

USING ICT TO IMPROVE THE EFFICIENCY AND EFFECTIVENESS OF THE UGANDA NATIONAL AGRICULTURAL SYSTEMS

Tenywa, M., Niyitengeka, M., Bekunda, M. Nakanyike-Musisi, B. Katunguka, S., Tumusiime, F., Fungo B., Basse, S., Wire, J., and Alluri, K.

Correspondence: tenywamakooma@yahoo.com

ABSTRACT

Uganda is gifted by nature with extremely high agricultural potential and yet the agriculture sector remains weak and less competitive. Farmers in Uganda are only able to market one third of their total food production. For example, Uganda ranks the second top most in producing bananas in the world but falls at the bottom of the list in terms of sales globally. This discrepancy is interalia attributed to the weak linkage between supply and demand sides of the agriculture sector. Education, research, extension, NGOs, private sector and policy makers, who are the main actors and functionaries of the innovation system, remain detached. Predicated on this, stakeholders of the Uganda National Agricultural Innovation System (UNAIS) have come together to develop a multimedia platform that includes mobile phone and the Internet (www.eunais.co.ug) to improve the efficiency and effectiveness of the agricultural marketing processes between smallholder producers and consumers. The platform, which includes three components, sms media, news and discussion forum, is designed using simple open source software, Joomla, to cater for the diverse interests of the stakeholders and ensure lifelong learning. The platform, launched by the President of Commonwealth of Learning at the 2007 CHOGM meeting in Kampala, Uganda, was received with overwhelming enthusiasm by farmers.

eUNAIS as well as partner-COL seeks to provide a platform for sharing with stakeholders our experiences in implementing an ICT based model to strengthen the performance of NARS including farmer access to markets. The platform will provide an opportunity for stakeholders to share relevant lessons and experiences in their NARS. It is hoped that we will come out with the answer the question –What is the best model for ensuring effectiveness and efficiency of the NARS in terms of learning and improvement of livelihoods.?

Keywords: *farmers, production, demand, lifelong learning*

APPROACH

The PCF5 is viewed as an opportunity to receive feedback on our experiences. We will have a 1-day shared pre-conference meeting in which various presentations will be presented and also an orchestrated discussion session. The presentation will cover rationale, project goal, objectives, status of the project, changing context, ICT policies, lessons learned, challenges and outlook. These will be in form of LCD power point and poster presentations. Discussions and feedback will be received on:

1. What is the real problem limiting the performance of national agricultural systems?
2. Is the model most suited to address the problem?
3. What are the critical components of the model?
4. How best can the model be scaled up and out?

RATIONALE

The economy is predominantly agrarian constituting 82% of the labour force. However, this potential is yet to be fully exploited. There is a weak linkage between supply and demand sides of the agriculture. Only one third of total food production is marketed. Past and ongoing efforts in agricultural education, research and extension are yet to translate into transformation of the traditional farming systems and improved livelihoods of the people. Agricultural development programs have not had the desired impact on the livelihoods of the people (Eicher, 2004). The levels of success in agricultural research, education and extension during the last 100 years as measured by the traditional indicators (improved per capita productivity and technology adoption) have rather been disappointing. During this period, there has been a marked decline in per capita productivity and non-transformation of the farming systems.

According to Opio-Odong (1992), the minimal impact of scientific research on sub-saharan Africa in particular Uganda, has been attributed to three major problems. Firstly, the tendency among agricultural researchers to ignore the management contexts (limitations and opportunities) of local agriculture/farmer innovations in the process of technology development. Secondly, the failure to target real needs of the key actors including smallholder farmers. Thirdly, lack of economic appraisal of experimental results before extension recommendations are formulated. The generation of technologies has largely been supply driven and the tendency has been to deposit them into a "pool" without any economic appraisal. This has not helped the end user in making informed choices. Universities have the trio functions (agricultural education, research and extension) and have a share in these problems too.

It is now common knowledge that tertiary training and learning through conducting research does not necessarily translate into improved livelihoods unless the requisite infrastructure, policies and socio-economic conditions are in place. Agricultural education, research and extension are part of a dynamic process embracing global and national policies governing the interaction of different actors along the value chains from "farm" to "fork". Thus, there is need for stakeholders to reflect on the micro-economic and policy environment in which research, education and extension are conducted.

The failure of the agricultural system to target real needs of the stakeholders from production through commercialization to consumption has also been a major problem. A common practice has been for research agenda to be determined by researchers or donor-driven. Zake (1999) reported that different stakeholders in the agricultural sector perceive different constraints to agricultural production and thus have different foci in efforts to address them. Tenywa (1999) observed that research does not adequately capture farmer innovations for incorporation in the research agenda. Graduates are not adequately equipped to address the real life problems of farmers and lack holistic problem analytical and solving skills needed for addressing issues that have positive social impacts. Extension workers are also not adequately equipped to capture the multi-dimensional problems of smallholder subsistence farmers living in complex farming systems. Past experience with industrial research shows that successful technological research and development programmes are distinguished by a

strong user orientation in advance of technology production (Zaltman, 1979). Unfortunately, this has not been true of Uganda's agriculture.

Over the years, the inability of the agricultural system to generate relevant and appropriate knowledge to support the livelihood strategies of the communities has increasingly led to declining flow of resources into agricultural tertiary institutions, research and extension systems (Court, 1999; Beintema and Pardey, 2003). Consequently, the institutions are in a financial crisis. The window of opportunity lies in the National Agricultural Research Systems (NARS) Act, 2005 of Uganda that provides for a system of non-traditional partners working together for improved agriculture. This is a great opportunity for using ICT to increase linkages between traditional and non-traditional partners. This can be in terms of communication and collaboration geared towards increased efficiency and effectiveness pertaining to their mandates (e.g. curriculum review in agricultural education, priorities and research and also extension dimensions).

When the agricultural research, education and extension, as well as private sector (retailers, processors) are interlinked, they can better identify society needs and priorities. Thus, they are likely to have greater positive social impacts as well as creating ownership. In essence, once the stakeholders are convinced that the education, research and extension is meeting their needs they are more willing to provide direct or indirect support that may translate into more resources flowing into these functions (education, research, extension). For example, if the private sector recognizes that research can help tap into new opportunities, they may be willing to allocate funds for research. Likewise, if the curricula and training are perceived to be globally competitive in quality and the graduates can meet the demands for the labour market, then more employers will recruit the students and more students will enroll, paying more money to the colleges. Similarly, the quality of extension to the farmers will also be improved and increasing the demand for extension services and perhaps more farmers willing to pay for the services.

Overall, if the stakeholders are empowered, their participation increased, own the processes and feel the system meets their demand, they will lobby politicians and government to put more resources into agricultural education, research and extension (Everson, 2001). Thus, more resources will flow from the non-traditional sources and reverse the trend of declining flow of resources to agricultural education at tertiary institutions, research and extension.

Goal

To improve people's livelihoods through increased income, food security and sustainable resource management

Purpose

To increase the efficiency and effectiveness of the NARS through improved creation, access, sharing, and application of relevant agricultural knowledge using ICT

Objectives

1. Facilitate formation of a robust national framework of an action plan by a joint committee of major tertiary level institutions and the National Planning Authority.
2. Leverage strategic partnerships for ODL and online learning to scale up research outputs for increased impacts
3. Strengthen community of practice (training officers) to improve synergies and communication with partners.
4. Capture synergies to enhance agricultural science and practice by strategically aligning Universities, development partners and relevant CGIAR centers and their resources.
5. Support capacity building to establish a stable human resource base for propelling ODL in NARS.
6. Development and delivery of modules aligned to the innovations systems through distance learning.

7. Facilitate linkages with other institutions that work with farmers to improve service delivery by adopting the use of telecenters established at sub-county level.
8. Facilitate Learning facilitators from such institutions like Universities and research institutions develop teaching materials for farmers and supply them to the telecenters where extension officers facilitate farmers to learn from at the centers.
9. Facilitate linkages of institutions involved in Research –NARES (e.g. by strengthening the efforts by the ASARECA network-RAIN).
10. Develop and institutionalize quality assurance system for training, education and learning in CGIAR

Output 1:

Building capacity of key stakeholders in the Lake Kivu Pilot Learning site of sub-sahara Africa Challenge Programme to interact on the platform using free-libre software. Several trainings will be conducted for the support staff and NARS staff:

- a. **Training of Trainers learning cycle for core ICT support staff;** The strategy will be to train trainers of core ICT students that will in turn train others. The specific activities will be reflection/audit/discovery relating to the ICT environment, e-readiness, availability of support staff, work loads and strengths of staff of selected NARS institutions. The specific activities focus on several trainings for retooling of ICT core staff – preparing them for effective NARS support in a virtual interactive forums including, pedagogy, strengthening individuals supporting interactive platform using free/libre open source software (FLOSS) (e.g. wiki).
- b. **Institutional capacity:** Several meetings for sensitization of institutional leaders, formalisation of institutional arrangements and interactions with other institutions. Specific activities will focus on institutional information-communication-knowledge management (e.g. uploading the relevant electronic content, its review, edition and updating. It will take the form of reflection-action-evaluation-mentorship meetings on what competences exist among staff, relevant multi-media tools and who will handle what ICT aspects, nature of learning materials, pedagogy, content development, quality assurance evaluation, publicity-repositioning of digital content. This process will be custom tailored to meet the unique characteristics of the individual institutions.

Output 2:

Establishment of a resource centre and an ICT platform for linking NARS stakeholders

The ICT platform will be a multi-media system for linking the key stakeholders based on the recommendations from the national NARS consultative meeting that was held in Makerere University on 8th October, 2007. This action will involve several activities including setting up an ICT-based platform for NARS institutions to dialogue on joint needs assessment and knowledge creation, content, support to farmers and other actors along the selected value chain. The specific activities will include software installation, configuring collaborative tools, customizing links and repositing digital content. It will also involve assessment and selection of other multi-media tools (e.g. use of mobile phones).

Output 3:

Development of multi-media products

The different components of the NARS pilot model ICT connectivity platform namely, infrastructure, human resource and environments will be captured and packaged in different multi-media forms for visual exhibitions to the public. This will include photography, video, DVDs and Cds.

Market activities that can be improved by the innovation platform include:

1. **Production:** The quantity and quality of supplies can be improved through confidence gained from market demand information shared on the platform.

2. Accumulation: The concentration of small quantities of production in order to make larger quantities. Accumulation for group marketing can be facilitated by improved communication on the platforms.

3. Transportation: an operation that permits the product to be transferred from the production site to the places where it will be consumed. Efficiency and effectiveness of transportation processes can be enhanced by ICT.

4. Selection and Classification: The value addition processes involved include processing and Storage. These can be improved through competitions based on information of various alternatives available.

5. Consumption: The last link in the commercializing process takes place when the product is in the hands of the consumer. Effective demand can be increased through improved sharing of information.

CHANGING CONTEXT

The context in which agricultural development is taking place is changing rapidly because of forces of change such as globalization, market liberalization, privatization, urbanization, HIV/AIDS, population growth, climate change, liberalization of research and extension and must adapt. In this case the context will be new innovation platforms set up under the umbrella of SSA-CP for "Proof of IAR4D concept" whether it works and involves various partners from three countries (DRC, Uganda and Rwanda) and various CG centers. Initially, the resource centre will be based in Kabale-southwestern Uganda.

ICT POLICY

There is no explicit policy either specific to agriculture or to education in general, but there has been a series of policy changes to facilitate the increasing use of ICTs both in education and public administration. The current policy on ICTs and regulatory environment in Uganda dates back in the telecommunications sector policy of 1996, which was operationalized by the Uganda Communications Act, 1997. The government of Uganda recognizes the current trends from tangible to new knowledge-based economy and the relevance of ICTs in agriculture, health, education, private and other sectors for development. It has established a Ministry of ICT mandated to implement the Information and Communication Technology Services and Systems: There is also ICTs Policy and Master Plan that evolved from the 2003-National Information and Communication Technology Policy framework. We recognize that policies for successful ODL must support the following aspects;

1. Enabling demand-driven community-centric approaches
2. Self-replicability, scalability and sustainability
3. Transforming agricultural extension approaches to make them amenable to ODL and Tech-MODE
4. Innovative collaborative mechanisms that strengthen both forward and backward linkages
5. Digitisation of content for multi-media applications

CHALLENGES

Power supply is erratic and unstable in rural areas and it demands an added cost of providing alternative source of energy for ICT installations in rural areas. In Uganda, only 4.3% of the households (only 2% in rural areas) have electricity connections. Computing facilities are still very much in the rudimentary stage compared to the large-scale operations required to establish and implement a well-functional distance learning program. Email is still not used as a regular mode of communication and overall use of computers is limited to basic application such as word processing. According to a survey by Mega-Tech (GoU, 2002), combined Teledensity (mobile + fixed) is still low (< 3%). The digital divide is acute with an average 80%-90% telephone/Internet subscribers concentrated in the capital city and other towns.

Outside capital cities and a few major towns, there is very little Internet penetration, making it a difficult task to deliver government services online in such remotely placed locations and communities. The awareness about ICT and benefits thereof, is low and ICT training cost in such areas is prohibitive. Over and above, connectivity and bandwidth is a major constraint.

OUTLOOK

There is need to support strategic partnerships (public-private) for improving the demand and supply sides of agricultural produce using multimedia (e.g. mobile phone, internet, print) to break barriers and expand markets. It is imperative to capture synergies between education, research and extension functions within the innovation system context to enhance agricultural science and practice by strategically aligning Universities, development partners and relevant CGIAR centers and their resources to create a new generation of agricultural scientists with capacity to face the emerging challenges. Effort needs to be directed to strengthen Community of Practice (extension workers) with ICT skills to harness synergies across grassroots' institutions/resources (e.g. use of telecenters) to use Decision Support Tools (e.g. soil test kits, Plant disease diagnostic kits, GIS) to assist farmers minimize risks on the supply side through knowledge sharing, creation and application. At national level there is need for a robust framework of an action plan to develop and institutionalize quality standards and assurance within innovation system context.

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