

CROP PROTECTION PROGRAMME

**Linking the demand for and supply of agricultural information in
Uganda**

R8429 (ZA 0658)

FINAL TECHNICAL REPORT



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Acronyms

AHI	African Highlands Initiative
CBF	Community Based Facilitator
CBO	Community-Based Organisation
CEED	Christian East African and Equatorial Development Trust
CPHP	Crop Post-Harvest Programme (of DFID)
CIAT	Centre Internacional de Agricultura Tropical
COARD	Client-Oriented Agricultural Research and Development
FG	Farmer Group
IARCs	International Agricultural Research Centres
ICRA	International Centre for development-oriented Research in Agriculture (Wageningen / Netherlands)
IFPRI	International Food Policy Research Institute
IITA	International Institute for Tropical Agriculture
INSPIRE	Integrated Soil Productivity Initiative through Research and Education
IPM	Integrated Pest Management
LPP	Livestock Production Programme (of DFID)
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries (of Uganda)
M&E	Monitoring and Evaluation
NAADS	National Agricultural Advisory Services (of Uganda)
NARO	National Agricultural Research Organisation (of Uganda)
NGO	Non-Government Organisation
NRM	Natural Resources Management
MUK	Makerere University Kampala, Uganda
PCC	Parish Coordination Committee (of NAADS)
PDC	Parish Development Council
PPP	Participatory Planning Process (of NAADS)
PSP	Private Service Providers (under NAADS)
R&D	Research and Development
S/C	Sub-county
TD	Technology Development
TOR	Terms of Reference
ULAMP	Uganda Land Management Programme
ZARI	Zonal Agricultural Research Institutes (of NARO)

Executive Summary

This project contributes indirectly to the purposes of *reduced impact of pests and improved quality and yield of crops* (CPP) and *improved survival and productivity of livestock species* (LPP) through: a) developing a strategy for the integration of natural resource management into the activities of farmer groups and local and national service providers, and b) institutionalising an adaptive research process appropriate to the priorities of farmers in Uganda.

Output 1: NRM considerations in the NAADS process

The project supported demand from the National Agricultural Advisory Services (NAADS) for developing a framework for the inclusion of natural resource management considerations in the advisory services process, specifically during enterprise selection stage. The **strategy document** developed builds on the NAADS NRM strategy, and used a consultative approach involving NAADS staff at sub-county, district and secretariat level to identify challenges in the incorporation of NRM considerations, and opportunities in addressing these. The main recommendations were as follows:

1. Capacity development of Community Based Facilitators, Parish Coordination Committees (PCC), farmer fora and NAADS coordinators at sub-county level in NRM
2. Developing PCC as a bridge between NAADS and the wider community
3. Support / guidance to private service providers in NRM
4. Storing / archiving NR related information in appropriate formats at the right level
5. Making better use of existing NRM experiences
6. Inclusion of NRM considerations during the Participatory Planning Process.

These recommendations were not validated in the field during the project, because of the limited time available. However, they received comments and support from NAADS managers at secretariat level, and will support them in decision-making on NRM issues in the future.

Output 2: Adaptive research process

Following discussions with NARO and ICRA, who are the principal partners involved in developing the capacity of the staff of the Zonal Agricultural Research Institutes in Uganda, the project was asked to provide training of trainers involved in the mentoring of stakeholders responsible for the implementation of adaptive research, particularly at Zonal level. The project achieved this through consultations with stakeholders culminating in a Workshop/Training held in November 2005 that involved participants selected by NARO (HQ and ZARIs), NAADS, local government, the African Highlands Initiative, Makerere University and representatives of NAADS farmer groups. The workshop analysed the potential for the adoption of the novel adaptive research process developed and tested by the first phase of the “Linking” project. A set of recommendations was developed by the participants to further integrate the novel adaptive research process (suitably modified) into the regular activities of NARO, NAADS and other stakeholders.

LPP-funded component on goat de-worming

The first phase of the “Linking Project” (R8281) included a component on technology validation. One of these technologies was the use of *Mucuna pruriens* for the deworming of goats.

The extension of the “Linking Project” (R8429) focused on two outputs unrelated to the technologies validated during the first phase. However, one of the project collaborators, Dr Francis Ejobi from Makerere University, submitted a proposal to LPP (Livestock Production Programme) to repeat the trials undertaken during R8281, as results were not conclusive. His proposal was accepted and LPP agreed to fund this component worth GBP 6,800. In order to facilitate the transfer of funds from LPP to Dr Ejobi, it was agreed to add them to the budget of R8429, and for the R8429 project manager in Uganda to disburse funds to Dr Ejobi.

The outputs of this component were not part of the scope of R8429, and there were no resources available for NRI staff inputs. NRI staff organised the visit of Mr Thakur (BAIF India) to Uganda to backstop the trial, and interacted with Dr Ejobi and his team in the field. However, NRI and CPP are not responsible for the quality of this output.

A study was conducted in the district of Arua, Uganda to test the efficacy of trichomes of *Mucuna* species against mixed natural internal parasites of goats in Uganda. The study was carried out under farmer's own conditions of management. A total of 109 goats were recruited to the study, and allocated into three experimental groups, using age and weight as blocking factors. Group 1 (n=40) received *Mucuna* trichomes treatment at a rate of 40mg/kg body weight as a single oral dose, group 2 (n=31) was untreated (positive controls), while the third group (n=38) of goats was treated with Albendazole 10% (Vermiprazol®) at a dosage of 0.5 mls per 10 kg body weight and given orally in as a single dose. The outcomes measured were total faecal eggs per gram counts and weight gains. The faecal samples were collected on days 0, 15 and 21, while the weights in kilograms were recorded on days 0, 14, 28, 42 and 56. The faecal samples were analysed using the modified MacMaster technique. Data were statistically analysed using general linear model (repeated measures) on SPSS® program for windows version 12.0. There was no significant difference in the mean faecal eggs per gram counts between goats that were untreated (positive controls) and those that were treated with *Mucuna* trichomes in the subsequent periods ($p>0.05$). Similarly, no significant difference in mean weight gains was found between consecutive periods ($p>0.05$) in the goats that received *Mucuna* trichomes and those that were untreated (positive controls). It was concluded that the trichomes of the *Mucuna* species used in the study do not have any effect on internal parasites of goats. This major drawback of the study was that species of *Mucuna* used in the study was not *Mucuna pruriens*, as discerned by Mr Thakkur, who was brought over from India to advise on the study. We recommend an up-scaled further study using authentic *M. pruriens* trichomes from India, but under controlled conditions (on-station) in order to not raise further expectations by farmers. Authentic seeds of *M. pruriens* could be imported to Uganda from India and grown for the experiments, and later multiplied for distribution to farmers, if proven to be effective.

Dissemination

Throughout the project Ugandan and UK stakeholders were kept informed of project progress and outcomes through the "Linking" project Newsletter, as well as by the wide circulation of the NRM working paper, visit reports and Workshop proceedings. All dissemination outputs were discussed with main partners (NAADS and NARO) and with wider stakeholders.

Background

This project is an 8-month extension of the project “Linking demand for and supply of agricultural information in Uganda” (R8281). It is designed to address some of the key issues identified from the first phase (Feb 2003 - March 2005). The project partners are NRI, NAADS, NARO, CIAT-Uganda, IITA-Uganda and Reading University. The project was conducted within a period of change, in NARO in particular, which provided a good environment for uptake of the project’s new ideas on adaptive research into its Research 4 Development approach. NAADS has been concerned for some time that NRM issues were being sidelined in the race for productivity and profitability, and specifically asked the project to find ways to overcome this.

Key findings from the **first** phase of the project were:

- A lack of institutional integration and a range of operational limitations in both demand and supply sides of information flows in Uganda, resulted in the project assisting the establishment of a high-level, cross-institutional (NARO/ NAADS/ Makerere/ IARC/ MAAIF/ COARD/ Linking project) Working Group to improve the quality and consistency of research outputs.
- Many CPP/LPP projects do not have “tangible technology” outputs that can easily be delivered to service providers and farmers without considerable translation and additional information, particularly on marketing, input supply, risk analysis and economic benefits.
- The adaptive research processes being used by NAADS/NARO do not provide all the information that farmers need to make decisions about uptake and use of technologies. The project therefore piloted a novel adaptive research process (using technologies from CPP and LPP research project outputs) that identifies and addresses farmer information gaps, and then makes that information available in formats useful to service providers and farmers.
- For two “trail-blazing” NAADS Districts (Arua and Tororo), the farmer-demand assessment process of NAADS was assessed against a range of stakeholder-agreed criteria.
- Private service provision is a key element of the NAADS vision. However, its success depends on the quality of the information provided to farmers. The project studied the number, type, qualifications and information access of service providers in two Districts, and assessed the quality of services delivered.
- All NAADS farmer groups sampled were composed of farmers from more than one wealth category. However, few technologies are adapted to suit the needs of different categories of farmers within the groups, particularly the very poor.

Discussions with the principal partners (NAADS and NARO) resulted in the prioritisation of two issues for the **second** phase of the project:

- a) The integration of natural resource management considerations into the NAADS process;
- b) Assessment of the strengths and weaknesses, replicability and cost-effectiveness of the novel adaptive research process, and the development of recommendations for its incorporation into the Uganda R&D system.

These then became the basis for the two Outcomes of the second phase.

In addition modest funds were secured from the Livestock Production Programme to fund a second trial to test the efficacy of *Mucuna* trichomes (pod hairs) for de-worming of goats under farmer’s conditions in Uganda.

Project Purpose

The CPP Purpose was: “*Promotion of **strategies** to reduce the impact of pests on crops, and improve quality and yield, for the benefit of poor people*”, while the LPP Purpose was: “*New technologies and **strategies** developed to improve survival and productivity of livestock species in high potential production systems, promoted and disseminated*”.

Output 1 (*Recommendations developed and validated in collaboration with NAADS to modify current demand processes so that natural resources management issues are more fully considered by farmer groups at enterprise selection stage and when terms of reference for extension services are drawn up*) contributes to these purposes by improving the capacity of farmers, NGOs and service providers to evaluate natural resource management issues in their farming systems and communities – including the impacts of pests and diseases on crops and livestock – but also the results of NR abuses on the health of the whole ecosystem and the social and economic situation of communities.

Output 2 (*The strengths and weaknesses, replicability and cost-effectiveness of the adaptive research and development process piloted by the first phase of the Linking project are externally assessed by NARO, MUK and NAADS staff, and recommendations developed for its incorporation into the Uganda R&D system*) contributes to the purposes by improving the capacity of those involved in adaptive research to develop locally-relevant technologies (including crop production and livestock production technologies) with a team of stakeholders, and to provide dissemination materials that respond to the needs of intermediary and end users.

Research Activities

Research activities for both Outputs were conducted with a wide range of Ugandan institutions representing the breadth of the National Agricultural Research and Innovation System, as well as with the locally-based international stakeholders CIAT and IITA. In each case it was the intention to raise understanding of these areas jointly with Ugandan partners, and to provide practical recommendations that can be incorporated into current and emerging systems.

Activities undertaken to achieve Output 1:

This output was identified in response to findings during the first phase of the Linking Project, which indicated that natural resource management considerations are currently not adequately addressed during the NAADS process (see William Draa’s MSc thesis – output one of the predecessor project).

In order to validate the findings from Mr Draa’s thesis research, and to gain a better understanding of specific NRM issues experienced by farmers in NAADS groups, checklist-guided discussions with farmer groups and other stakeholders at sub-county and district level were carried out in Arua and Tororo. People interviewed included private service providers, who are meant to play a key role in raising awareness of sustainable farming methods.

The information collected in the field fed into a desk study undertaken by NRI staff to assess the extent to which NRM considerations are taken into account during the different stages of the NAADS process, in particular during farmer demand assessment and enterprise selection. The study (see Annex One) was circulated to stakeholders in Uganda, and comments were received and incorporated into a strategy paper to guide NAADS and donors in ways of addressing NRM considerations in the NAADS process (see Annex Two). The Ugandan NAADS NRM advisor was closely involved in the development of the strategy document.

Originally, it was intended to test recommendations developed from this study in selected NAADS sub-counties. However, the time available for this was considered by all stakeholders to be too short. Documentation of the lessons learnt was done via the project newsletters, and is still ongoing.

Activities undertaken to achieve Output 2

This Output was designed to initiate the process of institutionalisation of the adaptive research and development process that was piloted by the first phase of the project.

Following discussions with NARO and ICRA, who are the principal partners involved in developing the capacity of the staff of the Zonal Agricultural Research Institutes, the project was asked to provide training of trainers involved in the mentoring of stakeholders involved in the implementation of adaptive research, particularly at Zonal level.

The project achieved this through consultations with stakeholders culminating in a Workshop held in November 2005 that involved participants selected by NARO (HQ and ZARIs), NAADS, local government, the African Highlands Initiative and representatives of NAADS farmer groups.

In addition modest funds were secured from the Livestock Production Programme to fund a second trial to test the efficacy of *Mucuna* trichomes (pod hairs) for de-worming of goats under farmer's conditions in Uganda.

Outputs

Project Outputs

Output 1: *Recommendations developed and validated in collaboration with NAADS to modify current demand processes so that natural resources management issues are more fully considered by farmer groups at enterprise selection stage and when terms of reference for extension services are drawn up.*

The rationale of this output was to assist NAADS in improving the farmer demand assessment process, in order to ensure that enterprises selected are making best use of the existing natural resource base, while sustaining or even enhancing it. As a second stage, advisory services on enterprises thus selected need to explicitly address NRM opportunities and constraints.

An analysis of the NAADS NRM strategy showed that the expected outcomes are currently not being addressed effectively, because of a number of challenges. Some of these are internal to NAADS and can be addressed through modified guidelines, but most relate to the capacity of stakeholders at the various levels, including farmer groups and fora, parish development and coordination committees, service providers, sub-county and district staff. Table 1 shows the outcomes and related challenges.

Table 1 Challenges in achieving NAADS NRM Strategy outcomes

Outcomes	Challenges identified
1. Different types of farmers have equitable opportunities to form, join and sustain farmers groups	<ul style="list-style-type: none">• In NAADS sub-counties, less than 40% of farmers are members of farmer groups. This makes it difficult for NAADS institutions to address NRM issues that are caused by and affect the whole community (e.g. deforestation, encroachment of wetlands, soil erosion)• The Parish Coordination Committees (PCC) represent only those farmers who are members in NAADS groups
2. Effective, inclusive, transparent and accountable farmer institutions are in place.	<ul style="list-style-type: none">• Institutions are in place, but not skilled and experienced in addressing NRM issues. Community-based facilitators (CBFs) and PCCs are yet to be trained.

Outcomes	Challenges identified
3. Farmers are knowledgeable about natural resource issues in relation to NAADS	<ul style="list-style-type: none"> • The IFPRI survey indicates that this outcome has not been achieved.
4. Farmers have effective access to and understanding of information about the economics, alternatives and markets for sustainable natural resource management in agriculture.	<ul style="list-style-type: none"> • This is a direct consequence of shortcomings in achieving outcome 8, 9 and 11. • The PPP does not consider NRM as a criterion for selection, and gives preference to enterprises that yield quick returns
5. Farmers are able to demand for agricultural advisory services on sustainable natural resource management	<ul style="list-style-type: none"> • Currently the Participatory Planning Process (PPP) results in the selection of an enterprise. NRM topics are generally not commissioned as service contracts or included as component parts of the enterprise contracts. • No situation analysis is undertaken during the PPP.
6. Sub-county and district NAADS work plans are integrated with priorities and plans for environmental and natural resource management.	<ul style="list-style-type: none"> • This integration does not happen at sub-county or parish level due to weak institutions and lack of knowledge about NRM issues (many Parish Development Councils – PDCs - are not active) • Lack of proper situation analysis and needs assessment makes it difficult to identify NR issues that should be integrated in the workplans
7. Contracts for agricultural advisory services address sustainable natural resource management issues.	<ul style="list-style-type: none"> • The TOR might include NRM, but in practice contracts rarely address wider NRM issues or alternative production technologies. • The TORs are not sufficiently specific for addressing the prevailing NRM issues
8. Agricultural advisory service providers have capacity to provide quality services related to sustainable natural resource management	<ul style="list-style-type: none"> • Most service providers do not have the capacity to provide such services. This brings to question their suitability to implement these contracts successfully
9. Agricultural service providers have effective access to and understanding of information about the economics, alternatives and markets for sustainable natural resource management in agriculture.	<ul style="list-style-type: none"> • Up-to-date sources of information on NRM that are accessible and affordable for private service providers are limited. • Even where such knowledge exists, the amount of funding for demonstrations within service contracts, and the length of time of those contracts limits the demonstration of good NRM practices.
11. Sufficient quality and quantity of private agricultural advisory service providers exist to meet demand for natural resource advisory service needs.	<ul style="list-style-type: none"> • The quality and quantity of private service providers (PSPs) with the required skills, knowledge, experience and attitude is inadequate.
15. Activities carried out by other organisations related to natural resource issues in agricultural advisory services are harmonised with NAADS activities	<ul style="list-style-type: none"> • There does not appear to be a clear policy and practice of integrating existing NRM expertise of farmers and other stakeholders, and of utilising existing project sites for demonstrations and learning (e.g. ULAMP, NGOs, AHI). Although cross visits between villages and even between Districts takes place on an informal basis, this is not coordinated or integrated into a formal programme by NAADS.
16. NAADS effectively monitors and evaluates its impact on sustainable natural resource management.	<ul style="list-style-type: none"> • This information does not appear to be collected and assessed systematically.

The project identified six intervention options (see Annex two for details), which are complementary and would together contribute to a more sustainable approach to farming, while maintaining an emphasis on commercialisation.

1. Capacity development of CBFs, PCC, farmer fora and NAADS coordinators at sub-county level in NRM.

While some expertise is available within the NAADS system (e.g. district or sub-county coordinators with a general knowledge and some experiences in NRM through previous jobs), most of the implementers of the NAADS process within the district are not in a good position to ensure an integration of NRM considerations into the process. They require targeted training, exposure visits/field trips and ongoing support (e.g. in the form of mentors, similar to NARO Outreach programme), in order to develop their understanding of NRM and to equip them with practical tools, skills and methods to assess both the impact of enterprises on the natural resource base, and the potential for enterprises based on an assessment of the NR base. Projects such as INSPIRE and AHI can play a role in this.

Table 2 Roles and responsibilities for NRM at different levels

Level	Current responsibilities	Additional potential role
Individual farming household	Farm in an environmentally responsible and sustainable manner	<ul style="list-style-type: none"> • Adapt NRM technologies • Monitor impact of NRM technologies on farm level
Village	Enforce local by-laws	<ul style="list-style-type: none"> • Undertake situation analysis of NR base • Make village by-laws for protection and or proper utilization of NRs bases.
LC1	Enforce local by-laws, village development plans	<ul style="list-style-type: none"> • Sensitize community members on NRM
Farmer group	Enable farmers to access advisory services on sustainable agriculture	<ul style="list-style-type: none"> • Support members in adoption of NRM technologies (social capital) • Monitor adoption and impact of NRM • Insist PSPs deliver NRM advice as per their contract
Group-based facilitator	‘To advise on the integration of cross-cutting issues in group activities and processes’, including NRM	<ul style="list-style-type: none"> • Train farmer groups in integrated NRM
Parish Development Committee	Agreement on and enforcement of local by-laws, contribute to parish development plan	<ul style="list-style-type: none"> • Sensitize community • Monitor implementation process
Secretary for production and environment (within PDC)	Intervene if local by-laws are not followed or NR challenges occur	<ul style="list-style-type: none"> • Spearhead integration of NRM
Parish Coordinating Committee	M&E of group activities (including NRM?)	<ul style="list-style-type: none"> • Link FGs with SPs, NGOs and sub-county technical team
LC2	Parish development plan	
Sub-county farmer forum	Ensure service contracts address NRM issues	<ul style="list-style-type: none"> • Sensitize FGs and promote integration of NRM
Sub-county procurement committee		<ul style="list-style-type: none"> • Development of TORs • Selection of suitable SPs
Sub-county	Support farmer fora in evaluating	<ul style="list-style-type: none"> • Guide development of TORs

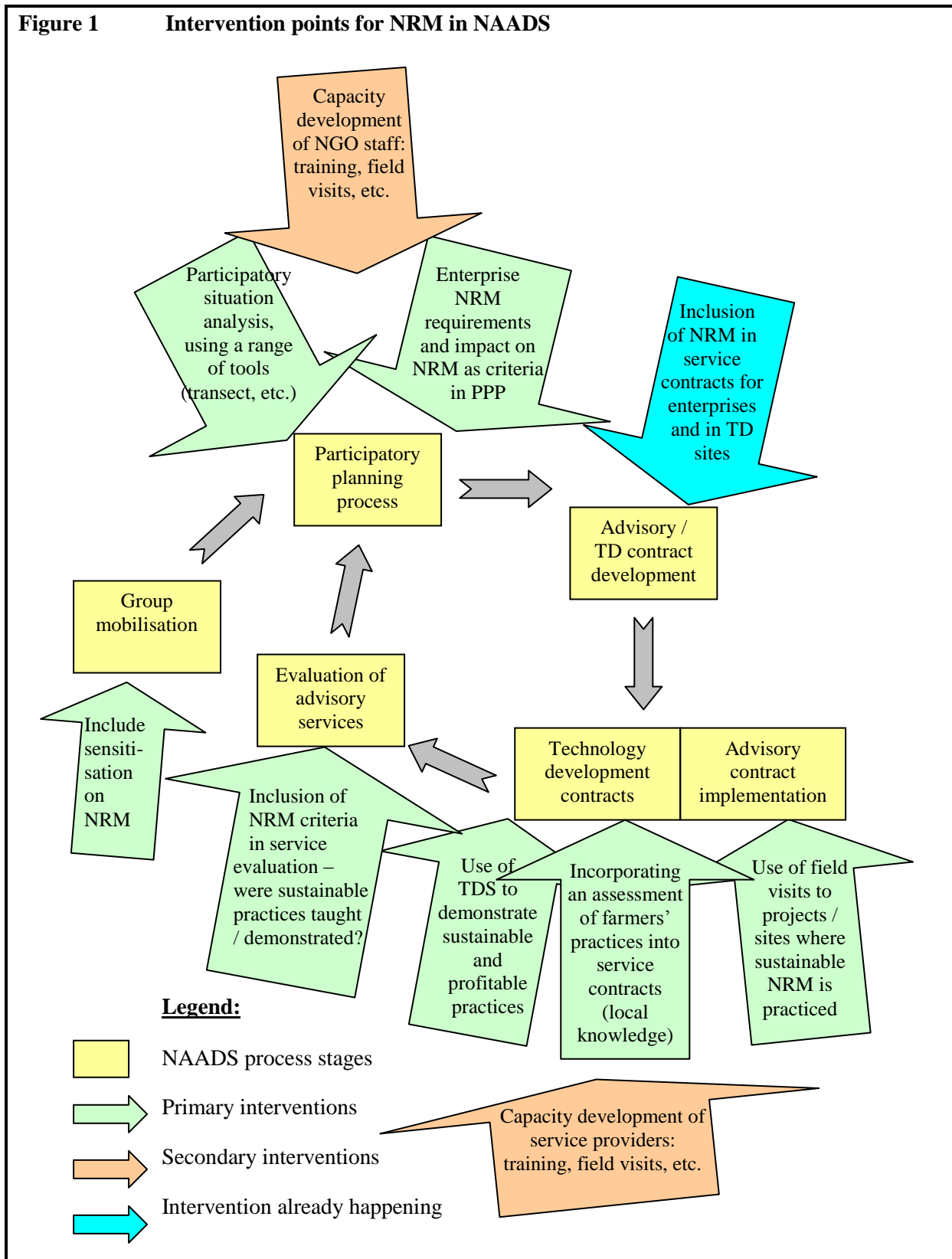
Level	Current responsibilities	Additional potential role
NAADS coordinator	and commissioning service contracts that address NRM constraints and opportunities	
Sub-county secretary for production and environment	Responsible for supervision of NRM integration	<ul style="list-style-type: none"> • Monitoring of agricultural development and marketing activities • Promote harmonized approach to NRM among different projects, NGOs etc operating in the sub-county
Sub-county subject-matter specialists	Advice on inclusion of specific NRM issues in service contracts	<ul style="list-style-type: none"> • Quality assurance and participatory M&E
LC3	Sub-county development plan	<ul style="list-style-type: none"> • Spearhead integration of NRM through political support
District NAADS coordinator	Ensuring a balance between NRM and production considerations	<ul style="list-style-type: none"> • Identify suitable PSPs • Supervises NRM the integration process
District farmer forum	Ensure service contracts address NRM issues	<ul style="list-style-type: none"> • Ensure exchange of information with existing NRM projects and programmes at district level
District Environmental officer	Advice the district on all matters relating to NRM	<ul style="list-style-type: none"> • Support NAADS coordinator in ways of addressing NRM issues in service contracts
District Production Coordinator	Ensuring holistic and integrated approach of NRM by key stakeholders and institution.	<ul style="list-style-type: none"> • Supervise NRM integration process
District Forestry Officer	Ensure sustainable utilisation of forest resources in the district Enforce national level conservation policies	<ul style="list-style-type: none"> • Spear head and advice on integration of Agroforestry practices and technologies.
LC5	District development plan	
NGOs involved in the NAADS participatory planning process	Guide farmers in selecting profitable enterprises	<ul style="list-style-type: none"> • Guide farmers in undertaking an assessment of the environmental challenges and opportunities in their area
Other NGOs Churches Projects and programmes	Support government agencies, CBOs and other stakeholders in NRM / sustainable agriculture; training and capacity development Initiate environmental activities (e.g. planting trees, soil conservation)	<ul style="list-style-type: none"> • Capacity development of private service providers and farmer groups • Providing training materials and publications for district resource centres
NEMA	Enforce government regulations on NRM	<ul style="list-style-type: none"> • Provide guidance on integration of NRM by different sectors
Line ministries at national level	Develop national level policies on NRM	<ul style="list-style-type: none"> • Promote NRM in respective line ministries.

2. Developing PCC as a bridge between NAADS and the wider community

Currently only about 40% of farmers in NAADS sub-counties are members of NAADS groups. The remaining 60% are not represented in the PCC, unless the LC1 and LCII chairperson are on the committee (this is currently optional). In addition, the TOR of the PCC currently do not contain specific responsibilities in terms of NRM. Creating a new committee at the village level through the

PCC has missed an opportunity to use the existing PDC to ensure all the community is involved in understanding NRM issues and in the protection and improved management of natural resources. The PDC should be the body to play the key role in promoting and lobbying for crosscutting, trans-boundary NRM considerations.

Figure 1 Intervention points for NRM in NAADS



3. Support / guidance to private service providers in NRM.

The procurement committee at sub-county level evaluates tenders and are meant to assess whether service providers have the skills, knowledge and experiences to fulfil the terms of reference of their contracts. NAADS policy has been to screen service providers at the contract awarding stage, and not to engage in direct capacity development of these private entrepreneurs. This is in line with the overall paradigm of NAADS, which assumes that the demand created through the NAADS process will led to efficient and equipped service providers to compete for contracts. However, service providers need clearer guidelines on NRM integration, access to good quality publications and materials on relevant NRM issues, and participatory monitoring and evaluation through the PCC and the sub-County and District NAADS coordinators.

4. Storing / archiving NR related information in appropriate formats at the right level.

To support service providers and decision makers at district, sub-county and parish level, information about NRM needs to be available and accessible to them. District resource centers are being developed, and have the potential to stock publications and training materials on NRM. However, location specific information needs to be kept at the sub-county level, to include records of previous situation analyses.

5. Making better use of existing NRM experiences.

There have been a range of programs and projects in Uganda that addressed NR constraints by developing, testing and validating NRM measures, including INSPIRE, AHI, CEED and others. Some of these also looked at the institutional requirements for effectively addressing NR constraints. It would be useful to develop a strategy that promotes systematically learning from these experiences, for the benefit of NAADS. This could possibly be initiated by commissioning a review of what has been done by and learned in these various programmes and projects. The review could be followed by a series of workshops for the people and institutions identified in Table 2, who are responsible for ensuring that NRM gets its proper focus in NAADS processes. At the district level, active linkages between service providers, farmer forum members and project staff (or, in case projects have ended, farmers involved in them) should be encouraged, e.g. through study tours to (former) project sites.

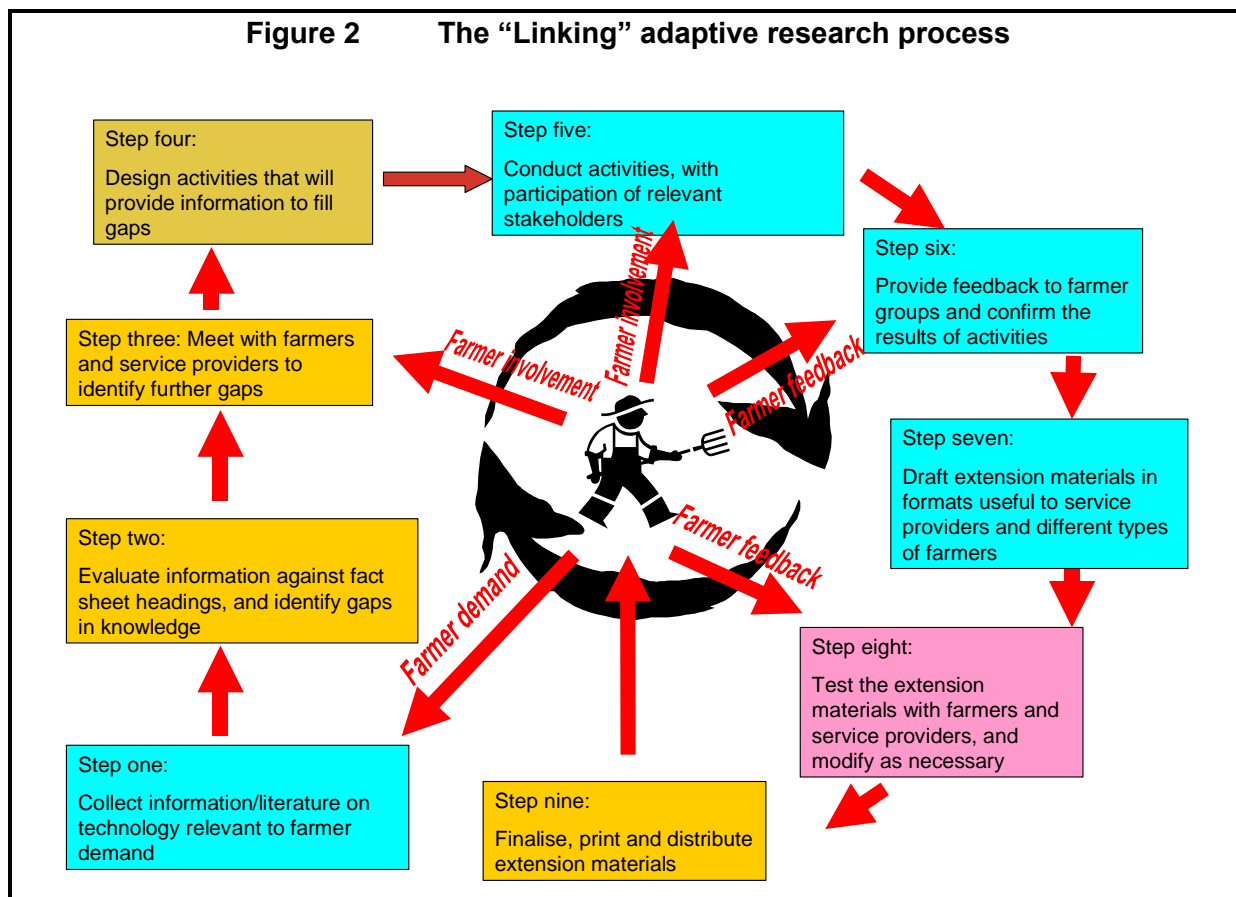
6. Inclusion of NRM considerations during PPP.

The participatory planning process currently does not consider NRM specifically – it is only indirectly included by considering risk (which includes both production and marketing risk). Simple, easy to use tools need to be developed to enable NGOs and farmer groups to undertake a situation analysis of NR problems and opportunities in their location. Based on the ULAMP experience, such tools could include community meetings, transect walks and community mapping. However, these will definitely increase the duration of the PPP and will require adequate facilitation and analytical skills of NGO staff and group based facilitators (see point 1). Considering that the PPP is the ‘back bone’ of the NAADS process, it appears justified to spend resources on ‘getting things right’ at this early stage. NAADS would need to make a commitment to the PPP and ensure that resources are available for a more inclusive process that considers technical, economic, social and environmental considerations.

Output 2: *The strengths and weaknesses, replicability and cost-effectiveness of the adaptive research and development process piloted by the first phase of the Linking project are externally assessed by NARO, MUK and NAADS staff, and recommendations developed for its incorporation into the Uganda R&D system.*

This Output was designed to initiate the process of institutionalisation of the adaptive research and development process that was piloted by the first phase of the project (see Figure 2).

Figure 2 The “Linking” adaptive research process



The adaptive research process was piloted in the first phase of the project by three (Ugandan) research teams using IPM of groundnut and pigeon pea, draught animal power and the de-worming of goats as the test technologies. The process was documented by its implementing teams, and dissemination materials were developed by two of the teams. The technical results from the third team (goat de-worming) were not conclusive enough to be disseminated, and the trials are currently being repeated with modifications designed to improve the likelihood of achieving significant differences between treatments as assessed by researchers and farmers.

The novel adaptive research process was found to be relevant to Ugandan conditions, and it was thought that it could form the basis for adaptive research for organisations involved in the development of technologies relevant to smallholder farmers. Following discussions with NARO and ICRA, who are the principal partners involved in developing the capacity of the staff of the Zonal Agricultural Research Institutes, the project was asked to provide training of trainers involved in the mentoring of stakeholders involved in the implementation of adaptive research, particularly at Zonal level.

The project achieved this through consultations with stakeholders culminating in a Workshop held in November 2005.

The overall objectives of the workshop were to:

- a) explore relevant approaches to adaptive research in Uganda;
- b) validate the adaptive research process piloted by the Linking project, and
- c) develop recommendations for the implementation and institutionalisation of the process within the Ugandan Agricultural Research and Innovation System.

The 21 participants came from diverse practitioner organisations: NARO (Secretariat and ZARIs), NAADS, Local Government, Makerere University, NGOs and the African Highlands Initiative. Two farmers from Tororo also participated. The workshop was facilitated by “Linking” project staff.

The workshop started by attempting to characterise adaptive research. The key concepts that emerged were that adaptive research is:

- Participatory testing of existing technology for local fit; adjustment of technology for specific circumstances; provision of technology that is relevant, responsive to people’s needs, and improves their livelihoods. The process should be a partnership between end users (farmers, processors, traders), intermediate users (service providers), researchers and the private sector. It should also be inter-disciplinary, based on an action-reflection cycle, usually demand-driven and decentralised, and involve situation analysis, on-farm research, on-station research, surveys and monitored demonstrations.

Participants were asked to discuss how they carry out adaptive research in their work. They recorded that:

- **Demand** is identified through situation analysis, using stakeholder consultations / stakeholder workshops and surveys (farming systems and livelihoods analysis, agro-ecosystem analysis), through government policies and initiatives – often donor-driven - , through the NAADS demand identification process (which is sometimes in conflict with that of NARO), and through self interest and organisational mandates.

Information for developing adaptive research activities comes from primary sources, such as:

- Situation analysis, discussion with key informants, agricultural shows and study tours, networking, secondary information from Production Department reports on demography and production statistics, district profiles, NGO / CBO / farmer group reports, journals and the media.

It was clear that adaptive research is not limited to bio-physical processes, but also considers:

- Markets, social and cultural aspects, infrastructure, relevance, acceptability, affordability, costs and benefits, access to inputs, environmental impacts and policy, influences and impacts, opportunities for value addition, existing knowledge about this technology in the community and risks (market risk, production risk and environmental risk).

Participation is a key concept in adaptive research, including at the planning, implementation and monitoring and evaluation stages of the process. It is important to validate technologies to provide input and management regimes that are suitable for commercial **and** resource-poor farmers.

Participants acknowledged a general skills and systems weakness in the area of documentation, sharing and dissemination of the results from adaptive research.

The novel adaptive research process piloted by the Linking project was discussed, and three case studies of the use of the adaptive research process were presented:

- Dr Francis Ejobi: De-worming of goats with *Mucuna* in Tororo and Arua
- Dominic Olege: Draught Animal Power adaptive research team, Tororo
- Barbara Adolph (for Africa 2000 Network): IPM for groundnut production

These were then analysed to learn lessons from the experience of the case studies, with specific reference to:

- a) Which stakeholders were involved, and which ones were left out;
- b) The good points and bad points for each of the 9 steps;
- c) The constraints faced in achieving the objectives, and
- d) The outcomes of the process (tangible and non-tangible)?

The constraints were then discussed to find potential solutions.

Florence Oumo presented the experiences of the national inter-institutional working group for improving the quality of research dissemination materials. This working group has adopted the check list of headings for dissemination materials developed in collaboration between COARD and the Linking Project. A CPHP-funded (Crop post-harvest programme of DFID) research project recently explored the feasibility of a market place for agricultural information in Uganda. The project involves Africa 2000 Network (Paul Nyende), and findings can be found at www.mpaisuganda.com.

Participants then brainstormed the question: “What are the elements of the institutional environment that need to be in place for the adaptive research process to work?” The responses were clustered into 9 groups:

- Effective communication;
- Mind-set;
- Partnerships;
- Recognition of performance;
- Expertise;
- Financial resources;
- Facilities and transport;
- Monitoring and evaluation; and
- Clear, non-contradicting policies.

These were discussed and expanded in groups.

Participants with expertise on the Competitive Research Fund spoke about the National and Zonal Competitive Research Funds. The latter will be piloted in Abi (West Nile), Kachekwano and Serere. 3 broad priorities have been identified for each pilot zone, and it is expected that adaptive research will be appropriate for research under the Zonal Fund.

The importance of **socio-economic differentiation** of farmers as clients for the outputs of adaptive research was stressed. Wealth grouping was illustrated as one tool for differentiating farmers. Generally, researchers do not undertake such socio-economic differentiations systematically – perhaps because of a lack of skills to do it. Extension staff / service providers also tend to present only one solution to farmers’ constraints, even though that solution might not be appropriate for resource-poor farmers.

A session was held to explore the objectives for adaptive research of two contrasting research scenarios in Uganda, and to assess how the novel Adaptive Research Process can be adapted to the needs of: a) research under the zonal competitive research grant, and b) under the NAADS technology development sites. Under the former it would be necessary to modify the adaptive research process to: i) identify zonal priorities; ii) archive results such that they could be easily accessed by interested stakeholders; iii) simplify the process by combining some of the steps, and iv) integrate M&E into all steps. Under the technology development sites the process would need modification at the start to do wealth ranking, social and economic analysis and stakeholder analysis.

The **recommendations** arising from the workshop are given in detail in the full proceedings, and in summary in Box 1:

**Box 1 Recommendations for adaptive research arising from a multi-stakeholder workshop
November 2005, Kampala**

- The adaptive research process should be adopted by NARO, NAADS and partners, but adapted to specific objectives and conditions
- Adaptive research, basic research and extension services should work together harmoniously to produce technologies relevant to the agreed needs and carefully analysed situations of Ugandan farmers
- The adaptive research programme should have flexibility to follow up secondary constraints and opportunities
- There is a need to enhance institutional memory – all projects and organisations must ensure that the research outputs they produce are documented, archived and easily accessible to interested stakeholders
- NARO and other organisations should train its staff in communication skills to better equip them to communicate research outputs to intermediate and end users
- Extension materials need to be quality controlled. A mechanism for this was proposed by the Working Group and needs to be followed up.
- AR includes studies on marketing, social, economic, environmental and policy issues as well as bio-physical ones. This requires expertise across a wide range of non-traditional disciplines
- Stakeholder analysis, identification of partners, partnership building, M&E and reflection and learning all need to be part of the adaptive research process, and resources need to be allocated for this
- Capacity building of partners can go hand in hand with adaptive research so as to decentralise research capacity and technical expertise
- Adaptive research should use tools and methods to differentiate needs on social and economic grounds, and produce technologies relevant to men and women farmers with differing access to assets.

Output of the additional trial on the efficacy of *Mucuna trichomes* for the control of worms in goats

The study was conducted in the district of Arua, Uganda. The main objective was to test the efficacy of trichomes of *Mucuna* species against mixed natural internal parasites of goats in Uganda. The study was carried out under farmer's own conditions of management. This might well have been the wrong decision, because the experiments showed that the treatment was not effective, possibly because of using a different species of *Mucuna* than the one used in India. Subsequent experiments should first be done on-station, under controlled conditions, before taking the treatment to farmers.

A total of 109 goats were recruited to the study. The goats were allocated into three experimental groups, using age and weight as blocking factors. Group 1 (n=40) received *Mucuna trichomes* treatment at a rate of 40mg/kg body weight as a single oral dose, group 2 (n=31) was untreated (positive controls), while the third group (n=38) of goats was treated with Albendazole 10% (Vermiprazol®) at a dosage of 0.5 mls per 10 kg body weight and given orally in as a single dose. The outcomes measured were total faecal eggs per gram counts and weight gains. The faecal samples were collected on days 0, 15 and 21, while the weights in kilograms were recorded on days 0, 14, 28, 42 and 56. The faecal samples were analysed using the modified MacMaster technique. Data were statistically analysed using general linear model (repeated measures) on SPSS® program for windows version 12.0.

There was no significant difference in the mean faecal eggs per gram counts between goats that were untreated (positive controls) and those that were treated with *Mucuna trichomes* in the subsequent periods ($p>0.05$). Similarly, no significant difference in mean weight gains was found between consecutive periods ($p>0.05$) in the goats that received *Mucuna trichomes* and those that were untreated (positive controls).

We conclude that the trichomes of the *Mucuna* species used in the study do not have any effect on internal parasites of goats. This major drawback of the study was that species of *Mucuna* used in the study was not *Mucuna pruriens*, as discerned by Mr Thakkur, who was brought over from India to advise on the study. We recommend an up-scaled further study using authentic *M. pruriens* trichomes from India, but under controlled (on-station) conditions to test their effectiveness. Authentic seeds of *M. pruriens* could be imported to Uganda from India and grown for the experiments, and later multiplied for distribution to farmers, if shown to be effective.

Contribution of Outputs to developmental impact

Contribution of Output 1:

Output 1: *Recommendations developed and validated in collaboration with NAADS to modify current demand processes so that natural resources management issues are more fully considered by farmer groups at enterprise selection stage and when terms of reference for extension services are drawn up.*

The Output was partially achieved – recommendations were developed in consultation with stakeholders (including NAADS), but their validation was not feasible within the time available. Agreeing on modifications to NAADS guidelines is a long-term process, which requires substantial debate in-country and with donors. It was not possible to go through this process within a few months, in particular as senior NAADS staff were preoccupied with the preparations for the NAADS mid-term review in May/ June 2005.

However, the strategy document produced with NAADS is the first step in addressing some of the shortcomings of the enterprise-based approach to advisory services and developing an integrated approach to NRM as an integral part of the NAADS process – from demand assessment through to the monitoring and evaluation of advisory services.

Currently NAADS covers 37 districts (see <http://www.naads.or.ug/districts.php>), and continues to expand. It is anticipated that the whole country will be covered by the programme within the next five years. Therefore it is very important that NAADS continues to reflect and learn from experiences – both own experiences, filtered upwards via the district coordinators, and experiences of other initiatives and projects in Uganda and elsewhere. Supporting this learning is an important developmental activity with a potentially high return, because of the sheer extent of the programme. Even if NAADS does not immediately take up all the opportunities outlined in the strategy document because of insufficient human and financial resources, the document and the process leading to its development (extensive consultations with NAADS staff at sub-county, district and secretariat level) have influenced the way NAADS thinks about NRM, and has triggered a keen interest in developing sustainable systems for capacity development of stakeholders at all levels – perhaps most importantly of PSPs.

Contribution of Output 2

Output 2: *The strengths and weaknesses, replicability and cost-effectiveness of the adaptive research and development process piloted by the first phase of the Linking project are externally assessed by NARO, MUK and NAADS staff, and recommendations developed for its incorporation into the Uganda R&D system.*

The Output was substantially achieved, although the cost effectiveness of the novel adaptive research process was not assessed.

Weaknesses in the present adaptive research processes of NARO have traditionally included an overly technical focus giving little attention to input supplies, markets, social organisational factors, risk and disadvantages of the technologies under test. In addition, adaptive research activities have not been well documented, and have rarely led to dissemination materials that are relevant to the needs of different types of users (including public and private service providers and different types of farmers). The alternative adaptive research approach piloted by the project, and analysed by Ugandan NARIS organisations, overcomes many of these constraints, and was endorsed, with modifications, by a multi-stakeholder workshop facilitated by the project. The Head of Outreach at NARO (Dr Emily Twinamasiko) fully supports the use of the approach in the recently strengthened Zonal Agricultural Research Institutes.

An 8-month project such as this one cannot hope to fully institutionalise new processes into even a dynamic organisation such as NARO. However there are good indications that this initiative has come at a propitious time, when the leadership and the field staff of NARO are particularly receptive to ideas that will lead to more effective Research For Development.

There is less immediate optimism about the use of the adaptive research process by NAADS, even though they have the potential to do so using the large number of Technology Development Sites that are sited in most parishes of NAADS sub-counties. At present, the Technology Development Sites are used for seed multiplication and demonstrations. A small shift away from service provider-led demonstrations to simple joint service provider/farmer-group trials would increase the ownership of farmer groups in the outcomes, and provide good comparisons to stimulate the consideration of optional inputs or husbandry techniques. The NAADS guidelines on the use of Technology Development Sites support their use for adaptive research. Further work is however needed before their routine use in local validation and documentation of options becomes a reality.

List of publications:

- Adolph, B; Pound, B. and Manzi, J. (June 2005) Working document on Integrating Natural Resources Management considerations into the NAADS participatory planning process – review of status quo and proposed Linking Project activities. CPP Project R8281, NRI project A1164
- Adolph, B. with inputs from Barry Pound, Rob Delve, Anthony Nyakuni, Jovia Manzi, Chris Garforth, Hugh Bagnall-Oakeley and James Legg (January 2005) Strengthening Natural Resource Management in NAADS: A strategy document.
- Linking project Newsletters editions 7, 8, and 9 sent to Ugandan and UK stakeholders (also on the NAADS website)
- Visit reports of NRI staff to Uganda from April, July, September and November 2005
- Proceedings of the workshop on Adaptive Agricultural Research in Uganda. Organised by the NAADS / NARO/ NRI / CPP / LPP research project: “*Linking demand for and supply of agricultural information in Uganda*”; UWEAL Building, Plot 38, Lumumba Avenue, Kampala 17th - 19th November 2005
- Efficacy of Trichomes of *Mucuna species* against Natural Mixed Infections of Internal Parasites in Goats in Uganda. A Report by Dr Francis Ejobi, Team Leader, Goat Deworming Project; Faculty of Veterinary Medicine, Makerere University, P.O Box 7062 Kampala, Uganda

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N/A