

Documenting and disseminating agricultural indigenous knowledge for sustainable food security in Uganda

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Abstract

There is a wealth of agricultural indigenous knowledge (AIK) in Uganda, which is useful in livestock keeping, crop management and food processing and storage as well as soil and water management. Unfortunately, this AIK is becoming less visible and irrelevant in some communities because of the adoption of modern methods of farming. In fact, a lot of AIK has remained largely undocumented which threatens its sustained utilisation. One of the bottlenecks of the effective utilisation of AIK is access to relevant and usable indigenous knowledge for the diverse stakeholders in the agricultural sector including farmers. It seems farmers in Uganda are adopting modern methods of agriculture at the expense of the AIK because of the less perceived benefits that AIK promises because crops planted using AIK have often faced pests and diseases and not yielded much. The problem is perhaps compounded because of increasing population growth, land fragmentation as well as migration to urban areas. This phenomenon raises the question of how AIK can be conserved. This paper is based on a study that investigated how Agricultural Indigenous Knowledge (AIK) is documented and disseminated in addition to identifying the challenges faced in its management for sustainable food security in Uganda's district of Soroti. Data in this study was collected through interviews, focus group discussions, document reviews and participant observation. The study findings revealed that despite the advent of modern farming methods, many small-scale farmers in the Soroti district continue to embrace indigenous knowledge in farming such as in managing soil fertility, controlling pests and diseases, controlling weeds, soil preparation, planting materials, harvesting and storage of indigenous root crops and animals. The study concludes that indigenous knowledge is still widely used but most of it is not documented nor fully understood by some members of the community; and that the Iteso and Kumam cultures have some restrictions on who acquires the knowledge. Thus the study recommends that AIKs be recorded for posterity, AIK should be researched upon further, be thoroughly documented and made freely available to anyone who needs it. On the whole, AIK in Soroti district requires attitudinal, behavioural, and methodological changes to give it a scientific touch. Moreover, small-scale farmers should be involved in agricultural extension services rather than leaving the work to formally trained officers who may have little attachment to specific cultural practices in the areas they operate.

Keywords: *Documenting, Disseminating, Agricultural Indigenous Knowledge, Sustainable Food security, Uganda*

Background

For many years, agricultural indigenous knowledge or AIK has been used by indigenous people in Africa, Asia and Latin America to sustain themselves to maintain their cultural identity. This knowledge is variously labelled as focal ecology, ethnology, indigenous knowledge, customary laws and knowledge of the land (Kyarisimire, 2010).

IKs are forms of knowledge that have originated locally and naturally (Altieri, 1995). According to Ermine (cited in Hammersmith 2007), AIK is linked to the communities that produce it and these “natural communities are characterised by complex kinship systems of relationships among people, animals, the earth, the cosmos, etc from which knowing emanates”. This knowledge (AIK) also goes by other names such as traditional knowledge, indigenous technical knowledge, rural knowledge (Nyota & Mapara, 2008) as well as ethno-science (or people’s science) as suggested by Altieri (1995). Studies such as Mapara (2009) indicate that indigenous knowledge systems manifest themselves in agriculture, medicine, security, botany, zoology, craft skills and linguistics as observed in the literature

Kunnie (2000) contends that farmers in the developing world have for long depended on AIK for improved agricultural produce. The applicability of AIK takes place during different farming seasons and periods. According to Nyota and Mapara(2008), such knowledge ranges from clearing the land, tilling, selecting seed varieties for planting, planting, harvesting and storage as well as identifying weather patterns (Lwoga *et al.*, 2010).

Generally, among the indigenous peoples the agricultural sector needs AIK and AIK needs the agriculture sector. This is perhaps because developing the agricultural sector remains a critical factor towards the achievement of sustainable food production and, indeed, global food security in the developing world. According to Swaminathan (2008), farmers in many developing countries have employed both the newly-acquired scientific methods of practising agricultural and the traditional (indigenous) methods. This study refers to these traditional forms of carrying out agriculture as agricultural indigenous knowledge (AIK).

Although indigenous agricultural knowledge is of immense value in improving food production, its documentation and dissemination remain a big challenge. Indigenous knowledge has an important role to play in global knowledge economy (World Bank, 1997). Since AIK is stored in people's memories and activities, its dissemination is mainly through individual or communal expressions, for example, in stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local languages, agricultural practices, equipment, materials, plant species and animal breeds (Swaminathan , 2008).

The utilisation of IK does not stop at farming, health and security alone. There are a number of uses that AIK offers to communities who employ it. Bategeka (2013) observes that different types of soap were made for bathing and washing using indigenous resources such as palm oil, palm kernel, palm fibres, the leaves, and ash. This is a clear manifestation that AIK usage has no physical boundaries although it is commonly seen in the agriculture and medicinal sectors. Unfortunately, most of the traditional knowledge is not documented. Wall (2006) observes that AIK is gradually disappearing in most African countries including Tanzania without any tangible efforts to recognise or manage it. Transfer of AIK from generation to generation is mostly done through oral tradition or by demonstration. AIK is gradually disappearing in most African countries including Uganda without any tangible efforts to recognise or manage it (Lwoga, 2010). In agreement with the above facts, Kumar(2010) attributes this to the fact that oral paths are being blocked and people are no longer staying in homogenous community blocks. The conviction here is that AIK seems not to be appropriately documented and disseminated and even the little that is in distribution is notably under looked in favour of scientific methods.

Uganda's Agricultural Sector

In spite of all threat attempts meant to develop agriculture in Uganda, the county's agricultural sector is still in despair. In recent years, the production trends of the sector's major crops were inconsistent. Although relatively positive increases were recorded for cereals (maize, millet, rice and sorghum), beans and simsim, significant declines were noted for root crops such as cassava, Irish and sweet potatoes and export crops such as cotton and coffee also declined. The performance of crops in terms of yields also varied significantly (Plan for Modernisation of

Agriculture [PMA] Secretariat, 2008). The agriculture sector, which is mainly for subsistence, employs the largest proportion of Uganda's workforce. During the Population and Housing Census (PHC) 2002, about 73 percent (81% female and 67% males) of the workforce was employed in agriculture, making it the dominant economic activity at that time. The sector remains a major employer to-date, with 70 percent and 66 percent of the working population engaged in agriculture during 2009/10 and 2010/11, respectively. The sector is crucial for general growth of the economy (providing inputs into the industrial sector) and poverty reduction especially among the rural poor for whom it provides employment (Uganda Bureau of Statistics, 2012). According to the Ministry of Finance Planning and Economic Development (MFPED 2003), not a lot is expected to change by 2020. The report indicated that the condition would instead worsen due to increased population and climate change. The main traditional cash crops grown in Uganda are coffee, cotton, tobacco, tea and sugar cane, while the traditional food crops are mainly maize, beans, cassava, Sorghum potatoes, sweet potatoes, groundnuts, bananas and finger-millet (MFPED, 2003).

Problem Statement

There is a wealth of AIK in Uganda, which is useful in livestock-keeping, crop management, and food processing and storage as well as soil and water management (Tabuti, 2003). Unfortunately, according to Ngulube (2002), this AIK is becoming less visible and insignificant in some communities because of the adoption of modern methods of farming. Perhaps a lot of AIK has remained largely undocumented which threatens its sustained utilisation. The problem is compounded by the soaring population growth, and fragmentation as well as migration to urban centres (Ebanyat *et al.*, 2010). This situation raises the question regarding how AIK can be conserved. Unless means for recording and preserving AIK in a comprehensive way can be found, some communities risk losing major sources of AIK which is useful for the indigenous people and for food security. In this regard, it was imperative for the study to investigate AIK management practices in Soroti district to identify the challenges encountered in documenting and dissemination AIK in a bid to find a solution towards using AIK for sustainable farming and food security.

Objectives

The study was guided by the following objectives:

- i. To identify the forms of AIK in use in Soroti district.
- ii. To establish the existing methods of documenting and disseminating AIK agricultural production.
- iii. To examine the constraints in documenting and disseminating AIK in Soroti district.
- iv. To propose best strategies for documenting and disseminating of AIK in Soroti district.

Literature Review

Rural communities in developing countries have an extensive base of widely available indigenous knowledge (IK). This knowledge is unique to a given culture, and it is predominantly tacit and embedded in practices and experiences of the local people (Sen & Khashmelmous, 2006). Kumar (2010) defines indigenous knowledge as the knowledge that has been developed over time in a community mainly through the accumulation of experiences and intimate understanding of the environment in a given culture. In the authors' views, native knowledge, traditional knowledge, cultural knowledge and civilization knowledge are synonymous terms. Various sources of literature are holistically in support of this assertion. There seems to be a general consensus that IK is unique to a given culture, society or a country: "It is seen to contrast with knowledge generated within the international systems of universities, research institutions and private firms" (Aluma, 2010).

There are a number of other studies on IK and Western knowledge. They indicate that there is a significant difference between IK and the Western knowledge which is also referred to as modern knowledge or scientific knowledge by different authors. According to Agrawal (1995), there are differences between indigenous and Western knowledge with respect to their history and distinctive characteristics. However, Briggs (2005) argues that the presumption that indigenous knowledge is concerned with the immediate and concrete necessities of people's daily livelihoods whereas Western knowledge attempts to construct general explanations and is one step removed from the daily lives of the people, does not hold water. There is scarcely any aspect of life in the West today that does not bear the imprint of science (Agrawal, 1995). At the same time, many writers on indigenous knowledge such as Kunnie (2000), Swift (1979),

Swift (1996), and Scoones and Thompson (1994) agree that it also encompasses non-technical insights, wisdom, ideas, perceptions and innovative capabilities.

Agricultural Indigenous Knowledge Model

AIK can be explained using various models towards the application of knowledge management in developing countries. Indigenous agricultural knowledge can be approached from the perspective of critical theory, analysing the relationship between knowledge and relations of power, with the goal of liberating indigenous farmers from forms of domination. Indigenous agricultural knowledge can also be explained using knowledge management models, since they add new insights and provide a range of possible solutions for knowledge management practices. These knowledge management models are specifically employed to provide a detailed and broad explanation and as a theoretical perspective (Tella, 2007).

Research Methodology

The study employed an ethnographic study approach to collecting qualitative data from a sample of 351 informants who were selected using random, purposive and snowball sampling techniques. The data collected included audio and video recordings (interviews, discussions, and conversations), pictures, structured personal interviews, focus group discussions and participant observation. A field-test questionnaire was also deployed to collect information from farmers using of interpreters in Ateso and Kuman languages.

Findings of the Study

The findings show that there are three major forms of AIK that are in use in Soroti district namely pest and disease management; food and grain storage and preservation; and soil fertility management. From the literature, many farmers talk about AIK but there are no specific forms or types of agricultural indigenous knowledge they provide. They differ in names but the applicability is the same from community to community and from clan to clan. This finding supports Thomas (2008) who notes that agricultural indigenous knowledge is not uniformly distributed and differs among and within communities. These variations in AIK, according to Somnasang and Moreno-Black (2000), occur because of cultural and geographical diversity. In Uganda, it is estimated that there are more than 65 indigenous communities or ethnic groups

(MGLSD, 2006), each of which is culturally distinct and has unique IK. Even within the same cultures, there are variations. For example, for each ethnic group in Uganda, there exists a diversity of clans which greatly add to the diversity in IK (Katende & Kityo, 1996).

Pests and Disease Management

In crop husbandry, the Teso use IK to control pests and protect harvests. This finding supports (Aluma, 2010) who noted that farmers use IK in the identification, production and/or harvesting of plants, animals and insects and their preparation and preservation for food. Aluma further notes that IK is used in making drugs for human and animal health, food preservation and crop protection (against pests/diseases) as well as management systems and techniques for crops, livestock, ecosystems conservation and communities.

The farmers in Soroti, for example, use local medicine to treat animals and plants when they are attacked by pests and diseases. To control pests and diseases in livestock, for instance, the findings indicate that farmers use a variety of locally-made medicinal plants to treat the animals. In fact, many farmers have developed ways of making their own spray from plants such as NEEM, garlic, red pepper, ash and marigolds.

Furthermore, farmers slash and burn the infected crops, carry out crop rotation and cultivate different varieties of crops to control the spreading of pests and diseases. This finding further supports Waziri and Aliero (2005) who noted that growing the same crops in the same garden year after year can encourage an accumulation of pests and diseases in the soil. These destructive agents keep on spreading from one crop to the next. The general recommendation is that crops should be cultivated in a different garden each year, and not planted in the same place for several years. According to the farmers, crop rotation hinders a variety of natural predators from surviving on the farm. The farmers in Soroti also spray crops with human and animal urine, dust the seeds with pepper. In this regard, one of the farmers said: “We mix animal urine, animal waste, poisonous plant leaves and ash to treat diseases in their animals such as diarrhoea, constipation and stomach-ache, flu in cows and goats...” According to the farmer, pest control medicine for plants is locally known as “Ikeeluikorion”.

Indigenous Soil Identification and Preparation Methods

The farmers also employ indigenous ways of classifying and characterising local soil types in their fields basing on the soils characteristics, problems, and their suitability for various crops. They make use of ditches, traditional waterways, stone terraces, vegetative barriers and contour ploughing to control soil erosion. It was further noted that some households in Soroti district practice non-tillage farming (soil is not tilled) as a method of soil fertility control whereby the land is cleared by hand or burning and crops are raised with minimum disturbance to the soil. Holes for planting are made with hoes. In the case of cassava, the cuttings are placed in the hole and the base is covered with soil. Farmers testified that there is generally no significant difference in terms of yield between tillage and non-tillage systems. They also mentioned that there are other benefits such as soil conservation and lower labour input compared to mechanised ploughing. Some farmers indicated that it would be wise to avoid ploughing fields because weed infestation is greater with tillage and inputs are also high.

Importance of AIK in Fostering Sustainable Agricultural Crop Production

Farmers were asked to state their main reasons for using indigenous methods in crop production. Of the 323 respondents, 28 percent agreed that AIK increased the crop yield; 24 percent indicated that it was cost-effective; and 21 percent said it improved storage quality. Other concerns raised were that wild medicinal plants and traditional crops have been reduced and modern farming systems or practices are a major contributory factor to this development. Asked about future trends, one of the farmers explained:

Traditional cropping practices are declining due to increased use in external inputs such as inorganic fertiliser, pesticides and mechanisation that diminishes the significance of nature. Introduced agricultural crop diversification likewise contributes to the loss of agro biodiversity and causes other environmental challenges which are unique to IK users.

Using folk taxonomies (practice of classifying plants and animals according to their presumed natural relationships), the study established that the people of Soroti district possess large and diverse knowledge of plant use. Their knowledge covered the management of human illnesses as well as magical, spiritual or ritual conditions. Other plants were specifically for diseases and conditions of cattle, covering many aspects of animal diseases, their treatment and control.

Importance of AIK to Sustainable Agriculture—Animal Production

The findings show that AIK is important in animal husbandry in Soroti district. Regarding the responses, 23 percent of the respondents said it was less time consuming, 27 percent said it was cost-effective, 33 percent did said that it was easily available, and 17 percent confessed that AIK was compatible with their systems of animal production . According to the farmers, “local herbs are crushed and mixed with water to activate hormones that increase milk production (locally called ‘Nabekiroke’. This herb is made from groundnut or ‘okileomaido’ leaves). This drug is also for general purpose and serves in treating a variety of animal ailments. According to one respondent: *“Ekweruis an herb used to cure blind cows and goats. When livestock has eye infections or the skin is dry, the leaves are harvested, mashed then mixed with water.”* It is also believed to cure several ailments in animals (broad-spectrum treatment). Other animal diseases frequently mentioned in Teso sub-region include CBPB(cough for cows) which affects cow’s lungs. In one account, it was revealed that some years back, when there was an outbreak of this disease in Soroti district (CDPP), many animals died despite receiving treatment from the area veterinary officers.

The elders in the area recommended an expert traditionalist to the DAO officers who intervened with AIK and helped to cure the disease. The traditional experts reported having acquired knowledge in their family line through community elders and their parents. The parents in turn disseminated the same knowledge by teaching their children. Several respondents claimed that AIK for animal diseases was, in fact, more effective than the Western medicine. It was noted that different Teso communities have medicinal experts, whom they consult whenever there is an outbreak of animal diseases in their areas. It was also noted that the very Teso culture has restrictions on who acquires the knowledge. For instance, only the children of the medicine-man are entitled to inheriting that specific knowledge. In other words, nobody from outside the family or direct lineage should get to benefit from the skills. This is in a way barrier to effective documentation and dissemination of the useful AIKs. In cases where an individual who is not a family member wants to acquire the skill from the experts on AIK, there is some “fee” to be paid for one to do so. . One farmer said: “Local knowledge in animal production was advantageous because we utilise local resources which are also cost-effective.” This stance is perhaps attributable to chemicals and manufactured animal feeds being expensive, requiring cash and the

majority of farmers in Soroti being smallholders who cannot afford to rely on modern farm inputs because they can be far more expensive than their average household income could afford. Indeed, these small-scale farmers are less dependent on outside supplies which can be more expensive and can be available only on an irregular basis. Therefore, IK seems to give them a sense of “ownership of the means of production” at all levels.

AIKs are deemed to be little time consuming because of small farm sizes and the system of production is mainly manual. The farmers reported that IK in animal production is a compatible system of production because they are familiar with indigenous practices and technologies. They understand how to handle and maintain them better than the newly-introduced Western practices and technologies that are encouraged by agricultural extension farmers.

Use of AIK Practices in Improving Food Security Among Farming Communities in Soroti District

Storage and Preservation

During storage and preservation of agricultural harvests, the farmers noted that they mainly use granaries to store and preserve their farm produce. The farmers further noted that they thereafter harvesting their produce such as sweet-potatoes, they peel and slice them, put them in the sun to dry and store the dried sweet-potatoes (Amukeke) in the granary. According to one farmer:

This amukeke can be stored and remains fresh for 2 to 3 years. However, when pests attack this amukeke in the granary, it's periodically removed and exposed under direct sunshine and the pests and fleas will die.

Another farmer noted:

After harvesting maize, they dry it and remove it from the cobs. After that, they put it in sacks, fix charismas tree leaves and store the maize in a cool dry place. The charismas tree leaves will then dry in the stored maize and the scent will remain in the maize. This scent is very crucial in repelling any potential pest that intends to eat the stored grains.

In addition, farmers noted that the use of red-pepper (pili-pili) to keep and protect their beans from pests is very common. One farmer said:

After harvesting, I dry the beans; remove them from pods by threshing the dry heaps of the beans. I then winnow them, picking out the good seeds, mixing them with red pepper. Then I put them in the sacks and store them in the kitchen. The beans will never be attacked by the bean weevils.

Storage of Grains for Food

It was noted that indigenous storage systems for grains such as maize and sorghum are different from those for perishable crops. In the Teso area, maize is primarily stored in granaries, locally known as “Edula” by the majority of the farmers. Whereas some farmers agreed that they have stored maize and sorghum in cool shades, they still confessed that keeping such produce in granaries was better. One farmer particularly noted that it lasts longer: “Such stored food helps us during the hard times of famine and long try spells”.

However, even in few homesteads where farming is commercialised with a sizable acreage, material resource bases are strictly limited; therefore, their storage and processing systems are generally simple. As a result of their simplicity and the fact that the set techniques are usually individually small-scale, they have in many cases been dismissed as “naive” by agricultural extension workers and commercial farmers. But these indigenous ways of preserving agricultural produce have been pivotal in promoting food security in Soroti district.

Seeds Preservation

The food crops found in Soroti include maize, simsim, groundnuts (emaido), millet and sorghum. The Itesots do have a clear concept of selecting seeds. In the case of sorghum, those that are kept specifically for use as seed are differentiated and are selected at the time of threshing and kept specifically for planting seed for the following year. To store maize and sorghum, one farmer noted that they select the best quality seeds and cobs and keep them around the fireplace. In this regard, one farmer said:

This local method of preserving produce for food and seeds has been very effective for me. It keeps the produce free from any insects that can attack it. The hot environment and the unbearable smoke kill the insects that try to invade the maize and sorghum.

For crops such as groundnuts and soya beans, the seeds are stored in pods or sacks so at the time of planting they have to be further sorted out. Similarly, after harvesting, the grains are also hung in the kitchen or shades in special containers or baskets. For simsim, smaller quantities of grains are selected and kept in gourds (Etuwo). There are different varieties planted by farmers in the area. For instance, some varieties of simsim are for short periods, taking three months to harvest while other varieties take up to seven months to harvest. To deal with pests and diseases in simsim plants, respondents agreed to growing traditional and disease-

resistant varieties which do not need scientific drugs for treating. Furthermore, for these traditional varieties which are commonly grown, farmers use ash to control pests such as weevils which attack the harvested seeds.

Some commonly used AIK practices in harvesting and storage include the use of traditional basket granaries, dusting with ash for storage preservation against weevils, winnowing of millet to remove thrash, packing cereals in sacks after threshing, sun-drying of legumes to dry them fully before storage and mixing them with ash for storage.

Other methods previously used very much but now being phased out include leaving harvests in the field (ground) and storing under shades (banana leaves or trees). Doing so helps to avoid pests and rodents (locally known as “ikuru” and “imukunyo”). These methods are no longer suitable because of land fragmentation and as a measure taken as a precaution against theft.

Therefore, in an attempt to overcome challenges to food security, the people of Teso area especially in Soroti district, harvest their produce and store them in granaries and around fire-places or on top of the roof. Elsewhere in Uganda, granaries are widely used to store agricultural produce. For crops such as cassava, local farmers practice what they call “storage avoidance”. This practice was also evident in many local communities in other parts of the country such as Hoima and Butaleja, where local farmers keep their produce in granaries and leave cassava in the gardens. The farmers uproot the cassava only when they are going to prepare it a meal either on that day or the following day (Tororo District Local Government, 2013).

In addition, food security in Soroti district has significantly improved following the return of internally-displaced persons (IDPs) to their original homes. Findings by the World Food Programme (WFP) led Emergency Food Security Assessment (2009) confirmed that food security conditions have greatly improved in the Teso sub-region and that food distributions to households affected by poor seasons would not be needed beyond 2014. By the time of data collection for this study, farmers noted that governmental and non-governmental organisations who had been operating in the entire Teso sub-region and Karamoja had stopped issuing food hand-outs and concentrated on promoting food security.

Existing Methods of Documenting and Disseminating AIK

The findings reveal that there are mainly three existing methods of documenting and disseminating AIK in Soroti district. These methods are in categorised indistinctive units namely: the Family units, agricultural researchers and agricultural extension workers also sometimes called development practitioners. This is supported by Abiola *et al.*(2011) who conducted a study on “*Documenting and Disseminating Agricultural Indigenous Knowledge for Sustainable Food Security: The Efforts of Agricultural Research Libraries in Nigeria*”. They stated that all the respondents identified oral history, case study, group interview, dialogue, field observation and joint interpretation, farmers’ participation and key informants means as the major methods employed in documenting AIK.

Family Units

Within family units, AIK is documented by some families and disseminated through family members and the communities. The family members are both female and male. In communities, AIK is documented and disseminated through folklore whereby the seniors in the community share the traditions community with their indigenous agriculture culture, subculture or the entire tribe and or clans. What is commonly adopted in Soroti district are the oral traditions such as tales, proverbs and jokes on agricultural indigenous knowledge practices.

Agricultural Researchers

According to the findings, agricultural researchers mainly document AIK through academic research reports, dissertations and thesis. With the advent of ICTs, AIK is also captured through CDs, data bases as a means of sharing and disseminating research findings. Additionally, many of the communities including Soroti would require researchers to return to the district and share what they documented to authenticate or validate the knowledge shared with them.

The study findings further indicate that the agricultural researchers face the constraints of inadequate training and limited input from the farmers. More investment in agricultural research would raise production which is critical to food security in Soroti district now and in future.

Agricultural Extension Workers

Agricultural extension workers also play a role in the documentation and dissemination of AIK in

Soroti district. The findings show that agricultural extension workers are engaged in field visits. During these field visits, they document and disseminate AIK to the locals. This finding supports Abiola *et al.* (2011) who found that the major channel of documenting and disseminating AIK through leaflets and bulletins. This study also found that 6.2 percent of the respondents claimed to use the radio and television as channels of AIK dissemination. Other channels identified by the authors in the course of the study are mobile library services and research reports.

The findings further reveal that there are mainly three existing methods of documenting and disseminating AIK in Soroti district. These methods are at three levels: the family units, agricultural researchers and agricultural extension workers. The local farmers document their AIK using what can be dubbed as cheap methods such as simple write-ups in books. They then pass on the AIK to their trusted children and other members of the family. This is orally done usually in their local dialect.

The agricultural researchers and agricultural extension workers are the ones who try to document this AIK in a more improved way. They capture the data collected from the field and systematically process it. They then write reports out of the data obtained. This method of AIK dissemination is not done only in Soroti district but even other parts of Uganda and the world. It is also practised in the developed world in a more technologically advanced way. In support of this finding, Warren *et al.* (1993) noted that in the developed world like in US, AIK studies have been archived in national and international centres in the form of databases. The information in these databases is systematically classified. However, Aluma (2010) has got a totally different view of AIK documentation. He notes that documentation of IK related to medicinal plants, herbal concoctions and the diseases treated (human and livestock), crop protection and food preservation has been ongoing but in and how ways. This is a big challenge and as Africans, we need to be serious about the documentation, protection and promotion of IK that we own (Moahi, 2012).

Many studies recommend the use of Information Communication Technologies (ICTs) in the documentation and dissemination of AIK. According to Lwoga and Ngulube (2008), ICTs are important tools in enabling the management and integration of indigenous and exogenous

knowledge in developing countries. This particular statement envisages the future of AIK. However, it remains to be seen how ICTs will be adapted and deployed by rural poor communities to document and disseminate AIK.

Constraints of Documenting and Disseminating AIK

The study findings indicate that the constraints of documenting and disseminating AIK are at four levels namely families, communities, agricultural researchers and government and extension workers.

Families: The biggest constraint amongst families is the ineffective family linkages. This is coupled with poor gender mainstreaming in extension activities and lowland and labour productivity have limited documenting and disseminating AIK in Soroti district

Communities: For the communities, the findings show that the biggest constraints that they face in the dissemination of AIK are communication problems and reservations about innovation, increased population growth and fragmented landholdings and small farms.

Government and Extension workers: The findings of the study further reveal that the government and extension workers have failed to document and disseminate AIK. Since extension workers play a pivotal role in disseminating agricultural information to the farmers, it is important to empower them to document and disseminate AIK for food security in Soroti. The findings indicate that there are several constraints involved in documenting and disseminating AIK in Soroti district. These constraints are positioned in three categories of people namely families, communities and the agricultural researchers. According to findings of the study, the biggest constraint amongst families is ineffective family linkages. This is coupled with poor gender mainstreaming in extension activities and low land and labour productivity. These findings support Okorafor (2010) who observed that the obstacles faced in the documentation of AIK include lack of suitable equipment for documentation, language barrier (in cases where the researcher does not understand the local languages), memory failure on the part of the resource persons as indigenous knowledge is orally passed from generation to generation, particularly in most African societies, cultural practices such as require certain rites to be performed as a

condition precedent to documentation, and intellectual property rights issues which might discourage full disclosure of indigenous knowledge. These findings are in line with those of Anyira (2010) in his study on preservation and accessibility of indigenous knowledge in the Niger Delta area of Nigeria.

For the communities, the findings show that the biggest constraints that they face in the dissemination of AIK are communication problems and reservations about innovation, increased population growth and fragmented land holdings and small farms. Gender dynamics and politics were also noted to have played a role in constraining the documentation of AIK. This finding supports Mudege (2005) who noted that AIK distribution is always fragmentary, due to gender dynamics, politics, power, culture, conflicts, resistance, religious beliefs and government policies. Furthermore, Tabuti *et al.* (2004) also notes that IKs disappearing because of increasing barriers that affect its transmission among community members.

Lwoga *et al.* (2010) attributes the lack of AIK documentation to libraries. He observed that research libraries have not been particularly active in documenting AIK. Nakata and Langton (2005) underscore the need for libraries to consider indigenous knowledge not simply part of a historical archive but a contemporary body of relevant knowledge.

Conclusions and Recommendations

Indigenous knowledge in farming is valued as a base and for determining food production and labour division between gender and age groups. This knowledge system regarding farming systems, which has been refined over generations, might be used to ensure that agricultural developments are viable within the local environment. Farmers in local communities need to and still employ various indigenous practices most of which cut across the crops grown. One of the pillars for indigenous as well as improved farming methods practised in the study area is early planting which is especially important in the agro-ecological communities where agriculture is rain-fed. Farmers take advantage of the early rains which also reduce the incidences of pests and plant disease to produce high yields.

The best strategies were determined in the light of the existing challenges in documenting and

disseminating IK in the country. The study makes the following five recommended strategies for proper management of AIK to ensure sustainable food security in Soroti district.

- a) IK should be researched upon and be thoroughly documented and made freely available to anyone who needs it. Doing so would help overcome the challenge of restricted specific lineage or family or clans. AIK in Soroti district further requires attitudinal, behavioural, and methodological changes to give it a scientific touch. It has been noticed that there is little trust between what agricultural extension workers believe as the best practices and the perceptions of the small-scale farmers.
- b) Small-scale farmers should be involved in agricultural extension services rather than leaving this work only in the hands of formally-trained officers who may have little attachment to specific cultural practices obtaining in the areas in which they operate. This view is supported by Moahi(2005) who states that there is a need to have individuals with the expertise to research on indigenous knowledge; with the ability to work with communities in non-threatening, respectful ways that would encourage communities to share their knowledge freely. In addition, IK that has already been documented needs to be evaluated to confirm its efficacy and utility. There is a need to raise awareness through the dissemination of salient information among community member so that they could be exposed to the most appropriate knowledge and technologies, and the benefits of adopting them.
- c) Where possible, strategies should be developed for mainstreaming IK and technologies in development actions and the national teaching curriculum at all levels of instruction from the primary level to secondary and university levels. In this campaign, universities should take centre-stage since they are the main producers and generators of knowledge and, more significantly, one cannot overlook their role in producing future leaders.
- d) Empower the private sector, the government and non-governmental organisations to support and advance the use of IK in the country. Currently, there is such a national strategy for the development and application of IK which was developed and is still being implemented by different national public and private sector based institutions

(NCL, Mbarara University of Science and Technology, Gulu University, Makerere University and the National Foundation for Research and Development). However, to be effective, this initiative still needs to work within a wider policy framework than it presently does.

- e) Finally, there is need for a fund to support IK development in different regions of the country as well as the need to for setting up regional centres for research on IK across the country to harness the rich cultural values that have yet to be documented in many cultural practices.

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