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Documenting Agricultural Indigenous Knowledge and provision of access through Online Database platform

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Abstract

The basic component of any country's agricultural knowledge system is its agricultural indigenous knowledge (AIK). It encompasses the skills, experiences and insights of people, applied to maintain or improve their livelihood. Regrettably, today, many AIK systems are at risk of becoming extinct because of rapidly changing natural environments and fast pacing economic, political, and cultural changes on a global scale. Practices vanish if not documented and this curtails knowledge growth. Sometimes, many AIK practices disappear only because of the intrusion of foreign technologies that promise short-term gains or solutions. The tragedy of the impending disappearance of AIK is most obvious to those who have developed it and make a living through it. But the implication for others can be detrimental as well, when skills, technologies, artifacts, problem solving strategies and expertise are lost. Because of the worry for the extinction of AIK, this study was instituted to document AIK among rural communities in three districts in Uganda and design an online platform for accessibility.

Six graduate students from Agriculture and Information Science were trained as research assistants and later paired up for data collection in each of the three districts. To ensure accuracy in data collection, the researchers visited the research assistants in the field. Data were validated by organizing a workshop with farmers in one of the participating districts. After the analysis of the data, an online data-base that captures and distributes AIK was developed (http://agshare-ik.mak.ac.ug/). This approach is considered important because unless efforts are made to capture oral/indigenous community based AIK the region runs the risk of losing this undocumented expertise and cultural idiosyncrasies as western methods are increasingly adopted.

1. Contextual Background and Problem

Interestingly, there is no standard definition of indigenous knowledge (Benguela Current Commission 2013). However, there is a general understanding of what it means. Some people define indigenous knowledge as the local knowledge that is unique to a given culture or society. Some have defined it simply as "local knowledge", while others have expressed it as "folk knowledge", "information base for a society", "traditional wisdom" or, when it applies to the physical environment, as "traditional ecological knowledge" (Warren 1991, World Bank 1997; Emeagwali, 2003 and Valdes 2010; Benguela Current Commission 2013). However, one common characteristics is that it is local knowledge– knowledge that is unique to a given culture or society. Local and indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life (UNESCO 2014). This knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities (Warren 1991, Mkapa 2004). Indigenous knowledge is part of the lives of the rural poor; their livelihood depends almost entirely on specific skills and knowledge essential for their survival. There is not one of the Sustainable Development Goals to whose achievement indigenous knowledge cannot contribute. Societies from all parts of the world possess rich sets of experience, understanding and explanation.

Agriculture has been recognized as a key pillar for developing countries' economies. Approximately 80% of people in developing countries depend on agriculture. In rural areas, agriculture is an important activity which assures access to both food and a source of income (Valdes 2010). In the emerging global knowledge economy, a country's ability to build and mobilize knowledge capital, is equally essential for sustainable development as the availability of physical and financial capital (World Bank, 1997). The basic component of any country's agricultural knowledge system is its agricultural indigenous knowledge. It encompasses the skills, experiences and insights of people, applied to maintain or improve their livelihood (World Bank 1997). However, oral tradition, characteristic of indigenous knowledge systems is often, although erroneous, looked down upon relative to the written tradition. Partly because indigenous knowledge is mainly oral and not written, and partly because it is people-centered and sometimes not so easily 'measurable' (Emeagwali 2003). This regrettably today, is making many agricultural indigenous knowledge systems to be at risk of becoming extinct because of rapidly changing natural environments and fast pacing economic, political, and cultural changes on a global scale. Practices vanish, as they become inappropriate for new challenges or because they adapt too slowly. However, many practices disappear only because of the intrusion of foreign technologies or development concepts that promise short-term gains or solutions to problems without being capable of sustaining them (World Bank 1997). The tragedy of the impending disappearance of indigenous knowledge is most obvious to those who have developed it and make a living through it. But the implication for others can be detrimental as well, when skills, technologies, artifacts, problem solving strategies and expertise are lost (World Bank 1997). Benguela Current Commission (2013) concludes it by noting that interest and awareness of the value of indigenous knowledge, particularly its potential contribution to sustainable development, is increasing at a time when such knowledge is being threatened as never before. It is therefore imperative that AIK is documented, preserved and accessed to contribute to the agricultural knowledge base. It is on this basis that this study was instituted.

1.1 Objectives

The objective of this study were to:

- Document AIK among rural Communities in three districts in Uganda
- Design an online platform for provision of access to the AIK.
- Recommend strategic interventions for protection of AIK

2. Brief Literature Review

Agricultural Indigenous Knowledge: Capturing, Preserving and Accessing

Benguela Current Commission (2013) note that interest and awareness of the value of indigenous knowledge, particularly its potential contribution to sustainable development, is increasing at a time when such knowledge is being threatened as never before. In documenting AIK, it is important that the sources of the information is identified. Mahalik and Mahapatra (2010) note that the sources of the traditional knowledge mainly derived from the human experiences, beliefs and practices are collected from several sources. There are also semi-recorded information such as manuscripts, photographs, and folk literature and grey literature. Ancient people had developed the religious books, grey literature, ethno-botanical texts and archaeological deposits which were the sources of knowledge for those people (Mahalik and Mahapatra 2010). Those sources give detail account of the life of the ancient people and the method of living in a prosperous way. Again, those sources also give information about biotechniques, medicinal knowledge, breeding techniques, agricultural farming systems, healthcare techniques, religious and astrological guidelines and cultural artifacts (Mahalik and Mahapatra 2010). However, one source which is important and where the information given can be verified is the people themselves. Mahalik and Mahapatra (2010) support this when they observe that most of the indigenous traditional knowledge are un-documented and are available orally or in memory of the group of the community of a region or area. Tribal communities have the traditional knowledge and frequently use such knowledge. This is essential as the sources of information on AIK. It should also be noted that people will give the accurate information and where there is doubt this can be verified within the community with similar believe or knowledge. Secondly, it gives the opportunity to the information provider to demonstrate or show how valuable the information is in different ways like pest management, disease treatment, soil fertility improvement among others.

In support of the involvement of people in capturing the IK, Brokensha (1990) noted that the origin of indigenous knowledge can be traced back to the ancient period. People used such knowledge from generation to generation for their livelihood in an unaccounted manner. There are no such written documents for recording and dissemination of such knowledge. The information must be gathered and documented for a particular community. However, In order to capture the AIK, the community members or the knowledge providers would require trust to be built with the knowledge documentalists or researchers. For the whole process of collecting, applying and disseminating indigenous knowledge, full participation of the local people is required (Benuela Current Commission 2013). Farmers just like other community people believe in the people they associate with and trust to provide AIK.

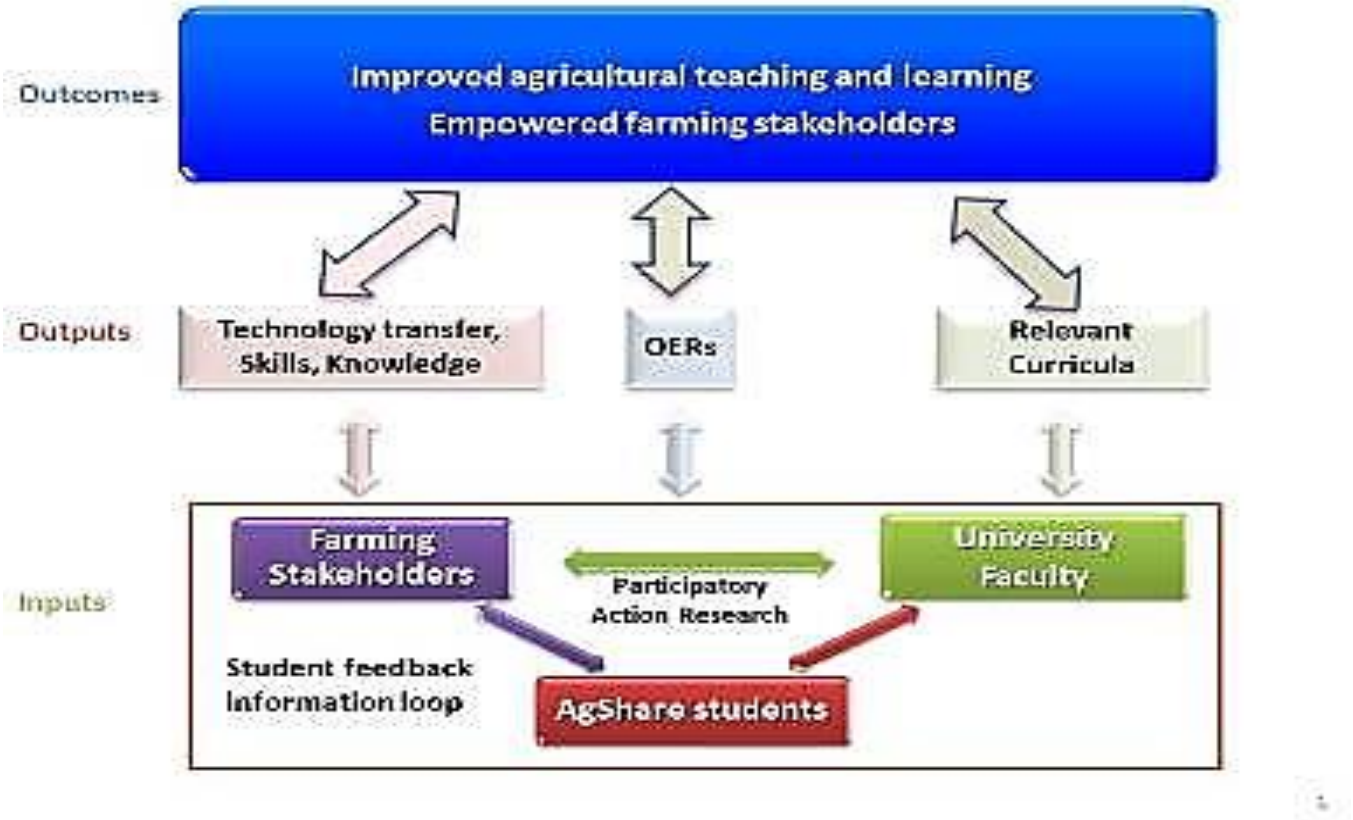
Once the AIK is documented, it is vital that access modalities are created. Platforms where indigenous knowledge is captured, stored and disseminated need to be developed, so as to prevent the erosion of cultural and biological diversity (Benguela Current Commission 2013). As Mahalik and Mahapatra (2010) have noted, after identifying and collecting such information, the appropriate technology can be used for capturing that knowledge in variety of media such as, audio, video, digitized and electronic database. All such knowledge available in libraries may be digitized in systematic classification, cataloguing and indexing so that effective retrieval can be made. Whenever required, the retro-conversion of those documents can be done for developing the digitized format (Mahalik and Mahapatra 2010). Therefore, ICT becomes a very powerful enabler for the exchange of Indigenous Knowledge. While considering the storage, steps may need to be taken to consider classification of textual data,

graphical, pictorial, audio-visual picture of indigenous/traditional knowledge in the database. It should also be noted that by developing the database it is not the end of the process, the developers or practitioners need to prepare the strategy of information services to disseminate information. That is why some strategic interventions are recommended in this study.

3. Methodology

The study was based on the AgShare methodology which is illustrated as below:

Figure 1: AgShare Methodology Illustration



The AgShare methodology is a scalable and sustainable method of filling critical gaps in agriculture related curriculum through a redesigned process. AgShare is a powerful road-tested method that provides strategies for a coherent institutional approach to teaching, research and community development. It is the research process that involves students, farmers and the faculty staff with a purpose of creating Open Education resources and improving on the curriculum at higher institutions. The students work with the farmers and technology applied to document the practices. Once these practices are analysed, the results should inform the curriculum development,

Before data collection commenced, the research assistants were taught on how to capture pictures, videos, uploading videos on the Internet and conducting a qualitative study. The research assistants were master's students in Agriculture and Information Science. Agriculture students were paired up with Information science students during the data collection. To ensure accuracy in data collection, the researchers visited the research assistants in the field. The data collected were validated by organizing a workshop in one of the participating districts. Research assistants were tasked with collecting data from particular communities and they were also selected based on their local dialects. Data collected were also validated through a series of oral interviews and observations. In the course of collecting this data a series of audio and video samples would also be collected to provide both evidence but also to offer multimedia experience for those who access the database. Videos would offer English subtitles but the local dialect would be preserved in the video soundtrack. To further validate the data collected, a team of five competent people were set up to check on the quality of the information and ensure accurate

translations. The proposed database of indigenous agricultural knowledge would store information organised according to different categories such as:

- Relevance to particular agriculture value chains (e.g. Maize, Dairy, Animal husbandry etc.);
- Usage focus (e.g. dealing with pests, ensuring optimal yields, minimising damage during climatic extremes etc.);
- Location, community & language;
- Media format (Text, illustration (Maps & Charts), audio and video etc.)

The research assistants and the researchers were taken through all these.

4. Findings

The main aim was to investigate the forms of Agricultural Indigenous Knowledge used by different groups of farmers. Findings reveal that despite the advent of modern farming methods, many small-scale farmers continue to embrace indigenous farming knowledge for managing soil fertility, controlling pests and diseases, controlling weeds, soil preparation, planting materials, harvesting and storage of indigenous root crops and animals.

The research project sought to establish the existing methods of documenting and disseminating such AIK, investigate the constraints of documenting and disseminating AIK, and determine the best strategies for documenting and disseminating of AIK as Open Educational Resources (OERs), so as to contribute to sustainable food security efforts in Soroti, Hoima and Masaka Districts in Uganda.

i. Documented AIK

The AIK was documented from three districts in Uganda namely: Hoima, Soroti and Masaka.

Data from Hoima District

Hoima District is a district in Western Uganda. Like most other Ugandan districts, it is named after its main municipal centre. Hoima District is bordered by Buliisa District to the north, Masindi District to the northeast, Kyankwanzi District in the east, Kibaale District to the south, Ntoroko District to the southwest and the Democratic Republic of the Congo across Lake Albert to the west. In 2012, the mid-year district population was estimated at 548,800. Agriculture with emphasis on food crops is the backbone of the district economy. Crops grown include: Sorghum, Maize, Millet, Peas, Groundnuts, Sunflowers, potatoes, Beans and Cotton. Others include Tea, Coffee, Tomatoes, Cabbage, Onions and Tobacco. Fishing on Lake Albert employs several hundred people. The recent discovery of petroleum in the district is increasingly attracting people from the district in the many activities that the industry entails.

The study established that a lot of Agricultural Indigenous Knowledge (AIK) exist undocumented. This study documented some of these unknown AIK as depicted in the different photos below:

Figure 2. **Cassava Preservation in Hoima through drying in sun while hanging**



Figure 3: Mixing local herbs to treat calf



Figure 4: Treatment of the calf in progress using the local herbs



When an animal is sick, the farmer has a genuine reason for anxiety. But we may probably not need the services of the vet each and every time we have to deal with animal health problems. Not even should we always have to rush to a farmers' shop for the often expensive vet drugs (Ssali 2010). Some of the problems could be treated with herbs right within our environment. And this is a view also shared by Dr Nicholas Ssekabunga, a veterinary Officer and Farm Manager at Kamenyamiggo District Agricultural Training and Information Centre (Datic) in Masaka. "When a goat had worms, there were herbs used to

remove them. There were herbs used to treat animal fevers and other ailments. Our forefathers knew which herbs to apply when an animal was experiencing difficulty during delivery. There were even herbs to treat infertility among animals. Just like many of us resort to herbs in the treatment of flu and other common ailments there are herbs that can successfully treat some animal diseases," said Dr Ssekabuga (Ssali 2010). However, as noted by Dr Ssekabunga in Ssali (2010) there are still challenges with indigenous knowledge. He notes that our agricultural research organisations should devote more time and money to discovering more about herbal treatment for animal diseases. "Even if some of the herbs are effective in the treatment of the diseases, the dosage is not well understood. For instance, how often should the herb be taken and in what quantities for the young animal and for the grown up animal? (Ssali 2010). This is why indigenous knowledge should be documented to allow scientific investigations.

Another problem is that most people with the indigenous knowledge about herbal medicine are not always ready to share it with others. The lack of written records further complicates the problem as many of them die suddenly without passing on the knowledge to another generation (Ssali 2010). A lot of valuable information has been lost in that way and many medicinal herbs have been cut down and become extinct since other people are ignorant about their usefulness. Most herbalists prefer to keep their knowledge to themselves so as to earn money from those who seek treatment (Sssali 2010). These are real challenges facing the documentation of the indigenous knowledge in general.

Data from Soroti District

1.1 Soroti Background Information.

Like any other indigenous populations of the world who live in a balance and harmony with nature, the Iteso people of Soroti and the entire Teso- sub region of eastern Uganda have been unequivocally good custodians of their cultural norms. Egeru (2011) states that over long periods of time, these people who are agro-pastoralists in the relatively dry lands area have acquired detailed knowledge about the functioning of their immediate environments including observations and insights on a wide array of issues including farming systems. This indigenous knowledge has been vital in responding to the challenges of the Itesots in Soroti District such as floods, droughts, diseases and pest infestations. Droughts in particular are not new phenomena to Iteso and over time, they have developed particular indigenous knowledge to foresee and cope with such challenges. The transfer of this knowledge and associated practices has been embedded in the culture through various rites of passage such as birth, initiation into adulthood, marriage, death, twin dancing and social gatherings that include beer parties (Egeru, 2011).

Some of the snapshots of the documented AIK are as below:

Figure 5: Food preservation in Soroti-Iteso



Data from Masaka District

The Masaka district is the country's agricultural hub for coffee (Coffea spp. L.) and the most important food crops are banana (Musa spp. L.), beans (Phaseolus vulgaris L.), cassava (Manihot esculenta Crantz.), maize (Zea mays L.), sweet potatoes (Ipomoea batatas (L.) Lam.) and other tropical fruits, vegetables and cereals. Pests and diseases have been presenting increasing problems due to the climate change and newly introduced pathogens and pest species (Unger 2014). At the same time, the population growth has led to an increased land pressure and chemical input use, which has impacted the soil fertility, the environment and the health of farmers and consumers. Indigenous knowledge, such as the use of pesticidal plants, is at the risk of becoming extinct due to a lack of documentation and scientific evaluation (Unger 2014). Major pests to be dealt with in the Masaka region include the banana weevil, the bean fly, cereal stem borers, pod feeders, the grain moth, rodents, moths, termites, birds, aphids and cutworms (Mugisha-Kamatenesi *et al.*, 2008).

Figure 6: Human urine collected and mixed with ash and red pepper to control banana weevils



Figure 7: Use of ash to control Banana wilt



ii. Designing an online platform for provision of access to the AIK

Access to information can be through a number of different ways. One of the ways is using online platform. The choice to use online platform was premised on the fact that this would give global access and later raises interest into the scientific investigations into the AIK. For instance, a scientist would pick interest into the mixture of urine and ask that kills the banana weevils and scientifically investigates the content. The designed open online database was developed using Agri-Drupal, to enhance access and exchange of information on agricultural indigenous knowledge. http://agshare-ik.mak.ac.ug

a. The Online Database Structure

The database is structured to enable easy access to the Agricultural Indigenous Knowledge and other related information under collections. The database also gives the login and search provisions. A user can search and accesses the knowledge in text and video formats. All materials included in the repository are either Open Access or Open Educational Resources (OER). They are free to download, distribute, and in the case of OER, to adapt for educational purposes. In this way, AgShare Indigenous Knowledge Database output will be visible to the worldwide scientific community. You can browse the repository by collection, authors, topic, and title. To pinpoint the maximum number of resources contained in the repository, we recommend that you carry out a free text or advanced search. For help on the searching, the help link is provided making it a user friendly online platform.

Collections

- Book Chapters
- Books
- Briefing Papers/Policy Briefs
- Brochures and Fact Sheets
- Case Studies
- Consultancy Reports
- Farmers Handbook
- Indigenous Knowledge Record
- Journal Articles
- Newsletters
- OER and Open Access
- Theses and Dissertations

User login

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Password *

- Log in using OpenID
- Request new password



Free to download, distribute & adapt for educational purposes.
AgShare Indigenous Knowledge Database
Search form

Search Search

Here you will find the intellectual output of the AgShare Indigenous Knowledge Database.

Resources in the Database are listed below. The ones entered most recently are on top.

About AgriDrupal

AgriDrupal, which is based on Drupal, the platform used for the AgShare Indigenous Knowledge Database, was developed by the UN Food and Agricultural Organization...

What are OER & OA?

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iii. Conclusion and Recommendations

Agricultural Indigenous knowledge (AIK) has a role to play for households and community well-being in Uganda. However, AIK is undergoing significant change and is on the decline in Uganda because of factors such as acculturation or the loss of IK through exposure to external cultures. Generally, the barriers to IK transmission include inadequate documentation of IK and the secrecy of custodians of IK. Some of the latter, especially traditional healers, are loathe to divulge their IK on healing to outsiders and to some members of their families. In some communities some healers refused to reveal their healing secrets to their daughters fearing that the latter would share the secrets with the families they marry into (Tabuti and Damme 2012). Over time, these IK disappear when its custodians die or migrate before their IK has been adequately transferred or documented. Despite these challenges, AIK still offers great opportunities for improved agricultural production and sustainable food security. Many authors have recognized it as an important source of developmental information (Anyira, 2010) and have recommended its proper documentation and dissemination for sustainable agricultural development. In Uganda, much of AIK has been lost because of lack of documentation. Therefore, harnessing the Indigenous Agricultural Knowledge potentials is one of the key strategies for developing the agricultural sector. This local knowledge is very crucial for sustainable agriculture and food security. It's essential in maintaining farm productivity, efficiency and profitability in the long run, without depleting the natural resources and the environment. It is therefore imperative to create awareness and bring critical issues relating to the documentation and dissemination of Agricultural Indigenous Knowledge to the policy makers so that its potentials can be harnessed to achieve sustainable food production to combat imminent food crisis.

The responsible Ministry in Uganda should set up national IK Systems Resource Centers in every region and housed by the Public library since every region has a distinct culture. The functions of the resource center will include:

- Providing a national data management function where published and unpublished information on IK are systematically documented for use by researchers and development practitioners through Online Database platform;

- Designing training materials on the methodologies for recording IK systems for use in national training institutes and universities;

- Establishing a link between the local communities, who are the originators of IK and the development community.

Proper recording and documentation of IK used for agriculture. There is need to do proper documentation of IK. Emphasis on good documentation is important since some data do not genuinely indicate IK in the community. This is true especially for a country like Uganda where there are sixty-five indigenous communities (MGLSD, 2006), each with a distinct culture. Therefore, when recording IAK, it is important to find who knows what in order to tap the right source. Otherwise data would not truly reflect IAK in the community.

Currently there are many policy texts and laws that have a bearing on IK in Uganda. Key among these are the Uganda National Culture Policy, the National Indigenous Knowledge Policy of the Uganda National Commission for Science and Technology (UNCST), the regulation on Access to Genetic Resources, and Benefit Sharing (ABS), the Constitution of Uganda, intellectual property right laws including trademark laws, and patent laws. The pivotal role of IK to sustainable livelihoods and national development is well-understood in Uganda, and the need to preserve, integrate, utilize and promote IK, is articulated in the Uganda National Culture Policy of 2006, sections 7.3. and 7.4 (MGLSD, 2006). Collectively, these policies and laws are there to promote IK and to ensure that bio-prospectors using IK develop products and share acquired benefits with IK owners (Tabuti and Damme 2012). What remains is the effective implementation of these policies and the laws to strengthen the documentation of IK including AIK.

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