

Research Application Summary

**Strengthening communication and knowledge management for increased
agricultural productivity: A Ugandan case study**

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Abstract

For growth and development to occur in the agricultural sector, availability of timely and relevant agricultural research information is important for both planning and practice at all levels. The National Agricultural Research Organisation (NARO) provides strategic direction for publicly funded agricultural research in Uganda. It sets national priorities, harmonizes research activities, and provides guidance to ensure delivery of quality agricultural research services by agricultural research service providers (ARSPs) in Uganda including universities, private sector, NGOs, CBOs etc. NARO has a responsibility to ensure that the knowledge generated contributes to agricultural and social economic development in Uganda. A study (Communication and Knowledge Management audit) was conducted within NARO and key stakeholders to establish the status of CKM. Findings indicate that the demand for this knowledge is huge but inadequate supply, inaccessibility, and packaging of agricultural research CKM products remains a challenge. To remedy this, NARO has developed a CKM strategy to give strategic direction in the generation, processing, packaging, preservation, storage, and sharing of knowledge to benefit key stakeholders. It is envisaged that implementing the strategy will promote delivery of quality and efficient agricultural research services to the technology end users as well as succession planning within NARO.

Key words: Agriculture, communication, knowledge management, research services, Uganda

Résumé

Pour que la croissance et le développement se produisent dans le secteur agricole, il faut du temps et la pertinence des informations de recherche agricole. Ceci est important pour la planification et la pratique à tous les niveaux. L'Organisation Nationale de Recherche Agricole (NARO) fournit une orientation stratégique pour la recherche agricole financée officiellement en Ouganda. Il définit les priorités nationales, harmonise les activités de recherche, et fournit des conseils pour assurer la prestation de services de qualité de recherche agricole par les fournisseurs de services agricoles de recherche (ARSPs) en Ouganda, y compris les universités, le secteur privé, les ONG, les OCB, etc. NARO a la responsabilité de veiller à ce que les connaissances générées puissent contribuer au développement économique agricole

et social en Ouganda. Une étude (L'audit de la gestion de la communication et des connaissances) a été menée au sein de NARO et les intervenants clés pour établir le statut de CKM. Les résultats indiquent que la demande de cette connaissance est énorme mais l'offre inadéquate, l'inaccessibilité et l'inorganisation des produits de la recherche agricole de CKM restent un défi. Pour y remédier, NARO a mis au point une stratégie de CKM pour donner une orientation stratégique dans la production, le traitement, le conditionnement, la conservation, le stockage et le partage des connaissances au profit des intervenants clés. Il est prévu que la mise en œuvre de la stratégie favorisera la prestation de qualité et des services de recherche agricole efficaces pour les utilisateurs finaux de la technologie ainsi que la planification de la relève au sein de NARO.

Mots clés: agriculture, communication, gestion des connaissances, services de recherche, l'Ouganda

Introduction

Knowledge is a strategic resource in organisations. Bollinger and Smith (2001) acknowledge that knowledge is a crucial ingredient for gaining competitive advantage and becoming innovative. Knowledge about past research and development projects, failures, successes, resources and organisational processes is the key driver in supporting effective decision-making. This requires knowledge, whether domain-specific or procedural or social, to be readily available and accessible.

The National Agricultural Research Organisation (NARO) is a knowledge based organization (NARO, 2008). It produces, distributes and uses knowledge, as well as other agricultural technologies. Therefore, knowledge, as well as its flows, should occupy a strategic role in NARO. This is especially needed now in this 'new world of business' - the Knowledge Economy, in which NARO operates, where knowledge is a key driver of productivity and social economic growth. NARO's specific mandate is to undertake, promote and coordinate research for crops, livestock, fish and forestry and to ensure the dissemination and application of research results. This mandate is executed with the major goal of "enhancing the contribution of agricultural research to sustainable agricultural productivity, economic growth, food security and poverty eradication through generation and dissemination of appropriate technologies, knowledge and information". NARO has a responsibility to ensure that the knowledge it generates contributes to social economic development in Uganda. Organizations that intend to remain relevant for a long time recognize that the effective generation and leverage of knowledge is a source of improved performance, competitiveness and sustainable competitive advantage. High levels of certainty characterize the knowledge economy and organizations need to continuously reinvent themselves to adapt to this environment.

To achieve the above, NARO set out on a journey to put together a CKM strategy, developed the audit tool, and trained NARO staff for data enumeration. The overall purpose of the knowledge audit was to identify and describe the current and future knowledge and communication needs, gaps/challenges, resources (human, infrastructure and financial) of NARO. This would serve as a launching pad for an effective, rational and well-informed communication and knowledge management strategy.

Materials and methods

The audit followed a mixed method research methodology. The audit instrument consisted of both close and open-ended questions to collect data from the target population on the following issues: demographic data of respondents; knowledge needs related to work functions; knowledge resources that respondents currently access and would also like to access; existing and future knowledge-sharing mechanisms; knowledge sources that respondents currently use and would like to use; as well as challenges and suggestions for better knowledge access, retrieval, storage, sharing and dissemination. The audit targeted NARO staff from selected institutes as well as other NARO stakeholders. A total of 17 institutes were studied as indicated in the sample frame of 90 respondents comprised of NARO employees. The 90 employees were purposively drawn from the NARO's employee database to form the sample of the audit. Senior managers, communication specialists and research officers who have a good understanding of the organization were interviewed in order to obtain a strategic perspective on the knowledge management requirements of NARO. These interviews looked at the strategic knowledge management requirements of NARO entities.

Knowledge audit instruments were administered to respondents in person by trained enumerators (NARO employees) during the study that sought to elaborate more on questions to ensure that the audit instrument was completed properly. Of the respondents, 53.3% were from the Zonal Agricultural Research Development Institutes (ZARDIs) and 46.7% from the National Agricultural Research Institutes (NARIs). The majority of respondents were researchers (62%), technicians (21%), Administration (11%), and communication officers (6%). The Statistical Package for the Social Sciences (SPSS) was used for data analysis. A descriptive analysis (percentages, frequency, and means) was performed on the data from the close-ended items of the knowledge audit tool. The open-ended items of the knowledge audit were analyzed using categorization of responses and counting frequencies of categories when appropriate. The following key assumptions were also made when conducting data analysis and presentation; above fifty per cent (50%) response rates were considered as constituting a majority.

The audit majorly followed three steps, knowledge requirements/needs analysis, inventory analysis as well as knowledge audit reporting. It excluded knowledge flow analysis and mapping due to time constraints although they are critical in building a solid base for knowledge management and communication within NARO. These steps are further elaborated below;

Knowledge requirements analysis. A total of 16 senior managers who own, maintain and use knowledge in NARO were randomly identified and individual interviews were conducted with them

Knowledge inventory analysis. During this process existing strengths and gaps in capability were determined. Products, and services that result from knowledge management and communication practices were identified and documented. Knowledge that is available, shared, used and needed within NARO was identified when the knowledge inventory was compiled. Knowledge gap areas that needed future attention were identified as well.

Knowledge audit reporting. This was an activity that led to the compilation, analysis and documentation of the audit outcomes. It is this report output that was used as a springboard for the development of a NARO's knowledge management and communication strategy.

Results and discussion

The audit findings indicate that knowledge management and communication - the generation, packaging, storage for retrieval and dissemination of information (data, knowledge) - is not a priority for nearly all NARO institutes. Thus there is inadequate allocation of resources (people, tools, funds) and processes to KMC.

Looking at the existing situation, identifying the kind of information and data staff need in order to carry out their work, and the means by which they get it, is important because it has implications on the quality of their work, and hence that of the organization. A number of respondents indicated that they obtained information needed to carry out their day to day work by electronic means (41 %), while a fewer number of respondents required print material. Majority (63 %) needed agronomic type of information to perform their work (Table 1). This included plant nutrition, fertilizers and their use, soil microbiology, soil fertility, natural resources, weed science, plant breeding, entomology, and pathology to name but a few. Nearly half (52%) of the respondents indicated that the main knowledge product they used were reports; the other knowledge products fell way below, largely data sets and policy briefs at 10% and 9%, respectively.

Feedback and frequency of sharing the knowledge

Sixty six percent (66%) of the respondents gave feedback to other colleagues and stakeholders they interacted with (Table 2). The feedback was mainly given by email (52 %) as noted by majority of the respondents. The frequency of receiving information from their colleagues and workmates was almost similar for quarterly, monthly, weekly, and daily information sharing (27%), (23%) (22%) and (20%). Most of the respondents were dissatisfied with the information they received. Some of the reasons for dissatisfaction with the information are highlighted in Box 1.

Internal sources of information

Findings show that the major source of information for NARO staff was information generated within NARO itself, i.e., 46% from the Public Agricultural Research Institutes (PARIs) and 30% from the NAROSEC. The PARIs included mostly NACRRI, NASARRI, NARL, NARI, KARI, ARIS, BUZARI, ABIZARDI, NGEZARDI, MUZARDI, and a few others. Whereas the major source of information for the respondents was from the NARO institutes, less than half of the respondents (42%) were alerted about available knowledge and information within NARO via emails; and about a third (33%) found that information themselves via websites. Staff received NARO-wide communications, via meetings (33%) and telephone calls (31 %).

Table 1. Information needs/ Sources/Knowledge products

| Means of obtaining information | (%) | Information needed for the job | (%) | Knowledge products | (%) |
|--------------------------------|-----|--------------------------------|-----|--------------------|-----|
| Electronic | 41 | Agronomic | 63 | Reports | 52 |
| Meetings | 22 | Environment | 10 | Data sets | 10 |
| Print | 16 | Process reports | 8 | Policy briefs | 9 |
| Social media | 7 | Others | 7 | Fact sheets | 8 |
| Others | 7 | Milestone tables | 6 | Brochures | 7 |
| Journals | 3 | Staff lists | 6 | Others | 7 |
| Telephone | 2 | Finance | 1 | Video clips | 4 |
| Physical postage | 1 | | | Journal articles | 2 |
| Multiple stakeholder platforms | 1 | | | Presentations | 1 |

Source: Data from the survey

Table 2. Knowledge sharing frequency/feedback

| Frequency of receiving information | % | Do you give feedback | % | If yes how | % |
|------------------------------------|----|----------------------|----|----------------|----|
| Monthly | 27 | Yes | 66 | Email | 52 |
| Weekly | 23 | No | 34 | Phones | 28 |
| Daily | 22 | | | Reports | 13 |
| Quarterly | 20 | | | Staff meetings | 7 |
| Annually | 4 | | | | |
| Monthly and quarterly | 3 | | | | |

Source: Data from the survey

Box 1. Reasons advanced for dissatisfaction with information received**Quality of Content**

- Some information received need the user to be guided by the mentor/sender for effective use
- Information had biases
- Information received lacked local context
- Information was scanty
- Information not target specific
- Sometimes the quality of the information is poor due to high staff turnover

Access

- Some institutes lacked Internet and libraries had no books or were outdated
- Some institutes lacked resource centres
- Most of the journals with information had restricted access
- Limited linkages between NAROSEC and institute information officers

Status of knowledge resources and knowledge-sharing practices

The audit revealed that information products generated in the organization were mainly reports (36%). The major channels through which the information products were availed to other people within NARO were mainly through meetings (41%) and emails (22 %). The frequency of communicating the communication products to other colleagues was mainly quarterly (31 %). The majority of institutions and individuals shared their communication products through the directorate of research (67%), and they asserted that knowledge sharing was actively rewarded within the institution (60%). This later finding is contrary to the earlier assertion that there was no structure within NARO for demanding information from scientists. There is therefore need for more clarity about knowledge flows in the organization, target stakeholders, content to stakeholders and means of sharing knowledge.

The respondents identified farmers (81.1%) as their main stakeholders, while other value chain actors identified as stakeholders were processors (3%). The main content provided to the major stakeholders (Table 3) was new innovations (29%). According to the respondents, this was communicated to stakeholders mostly through farm visits and electronic means. As the means of communication used by the respondents can only reach a few stakeholders, the finding implies that the major stakeholders (the farmers) barely get communications generated by NARO. This is a serious anomaly that the KMC strategy needs to address.

Within NARO, individuals communicated to others as individuals mainly through social media (29%); as programmes through reports (39%); and as institutes through emails (23 %). The findings indicate that more staff communicate as individuals via social media, implying that social media networking could be exploited by NARO. Findings also show that the respondents did not communicate via websites. This may explain why most NARO institute

Table 3. Content and means of dissemination of information to NARO target stakeholders

| Stakeholders | % | Content to stakeholders | % | Means you communicate it to stakeholders | % |
|----------------------|----|--------------------------|----|--|----|
| Farmers | 81 | New innovations | 29 | Electronic | 18 |
| Government | 9 | Good agronomic practices | 16 | Farm visits | 18 |
| Processors | 3 | Best practices | 13 | TVs and radios | 14 |
| NGOs | 2 | Disease management | 11 | Personal communication | 12 |
| Students | 2 | Seed system | 7 | Others | 12 |
| Academic institution | 1 | Water and environment | 7 | Telephones | 10 |
| Others | 1 | Others | 7 | Policy briefs | 9 |
| | | Postharvest | 6 | Workshops | 6 |
| | | Plant Health | 6 | Group discussions | 1 |

Source: Data from the NARO survey

websites lack useful content. In contrast, the findings also indicate that about a third of the respondents look for information available within NARO via websites. Overall, these findings indicate that the major stakeholders are barely being reached by individual, programme and institutional communication activities of the respondents.

Determination of content for dissemination and means of getting feedback from stakeholders was largely through Scientific committees (48%) and review meetings (23%) mainly determined the content for dissemination to NARO stakeholders. This could be explained by the fact that NARO is a research-based organization and this determines its operation modalities. This also explains why reports and peer reviewed scientific publications are primary source of content of the information products generated. Feedback was mainly provided through phone calls (26%) and meetings (23%). These findings indicate that feedback is given by stakeholders who have direct access to the respondents.

Knowledge capture, storage, access and retrieval

It was further established that most of the information in NARO was stored in libraries (57%) and personal computers (23 %). In terms tools and processes for capturing data, the majority of the respondents indicated that they used technical reports (31 %). There was no evidence indicating that the respondents captured data in databases. Registries were the main format in which information was stored (37%), and the information was mainly retrieved from libraries (46%). The majority of respondents (73%) also indicated that NARO did not have a knowledge retrieval policy (73%).

NARO information and data services

Information and data services are provided to stakeholders to access information generated by NARO either physically or virtually. Just over half of the respondents (53%) said that the organization had a data and information center. In addition, 39% of the respondents asserted that the organization offered question and answer services to stakeholders, and 31% indicated

that NARO offered current awareness services. These findings indicate that stakeholders do seek information and data services when they are provided by an institute.

An equal number of respondents answered yes (41%) and no (41%) to whether their institute evaluated its information services. This indicates that improving the quality of information services is not a priority for the majority of NARO institutes and hence calls for urgent attention. Forty nine percent (49%) of the respondents said that the organization conducted technology promotion services while 40% noted that they did not know whether the organization conducted the services. Of the percentage that said yes they conducted technology promotion services, 54% said that technology promotion was done through agricultural shows. This implies that farmers who do not attend the agricultural shows may never get to know about the technologies promoted.

Generally, knowledge and data management in NARO was characterized by face-to-face meetings, which have become increasingly expensive to organize in terms of time and finance. There is limited use of other sources of knowledge, data, information documents, particularly those located outside their respective institutes. This implies that there is limited access to sources of information available outside the respective institutes of the respondents. In terms of technological readiness, respondents indicated that there was access to key ICT tools required for online Community of Practice (CoP), but the quality of the technologies and services required improvement.

Conclusion

Through the consultative process NARO has developed a Knowledge Management and Communication (KMC) strategy which is intended to give strategic direction to publicly funded agricultural research organizations in the generation, processing, packaging, preservation, storage, and sharing of information (data, knowledge) for the benefit of her key stakeholders. It is envisaged that implementing the strategy will promote delivery of quality and efficient agricultural research services to the technology end users. The goal of the strategy is to enhance the contribution of agricultural research information and knowledge to sustainable agricultural productivity, sustained competitiveness, economic growth, food security and poverty eradication with the purpose to generate and disseminate appropriate, reliable and cost effective agricultural research Information and Knowledge.

The KMC strategy also provides the framework for NARO to respond to the need for agricultural information and knowledge by technology end-users in Uganda. The strategy will be used to set priorities for knowledge management and communication (KMC), set the scope of work for KMC, guide investments in KMC, enable NARO to plan and budget for KMC, guide strategic interactions with stakeholders; and advocate for and inform agricultural policy reforms.

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