

## Research-extension-farmer linkages

*Mr. F.A. Ojacor*

Associate Director (RELU)  
P.O Box 295, Entebbe, Uganda

### Abstract

Efforts to promote linkages between research and extension can probably be traced back to the 1920s when the research stations were established. Serere and Bukalasa trained chiefs and agricultural ox instructors while veterinary education started under the umbrella of the research division as part of disease control measures. By 1958 veterinary research officers still worked as field extension officers to introduce the results of research into the field. The past efforts to promote linkages included such joint activities as experimental committee meetings, field days, field trials, extension training, field surveys, diagnostic work to support field services and production of fish fry. In a move to restructure agricultural research and extension services, Government in 1990 set up a number of working groups, two of which were charged with the role of articulating the most appropriate research and extension systems for Uganda. Following the recommendations of these working groups, national agricultural research and extension strategies and plans were adopted by Government. This resulted in the creation of NARO and implementation of the national agricultural extension programme. These strategies emphasized the need for strong research-extension-farmer linkages. The linkages which were adopted are operationalised through such joint activities as technical and seasonal planning workshops, joint field visits, diagnostic surveys, training, technical publications, on-farm research, agricultural shows, field days and outreach programme. Following decentralization of extension services and restructuring of MAAIF, the agricultural extension function is now shared among the District Administrations, MAAIF Directorates of Crop and Animal Resources and NARO. NARO is responsible for disseminating the technologies it generates to districts and promoting linkages with them. This calls for strengthening of the technology delivery system through expansion of outreach activities. A number of selected District Farm institutes will be rehabilitated and developed into zonal adaptive research and outreach centres each to serve a specified number of districts. Each centre will undertake such activities as: dissemination of technical information to the districts, adaptive research and on-farm demonstrations, training of extension staff and farmers, production of foundation seed, planting material, stock and fish species. Achievements made on various joint activities implemented by the unit include: production of some 80 brochures and leaflets both at NAROSEC and institutes, monthly production of 1800 copies of NARO bulletin, 1000 copies of Uganda Journal of Agricultural Sciences per issue, technical and seasonal workshops have been regularised and during 1995 and 1996 a total of 2889 farmers and 1031 extension staff were trained. Holding of field days at institutes has been regularised and NARO actively participates in national agricultural shows. Diagnostic surveys are now regularly conducted and all technologies before release are on-farm tested to ensure relevance and acceptability by end-users. Emphasis will be put on promotion of extension staff training so as to impart appropriate skills, consolidating outreach programme and intensifying on-farm research, demonstrations and promoting farmer-based seed production.

**Key words:** Research, extension, farmer, linkage.

### Introduction

Efforts to promote linkages between research and extension can probably be traced back to the establishment of Bukalasa and Serere experimental stations in the 1920s and a bacteriological department for both veterinary and medical research work in 1922. Serere and Bukalasa experimental stations conducted 3 months training for chiefs and agricultural ox instructors. The training was further extended to other stations, district variety trial centres and ox-units. In the 1950s Serere Research station also played a great role in offering one year practical training to Makerere University College Faculty of Agriculture students.

On the other hand work on disease investigation and control was administered by veterinary research workers before a separate administration was established in 1925.

At the same time veterinary education started in 1926 under the umbrella of the research division as part of disease control measures.

In the case of forestry, the Forest research section has been in existence since 1947 and was responsible for setting up research plots, collection of data, analysis and writing up of research results. However, formal forest management in Uganda started initially as research, then later timber and rubber production.

### Past efforts to promote Research-Extension-Farmer Linkages

Following a widespread outbreak of rinderpest which covered the whole country between 1928 and 1930, the entire research officers went into the field to combat the disease. Consequently the research laboratory was closed during this period and "field" laboratories were established

for anti-rinderpest serum production. Even during the period 1933-1958 the veterinary research officers worked as field extension officers to introduce the results of research into the field.

In order to correlate the activities of various experiment stations in the crop sub-sector an experimental committee was also established in the fifties. The committee was made up of four regional officers, the officers-in-charge of Kawanda and Serere and heads of sections and met under the Chairmanship of the Chief Agricultural Research Officer.

The Chief Research officer of the Veterinary department, the Director of the Cotton Research station, Namulonge, and the Professor of Agriculture at Makerere University College were also invited to the committee meetings. In this way a clear-cut programme of work for the following year was drawn up and agreed at these annual meetings. The cotton and coffee advisory councils were also established under the chairmanship of the Commissioner for Agriculture.

At a later date the experimental committees were established on experimental station basis. The respective stations submitted their recommendations to the Chief Agricultural Research Officer and these would then be reviewed by the Research Advisory Committee under the chairmanship of the Commissioner for Agriculture. The membership of this committee besides the Chief Agricultural Research Officer, researchers and extension administrators, included Faculty of

Agriculture, Coffee, Cotton and Tea Organisations and Marketing departments (i.e. Cooperatives and Trade).

From the 1920s to 1980s, the main activities promoted in an effort to accomplish research extension-farmer linkages included:

#### **Crop Sub-Sector**

- i Experimental committee meetings during which past work was reviewed and priorities for research were established.
- ii Participation by farmers and extension staff in field days organised by research stations.
- iii On-farm research, such as fertilizer trials
- iv Determining recommended practices based on on-farm research results.
- v Participation in extension training.

With regard to on-farm research, the early major thrust was the extensive field experiments with fertilizers which were first carried out in Uganda in 1946. Over a period of 3 years, 45 fertilizer trials were carried out, testing the effect of sulphate of ammonia, sulphate of potash and three forms of phosphate on a variety of crops (i.e. finger millet, maize and cotton). The nitrogen fertilizer was found to provide the greatest stimulus to crop growth.

The distribution of trial centres, around which individual experiments on private farms were carried out covered the districts of West Nile (8 centres), Acholi (6 centres), Bunyoro (4 centres), Ankole (4 centres), Bugisu (3 centres) Sebei (1 centre). The variety trial centres which also served as locations for adaptation trials under various agroecologies had already been established across the country. By 1971, approximately 5000 trials had been successfully completed.

Support to root crops, sorghum and finger millet enabled diagnostic surveys to be undertaken and some on-farm trials to be initiated. Also support from IFAD and World Bank to SWRAP and ADP projects also put emphasis on adaptive research for which specific funding was provided. NARO assigned research scientists to these projects to head the adaptive research components.

#### **Forestry Sub-Sector**

In the case of forestry, the silvicultural research section used to be responsible for advising on the setting up of permanent sample plots which were the sole responsibility of District forest Officers (DFOs). The research staff took part in the analysis of data and advising the DFOs on the results of the assessments. It was the individual DFO who was responsible for all operations such as location of the plots on the map, setting them up in the forest, undertaking the first and subsequent assessments and making sure that access lines, plot boundaries and numbering of individual trees was correctly done.

The AFRENA project implemented in the late 1980s to some extent helped to build up local capacity for agricultural research, training and extension in the country.

#### **Livestock Sub-Sector**

The main field activities undertaken included among others:

- (a) Diagnostic work to support field services
- (b) Setting up of field testing units for blood tests for CBPP
- (c) Carrying out vaccine trials in the field to assess their virulence and efficiency at various stages
- (d) Field surveys of virus and other disease outbreaks in different parts of the country
- (e) Providing field advisory work by pasture agronomists
- (f) Field investigation of the differences in production between burnt and unburnt grassland (Themeda triandra) and methods of control of acacia hockii
- (g) Training of extension staff.

#### **Fisheries Sub-Sector**

In order to address the needs of fish farmers, the Fisheries Department set up Experimental Fish Farm at Kajjansi in 1953 with the aim of:

- i Training extension staff and farmers
- ii Producing fry for satellite centres at the regions and for fish farmers; and
- iii Conducting experiments on fish production, productivity and water quality.

#### **Restructuring of Agricultural Research and Extension services**

The organisation of Uganda's national agricultural research system (NARS) under the umbrella of the National Agricultural Research Organisation (NARO) is one of the major policy instruments of the Government in revitalizing and reforming the agricultural sector of Uganda's economy. The six-point action plan of the Government in promoting policy and institutional reforms in the late 1980s had, as one of the cardinal objectives, the strengthening of agricultural research and extension institutions.

As part of the economic recovery program, the Government established an Agricultural Task Force in 1987 to formulate recommendations for strengthening the agricultural services sector. Agricultural Research Task Force made two specific recommendations: one, to set up a team of research planners whose main task would be to prepare a national agricultural research strategy and plan; two, to establish a semiautonomous umbrella research organisation for all agricultural research in the country. Following these and other recommendations of the Task Force, the Government then adopted a policy agenda for the agriculture sector and constituted a number of working groups to follow up the recommendations of the Task Force and the component groups.

In its Action Plan, Government identified the area of "Strengthening of Agricultural Research and Extension" as needing immediate attention. Two Working Groups, (9A and 9B) were created by the Agricultural Policy committee, supported by the World Bank and guided by International Service for National Agricultural Research (ISNAR) to articulate the most appropriate research and extension systems for Uganda.

The purpose and rationale for an improved agricultural research service was to provide for a major increase in the flow of research results and technologies to producers. These innovations had to be attractive to facilitate their dissemination, sustainability, realistic in input requirements, and supportive of efforts to enhance environmental quality.

The realisation of this purpose required:

- (i) A sufficient understanding of the agricultural sector to correctly focus research efforts on producer's needs.
- (ii) A knowledge of the range of possible innovations available locally and externally
- (iii) An ability to successfully conduct research, on and off station, and transmit the results to the extension services and to producers.

The Working Groups made the following recommendations on the need to strengthen research-extension linkages:

#### **Working Group 9A**

Ensure strong client orientation and guidance of research programmes through such mechanisms as:

- A national agricultural research board to guide the research organisation and advise the government on agricultural research policy and priorities;
- Client participation in planning, implementation and evaluation of all research activities at various levels; and
- a scheme of service which makes liaison with clients a responsibility of all research staff.

#### **Working Group 9B**

- Build on and expand research and extension collaboration in on-farm trials and on-farm demonstrations

- Establish clear channels of communication as well as an information section to work closely with SMSs to prepare educational material for farmers on improved practices
- Strengthen a system for follow-up on performance of recommended practices
- Promote joint meetings between researchers and extension

#### **The need for strong research extension linkages**

As stipulated in the above recommendations by the two working groups, it is clear that strong research-extension linkages are necessary if we are to ensure that:

- Research tackles clients' priority problems
- Research results are applied to solving clients' problems as well as expanding their opportunities
- Available technologies are promoted and disseminated widely to users
- Clients have access to information and services required to support technology
- Research capitalises on clients knowledge and obtains feedback on the relevance and performance of technologies

#### **Current efforts to promote Research-Extension-Farmer linkages**

##### **The Agricultural Research Strategy and Plan**

Following the recommendations of working Groups 9A and 9B, a National Agricultural research Strategy and plan as well as the National Agricultural Extension Strategy and Plan were adopted by Government. This resulted in the creation of NARO and implementation of the National Agricultural Extension programme. The Research Strategy and Plan stresses:

- The importance of NARO maintaining strong client orientation and guidance in the design and implementation of research programmes
- That the primary responsibility for operationalisation of linkages with extension and clients rests with the research programmes themselves
- Each programme is to carry out both on-station and on-farm research
- That a liaison unit would be established to assist institutes and programmes interact with producers, extension services and development agencies

These interactions would include: exchange of information, station tours and feedback from extension. The liaison unit at each institute would be responsible for:

- Preparing and disseminating information to extension, producers and other agencies on
- Organising tours to institutes for extension personnel and farmers
- Assisting the institutes identify organisations and individuals to serve on programme planning and review committees.

At the national level the unit is charged with the role of co-ordinating and promoting linkages between and among

the various stakeholders in technology generation, development and transfer. The unit essentially became operational in 1995 when the posting of research-extension liaison officers were posted to the research institutes. Following the restructuring of MAAIF, the unit is now being expanded so as to cope up with the outreach and technology transfer activities now being decentralised to zonal adaptive research and outreach centres. The linkages which have been adopted are promoted through various joint activities.

#### **Research-extension-farmer linkages adopted**

The following joint research-extension-farmer linkages are being promoted:

##### **Diagnostic surveys**

These are undertaken jointly between scientists and extension staff with active farmer involvement.

##### **On-farm research**

All the programmes in various institutions undertake both on farm and on-station research depending on availability of funds. The liaison officers work closely with scientists to deliver inputs and other materials to districts for on-farm trials.

##### **Training support to extension**

This covers:

##### **(a) Technical Workshops**

These are the main fora for regular review of technologies and training of Subject Matter Specialists by researchers.

##### **(b) Pre-seasonal Planning Workshops**

These are held twice a year for first and second rain seasons. They are held at both zonal and national level.

##### **(c) Monthly Training**

Researchers participate in these workshops as and when needed. They are mainly conducted by District Extension Coordinators and Subject Matter specialists (SMSs)

##### **(d) Training in Specialised Areas**

These courses are conducted by researchers in collaboration with SMSs, and are intended to equip extension staff with new knowledge and practices required to build up production skills.

##### **(iv) Technical Publications**

In collaboration with the Agricultural Communication Centre of MAAIF, the NARO Secretariat produces brochures and leaflets for use by extension staff and producers. Institutes also produce limited copies of leaflets. A monthly NARO bulletin and the Uganda Journal of agricultural science are also published.

##### **(v) The Research Programme Planning and Review**

The Research Programme Planning and review Committee meetings at institutes have been taking place regularly since 1994. These take place at two levels - programme level and institute level.

##### **(vi) Field days at Institutes**

These are now scheduled to be held biannually at institute or station level.

##### **(vii) Agricultural Shows and Exhibitions**

NARO participates regularly in national shows and some district shows.

##### **(viii) Joint Field visits and tours**

NARO personnel have undertaken joint field visits with extension staff in the course of monitoring and follow-up

on field trials and checking on seed multiplication sites.

##### **(ix) Visits to research institutes/stations**

Farmers, extension staff, students, other clients are being encouraged to visit research institutes to up-date themselves on new technologies and acquire some limited planting materials if available.

##### **Action Research and Development Programme (ARDP)**

Following a review of the Headstart for Agricultural Research and Extension Project in July, 1994, NARO identified a number of viable technologies which awaited further on-farm testing, seed multiplication and eventual transfer to the producers. The twelve technologies identified were formulated into an Action Research and Development Programme (ARDP) which was drawn in consultation with extension staff. The programme was implemented during 1995 and 1996 with the following objectives:

- (i) To demonstrate the benefits of new technologies to extension workers and farmers through on-farm demonstrations
- (ii) To produce planting material for primary seed producers
- (iii) To train field extension workers and farmers on the application of the new technologies and private seed producers on seed production technologies

##### **Outreach Programme**

Realising that technologies being generated at institutes do not seem to be readily adopted by the farming communities in general and those neighbouring the research institutes, in particular, NARO in 1997 designed a strategy of enhancing an outreach programme deliberately aimed at getting communities neighbouring the research institutes to adopt at least some of these technologies.

Following the decentralization of extension and restructuring of the Ministry of Agriculture, Animal Industry and Fisheries which followed, the agricultural extension function is now shared among the following agencies:

##### **(i) MAAIF**

Through the 2 Directorates of Crop and Animal Resources, MAAIF is now responsible for:

- Regulation, overall supervision and inspection of extension activities
- Monitoring and evaluation of extension activities in districts
- Information dissemination at National level
- National Agribusiness
- Overall policy formulation for Extension services.
- Designing Extension Methodology and harmonisation.
- Setting National Extension Standards
- Provide technical training to the Extension officers.

##### **(ii) Districts**

- Day to day supervision and implementation of extension programmes
- Conducting technical workshops

- Conducting farmers workshops
- Planning activities within the respective districts
- Training in districts
- Coordination of NGOs operating within their respective district boundaries
- Programming of visits to farmers.

### (iii) NARO

- Conduct technical workshops
- Research planning
- Information dissemination to districts
- Research-extension-farmer linkages
- Demonstration of technologies
- Transfer of technologies.

To ensure that technologies which are generated and developed reach end users through various delivery agencies (technology uptake pathways) in districts and also where feasible, through target groups, NARO is working on modalities that would enable it to assume greater responsibility of delivering its technologies directly to districts. This will require strengthening of the technology delivery system through expansion of its outreach activities. At the same time it has to expand its activities for participation in the seasonal extension planning and technical workshops and play a greater role in training of extension staff, organisation of large scale demonstrations, providing advice and training on production of seed, planting and stocking materials and dissemination of information.

In order to address the challenges of getting nearer to the technology uptake pathways and rural communities in the districts, it is planned that a number of selected District farm institutes will be rehabilitated and developed into zonal adaptive research and outreach centres. Each centre would serve a specified number of districts. The rest of the District farm institutes will also perform outreach functions. These would be linked with research institutes which would continue to have their national mandates and would be the source of technologies for adaptive research and outreach depending on the needs of the various agro-ecological zones. The institutes would, however, continue to operationalise their own outreach programmes in their neighbourhood.

The activities of these zonal adaptive research and outreach centres, among others, would cover:

- Adaptive research and on-farm demonstrations
- Training of extension workers and farmers
- Facilitating and organising planning and technical workshops
- Production of foundation seed, planting material, stock and fish fry
- Dissemination of technical information to the districts.

### Progress achieved under various joint activities

#### Extension Training

#### Technical workshops

These are the main fora for regular review of technologies and training of SMSs by researchers. They are now held regularly.

During 1996, a total of 12 technical workshops were held and in 1997 a total of 10 were held. Five were held during first rains 1998 (April/May) and 5 are planned for October, 1998.

Efforts during these workshops have been geared towards improving survey skills of SMSs and researchers using systematic client consultation approach.

#### Seasonal planning workshops

These are held at zonal and national level.

During 1996 a total of 10 workshops were held and in 1997 a total of 13 were held. A total of 7 workshops were held during first season, 1998 and one national workshop was held during second season, 1998.

An average of 3 scientists and one RELO participate in each regional workshop and all Directors of research institutes, RELOs and selected programme leaders and NARO Secretariat staff attend the national workshops. Other participants include District extension co-ordinators, NGOs, Farmer associations, Makerere staff and MAAIF Headquarters staff.

#### Specialised courses

During the action research and development programme a total of 2889 farmers/producers and 1031 extension staff were trained by various scientists to equip them with knowledge and skills on cassava, beans, agroforestry, aquaculture, dairy and pasture management, tsetse control, groundnuts and sesame, sweet and solanum potatoes and on-farm grain storage. Other specialised courses are organised by MAAIF and Ministry of Natural Resources and they use researchers as resource persons.

#### On-farm Research

All technologies before release must be on-farm tested to ensure their relevance and acceptance by the farming community. Over the last five years a total of 24 crop varieties have been released.

All in all research scientists now start with the farmer (diagnosis) and end with the farmer (validation of pipeline technologies on-farm).

#### Diagnostic survey

The various programmes which have been undertaking surveys regularly include: root and tuber crops, Post-harvest, banana, coffee and beans. The institutes have also undertaken participatory rural appraisals for purposes of initiating outreach programme. These have generated useful information, which is the basis of interventions already selected to address the constraints identified. A survey of the Teso farming research was undertaken in February, 1998 and funds permitting other farming systems will also be done progressively. On the whole surveys are now the major basis for determining priorities.

#### Publications

Virtually all the brochures and leaflets produced by the unit at the NAROSEC are printed by the agricultural communication centre of MAAIF. To date, some 80 brochures and leaflets have been produced both at the institutes and the Secretariat.

The unit also handles publications of the monthly NARO bulletin. A total of 1800 copies are produced monthly. The Publications Officer in the unit works as a managing editor of Uganda Journal of Agricultural Sciences, which is published twice a year. On average 1000 copies are produced per issue.

#### **Research Programme Planning and Review Committee**

Since 1994 when the first members were appointed, these committee meetings are now taking place on a regular basis. New members of the committees were appointed in October 1996 and they include various stakeholders such as farmers, extension staff, university officials, NGO, agro-industry and donor representatives. Meetings are usually held during November/December of each year.

#### **Field days at Institutes**

SAARI had held field days annually since 1994 and FIRI held theirs in 1995 and 1997 while Kalengyere Research Station held one during 1997. NAARI held an open day in July 1996 and hosted the 1997 World Food Day celebrations where the main guests were members of parliament who participated actively in demonstrations organised by the scientists.

#### **Agricultural Shows**

Since its establishment, NARO has actively participated in agricultural shows held in parts of the country. These include:

- UNFA agricultural and trade shows
- World food Day observance shows, NAARI
- Presidential forum
- Technology generation and transfer exhibition in December 1995.

#### **Joint field visits and study tours**

Joint study tours have also been undertaken to Nigeria, Kenya, India and the Philippines. These have been very useful and will continue to be encouraged.

#### **Visits to Research Institutes/Stations**

Over the years all levels of clients converged particularly in KARI, NAARI, and SAARI for planting materials particularly cassava cuttings, groundnuts and KARI for fruit budlings and Kajjansi for fish fry. This is a healthy sign, as these institutions are no longer seen as being out of bounds for the clients.

#### **Action Research and Development programme**

The achievements under this programme implemented during 1995 and 1996 with the aim of demonstrating benefits of new technologies and training farmers and staff on their application, are:

- A total of 1031 extension staff and 2889 farmers trained
- An area of 395 ha was under multiplications of seed and planting material
- 54,638 seedlings of various agroforestry tree species were planted in Iganga, Tororo, Mbale and Mukono and Nebbi districts. 930 farmers were involved.
- 48,600 fish fry were produced.
- 108 on-farm trials for cassava, sweet and solanum potatoes were established
- 430 house holds with estimated 2000-2500 farmers were covered by the on-farm grain storage sub-programme
- a total of 144,000 E.Lopezi enemies of cassava mealybug were released.

#### **Outreach Programme**

- Surveys have been undertaken by all institutes and the outreach programme is under implementation
- Arrangements are in progress to establish zonal adaptive research and outreach centres using some of the DFIs already taken over by NARO

#### **Countrywide Survey**

Since the decentralization of extension services to the districts, NARO is faced with a challenge to link up directly with districts which are now responsible for extension services. Accordingly, NARO in conjunction with MAAIF in January 1998, conducted a country-wide survey aimed at identifying technology uptake pathways and target groups as well as current technology needs.

The findings of the survey were validated by stakeholders during a workshop held on 2nd April, 1998. They also made recommendations on a basket of technologies to be promoted in various agro-ecological zones.

#### **Future Plans**

- (a) Intensify training of extension staff so as to impart appropriate skills on new technologies
- (b) Consolidate outreach programme activities to ensure effective coverage and impact.
- (c) Intensify work in the area of on-farm research, demonstrations and informal, farmer based seed production
- (d) Promote involvement of stakeholders in detailed annual reviews of research findings as well as extension programme.