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Assessment of Indigenous Knowledge Practices for Sustainable Agriculture and Food Security in Idemili South Local Government Area of Anambra State, Nigeria

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Abstract
The study Investigated Indigenous Knowledge Practices for sustainable Agriculture and Food Security in Idemili South Local Government Area of Anambra State. Data were collected using structural questionnaire administered to 120 respondent randomly selected using the simple random sampling technique. Data collected were analyzed using descriptive tools such as frequencies counts, and percentages. Findings revealed that majority of the rural dwellers are farmers and literates and have vast knowledge of indigenous practices. There was an extensive use of indigenous knowledge in the area such as mulching, use of organic manure, sun drying, roasting and frying food, use of sacks, mixture of red pepper and placing under fire. The study further revealed that the major constraint to the use of IK as perceived by the respondents are lack of documentation, time demanding and poor recognition. The study recommended among others that ICTs such as computer, internet and libraries be used to make indigenous knowledge accessible and incentives to the rural dwellers to reduce the cost they incurred in using indigenous agriculture and food security practices.
Keywords; Food security, agriculture, indigenous knowledge, sustainability, development

INTRODUCTION

Rural African communities from the time of our ancestors, have been greatly endowed with 'special' knowledge with which activities were carried out and notable progress made. Notwithstanding, people fail to realize the efficacy of the 'special' knowledge that is indigenous knowledge in the enhancement of sustainable development. This traditional knowledge has not been properly mainstreamed into development projects, especially in Nigeria (Wole and Ayanbode,2009). Moreover, widespread poverty, epidemics, political unrests economic instability, terrorism and corruption, among other development devourers have eaten hard into Africa. Efforts were made by many in different quarters; extremely and internally to set Africa free from these development devourers. Yet, Africa suffers underdevelopment from generations to generations and Nigeria, as an African country, is not exempted. Since Nigeria gained independence in 1960, different and many development initiatives have been made and implemented by development communities and other development stakeholders notwithstanding, appreciable success has not been achieved or recorded just because indigenous knowledge has not been given the rightful position in development initiatives (Wole and Ayanbode, 2009) .

The antidotes to Africa's economic problems are the responsibility of everyone. The third world countries, including Nigeria have made mistakes in efforts to bring about the development of Africa. They have depended on the developed world for aid and assistance for too long, even after independence and this has made it difficult to achieve viable alternative approaches to development.

Alternative development projects and initiatives that are African based are emerging and this is making Africa to have gradual and noticeable liberation from dependency. Some of these initiatives are: The New Economic Partnership for Africa's Development (NEPAD) and the Lagos Plan of Action (LPA).Only such endogenous initiatives can positively bring about sustainable development in Africa. Africa is blessed with adequate human and non-human resources needed to bring about sustainable development, without external influence. The success of development projects and initiatives in Africa depends solely upon grassroots participation of local people: which is a function of the understanding and harnessing of their indigenous knowledge (Wole and Ayanbode, 2001).

Indigenous knowledge (IK) is an important asset with regard to the social capital of local people and constitutes their main resources for their livelihoods. For instance, farmers predominantly in developing countries have planned agricultural production by using their IK to ensure food security and sustainable agricultural producing over countries (Mascarenhas 2003). Agriculture is the important sector in the economics of most African countries. The potential of IK in improving agricultural production can be gauged by the traditional sector which accounts for more than 90 percent of the seeds planted in the country (Mushi, 2008). At the same time, research shows that the more than local people experiment with external technologies, the more they strengthen their indigenous knowledge and practices (Lemma and Hoffman, 2005). External knowledge is a key component in improving small scale agricultural production and linking increased production to remunerative markets, thus leading to improved rural livelihoods, improving quality and yield, food security and national economics (Asaba, 2006). Thus, sustainable agricultural development may be better served by a system that unifies both indigenous and external knowledge systems.

Nevertheless, in the formal agricultural economy, external knowledge receives more of the attention and investments than other knowledge systems in developing countries (Mascarenhas, 2003). Lack of a cohesive approach for managing knowledge suppresses efforts of the poor to take advantage of their innovations and skills to improve their farming activities (Lwoga and Ngulube 2008). IK is mainly preserved in the memories of elders whose knowledge disappears when they die of old age, and thus Ik has been lost at a high rate. At the same time, there is still a low rate of adoption of external technologies despite the fact that it receives most of the attention (Ngendello, et al., 2003) due to weak linkage between research, extension and farmers. Hence, farmers neither adopt the new technologies, nor manage their knowledge systems for improved farming operations.

Nigeria has a valuable but largely untapped reservoir of indigenous agricultural and natural resources experience and knowledge. The need for indigenous knowledge for national development had come timely to reinforce the emphasis on structural adjustment programme which country had vigorously pursued in the last decade. Development being regarded as a process of increasing people's economic powers by improving their access to technologies appropriate to their skills, incomes and environment. Looking at the simple definitions of indigenous knowledge and development process, the development planners policy makers are beginning to recognise the need to understand the existing knowledge systems and decision making processes as they focus their attention on small scale agricultural producers.

Moreover, indigenous knowledge is often overlooked by development professionals as inferior knowledge. But agricultural scientists and planners now recognize that by recording indigenous knowledge systems, we can work with and through them to improve communication between agriculture researcher and extension staff and the farmers themselves. Also development professionals increasingly are seeing the value of this type of knowledge in solving agricultural and environmental problems. Today, many indigenous knowledge practices 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 varnish as they become inappropriate for new challenges or because they adopt too slowly.

However, many practices disappear only because of the intrusion of foreign technologies. 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 problem solving strategies are lost. Some indigenous knowledge systems (IKs) and practices are, however, not free of limitations due to shrinking and fragmented land holdings, limited input from farmers in setting priorities and formulating research agenda. Lack of adequate and organized trainings for farmers and extension workers has also constituted a major constraint in implementing indigenous knowledge. Within the forgoing context, therefore, sustainable agricultural production may be conceptualized as a process of improvement both in qualitative and quantitative terms taking place in farming operations which must meet the needs of the present without compromising the ability of future generations to meets their own needs.

The broad objective of the research was to describe indigenous knowledge practices for sustainable agricultural production and food security in Idemili South Local Government Area of Anambra State. Specific objectives of the study include:

a. To identify the socio-economic characteristics of respondents.
b. To identify indigenous knowledge practices of respondents in agricultural production for food society.
c. To determine the extent of use of indigenous knowledge.
d. To identify the benefits of indigenous knowledge to sustainable agriculture and food security.
e. To identify factors that limits use of ingenious farming practices.

METHODOLOGY

Anambra is a State in South-eastern Nigeria. Its State theme is "Light of the Nation". Its boundaries are formed by Delta State to the West, Imo State to the South, Enugu State to the East and Kogi State to the North. The origin of the name is derived from the Omambala River which is easily called Anambra River. It has twenty one local government areas (L.G.A) and an estimated population of 4,177,828 (Male 2, 117, 984 and female 2,059,844 projected from 2006 census figure (FGN, 2009). The state covers an area of 4,41684km, has tropical rain forestry vegetation, humid climate with a temperature of about 871 and a rainfall of between 152cm-203cm. Anambra State is one nine states of the agro-ecological zones located in the South Eastern part of Nigeria. It is divided into four agricultural zones namely Aguata, Awka, Onitsha and Anambra zones. The state lies between latitudes $5^0$40' and $70^0$5' North and longitude $0^0$35' and $8^0$30' East. The study area is Idemili South Local Government area of Anambra State. It is one of the 21 local government areas in Anambra State. It consist of seven communities namely Akwa-ukwu, Alor, Akwa-etiti, Nnobi, Nnokwa, Oba and Ojoto. The study area lies between latitude $5^0$40' and $7^0$50' North and longitude of $6^0$35' and $8^0$30' East. The population of Idemili South Local Government Area of 2011 is 445,375 (NPC 2006) projected from 2006 census figure. The study area is located at 29.1km from the head quarters Awka and has a common boundary with Idemili North, Aniocha, and

Dunukofia local government area. The rainfall pattern begins with a steady increase unconventional rainfall from March to July, higher and more persistence during September after which emerges decreasing rain in October and November. The major occupation of people in the study area is predominantly farming and major crops grown are yam, cassava, maize, vegetable, cocoyam and oil palm. The population for the study consists of farmers in Idemili South Local Government Area of Anambra State. Simple random sampling technique was used in selecting respondents. Thirty (30) farmers were randomly selected from four communities namely Nnokwa, Ojoto, Oba and Nnobi to give a total of one hundred and twenty (120) respondents. Four communities were purposively selected from the seven communities that make up the Local Government Area. The study made use of both primary and secondary data. Primary data were collected using structured questionnaire. The instrument elicited information from respondents on their socio-economic characteristics, indigenous knowledge in agriculture for food security, use of indigenous knowledge, role of indigenous knowledge practices to sustainable agricultural production, and factors that limit them. Secondary sources of data include: Journals, publications, pamphlets, research projects and newsletters were also consulted to give the background information. Analytical tools such as simple descriptive statistics were used to analyze the data generated from the study. Descriptive tools such as frequency counts presented in tables, pie chart bar graphs and mean were used to present the data.

Socioeconomic Characteristics of Respondents

On the socioeconomic characteristics, a total of 59.2% of the respondents are male while 40.8% are female. This shows that more male are involved in farming in the study area. The distribution could be attributed to the enhanced status of farming as a source of income. This more males who by virtue of being head of the family and people who have access to land resources engage more than the females who only have access to their husbands assets at the will of their husbands. On marital status, a total of 2.5% indicated that they are single, while 82.5 percent indicated that they are married. Again, 9.2% and 5.8% are widows and widowers respectively. The result shows that married people engaged in farming activities are in the majority. The couple and the offspring's complement one another's efforts thereby reducing the stress that could have been in individual working alone. The cost of labour is reduced too. In the same manner, more information on indigenous knowledge are most likely to trickle in as each member of the farming is a prospective source of receiving information on indigenous farming practices. Again, 56.0% of the respondents fall within the age range of 50 years and above, 18.33% of the respondents falls within the range of 21-30years, while 7.50% of the respondents fall within the range of 31-40 years, and 11.6% of the respondents falls within the range of 41-50 years. The mean age of the respondents in the area is 41 years. The implication of this is that the respondents in the area are relatively young and therefore they should have more strength for farm work involving indigenous farming practices. Table 1 also shows that 5.5% of the respondents have between 4-6 persons per household, 20.8% have between 1-3 persons per household, while 20.0% have between 7-9 persons per household, and only 4.2% have above 10 persons per household. This shows that majority of the respondents have the household size of 4-6. The mean household size was 5. From the table also, a total of 21.7% indicated that they had no formal education, 13.3% indicated that they had adult education, 34.2% indicated that they had primary education, 24.2% indicated that they had education up to secondary school level while 6.7% attained tertiary education. This shows that most of the farmers are enlightened and only few of them are illiterates. The engagement of educated people in farming is an asset to technological adoption and sustained use. Education polishes an individual, develops the intellect and makes him a wide user of resources. Educated people are exposed and can avail themselves of information on the print media. The table shows that lower proportion of the respondents (19.2%) were not visited regularly by extension agents, while higher proportion (80.8%) have received the visit of an extension agent. This implies that extension visit is okay in the area. Furthermore, greater numbers of respondents (41.6%) have farm size 0.25-1 hectare, 35.8% have 1.5-2 hectares, and 18.3% have 2.5-3 hectares, while only 4.2% have farm size of 3.5 and above. The mean farm size is 3hectares which implies a reasonable farm size. Again, 10.0% of the farmers belong to farmers council, while 21.7% indicated that they belong to church organization, 42.5% belong to age grades. Where as 25.8% belong to co-operatives societies. It then entails that all the farmers belong to at least one social organization. Membership of association could enable the farmers to get more information on indigenous knowledge particles because member of the association are follow farmers. Many scholars have indicated that learning and acquiring information is facilitated by the identification with and participation of farmers in organized groups. On leadership title, majority of the respondents (73.3%) has one leadership title or more, while about 26.7%, do not have any leadership title. This implies that more of the respondents have the opportunity of exchanging ideas with their counterparts.

Table 1: Socio-Economic Characteristics of Respondents

Characteristics	Frequency	Percentage
Gender		
Male	71	59
Female	49	40.8
Marital status		
Single	3	2.5
Married	99	82.5
Widow	11	9.2
Widower	7	5.8
Age		
21-30	22	17.3
31-50	9	7.5
50 and above	14	55
Household size		
1 – 3	25	20.8
4 – 6	66	55
7 – 9	24	20
10 and above	6	4.2
Educational level		
No formal education	26	21.7
Adult education	16	13.3
Primary	41	34.2
Secondary	29	24.2
Tertiary	8	6.7
Extension visit		
Yes	97	80.8
No	23	19.2
Farm size		
0.25 - 1	50	41.6
1.5 – 2	43	35.8
2.2 – 3	22	18.3
3.5 and above	5	4.2
Organization		
Farmer council	12	10
Christian organization	26	21.7
Age grade	51	42.5
Cooperative society	31	25.8
Leadership title		
Yes	88	73.3
No	32	26.7

4.2 Indigenous Knowledge Practices of Respondents in Agricultural Production for Food Security.
Table 2: Distribution of Respondents According to indigenous farming practices**.**

Indigenous farming practices	*** Frequency**	**Percentage (%)**
Mulching	101	84.2
Use of organic manure	104	86.7
Use of locally made pesticide	49	40.8
Non tillage	24	20.0
Use of ash for seed treatment	46	38.3
Food processing and storage		
Sun drying	113	94.2
Pounding with locally made mortar	43	35.8
Roasting and frying food	75	62.5
Grinding with stone	48	40.0
Early harvesting with hand	91	75.8
Use of sacks	82	68.3
Burying in moistened soil	20	16.7
Mixture of red pepper	92	76.7
Wood ash application	56	46.7
Placing under fire	102	85.0

Table 2 shows that majority of the respondents use indigenous practices such as mulching (84.2%), organic manure (86.7%), while 40.8% use locally made pesticide, non tillage (20.0%) and ash for seed treatment (38.3%). The table also reveals that majority of the respondent in food processing and storage practice sun drying (94.2%), mixture of red pepper (76.7%), roasting and frying food (62.5%), early harvesting with hand (75.8%) use of sacks 68.3%) and placing under fire (85.0%). While few respondents use grinding with stone (40.0%), Burying in moisture soil (16. 7%) and wood ash application (46.7%). It can therefore be concluded from the study, that most rural dwellers in the study area employed indigenous knowledge practices for their farming activities, food storage and processing. It shows that the rural dwellers appreciate the usefulness of conserving and protecting their farm practices so as to enhance their livelihood. Research shows that the more the local people experiment with external technologies, the more they strengthen their indigenous knowledge and practices (Lemma and Hoffman, 2005). External knowledge is a key component in improving small-scale agricultural production and linking increased production to remunerative markets, thus leading to food security and national economics (Asaba et al, 2006). The above findings are also in line with Chikaire and Nnadi, (2011) who posited that indigenous knowledge provides the basis for problem solving strategies for local communities especially the poor. It represents important components of global knowledge on development issues. IK is an underutilized resource in the development process. Learning from IK, by investigating first what local communities know and have, can improve understanding of local conditions and provide a productive context for activities designed to help the communities. Understanding IK can increase responsiveness to clients. Adapting international practices to the local setting can help improve the impact and sustainability of development assistance. Sharing IK within and across communities can help enhance cross-cultural understanding and promote the cultural dimension of development. Local farmers in the tropics have been know to conserve C in soils through the use of zero tilling practices in cultivation, mulching and other soil management technique (Schafer and Osunade,1994). Natural mulches moderate soil temperatures and extremes, suppress diseases and harmful pests, and consume soil moisture. Before the advent of chemical fertilizers, local farmers largely depended on organic farming, which also is capable of reducing GHG emissions.

It is widely recognized that forests play an important role in the global carbon cycle by sequestering and storing C (Stainback and Alavalapati, 2002). Local farmers are known to have practiced the fallow system of cultivation, which encouraged the development of forests. It may be argued that with the growth in population, lengths of fallow have been reduced to the extent that the practice no longer exists in certain areas. However, one must not forget that the importance of forests have been recognized by traditional institutions to the extent that communal forest reserves were very common in traditional societies. Beside the facts that these well managed forests provided food and timber resources to the community, they also served as C sinks. It is recognition of the role of forests in climate change that has influenced participants of the Kyoto protocol to allow countries to include carbon sequestered ion forests in a country's emission requirements.

4.3 Extent of Use of Indigenous Knowledge.

Table 3: Extent of use of indigenous knowledge

Indigenous knowledge	Extent of use	
	Often	Not often
Control of pests in garden	79 (65.8%)	41 (34.2%)
Use of locally made pesticide	52 (43.3%)	68 (56.7%)
Use of chemicals from industries	39 (32.5%)	81 (67.5%)
Maintenance of soil fertility	96 (80.0%)	24 (20.0%)
Use of organic manures	100 (83.3%)	20 (16.7%)
Use of inorganic manures	33 (27.5%)	87 (72.5%)
Storage technologies	31 (67.5%)	39 (32.5%)
Traditional processing methods	95 (79.2%)	25(20.8%)

*** Source: Field survey data, 2011.**

Table 3 shows that farming practices such as control of pests in garden, maintenance of soil fertility, use of organic manures, storage technologies and traditional processing method were often practiced by the respondents, whereas use of locally made pesticide, use of chemicals from industries and use of inorganic manures were not often practiced by the respondents. The result of the study reveals that indigenous knowledge technologies and know-how have an advantages over introduced or scientific technologies in that they rely on locally available skills and materials and are thus often more cost effective than introducing exotic technologies from outside sources (IIRR, 1996a) as well local people are familiar with them and so do not need any specialized training. Scientists now recognize that indigenous people have managed the environment in which they have lived for generations, often without significantly damaging local ecologies (Emery, 1996). Many feel that indigenous knowledge can thus provide a powerful basis from which alternatives ways of managing resources can be developed. According to Chikaire and Nnadi, (2011). Indigenous knowledge is dynamic, changing through indigenous mechanisms of creativity and innovativeness as well as through contact with other local and international knowledge systems. These knowledge systems may appear simple to outsides but local but they represent mechanisms to ensure minimal livelihoods for local people. Indigenous knowledge systems often are elaborate; mid they are adapted to local cultural and environmental conditions.

Indigenous knowledge systems are tuned to the needs of local people and the quality and quantity of available resources (Chikaire and Nnadi, 2011). They pertain to various cultural norms, social roles, or physical conditions. Their efficiency lies in the capacity to adapt to changing circumstances. Traditional knowledge has been viewed as part of a romantic past, as the major obstacle to development, as a necessary starting point, and as a critical component of a cultural alternative to modernization. Only very rarely, however, is traditional knowledge treated as knowledge perse in the mainstream of the agricultural and development and environmental management literature, as knowledge that contributes to our understanding of agricultural production and the maintenance and use of environmental systems.

4.4 Benefits of Indigenous Knowledge (IK) for Sustainable Agriculture and Food Security.

Table 4: Benefits of indigenous knowledge practices

Benefits of IK practices	* Frequency	Percentages (%)
Seed preparation promotes early germination	70	58.3
Availability of healthy crops	69	57.5
Production of high yielding crops	58	48.0
Reduction of pest diseases	70	58.3
Less disruption of farm practices	40	33.3
Aid soil/water aeration	61	50.8
Improve soil fertility	91	75.8
Reduced damage to food produce	58	48.3
Stores food produce longer	77	64.2
Availability of diseases and resistant crops	80	66.7
Crops adapt to harsh weather condition	95	79.2

***Multiple Response**

Table 4: shows that majority of the respondents were aware of the benefit of indigenous farming practices which includes seed preparation promotes early germination (58.3%), availability of healthy crop (57.5%), production of high yielding crops (48.0%), reduction of pest diseases (58.3%), less disruption of farm practice (33.3%), aid soil/water aeration (50.8%), improve soil fertility (75.8%), reduced damage to food produce (48.3%), and stores food produce longer (64.2%). Indigenous knowledge practices produced crops that are resistant to pests and diseases with (66.7%) response. Locally produced crops also adapt to harsh climatic

condition as shown by (79.2%) response The result shows that majority of the rural dweller in the study area rated the above practices according to the benefits they accrued from indigenous knowledge. This is true because people are familiar with indigenous practices and technologies, they can understand, handle, and maintain them better than introduced western practices and technologies. People are less dependent on outside supplies which can be costly, scares and unavailable regularly (NAARAP, 2009). This could account for the high level of involvement in farming using indigenous knowledge practices. Supporting the above, Chikaire and Nnadi, (2011) said that Local knowledge is vital for preserving bio-diversity which is considered a very successful mitigation strategy. Through the World Bank, gene banks have been established to pressure genetic information of local varieties or indigenous species. Genetic traits of these species and the knowledge of cultivators may prove instrumental in future breeding programs to introduce resistance against posts or diseases or endurance for harsh climate conditions. .

Factors that Limit Use of Indigenous Knowledge Practices.

Table 5: Limitation s of indigenous practices.

Factors that limits use of IK	* Frequency	Percentages (%)
Lack of documentation	88	73.3
Obsolete and outdate	54	45.0
Unsupportive authors	48	40.0
One man knowledge	66	55.0
Time demanding	77	64.2
Poor recognition	79	65.8
Lack of resources	47	39.2
Lack of trust	52	43.3
Socio-economic status	38	31.6

*** Multiple Response**

Table 5: Shows that a total of 73.3% indicated lack of documentation, while 45.0% indicated obsolete and outdated. Also, 40.0% indicated unsupportive authors while 55.0% indicated one man knowledge. A total of 64.2% indicated time demanding, 65.8% indicated poor recognition, 39.2% indicated lack of resources, and 43.3% indicated lack of trust, while 31.6% indicated socio-economic status. This implies that these factors hinder the use and effectiveness of indigenous knowledge to agriculture and food security. The work of Lwoga and Ngulube, (2008) indicated that lack of a cohesive approach for managing knowledge suppresses efforts of the poor to take advantage of their innovations and skills to improve their farming activities. Indigenous knowledge is mainly preserved in the memories of elders whose knowledge disappear when they die of old ages, and thus indigenous knowledge has been lost at a high rate. At the same time, there is still a low rate of adoption of external technology despite the fact that it receives most of the attention (Ngendello, et al., 2003) due to weak linkage between research extension and farmers. Hence, farmers neither adapt the new technologies, nor manage their knowledge systems for improved farming operations.

CONCLUSION

Based on the finding of this study, indigenous knowledge is important not only that it can provide effective alternatives to Western know-how and gives extra options to local people when carrying out their farming operations. Instead of searching only among western technologies for feasible solutions, they can choose from indigenous knowledge or combine indigenous and western technology. Sustainable agriculture and food security on the other hand are important for human survival therefore the need to practice it. Furthermore, indigenous knowledge has without doubt contributed immensely to sustainable agriculture and food security. It can be concluded, from the results of the study that rural dwellers in Idemili South Local Government Area of Anambra State have developed over the years complex management patterns for sustainable agricultural practices and food security in the area such indigenous practices included mulching, use of organic manure, sun drying, roasting and frying food, early harvesting with hand, use of sacks, mixture of red pepper, wood ash application and placing under fire. We therefore recommend the following:

- Government should provide ICTs such as computer, internet, digital cameras and camcorders and so on, to allow libraries to make indigenous knowledge accessible.
- Seminars, workshops and extension education campaigns should be initiated to promote rural people utilization of IK and practices in agriculture.
- It is pertinent for the government, private institutions and the communities address the issues of IK practices and farming activities in the rural areas.

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