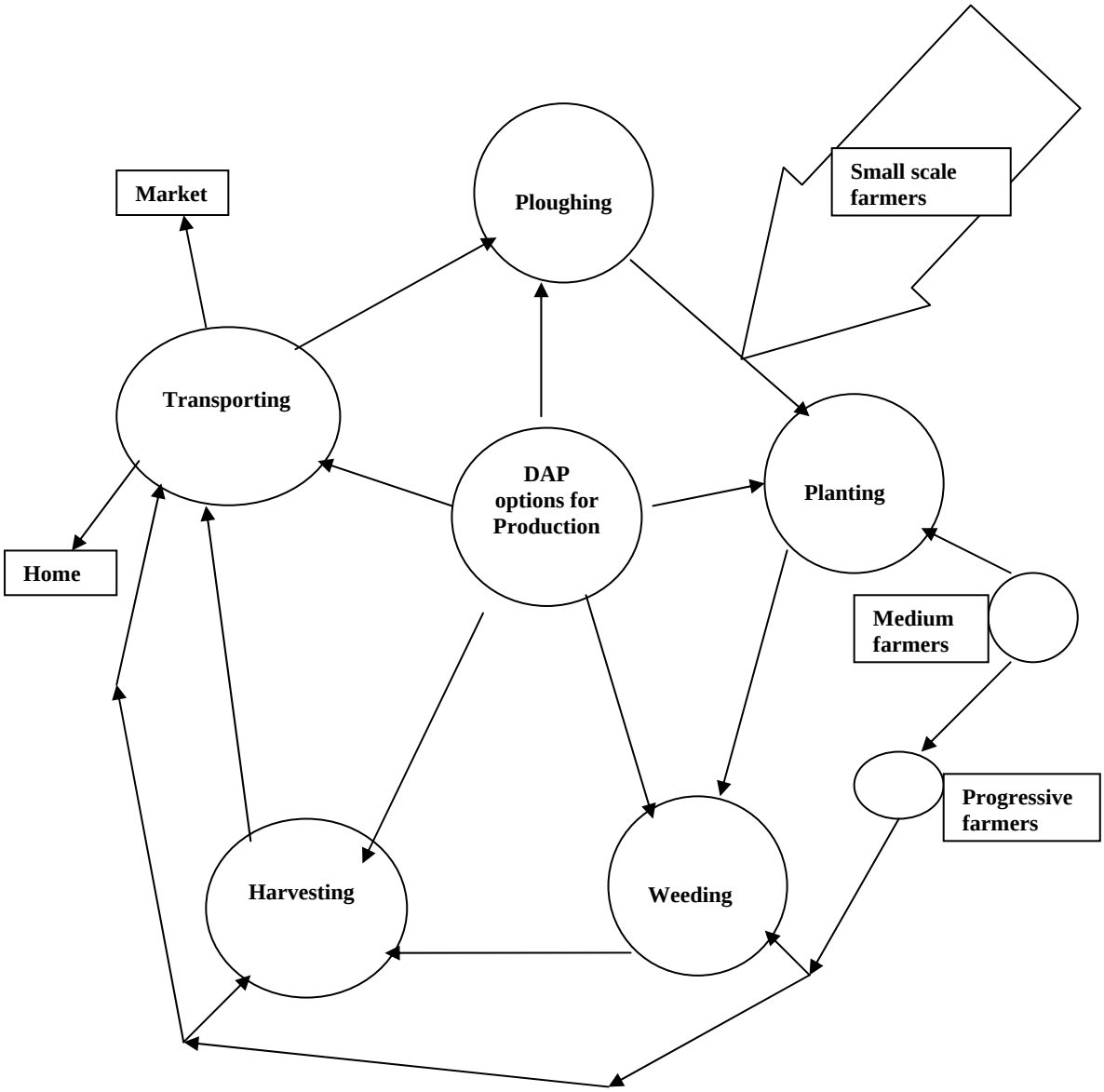
Training to plant: The animals trained to weed will take 3 to 4 days to learn how to walk straight along the furrow. Semi trained animals will take 7 to 10 days to learn the above skill.

Training to ridge and lifting groundnuts: the technologies require the farmer to master the skill of ridging and groundnut lifting within ridger or plough. The farmer can be trained for one day, but a farmer should practice for 7 days to master the skill.

Training to transport using ox-cart: train animals to pull the cart under different conditions (ploughed field, along paths, highways, etc). Train the farmer to control animals when hitched to an ox-cart. This may take 2 to 3 days but frequently yoke animals and walk with a cart at different times of the day.

Training farmers to make yokes: it is essential to use the appropriate yoke for particular technology. This requires a farmer to know how to make various yoke types, i.e., for ploughing, weeding and transport yokes. This session takes about 2 to 3 days but the farmer needs to conceptualize the principles of yoke making.

Follow up trainings: in order for the farmer to adopt these technologies there is need to constantly make follow up visits once or twice in a month for a period of 4 to 6 months.



DAP options available for exploitation to enhance commercial farming in rural areas

PROFITABILITY OF DAP

Ploughing:

- It takes a pair of oxen 1-2 days to plough 1 acre with a cost of 15,000/=, 7,500/= per day, while it takes 8 people 4-5 days to dig one acre, equivalent to 32,000/= - 40,000/=.

Weeding:
Groundnuts:

- It takes to weed groundnut by hand (one acre) 25 people working 5 hours equivalent of 25,000/= once, whereas ox-weeding takes 3 hours a pair of oxen and two people per acre costing 10,000/= (two people 2,500/= each oxen and implements 5,000/=)

Maize:

- It takes to weed maize by hand (one acre) a5 people working 5 hours equivalent 15,000/= whereas ox-weeding 2 hours a pair of oxen and two people per acre costing 8,000/=.

Non adoption of DAP:
In some areas DAP technology is not adopted due to the following:

- Ignorance of the technology
- Tsetse fly infestation
- Cattle diseases
- Cultural believes (e.g. women are not to plough with oxen)
- Topography (steep slopes don't favor use of DAP)
- High prices of implements
- Cattle rustling in some areas
- Attitude of the farmers toward particular technology
- Market forces of produce

5.0 MANAGEMENT OPTIONS FOR DAP

(a) Advantages and disadvantages of owned/hired oxen and implements

	Advantages	**Disadvantages**	**Who needs?**
Own oxen	- Hire out for cash - Sell for money - Use for garden work - Provide manure - Used for traditional marriage - Assessable at convenience - Guarantee as security for a loan - Oxen can be used maximally and profitably	- Grazing costs - Treatment costs - Risk of being stolen - May become aggressive if not used	All categories of farmers (small scale medium scale and progressive)
Own implements	- No hiring in costs - Operations timely	- Cost of purchasing some times in high	Medium scale and progressive farmers

	done. - Can hire out for cash	- Maintenance costs to be met - Storage facility to be provided - Risk of being stolen	
Hire oxen	- No costs associated to grazing and treatment - No risk of being stolen - Use when there is need.	- Operations not timely. - Prices may rise according to demand - Cash may not be available at the time of demand. - Use of oxen is limited.	Small scale farmer.
Hire implements	- No costs associated to purchasing and maintenance. - Storage problems eliminated. - No risk of being stolen - Use when there is need.	- Operations not timely. - Prices may rise according to demand - Cash may not be available at the time of demand. - Use of implements is limited	Small-scale and medium scale farmer

Small scale farmer: area of land up to 4 ha.
Medium scale farmer: area of land 4 to 10 ha.
Progressive scale farmer: area of land 10 to 20 ha.

Note: it's the head of the house hold who takes a lead in decision making in as far as management of oxen and implements, and it's her or his responsibility to hire in or out implements or oxen.

6. STRATEGIES FOR SUSTAINABLE UTILIZATION AND MANAGEMENT OF DRAUGHT ANIMAL POWER IMPLEMENTS UNDER FARMER GROUPS

The strategies suggested are meant for small holder farmers in a group whose land and farming capacity can not economically sustain implements.

- The group members should be homogeneous in (2 – acres farming capacity) terms of production level and/or income. In case of wide range differences, measures should be placed to harmonize active participation.

- Participatory planning of activities including review meetings should be done on rotational basis at homesteads / farm lands as frequent as two weeks and every member actively monitors all the group developments.

- Besides the executive committee in place, two other committees, finance and general management, with either 3 or 5 persons should be instituted. These committees should rotate on regular basis amongst members as decided by the group to develop confidence and trust amongst members. An induction or capacity building training on group management and finance among others should be given.

- The group should establish a strong financial management system (FMS) which should have a simple accounting records well understood by members, money received should be receipted, any money at hand be counted before members, minimum amount of cash to be kept by the treasurer should be decided on and extra banked. The general management committee should develop a two weeks calendar of activities, which should be strictly adhered to and implemented.

- The group should develop bye laws for the general management of the group and specifically on implements. This should include a user fee that will be charged on activity/day basis and all monies receipted. This also include ways to build a strong financial position of the group either by group members contributing money or providing produce to be sold to generate funds to expand their activities. Every group member should have a crop for income generation.

- It would be better if the group is small about 10-15 people easily manageable and implements rotate within a short time and at least half the group members owning trained animals, modalities of sharing of animals should be put in place.

- The implements should be under the custodian of one member of the group selected and entrusted by the group to manage and be accountable to the utilisation of the implements and popularize (promote) the implements amongst the farming community.

- The progressive or small-scale commercial farmers should be encouraged to form a group or about 5 people (farmers) and with the principles above, buy the implement and manage.

- The group unity, togetherness, sharing of ideas, experiences and responsibilities, mobilisation of resources, energy and active practicing farmers shall promote DAP implements utilisation.

7.0 KEY STEPS TO THE USE OF GROUNDNUT LIFTERS, OX-PLANTERS AND OX-WEEDERS: THEIR BENEFITS AND MAINTENANCE

Groundnut Lifter

What is groundnut lifter?

- Simple fork like tool attached to a plough in the position of mould board after removing the mould board.

What it does!

- After digging out the groundnuts from the ground, the lifter shakes off the soil and the crop with nuts are exposed to the sun.

How to use

- Remove the mould board, replace with lifter
- Adjust the depth so the share does not damage the groundnut.
- Drive the oxen while the plough is lifting up the Groundnuts

Benefits accrued

- The lifter eases harvesting
- Works even if the ground is hard at the time pulling would be difficult
- It encourages farmers to invest in large acreage of Groundnut production
- A pair of lightweight (180 kg each) oxen can easily pull it.
- Less expensive in terms of human labour only two people are weeded to operate a pair of oxen to lift one acre of Groundnuts in an hour.
- It is affordable, easy to operate, maintain and can be locally fabricated.

Ox-Planter

Benefit of Planter

- The farmer saves time by planting with a planter.
- Uses less human labour and able to handle large acreage and obtains optimum plant population per unit area.
- The planter available is multi-crop, it can handle many crops e.g. maize, groundnuts, beans and sorghum.
- The animals can comfortably plant up to 2 acres of groundnuts, 3 acres of maize in 5 working hours.

How to use the planter

- Prepare your fields well in advance and thoroughly harrowed.
- Select an appropriate yoke size/length,
  90 cm – Groundnuts
  120 cm – Soya bean, Sorghum
  150 cm – Maize, Cotton and Pigeon Peas
- Ensure that the seeds to be used are of uniform and even size.
- Calibrate the planter by selecting the appropriate spacing holes, test the performance and adjust accordingly before taking in the field.
- Mark the field, to show the starting point and subsequent runs.

Time of planting

- You achieve better performance when planting is done in the morning.
- The soils are very damp, but moderately moist.

Other requirements

- The working oxen should be well trained and the ox-man too should be skilled in driving and operating the Implements.
- Work the animals during cool time for better oxen performance
- If the oxen have taken long without performing the type of work – rehearse at least two days.

Maintenance of Planter

- At the end of Daily work ensure that all bolts and nuts are in place.
- Empty the container and clean off all dirt and soils.
- Replace all worn out parts
- Oil or grease movable with light grease before storage to protect from rust.

Weeder

Benefits of using a Weeder
- The farmer shall be able to handle large crop acreage within the weeding period.
- Experience fewer bottlenecks in labour shortage within this period.
- Saves time for doing other farm economic activities
- Side benefit, weeders make ridges for water harvesting.

Why weed
- Weeds reduce crop yields up to 80%
- Weeds can act as habitants for pests and disease pathogens
- Weeds can contaminate produce during harvesting
- Weeds may hamper other operation like irrigation

Type of Weeders available in Uganda markets
- Cultivators, tool bar types detachable Weeder.
- Standard plough with detachable Weeder.

When to Weed
- Better results are achieved when done just a week after crop emergence.
- Weed before you see weeds

How to weed with Oxen
- Select appropriate Yoke for particular crop
  90 cm – Groundnuts and Rice
  120 cm – Soya beans, Sorghum, Cow Peas
  150 cm – Maize, Pigeon Peas, Cotton, Cassava

What happens to perennial weeds?
- Remove most of the perennial weeds at the time of land preparation.
- Harrow the field several times to collect and burn the weeds
- If weeds are notorious use herbicides e.g. Glyphosates (Roundup max).

Efficiency of Weeder
This will depend on maximum efficiency which is obtained with well-trained oxen, skillful operator and timing the stage of weeding.
- Crop planted in straight rows
- The soils are not very damp.

8.0 COST/BENEFIT ANALYSIS

Justification of DAP as potential technology to commercializing farming in rural setting

- This technology can be useful in a farm up to 20 hectares (50 acres)
- The farmer can increase the number of teams according to farm demand and activities preferably each team with its ox-plough.

- DAP technology is fairly expensive but affordable for the rural poor. In a group or an Association they can afford a complete package.
- The local artisans can easily fabricate the spares hence minimizing the use of foreign currency.
- It has a positive Investment potential to rural farming and large-scale investment.
- Tororo Farming system makes it easy for any household to own draft animals.

But on assumption that:
1. There is an increase demand for DAP services
2. Improvement in produce market prices enhances the DAP services.
3. Working Animals are kept healthy through good feeding regular treatment, de-worming and spraying.
4. Security of Animals and equipment observed.
5. The group or Individual owner should entice communities to demand for DAP services.

Simple Invest Analysis Projected below:
- Two teams of oxen and 1 set implement each
- Life span of oxen 7 years (appreciation in value)
- Implement depreciation for 10 years.

Capital Investment:

Implements and two teams of oxen:

The Capital Investment in setting equipped DAP Unit (Set of implements and two teams of oxen)

No		**Quantity**	**Cost/Unit (Ushs)**	Total
1.	Two pairs of Oxen	4	250,000	1,000,000
2.	Ox Ploughs	2	180,000	360,000
3.	Ox-Weeders	1	250,000	250,000
4.	Ox-Planter	1	300,000	300,000
5.	Ox-Cart	1	700,000	700,000
6.	Groundnut Lifter	1	30,000	30,000
7.	Yokes	8	25,000	200,000
8.	Muzzles	4	5,000	20,000
9.	Shed for Implements	1 Unit		500,000
Sub-total				**3,180,000**

Maintenance Costs:

1. Oxen:		
Feeding Grazing and watering	30,000 x 12 x 7	2,520,000
Supplementary feeds	5,000 x 12 x 7	420,000
Spraying, Veterinary drugs and other services	100,000 x 7	700,000
Sub-total		**3,640,000**
2. Ox-ploughs: 2 spares per year		
16 shares	1 x 4,000	448,000
8 Land sides	7 x 3,500	196,000

4 Mould board	7 x 9,000	252,000
64 Bolts + Nuts	7 x 500	224,000
Wheels	7 x 5,000	140,000
Axles	7 x 1,000	70,000
Contingencies (10%)		133,050
Sub-total		**1,463,550**
3. Ox-weeder (minimum repair: servicing, tightening bolts and oiling)		
Axle	3 x 7 x 1,000	21,000
Bolts	16 x 7 x 500	56,000
Sub-total		**77,000**
4. Ox-planter (similar to the ox-weeder)		
Axle	3 x 7 x 1,000	21,000
Bolts	16 x 7 x 500	56,000
Sub-total		**77,000**
5. Groundnut lifter		
Shares	2 x 7 x 4,000	56,000
Landslide	1 x 7 x 3,500	24,000
Bolts	8 x 7 x 500	28,000
Wheel	1 x 7 x 4,000	28,000
Sub-total		**136,000**
6. Ox-cart		
Bearings	4 x 200,000 x 7	280,000
Greasing and servicing	2 x 20,000 x 7	140,000
Sub-total		**420,000**
7. Depreciation of implements in seven years		
Ox ploughs	180,000 x 10% x 7 x 2	252,000
Weeder	250,000 x 10% x 7	175,000
Planter	300,000 x 10% x 7	210,000
Groundnut lifter	30,000 x 10% x 7	21,000
Ox cart	700,000 x 10% x 7	420,000
Sub-total		**1,078,000**
Total maintenance costs		**6,891,550**

Note: It should note that these implements can serve for over 20 years. Animals will not depreciate but appreciate under good management.

Potential Income (with the above assumption in place)

1. Ploughing: (2 Ploughs) 180 acres per year	20,000 x 7	2,520,000
2. Weeding: 208 acres per year	9,000 x 7	13,804,000
3. Planting: 104 acres per year	8,000 x 7	5,824,000
4. Groundnut lifting: 208 acres per year	5,000 x 7	7,280,000
5. Transport (Ox-Cart)	50,000 x 12 x 7	4,200,000

Gross/Net income

Gross income	32,928,000
Net income	26,036,450
Yearly net income	3,719,500

Potential savings realized from use of DAP technologies

Operation	Oxen	Amount	Hand	Amount	Saving
Ploughing	3 pple (5.6 man days)	6,000	30 pple (30 man days)	30,000	
	Cost of using oxen	2,000			
	Cost of using a plough	2,000			
	Sub-total	**10,000**		**30,000**	**20,000**
Planting maize	2 pple (1 man day)	4,000	20 pple (20 man days)	20,000	
	Cost of using oxen	2,000			
	Cost of using implement	2,000			
	Sub-total	**8,000**		**20,000**	**12,000**
Weeding maize, 3 times	2 pple (3 man days)	12,000	20 pple (45 man days)	45,000	
	Cost of using oxen	6,000			
	Cost of using implement	6,000			
	Sub-total	**24,000**		**45,000**	**21,000**
Transporting maize, 3 trips	2 pple (1 man day)	5,000	10 pple @ 2,500/=	25,000	
	Cost of using oxen	2,000			
	Cost of using ox-cart	8,000			
Sub-total		**15,000**		**25,000**	**10,000**
Total		**57,000**		**120,000**	**63,000**

9.0 REFERENCE GUIDE

Draught animal power manual for use by Extension agents. FAO, Rome 1994.

Agricultural engineering training centre, Zimbabwe AP2, AP3.

Training for animal traction- by VSF-Spain in collaboration with SAARI.

ANNEX 14

Information Data Sheet on DAP Technologies

1.0 NAME OF THE TECHNOLOGY

- Draught/draft animal power technology (DAP). This is using animals to provide a pulling force for various agricultural implements.

1.1 OTHER OR COMMON NAME(S) OF THE TECHNOLOGY

- DAP is sometimes referred to as ox-cultivation or animal traction.

2.0 GENERAL DESCRIPTION OF THE TECHNOLOGY

2.1 Characteristics of good quality draft animal, e.g., oxen.

- Animal breed: Zebu, Boran, Exotic x Zebu (crosses). Select local breed adaptable to local environment, resistant to tick borne diseases, available feeds and traditional management system.
- Age: select animal of 2-3 years with 180-250 kg for training but has potential to increase/gain weight as it grows. Oxen can work for 7-10 years under good management.
- Weight: the heavier the animal the better for traction because the animal gives 10% of its weight as potential energy for traction purposes.
- Conformation: has straight back, wide and deep chest, straight strong legs, closed hooves and well developed hump.
- Temperament: animal that is with responsive behaviour, not docile neither too aggressive to other animals and people. Castrate when bullocks are 2.5 – 3 years to achieve responsive behaviour.
- Health: choose healthy animals with good sight and hearing ability. Eliminate lame or limping animals or those with irregular breathing habit.
- Sex: all sexes can perform traction. Females have even proved better performers than males. Stop using in-calf cows 2-3 months prior to calving.

2.2 Land opening, general preparation

- Tool used: ox-plough, cultivator and harrows.
- Land is tilled by ploughing two or three times using an ox plough giving an interval of 4 and 2 weeks respectively or even more time depending on vegetation and rate of decomposing. Depending on the seed/crop, harrowing is done to have a fine seedbed where a harrow or cultivator is available.

2.3 Planting

2.3.1 Planting using ox-plough (along furrows)

- Train the animals to walk between pegs used to make an opening furrow. The training can take 3-5 days for 2 hours daily.

- The field should be divided into smaller fields that can be run 10-15 either side to complete in order to minimize errors and for efficient planting.
- Mark the opening furrow line using 1 m high pegs dividing the small fields into half.
- Drive the animals to open up the furrow follow with subsequent furrows.
- Placing seed/fertilizer, follow agronomic practices, e.g.;
- Maize/cotton (75 x 60, 50 or 30 cm) place the seed or fertilizer every third furrow between seeds 60, 50, 30 cm estimated. The plough will cover the seeds.
- Soyabean/sorghum (50-60 x 25, 10 cm place seeds every second furrow.
- Groundnuts (40-45 x 10, 15 cm) make wider furrows and place seeds in every furrow at 10 or 15 cm gaps.

2.3.2 Planting with ox-drawn weeder/plough with a yoke

- Use detachable weeder mostly. Calibrate the spacing required for the particular crop.
- Use a weeder yoke depending on the crop (90 cm, 120 cm, and 150 cm).
- Drill the furrows with weeder in well prepared harrowed field.
- Place the seed or fertilizer in the drilled furrows according to agronomic recommendation.
- Open furrows using ox plough, drop the seeds and cover manually.

2.3.3 Planting seeders (AH Seeder, Italian planter, Jab planter)

- Calibrate or adjust the distance between plants on the seeder.
- Use weeder yoke as above for weeder.

2.4 Heaping potatoes

- Use a ridger or detachable ridger on a toolbar or mould board plough.
- Run the ridger and it will heap the ridge half way either side.
- In the return furrow one will be completed and half made the process should continue till the field is completed.
- For mould board plough, use a ploughing yoke, oxen driven to repeat the same furrow either side until the ridge is built.

2.5 Weeding with oxen

- Use appropriate weeder yoke, muzzle up animals to minimize them grazing on the crop.
- Efficient draft animal weeding is done 10-14 days after crop germination and subsequent weeding follows so long as there is minimum damage on the crop.
- Late introduction of first weeding lowers the proficiency of weeding.
- Subsequent weeding follows as weeds emerge.

2.6 Groundnuts harvesting or lifting using ox-plough

- Better on row planted crop.
- Remove the mould board incase the farmer possesses groundnuts lifter and replace the mould board with lifter.
- Adjust the depth to at least 15 cm deep to minimize pod damage.
- The groundnut can be left in the field to dry before plucking.

2.7 Transporting

2.7.1 Transporting with sledge

Wooden sledge is commonly used in rural area but have the following disadvantages:

- Requires bagging and bags are prone to damages on transit.
- Increases post harvest losses through moisture contamination and spillage.

2.7.2 Transporting with ox-cart

- Use 180 cm yoke preferably 300-400 kg oxen.
- Pneumatic wheels perform better in soft ground than steel wheels.
- Load to the capacity of ox-cart; 250 kg, 500 kg or 1 tonne.
- In hilly areas ox-cart use possess risks to both oxen and person driving if breaking system is lacking.

3.0 IMPORTANCE OF DRAUGHT ANIMAL POWER

- DAP reduces labour costs in weeding and drudgery in humans.
- It is faster than hand hoeing therefore saves time.
- DAP ensures timely operations in planting, spraying, harvesting, water pumping for production and domestic use.
- Use of DAP results to increased acreage, production and productivity.
- DAP can be used for transportation of farm produce and products.

3.1 Land opening/preparation (ploughing)

- Ploughing an acre once takes 3 days, 2 or 3 people for 4-5 hours daily approximately 4.5 man days or 5.6 man days while hand hoe 30 man days.

3.2 Ox-planting with seeder, weeder, plough

- It promotes row cropping acquiring optimum plant population covering large acreage within planting time frame (two weeks).
- It takes 6-8 people to plant an acre either 1 day or 2 days working 4 hours. If a seeder only 2 people. Instead of 15-20 people working for 6 hours to plant an acre in a day, an ox-weeder/ plough can be used in 1 day to plant an acre or more with two people on driving the animals and the other operating the seeder.

3.3 Weeding: approximately 3 hours two people an acre.

3.4 Groundnut lifting: 3-5 hours to lift groundnuts off the ground, depending on how the ground is, in a day two people instead of 30 people hand pulling for 3 hours.

3.5 Transport: 1 tonne of produce takes oxen 1 trip where as it takes 10 people, assuming each carries 50 kg, 2 trips.

DIRECT BENEFICIARIES OF DAP

- Small holder farmers with 1-5 hectares of land.
- Small scale commercial farmers (fairly wealthy) holding 5-50 hectares of land.
- Category two (small scale commercial farmers) can acquire and make efficient use of the implements - planters, weeders, ox-carts, ploughs while category one 1 (small holder

farmers) can own a plough on individual basis and the others on group basis otherwise on hire services.

4.0 ECONOMIC BENEFIT ANALYSIS

- Ploughing an acre once takes 3 days, 2 or 3 people for 4-5 hours daily approximately 4.5 man days or 5.6 man days while hand hoe 30 man days.
- It takes 6-8 people to plant an acre either 1 day or 2 days working 4 hours. If a seeder only 2 people. Instead of 15-20 people working for 6 hours to plant an acre in a day, an ox-weeder/ plough can be used in 1 day to plant an acre or more with two people on driving the animals and the other operating the seeder.
- Hand weeding groundnuts takes 73 hours per acre and it takes oxen 31 hours to weed 1 acre once.
- It takes oxen 3 to 5 hours to lift groundnuts off the ground, depending on how the ground is, in a day with two people instead of 30 people hand pulling for 3 hours.
- Transport: 1 tonne of produce takes oxen 1 trip where as it takes 10 people, assuming each carries 50 kg, 2 trips.

5.0 NON-ECONOMIC BENEFITS

- Using DAP implements like ploughs, harrows, weeders and ox-carts reduces human drudgery.
- Soils get perforated hence increasing soil aeration.
- Water harvesting techniques used (making of drills, ridging, etc.)
- Transport water, firewood, etc for domestic use.

6.0 SUITABILITY OF THE TECHNOLOGY FOR DIFFERENT SOIL TYPES AND CLIMATES

- The technology of ox-cultivation works well in flat and fairly sloppy topography; it also works well in sandy and clay loam soils. However, it can not work well in steep slopes, rocky areas and forests.
- When a weeder is used, it ridges the crop and the pan left by the weeding tines act as water catchments area thus retaining soil moisture for long which is advantageous in drier areas of Uganda.

7.0 POTENTIAL ENVIRONMENT IMPACT

7.1 Positive impacts

- Use of animal manure, vegetative and crop residue ploughed back helps to rejuvenate the soil.
- Making of drills, weeding, ridging and construction of drainage channels promotes water harvesting.
- Bush clearing in tsetse infested areas and spraying of the animals reduces the incidence of trypanasomiosis in cattle and sleeping sickness in human beings.

7.2 Negative impacts

- Extensive ploughing without soil and water conservation measures leads to heavy erosion, river and lake silting.
- Extensive ploughing also disturbs and destroys the soil profile and structure.
- Extensive use of one type of implement may make the soil develop a hard pan.
- Inappropriate acaricide use on draught animals will destroy birds that feed on sprayed ticks.
- Careless handling and use of veterinary drugs on draught animals may cause harm to both the livestock and humans.
- De-stumping for DAP leads to deforestation of the area.

8.0 RESOURCES REQUIRED FOR IMPLEMENTING DAP

- Draught animals (oxen)
- Resource persons (skilled and unskilled labour)
- Draught animal implements (ploughs, harrows, weeders, seeders, ridgers, carts/sledges, etc.)
- Training materials (stationery, tools, etc.)
- Facilitation for resource persons incase training is needed in a specialized area/technology.
- Availability of land.
- Facilities and services for animal health care.

9.0 AVAILABILITY OF IMPLEMENTS

DAP technology	Implement	Source	Price[1]
Ploughing	Sugura plough	SAIMMICO, Local market[2]	150,000
	Zim plough	SAIMMICO, Local market	170,000
	Tool bar plough	SG 2000	235,000
Harrowing	Spike harrow	SAIMMICO	200,000
	Tool bar plough	SG 2000	235,000
	Cultivators (Consul)	Local market	200,000
Planting	Jab planter	AEATRI	
	SAARI planter	SAIMMICO	250,000
	Ploughs & weeders can also used for planting		
Weeders	SAARI type 1 attachments	SAIMMICO	90,000
	SAARI type 2	SAIMMICO	90,000
	Tool bar	SG 2000	235,000
	Cultivators (Consul)	Local market	200,000
Ridging	Ridgers	SAIMMICO	220,000
	Plough	SAIMMICO	170,000
Groundnut lifting Irish potato lifting	Lifter attachment	SAIMMICO	20,000
	Lifter attachment	EAATRI	20,000
	Lifter complete	SAIMMICO	14,400
Transport	Ox-cart with steel wheel	SAIMMICO (1 tonne)	600,000
		AEATRI (0.5 tonne)	400,000

	Ox-cart with tyres wheel		250,000
		SAIMMICO (1 tonne)	500,000

[1] Price as per December 2004; [2] Towns of Tororo, Mbale, Soroti and Arua (assorted plough spares sold).

10.0 RISKS INVOLVED IN DAP

- The loss of draught animals to cattle rustling, theft, diseases and other parasitic outbreaks (Trypanosomiasis, Tick borne diseases, Contagious Bovine Pleuro Pneumonia (CBPP), Foot and Mouth Disease (FMD), Rinderpest, etc).
- Inappropriate government policies on draught animal power utilisation or taxation on agricultural implements.
- High population pressure leads to land fragmentation which may cause uneconomic use of DAP.
- Weather that is not favourable may reduce the productivity of draught animals and may affect field operations and utilisation of draught animal power.
- Extreme draught may cause shortage of herbage, hard ground to plough.
- Bites from snakes and poison from many sources may kill draught animals.

Human injuries and harm due to sharp metals from implements that are not disposed off in a proper manner.

ANNEX 15

Methodology of and Mini Report on Pre-Testing IPM Brochure and Botanical Spray Calendar for Pigeon Peas

Jimmy Bamaru, District Production Co-ordinator, Arua District

1. Overview of the pre-testing of the IEC materials

The two IEC materials Brochure and Botanical Spray Calendar pre-testing were investigated according to the validity and reliability of the method used. A simple Plus- minus reader-based and correction methodology was designed for the pre-testing. This was because the target audience was directly involved in the design and preparation of the IEC materials.

In the Plus -minus reader-based and correction methodology, members from the target audience read the brochure and Botanical Spray calendar for the following:

- Well written and material need content/ Correctness
- Clarity in language and stylistic structure / Comprehension
- Graphic design
- Relevance, Acceptance

Then, they recommend plus for well done material and minus for uninteresting and unimportant elements. The target audience work based on semi-structured guiding questionnaires asking them to assess brochure and Botanical Spray Calendar design and content characteristics such as ease of finding information, readability of text, overall quality of the IEC materials and title.

Well-written and material need content/ Correctness

- Is the material relevant to its intended mission? That is, useful to the intended users
- What are the expected measurable outcomes of the IEC material in the pigeon peas production and community development
- Is there any way or room for improvement on the IEC material?

Clarity in language and stylistic structure / Comprehension

- Are the intended languages used applicable to the Community where the IEC material is for use?
- What languages are preferred for what kind of people?
- Is the style of language used relevant to the target audience?
- What corrections can be made?
- Are the language style used User – friendly that is well understood by all beneficiaries?
- How about its impact on the locals.

Graphic design

- Is the design in line with what target audience appreciate?
- What would the target audience prefer?

Relevance and Acceptance

- Who are the beneficiaries and have they appreciated the material?
- What is the relevance of the IEC materials in developing Pigeon peas in the area of location?
- Does these materials improve on the functional quality of farmer's information on pigeon peas process?

2. Methodology

The pre-test process planned to engage Pigeon pea Farmers as focus groups and apply the above-mentioned methodology for pre-testing the brochure and botanical spray calendar. It planned to carry out discussions, analysis, correction and application of the IEC materials.

3. Contents

1. The pre-test location was intended to take place in Offaka Sub County and at the Centre where the pilot project of Pigeon Pea is located.

2. IEC materials designed with consent and participation of farmers. Ten farmer group members from Uleppi and another ten farmer groups from Offaka – were to be sampled and merged for pre-testing. Thus a total of twenty farmers from the two project sites were to be sampled for the pre-testing.

3. Gender Balance group was to be taken into consideration. Two groups were to emerge out of the combination from the two farmer groups from Uleppi and Offaka

4. Pre-test materials were planned to be provided to each group member. A group leader and a Secretary would conduct the pre-testing by reading Method while others follow from their copies and plus- minus method applied with the guidance of simple questions sampled above and with a general comment given room.

5. On compilation, the two groups merge together to finally review the materials and come up with final copy as viable and agreed upon.

6. Planned languages to be used were Lugbara, Madi and English

4. Mini Report

The Pre-testing was carried out at Offaka as planned. Thus farmer groups from Uleppi and Offaka respectively were merged and later on divided into two pre-test groups. This group formed focus groups that were given finding questions and directions.

Notably, the preparation of the IEC materials was done earlier on, using participatory approach where the same farmer groups of Uleppi and Offaka were involved.

Hence it was more of pre-testing, analysing and correcting their own IEC materials using Plus- minus reader-based and correction methodology.

The pictures in the IEC materials were of their own plot farm and farmers themselves.

Pre-test

On reviewing the two materials, farmers agreed that the materials prepared were relevant for their use especially the calendar that was a guiding material for IPM.

The calendar was rated as teaching and as well as calendar for following schedule of Pigeon Peas growth and insect pest management. It was rated plus

5. Problems identified.

The problems were identified in the areas of Clarity in language and stylistic structure / Comprehension.

The Pre-testing participants appreciated Madi language, which they referred to as the first IEC material ever produced in local language. They rated it plus with excellence

The pre-test result showed that the beneficiaries can read and understand Madi excellent, English average and Lugbara was rated least in the hierarchy of understanding and readability.

The Pre-test result showed that the languages used were generally simple and user – friendly
However, a number of words of expression were omitted, e.g. “vi”. But corrections were made and justified right thus applicable to the beneficiaries.

The pictures used were relevant taken earlier on, on site in Madi Offaka and Uleppi. The insects and worms were the common ones in the area of the project. The persons were the farmers themselves, which excited them very much.

However, the pre-test result recommended Madi language and English to Lugbara since the users were Madi’s and it was the first exciting IEC material in Madi.

In non --Madi Lugbara occupied areas limited number of Lugbara Version was recommended for production. Madi language took lead.

6. Conclusion

The pre-test was successful and the farmers appreciated the IEC materials. However, the farmers preferred two languages Madi and English to Lugbara.

Similar material could be designed for other areas where pigeon pea is widely grown especially in Terego.

ANNEXES 16 –18

ANNEX 16: Bamaru, J. 2005. Farmers guide to integrated pest management – pigeon peas, and botanical spray calendar. Dissemination output from the IPM adaptive research process **(on CD in electronic version)**

ANNEX 17: Africa 2000Network. 2005. Integrated Pest Management for Groundnut Production: A User Guide. Dissemination output from the IPM adaptive research process **(on CD in electronic version)**

ANNEX 18: Linking project Newsletters #1-6 **(pdf versions on CD in electronic version)**