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Documenting and Disseminating Agricultural Indigenous Knowledge for Sustainable Food Security: The Efforts of Agricultural Research Libraries in Nigeria

Abstract: Developing the agricultural sector remains a critical factor towards the achievement of sustainable food production and, indeed, global food security. While indigenous agricultural knowledge is of immense value in improving food production, its documentation and dissemination remain a big challenge confronting librarians and other information professionals, particularly in Africa where traditional practices are prevalent. This study, therefore, investigated the efforts of agricultural research libraries in Nigeria in documenting and disseminating agricultural indigenous knowledge towards achieving sustainable food security in the country. It also determined the agricultural indigenous practices that have been documented as well as the obstacles to the documentation of agricultural indigenous knowledge. Librarians in selected agricultural research libraries in Nigeria constituted the target population of the study, and a questionnaire was the instrument used for data collection. Based on the findings of the study, recommendations have been made aimed at improving the documentation and dissemination of agricultural indigenous knowledge in order to enhance food security in Nigeria.

saying. In most cultures, there are popular sayings or proverbs emphasizing the importance of food to human existence. Among the Yoruba people of South Western Nigeria, there is a popular saying to the effect that no other matter can arise or be entertained in the presence of hunger. It is, therefore, not a surprise that the world food situation which has reached a critical and alarming state has led to concerns about the potential for a global food crisis and made food security a global concern. It is estimated that over 900 million people around the world suffer from hunger while an even larger number experience malnutrition, the majority being in lower income developing countries. Strategic programmes and initiatives have been adopted at different levels to tackle the challenges of food security and prevent the imminent global food crisis. International organizations, particularly the United Nations Food and Agricultural Organization (FAO) have championed some of these initiatives. In Africa, the African Union (AU) has put in place a plan to make Africa food secure by requiring countries in the continent to allocate “substantial amounts from government own [sic] resources to agriculture and related investments” (Peace 2010). This plan is in apparent recognition of agriculture as the critical sector for sustainable food security. One of the strategies for developing the agricultural sector is to harness the potentials of indigenous agricultural knowledge (AIK) which has gained recognition through many initiatives including the 1992 United Nations Conference on Environmental Development (Centre for International Earth Science Information Network 2011), the potential contribution of which towards achieving the Millennium Development Goals, particularly the eradication of poverty and hunger has been acknowledged. This can be promoted through the documentation and dissemination of AIK. The documentation and dissemination of AIK, therefore, constitute a critical challenge facing librarians in Nigeria.

The literature on AIK does not provide a single definition of the concept. This lack of awareness is in part due to

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Introduction

Of all human basic needs, food seems to be the most critical. A hungry person is an angry person goes a common

the differences in background and perspectives of various authors, ranging from social, anthropology to agricultural engineering. Nevertheless, the various definitions have some common traits which are that AIK is:

- generated within communities (Agrawal 1995);
- location and culture specific (Ahmed 1994);
- the basis for decision making and survival strategies (Agrawal 1995, 416);
- not systematically documented;
- concerned with critical issues of human and animal life: primary production, human and animal life, natural resource management;
- dynamic and based on innovation, adaptation, and experimentation; and
- oral and rural in nature (UNESCO 1999; Ossai 2010; Sadiku and Sadiku 2011).

According to Sundamari and Ranganathan (2003), AIK is an unwritten body of knowledge. It is held in different brains, expressed in various languages and skills, in as many groups, cultures and environments. According to Atteh (1989) cited in Williams and Muchena (1991), “it covers the whole range of human experience.” Hence, as AIK is closely related to survival and subsistence, it provides a basis for local-level decision making in:

- food security
- human and animal health
- education
- natural resources management
- various other community-based activities.

However, ironically the existence of AIK is threatened by the development process, and the World Bank states that indigenous knowledge systems are “at risk of becoming extinct” (Ahmed 1994). Kothari (1995) attributed this to the fact that oral paths are being blocked and people are no longer living in homogenous community blocks. AIK systems in rural communities are rarely documented. Thus, should the existing methods of preservation and perpetuation be disrupted, there is a risk that within one generation, the knowledge could be lost forever (Warren 1993). The fact that AIK is threatened with extinction justifies the call for documentation.

In Nigeria, it is encouraging to observe that, over the last two decades, there has been a dramatic increase in interest in the role that indigenous knowledge can play in truly participatory approaches to food security for sustainable development. It may not be accidental that the growing interest in the potential contribution of indigenous knowledge to development is becoming manifest at a time when current development models have not

proven successful. Recent research has given valuable insights into how people use their own locally generated knowledge to change and improve, for example, natural resource management. The agricultural sector provides a prime example. Farmers adopt a wide range of indigenous agricultural practices based on generations of experience, informal experiments and intimate understanding of their environments. The application of indigenous agricultural farming for example is reflected in the following:

- Indigenous soil preparation and planting materials
- Indigenous methods of controlling pests and diseases
- Indigenous methods of maintaining soil fertility
- Indigenous methods of controlling weeds
- Indigenous methods of harvesting and storage.

This article is not concerned with the details of the indigenous knowledge itself, but in the ways that agricultural research institutes in Nigeria have documented and disseminated AIK in seeking to assure sustainable food security in Nigeria. The idea of documentation of agricultural indigenous practices in Nigerian national agricultural research institutes is based on the observation that carefully documented case histories can provide excellent guidelines for policy making and planning new projects that can sustain food security. The literature has shown that many people are working on agricultural projects in which indigenous knowledge plays an essential and practical role (Anyira, Onoriode, and Nwabueze 2010; Chisita 2011). It is very important that information about these kinds of projects is made available worldwide so that other people can learn from the experiences.

It is believed that indigenous knowledge has much to offer and teach the world at large and only by research and documentation can it be preserved and made available to development workers worldwide, and its uses exploited. Ngulube (2002) noted that the growing realization of the role of indigenous knowledge in national development has led to the increasing interest in its preservation and management. Tikai and Kama (2010), in their study of indigenous knowledge and its role to sustainable agriculture in Samoa, recommended proper recording and documentation of indigenous knowledge used for agriculture; it is important when documenting to find out who knows what in order to tap the right source for data to reflect accurately the indigenous knowledge in the community. It is for this reason that the efforts of national agricultural research institutes in Nigeria at documenting and disseminating agricultural indigenous knowledge were investigated.

Food Security Situation in Nigeria

As in other parts of the world, food security is a major concern in Nigeria. The importance attached to it is reflected in the policy thrust of the late Musa YarAdua (the immediate past President of Nigeria) and his seven-point agenda for the country. According to the FAO's definition cited in Koc *et al.* (2000, 1), food security means "that food is available at all times; that all persons have means of access to it; that it is nutritionally adequate in terms of quantity, quality and variety; and that it is acceptable within the given culture."

From this definition, the key elements of food security are food availability, accessibility and utilization. The situation in Nigeria is critical. Though domestic food production is on the increase, it is not enough to keep pace with the increasing population because of past neglect of the agricultural sector. Access to adequate and nutritious food is limited by the low income of the majority of the populace. Consequently, access to food is now perceived by many as a privilege rather than a basic human right. Large numbers of people (mainly women, children and the elderly) suffer from malnutrition (Omonona and Agoi 2007). A high level of malnutrition is particularly reported among rural children, with the figure varying from 56 percent in rural communities in the South West to 84.3 percent of those in Northern Nigeria (Akinyele 2009). According to the National Bureau of Statistics (2007), food utilization and nutritional well-being of many households in Nigeria are of relatively low quality, while about 60.8 percent Nigerians are malnourished. Far from disappearing, hunger and malnutrition seem to be on the increase. The continuing reality of hunger and malnutrition makes food security an essential concern.

Problem Statement

AIK offers great opportunities for improved agricultural production and sustainable food security. Many authors have recognized it as an important source of developmental information (Anyira, Onoriode, and Nwabueze 2010) and have recommended its proper documentation and dissemination for sustainable agricultural development. In Nigeria, much AIK has been lost because of a lack of documentation. It is, therefore, imperative to create awareness and bring critical issues relating to the documentation and dissemination of AIK to the fore so that its potential can be harnessed to engender sustainable food production to combat an imminent food crisis. This is the bedrock of this study.

Objectives

The study sets out to achieve the following objectives:

1. Find out the existence of a policy for the documentation and dissemination of AIK in national agricultural research libraries in Nigeria.
2. Find out whether AIK is documented and disseminated in these libraries and which areas of agricultural production are covered.
3. Determine the methods employed for documentation and the format(s) in which AIK is documented.
4. Ascertain who the users of AIK are and what the channels of dissemination are.
5. Investigate the constraints/obstacles to the documentation and dissemination of AIK.

Literature Review

AIK has become valuable not only to those who depend on it in their daily lives, but to modern industry. It is common knowledge the world over that modern science has begun to recognize the vital role that indigenous knowledge can play in the formulation and implementation of sustainable development policies and projects particularly in developing countries (Chisita 2011). Although Ossai (2010) regarded indigenous knowledge as essentially tacit knowledge that is not easily codifiable, she nevertheless agreed that it provides the basis for problem solving strategies for local communities. It is available in virtually all aspects of human activity including agriculture (Mugwisi, Ochalla, and Mostert 2012). Warren (1991) noted that AIK has made a tremendous contribution to crop production by poor farmers. Okuneye and Ayinde (2004), cited in Anyira, Onoriode, and Nwabueze (2010), added that small scale resource farmers have good reasons for sticking to their local knowledge and farming practices, because modern technologies can only be successful and sustainable if indigenous knowledge is taken into consideration. Akullo *et al.* (2007) particularly enumerated the advantages of indigenous knowledge in agricultural production. These include cheapness of its products, creation of social harmony and cohesion and easy understanding of its concepts and practices. One of the best modern approaches to preservation of traditional knowledge is documentation in some permanent form and public accessibility. In addition to preservation, documentation and dissemination of agricultural indigenous practices provides an effective tool for research and innovation. However, Lwoga, Ngu-lube, and Stilwell (2010) observed that research libraries

have not been particularly active in documenting AIK in Tanzania. Nakata and Langton (2005) asserted that libraries must consider indigenous knowledge not simply part of a historical archive, but a contemporary body of relevant knowledge.

Different authors have suggested many methods for the documentation of AIK. The International Institute of Rural Reconstruction (IIRR 1996) suggested identifying specialists, case studies, field observation, in-depth interview, participant observation, participative technology analysis, surveys, brainstorming, games, group discussions role play, SWOT analysis, village reflections, village workshops, flow charts, mapping, taxonomies, participatory video and photo/ slide documentation. The IIRR also reported that AIK could be documented in the form of descriptive texts such as reports, inventories, maps, matrices and decision trees; audiovisuals such as photos, films, videos or audio cassettes as well as dramas, stories, songs, drawings, seasonal pattern charts, daily calendars and so on. Indigenous knowledge is also stored in local communities, databases, card catalogues, books, journals and other written documents, audiovisuals and museums.

Karter (1993) pointed out that the verbal style of investigation does not yield satisfactory results always. He argued that observation becomes important and that real insight could be obtained by prolonged observation. Chande (1993) reported that surveys, competitions and interviews help document AIK. Dubey, Naraina, and Gupta (1993) reported several methods like the case study method, the oral history method; key informant means, making diagrams, case histories, critical incident techniques, preference ranking and inventories of farmers' indicators could be used for documenting knowledge from local people.

Mare and Suteria (1993) used methods like dialogue, field observations and joint interpretations to arrive at conclusions to document indigenous knowledge. Rajasekaran (1993) also recorded details of AIK using farmers' participatory methods such as participant observations and unstructured exchanges. Rath (1993) was of the view that the participatory approach was the method for indigenous research. Singh and Rajoo (1993) concluded that individual and group interviews, participant observations and agro-ecosystem analysis play a vital role in documenting indigenous practices in agriculture. Vivekanandan (1993) stated that conducting village level workshops and group discussion with farmers, publishing newsletters in local language for the exclusive communication of traditional farm technologies and travelling to interior regions were some of the effective means of disseminating AIK.

Methodology

A descriptive survey design was adopted for the study. At the time the survey was carried out, there were fifteen national agricultural institutes in Nigeria established at different dates with different mandates all geared towards boosting agricultural production as indicated in Appendix 1 and each with its own library.

The 62 library personnel in these libraries constituted the population of the study. In view of the small size of the population, a total enumeration method was adopted. A questionnaire was the main instrument used for data collection. Sixty-two copies of the questionnaire were administered, of which 48 copies were completed and found usable, giving a return rate of 77.4%. The questionnaire was complemented with informal interviews with the head librarians of eight libraries. The discussion centred on AIK policy, funding, equipment and technical knowledge and was frank and revealing. The interviews were recorded through note-taking by the researchers. Data collected with the questionnaire were analyzed and interpreted using Statistical Package for the Social Sciences (SPSS) and frequency counts and percentages while responses from the interviews were collated.

Findings and Discussion

The major findings of the survey are presented in Table 1 and discussed under the topical headings following it.

Existence of AIK Documentation and Dissemination Policy

The majority of the respondents (37, or 77%) claimed that their agricultural research institutes had a documentation policy for AIK materials, while 11 respondents representing 23% of the total respondents claimed that no such policy existed in their institutions. However the interviews conducted revealed that apart from the enabling legislations establishing them, most of the institutions claiming to have a policy lacked a comprehensive and well-articulated policy that could take care of all aspects of AIK documentation and dissemination process. A policy is a vital requirement for the documentation and dissemination of AIK. It not only confers authority on the institution but also creates an enabling framework, lays the basis for funding, and gives general direction for the documenta-

Table 1: Simple percentages showing responses from the participants on documentation and dissemination of agricultural indigenous knowledge in Nigeria

S/N	Statements	Yes	No
Existence of AIK Documentation and Dissemination Policy			
1	Agricultural research institutes had a documentation policy for AIK materials	37 (77%)	11 (23%)
Documentation and Dissemination of AIK			
2	Libraries documented and disseminated AIK	38 (79.2%)	10 (20.8%)
Methods and Formats of Documentation			
3	Oral history, case studies, group interviews, dialogue, field observation and joint interpretation, farmers' participation and key informant interviews were the major methods employed in documenting AIK	44 (91.7%)	4 (8.3%)
4	AIK documented on compact disc.	4 (8.3%)	44 (91.7%)
Users of AIK and Channels of Dissemination			
5	Users of AIK materials were researchers and students from agricultural and other institutions across the nation	27 (56.3%)	21 (43.7%)
6	AIK was disseminated strictly to local farmers, agricultural extension workers and foreign researchers	16 (33.3%)	32 (66.7%)
7	Leaflets and bulletin as channels for disseminating AIK.	32 (66.7%)	16 (33.3%)
9	Agricultural extension workers as channel of AIK dissemination	12 (25%)	36 (75%)
10	Use of radio and television as channels of AIK dissemination.	3 (6.2%)	45 (93.8%)
Obstacles to AIK Documentation and Dissemination			
11	Inadequate funding as major obstacle in documenting and disseminating AIK	29 (60.4%)	19 (39.6%)
12	Lack of co-ordination in documentation services is major challenge in documenting and disseminating AIK	15 (31.2%)	33 (68.8%)
13	Poor infrastructure and the dearth of human resources are part of challenges in documenting and disseminating AIK	4 (8.3%)	44 (91.7%)

tion and dissemination of AIK. Areas to which a policy should relate include the following:

- Objectives of AIK documentation
- Broad areas of agricultural production
- Right of access to AIK
- Funding for documentation project
- Intellectual property rights
- AIK dissemination methods and channels

Documentation and Dissemination of AIK and Areas of Agricultural Production Covered

The majority of the respondents (38 or 79.2%) claimed that their libraries documented and disseminated AIK while the rest (10 or 20.8%) submitted that nothing was being done in their libraries in this respect. The areas of agricultural production covered by those libraries that undertook the project, however, depended on the mandates of their agricultural institutes. The general areas of agricultural practices identified by majority of the respondents included harvesting and storage, pests and diseases control, cropping system, weed management, soil fertility and crop nutrient management. Interestingly, these prac-

tices fell within the broad areas of indigenous agricultural practices identified by Rajasekaran (1993).

Methods and Formats of Documentation

All the respondents identified oral history, case studies, group interviews, dialogue, field observation and joint interpretation, farmers' participation and key informant interviews as the major methods employed in documenting AIK. The majority of the respondents (44, or 91.7%) claimed to document AIK in paper format. The interview session revealed that in view of the oral nature of indigenous knowledge, documentation process entails recording, usually on tape which is then transcribed and put in paper format. Only four respondents (8.3%) reported to have AIK documented on compact disc. It is rather disappointing that despite the present level of information and communication technology (ICT) development, none of the institutes documented AIK in digital format. This is a reflection of the level of ICT adoption in these libraries and the society they are set up to serve.

Users of AIK and Channels of Dissemination

The majority of the respondents (27, or 56.3%) claimed that the users of AIK materials were researchers and students from agricultural and other institutions across the nation while some other respondents (16, or 33.3%) said that AIK was disseminated strictly to local farmers, agricultural extension workers and foreign researchers. The rest of the respondents (5, or 10.4%) skipped this aspect of the questionnaire. The interview conducted, however, revealed that some categories of users did not derive satisfaction in the use of AIK because of the format in which it was documented. These users preferred that AIK was documented using modern technology rather than paper format.

The major channel for disseminating AIK identified by the majority of the respondents (32, or 67%) was leaflets and bulletins. Twelve respondents (25%) claimed to use agricultural extension workers while only three respondents (6.2%) claimed to use the radio and television as channels of AIK dissemination. Other channels identified in the course of the interview were mobile library services and research reports. While the low level of ICT development in the country is appreciated, it is submitted that digital technology should also be employed to facilitate wider access, particularly by researchers (local and foreign) and students who have been identified as key users of AIK.

Obstacles to AIK Documentation and Dissemination

The majority of the respondents (29, or 60.4%) identified inadequate funding as their major obstacle in documenting and disseminating AIK. Fifteen respondents (31.2%) claimed that lack of co-ordination in documentation services was their major challenge. This category of respondents submitted that there was no proper coordination mechanism in place in their institutes that could spell out the roles of the different players, serve as a platform for best practices and lessons from the different approaches to be undertaken in documenting and disseminating AIK. This finding is similar to that of Okorafor (2010) that one of the weak points of the AIK policy is that responsibility for AIK project coordination is not clearly stated in institutional policy. Four respondents (8.3%) identified poor infrastructure and the dearth of human resources as part of their challenges. The interviews conducted also revealed that some of the institutes lacked professional expertise and institutional capability to document AIK. The major-

ity of the personnel working in the agricultural research institute libraries are librarians and not documentalists. A documentalist is an expert in documentation and particularly specializes in scientific and technical documentation. Phiri (2002) recommended in his study that a good documentalist should be available to document indigenous knowledge activities. Other obstacles identified include lack of suitable equipment for documentation, language barriers (in cases where the documentalist did not understand the local languages), memory failure on the part of the resource persons or informants as indigenous knowledge is orally passed from generation to generation, particularly in most African societies, cultural practices such as requiring certain rites to be performed as a condition precedent to documentation, and the intellectual property rights issue which might discourage full disclosure of indigenous knowledge. These findings are in line with those of Anyira, Onoriode, and Nwabueze (2010) in their study of preservation and accessibility of indigenous knowledge in the Niger Delta region of Nigeria.

Conclusion and Recommendations

The urgency regarding the documentation of indigenous knowledge in Africa can be appreciated from the fact that when an elderly person dies in Africa, a whole library/archive perishes with the person because of the oral nature of African indigenous knowledge. It is evident that AIK offers great potentials for increased agricultural production and, consequently, for tackling the problem of food security. This potential seems to have been recognized by the national agricultural institutes in Nigeria. The need to document and disseminate indigenous agricultural practices is, therefore, felt and appreciated, prompting most of the national agricultural institute libraries in Nigeria to embark on a project of documenting and disseminating AIK on varying scales and with varying degrees of success. The projects in some of these libraries are, however, haphazard and faced with enormous obstacles which have held them back and which have the potential to completely derail it, the most critical being poor funding.

It is, therefore, imperative that AIK documentation and dissemination projects in Nigeria should be properly funded with a budget line and annual budgetary provision for them. National agricultural institute libraries in the country must look beyond the government for funding. There are many international organizations with the mandate to support laudable projects aimed at alleviating poverty and hunger to which grant proposals for support

for AIK documentation and dissemination could be submitted by these libraries. These include the World Bank, FAO, United Nations International Fund for Agricultural Development (IFAD), Swedish International Development Cooperation Agency (SIDA) and the Canadian International Development Agency. However, the libraries require a comprehensive AIK policy which will give guidelines and direction that can facilitate proper coordination of AIK documentation and dissemination programme. Necessary modern equipment should be procured, and staff capacity building should be stepped up for the project.

Collaboration and networking among libraries need to be extended to the AIK projects so that one library can learn and benefit from the experience of others to attain a high level of success in the documentation and dissemination process. Furthermore, AIK should be disseminated on a wider scale, so that it can be integrated into the conventional agricultural production practices. Those libraries that are yet to embark on the project should embrace and regard it as a necessary component of their mandates in order to complement the efforts at the international level to prevent global food crisis and make food security an accomplished Millennium Development Goal.

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Appendix: National Agricultural Research Institutes in Nigeria

Name of Research Institute	Year Established	Formal Mandate
Institute for Agricultural Research P.M.B 1044, Ahmadu Bello University, Samaru Zaria.	1924	Genetic improvement and development of production and utilization technologies for sorghum, maize, cowpea, groundnut, Cotton, sunflower, and the improvement of the productivity of the entire crop-based farming system in the North West Zone of Nigeria.
National Veterinary Research Institute P.M.B 01, Vom	1924	Research into all aspects of animal diseases, their treatment and control, as well as development and production of animal vaccines and sera
Nigerian Institute for Oil Palm Research P.M.B 1030, Benin City	1939	Research into genetic improvement, production and processing of oil, coconut, date, raphia, and ornamental palms
Institute of Agricultural Research and Training P.M.B 5029, Ibadan, Nigeria	1956	Soil and water management research, genetic improvement of kenaf and jute, and improvement of the productivity of the entire farming system of the South West Zone
Lake Chad Research Institute P.M.B 1293, Gamboru Road Maiduguri, Borno State	1960	Genetic improvement and development of production technologies for wheat, millet, and barley; the improvement of the productivity of the entire farming system in the North Eastern Zone
Rubber Research Institute of Nigeria P.M.B 1049, Iyanomo Benin City	1961	Research into genetic improvement, production and processing of rubber and other lather producing plants
Cocoa Research Institute of Nigeria P.M.B 5244 Idi-Ayunre Ibadan	1964	Genetic improvement, production and local utilization research on cocoa, cashew, kola, coffee and tea
National Institute for Freshwater Fisheries Research , P.M.B 6006, New Bussa	1968	Research into all freshwater fisheries, and long term effects of man-made lakes on ecology and environment throughout the country
National Cereal Research Institute P.M.B 8, Badeggi, Bida Niger State	1975	Genetic improvement and production of rice, soybean, benniseed, sugarcane and improvement of productivity of entire farming system of the Central Zone
National Horticultural Research Institute P.M.B 5432, Idi-Ishin, Ibadan	1975	Research into genetic improvement, production, processing and utilization of fruits and vegetables, as well as ornamental plants

- Nigerian Institute for Oceanography and Marine Research** 1975
P.M.B 12729, Victoria Island,
Lagos
Research into the resources and physical characteristics of Nigerian territorial waters and the high seas beyond; genetic improvement, production and processing of brackish water and marine fisheries
- National Agricultural Extension, Research and Liaison Services**, Ahmadu Bello University, Zaria 1975
Research into technology transfer and adoption studies; overall planning and development of extension liaison activities nationally; collation and evaluation of agricultural information
- National Root Crop Research Institute** 1976
P.M.B 7006, Umudike, Umuahia,
Abia State
Genetic improvement of cassava, yam, cocoyam, Irish potato, sweet potato, and ginger and overall research in improvement of farming system of the South East Zone
- Nigerian Store Product Research Institute** 1977
P.M.B 1489, km 3, Asa Dam Road,
Ilorin, Kwara State
Research into improvement of major food and industrial crops and studies on stored product pest and diseases, pesticides formulation and residue analysis
- National Animal Production Research Institute** 1977
P.M.B 1096, Shika,
Zaria
Research on food animal species and forages