Assessment of Indigenous Knowledge usage Among Small Scale Farmers in Kpando Municipality, Ghana

Francis Yao Anyan

Abstract: The study assessed the indigenous knowledge (IK)usage among small scale farmers. The study was conducted in the Kpando Municipality with a sample size of 140 respondents. Simple random sampling technique was used to collect data from respondents. Data collected were analyzed using descriptive tools such as frequencies, percentages, mean and standard deviation. The study reveal that majority of small scale farmers in the municipality are female. Also farmers in the municipality frequently use indigenous knowledge such as Organic manure, Mulching, Bush fallowing, Harvesting with hand and Rain water harvesting.

Keywords: Mulching, Harvesting, Indigenous, Knowledge, Bush fallowing, standard deviation.

I. INTRODUCTION

From the time of our ancestors, rural communities in Africa have been greatly endowed with special knowledge with which most of their activities were carried out and notable progress made. Most people fail to realize the efficacy of this special knowledge that is called indigenous knowledge (IK) or local knowledge in the enhancement of sustainable development. According to Alavi and Leidner, (2001) the question of defining knowledge has occupied the minds of philosophers since the classical Greek era and has led to many epistemological debates. Knowledge is processed in the mind of an individual, it is internalized information related to facts, concepts, ideas and observations. The terms that are used to describe IK are 'local knowledge', 'indigenous knowledge', 'indigenous traditional knowledge', 'indigenous technical knowledge', 'traditional environmental knowledge', 'rural knowledge' and 'traditional ecological knowledge'. Literature on IK does not provide a single definition of the concept. This is in part due to the differences in background and perspectives of various authors, ranging from social, anthropology to agricultural engineering. According to Warren (1991) Indigenous knowledge (IK) is the local knowledge that is unique to a given culture or society. Flavier et al. (1995) define indigenous knowledge (IK) as the information base for a society, which facilitates communication and decision-making. Indigenous knowledge (IK) act as the basis for local-level decision making in agriculture, health care, food preparation, education,

Natural-resource management, and a host of other activities in rural communities. Steiner (2008) described indigenous/traditional knowledge as the knowledge of an indigenous community accumulated over generations of living in a particular environment. It is traditional cultural knowledge that includes intellectual, technological, ecological and medical knowledge. Indigenous knowledge can also be defined as a body of knowledge built up by a group of people through generations of living in close contact with nature (Johnson 1992). Some authors have attempted to differentiate these terms, especially 'local' and 'indigenous'. In Langhill (1999), for example, 'indigenous knowledge' is said to refer to the knowledge possessed by the original inhabitants of an area, while the term 'local knowledge' refers to the knowledge of any people, not necessarily indigenous, who have lived in an area for a long period of time. According to Mugabe et al. (2010), the local weather and climate is assessed, predicted and interpreted by locally observed variables and experiences using combinations of plants, animals, insects and meteorological and astronomical indications. This study would adopt the definition of Steiner (2008).This would become the working definition of IK for the study.

Chisenga (2002) have identified some characteristics of indigenous knowledge as follows:
It is generated within communities, It is location and culture specific, and has been transformed by local people and incorporated into their way of life. It is not systematically documented; it is dynamic and based on innovation, adaptation, and experimentation, and it is oral and rural in nature. It is also based on experience; it is often tested over centuries; it is adapted to the local culture and environment, and it is expressed in local languages.

One sector which has utilized IK effectively is agriculture. In subsistence agriculture IK have been utilized along the production value chain. Generally, agriculture is the backbone of the economy of developing countries, hence the growth of the sector is particularly important as it constitutes the bulk of the national economy in terms of human and material resources. However, this sector is characterized by low productivity and has failed to make a substantial contribution to the country's economic growth and to ensure food self-sufficiency. As a result, countries have been subjected to dependency on foreign aid, which is increasing from year to year. Crop yields mainly depended on rainfall patterns and other natural resources – soil nutrient and organic manure to fertilize homestead farms (mostly mixed cropping).

Yields were constant and enough to sustain the farm family. This type of agriculture is referred to as indigenous agriculture and it mostly depend on Indigenous Knowledge**.**

Indigenous agriculture knowledge is a composite, heterogeneous and locally adjusted knowledge which was developed by farmers and herders' thousands of years ago. It is a sustainable agricultural knowledge that has stood the test of time based on resourceful combinations of strategies and practices that promote 'community food security and the conservation of natural resources and biodiversity' (Altieri and Koohafkan, 2008). With farmers' ingenuity, they have been able to meet their survival needs regardless of environmental diversity without much use of modern agricultural inputs (Altieri and Koohafkan, 2008). According to Altieri and Koohafkan, (2008) and Amanor, (2011) Indigenous agriculture has been significant in contributing to ecological and socio-cultural needs through the maintenance and conservation of technical local knowledge, indigenous crop and animal diversity and other forms of socio-cultural organizations. Indigenous agricultural system is participatory allowing farmers to interact with their environment using their ingenuity, experiences and available local resources which have accrued over time.

In a study by Hashim (2013) the people of Butana area of Kassala state of Sudan have developed through their Indigenous knowledge (IK) some types of land and soil classification. Land is classified by the people as high land, low land and delta land and soil classified as Brown clay soil with hard surface, Heavy cracking clay and Silty clay loam. According to the study they practice some patterns of use that suit each type of soil. They grow different local varieties of sorghum such as geshesh and korokolu in the Mahwa land while Mugad variety is usually grown in Elwadi land. Also some vegetables like cucumber and Okra are grown by women under this type of land use. Because the direct rainfall is insufficient to secure a successful season in Mahwa land people use their IK in constructing small earth bunds that follow the contour lines in order to slow the sheet flow of water so as to enhance the soil moisture holding capacity.

Ghana has a valuable reservoir of indigenous agricultural knowledge which farmers in the rural areas used in their farming activities .However indigenous knowledge is often overlooked by development professionals as inferior knowledge .Practices varnish as they become inappropriate for new challenges or because they adopt too slowly.

The study therefore has a broad objective to explore the utilization of IK by rural farmers in Kpando Municipality. Specifically, the study would find out the following:

- To identify indigenous knowledge sources of respondents in agricultural production for food security
- To determine the degree of relationship among indigenous knowledge usage by small scale farmers in their farming.
- To find out the extent to which farmers used indigenous knowledge in farming activities and their implication for agricultural development

II. METHODOLOGY

The study was conducted in the Kpando Municipality of Ghana. Kpando Municipality lies within Latitudes 6° 20' N and 7° 05' N, and Longitude 0° 17' E. It shares boundaries with Biakoye District to the North, Afajato South District to the East and North Dayi District to the South, while the Volta Lake defines the Western boundary. The municipality covers approximately a total land area of 314.1 square kilometers which represents 1.5 percent of the total land area of the Volta Region. Almost 12% of the land is submerged by the Volta Lake. Kpando, the municipal capital, is about 70km from Ho, the Regional Capital. (Statistical Service 2010). Below is the map of the municipality.
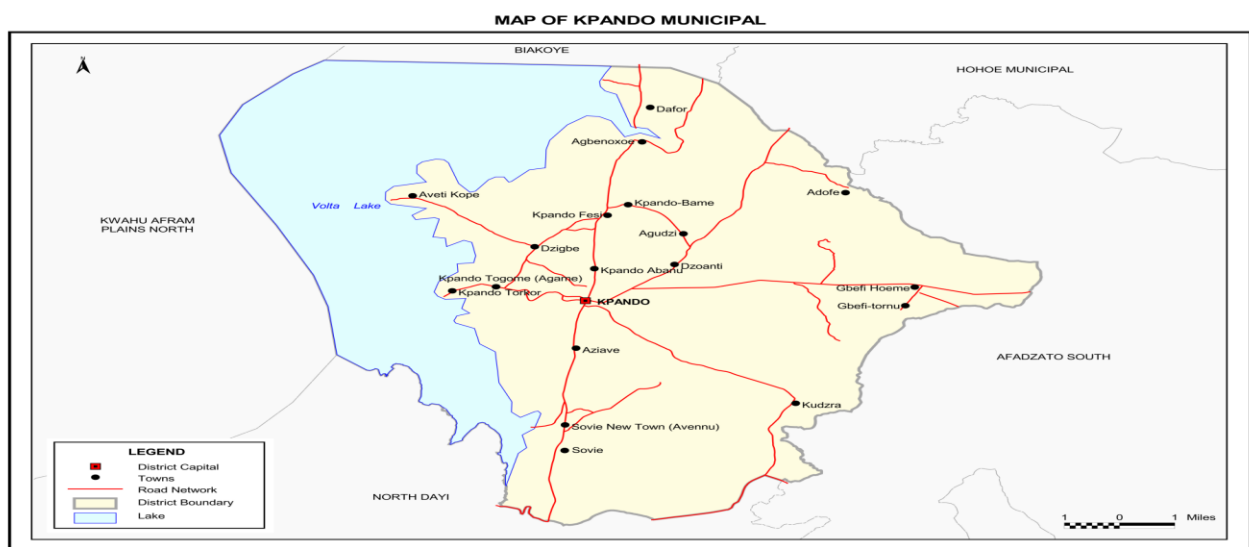

Figure 1: Map of Kpando Municipality

104

The population for the study consists of small scale farmers in Kpando Municipality. Simple random sampling technique was used in selecting four (4) communities namely Gbefi-Hoeme, Kpando-Dzoanti, Kudzra and Kpando- Bame. Thirty-five (35) small scale farmers were selected from each of the four communities to give a total of one hundred and sixty (140) respondents. 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 and the level of Agricultural Indigenous Knowledge usage by Small Scale. Secondary data were obtained from Journals, publications, pamphlets, research projects and newsletters to provide background information. Analytical tools such as simple descriptive statistics were used to analyze the data generated from the study. Descriptive tools such as frequency tables and mean were used to present the data.

III.   RESULTS AND DISCUSSION

This section discusses the analysis and the findings of the research. Both descriptive and inferential statistical analysis were used. The variables analyzed included, the socioeconomic characteristics of respondents, source of indigenous knowledge, types of indigenous knowledge and the extent of indigenous knowledge usage by small scale farmers.

3.1. Socioeconomic Characteristics of Respondents

The table below shows the analysis of the Socioeconomic Characteristics of Respondents which include Gender, Age and Marital status.

Table 1: Distribution of Respondents based on their Socio-Economic Characteristics

Characteristics	Frequency	Percentage
Gender		
Male	62	44
Female	78	56
Age		
20-39	35	25
40-49	25	18
50-59	32	23
60 and above	48	34
Marital status		
Single	47	34
Married	69	49
Widower/Widow	13	9
Divorce	11	8

The study reveals that majority (56%) of the small scale farmers in the Kpando municipality are female whereas the male in the municipality constitute 44%. This implied that more women are into small scale farming as compared to their male counterparts. This may be connected to the population census conducted in 2010 by Ghana Statistical Service which reveal that women are in majority (51.8%) in the Municipality.

The findings of the study also show that majority (34%)of the respondents are above sixty (60) years, followed by those in the age those in the age range of 20-39 who constitute 25%, 50-59 23% and 40-49 (18%). The implication of majority of respondents being over sixty (60) years is that the respondents in the area are relatively older and therefore may not have more strength for farm work but may be a source of information on indigenous farming practices for the younger generation. On marital status those who are married are in the majority (49%). This implies that couples and children would complement each other on the farm thus reducing the stress that could have been in individual working alone. The cost of labour is also reduced. 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.

3.2. Source of Indigenous Knowledge

The table below shows the responses from respondents on their sources of indigenous knowledge.

Table 2: Distribution of Respondents According to Source of Indigenous Knowledge (n = 140)

Source of Knowledge	Number of Respondents	%
Personal Experience	140	100
Parents/ Guardian/Family	128	91
Neighbour/Friends	129	92
Farmers' Groups	126	90
Village Leaders	125	89
Social Group Gatherings	132	94
Church/Mosque	125	89
Newspapers	132	94
Observation	130	93

*Multiple responses

From the table above it can be observed that all (100%) of the respondents said personal experience is their major source of indigenous knowledge in their farming activities. The findings of the study also shows that Parents/ Guardian/Family (91%), Neighbour/Friends (92%), Farmers Groups (90%), Village Leaders (89%), Social Group Gatherings (94%),

Church/Mosque (89%), Newspapers(94%), and Observation(93%) are other sources by which small scale farmer obtained indigenous knowledge for their farming activities It can therefore be concluded from the study, that most rural dwellers in the study area heavily depend on various sources for indigenous knowledge for their farming activities.

3.3. Types of Indigenous Knowledge

Table 3: Distribution of Respondents According to Types of Indigenous Knowledge require in farming

Types of Knowledge/Information	Number of Respondents	Percentage (%)
Planting season	125	89
Pest Control	132	94
Marketing of farm produce	100	71
Crop processing	112	80
High yielding	103	74
Shifting cultivation	90	64
Improving soil fertility	89	65
Information on rainfall pattern	128	91
Market Information	126	90
Information on different agricultural program	89	64
Soil classification	60	43
Irrigation	80	57
Agricultural tools	135	96
Land preparations	124	89

*Multiple responses

	Number of Respondents	Percentage (%)
Use of organic manure	103	74
Mulching	90	64
Bush fallowing	89	65
Sun drying of seeds	132	94
Harvesting with hand	135	98
Tilling land with local tools	128	91
Grinding with stone	126	90
Rain water harvesting	132	94
Use of sacks	100	71
Mixture of pepper for spraying	112	80
Pounding with locally made mortar	103	74
Wood ash application	90	64
Mix cropping	89	65
Ridging	128	91
Intercropping	126	90
Use of terracing	89	64
Crop rotation	60	43
Use of locally made pesticide	80	57
Burying in soil moisture	135	96

*Multiple responses

Table 3 shows that majority (89%) of the respondents are of the view that they required knowledge on planting season for their farming activities. An overwhelming majority (94%) required knowledge on pest control, on marketing of farm produce 71%, Crop processing 80%, High yielding 74%, Shifting cultivating 64% Improving soil fertility 65% information on rainfall pattern 91% Marketing information 90%, Information on different agricultural program 64%, Soil classification 43%, Irrigation 57%, Agricultural tools 96% and Land preparations 89%.

Responses of respondents as regards to the type of indigenous knowledge practiced in their farming activities were analyzed in the table above. It can be seen from the table that 80% of the respondents practiced the use of ash in seed treatment, 74% practiced the use of organic manure in farming,64% practiced mulching, 65% Bush fallowing ,94% Sun drying of seeds, whiles 98% harvest with their hand. Additionally, 91% till the land with local tools, 90% uses grinding stone, 94% practiced rain water harvesting, 71% uses sacks, 80% practiced a mixture of pepper for spraying,74% pound with locally made mortar and 64% practiced wood ash application. Also 65% practiced mix cropping 91% ridging 90%intercropping, 64% use terracing and 96% practiced burying in soil moisture.

3.4. Indigenous Knowledge Practice

Table 4: Distribution of Respondents According to Indigenous Knowledge Practiced in farming

Indigenous Knowledge Practice	Number of Respondents	Percentage (%)
The use of ash in seed treatment	112	80

3.5. Extent of Indigenous Knowledge usage

Table 5: Distribution of Respondents According to the Extent of Indigenous Knowledge usage in farming activities?

Types of Indigenous Knowledge	Extent of IK Usage				
	Very Rarely	Rarely	Occasionally	Frequently	Very frequently
The use of ash in seed treatment	3(2%)	8(6%)	19(14%)	62(44%)	48(34%)
Use of organic manure	6(4%)	4(3%)	9(6%)	71(51%)	50(36%)
Mulching	8(6%)	5(4%)	21(15%)	65(46%)	41(29%)
Bush fallowing	3(2%)	4(3%)	14(10)	71(51%)	48(23%)
Sun drying of seeds	3(2%)	7(5%)	17(12%)	70(50%)	43(31%)
Harvesting with hand	7(5%)	3(2%)	43(31%)	17(12%)	70(50%)
Tilling land with local tools	8(6%)	5(4%)	21(15%)	65(46%)	41(29%)
Grinding with stone	5(4%)	2(1%)	4(3%)	79(56%)	50(36%)
Rain water harvesting	1(0.7%)	6(4%)	12(9%)	75(54%)	46(33%)
Use of sacks	4(3%)	4(3%)	14(10%)	69(49%)	49(35%)
Mixture of pepper for spraying	5(4%)	2(1%)	4(3%)	79(56%)	50(36%)
Pounding with locally made mortar	9(6%)	6(4%)	17(12%)	60(43%)	48(34%)
Wood ash application	12(9%)	7(5%)	21(15%)	53(38%)	47(34%)
Mix cropping	5(4%)	2(1%)	4(3%)	79(56%)	50(36%)
Ridging	6(4%)	4(3%)	9(6%)	71(51%)	50(36%)
Intercropping	4(3%)	7(5%)	17(12%)	67(49%)	43(31%)
Use of terracing	12(9%)	7(5%)	21(15%)	53(38%)	47(34%)
Crop rotation	5(4%)	4(3%)	17(12%)	66(47%)	48(34%)
Use of locally made pesticide	7(5%)	12(9%)	21(15%)	53(38%)	47(34%)
Burying in soil moisture	12(9%)	6(4%)	15(11%)	55(40%)	51(37%)

Respondents were asked to indicate the extent to which they use the stated Indigenous Knowledge in their farming activities on a five point Likert scale of 1=Very Rarely, 2= Rarely, 3=Occasionally 4 =Frequently and 5= Very Frequently. Their responses were analyzed using percentages in the table above. As can be seen from the table most of the stated Indigenous Knowledge such as The use of ash in seed treatment, Use of organic manure, Mulching, Mixture of pepper for spraying, Intercropping and Use of terracing were frequently used. This shows that small scale farmer are still using these knowledge frequently.

The data collected was further tested statistically to confirmed the information reveal in table 4 above. This is shown in the table 5 below.

Variable	Mean	SE Mean	St Dev	Skewness
Use of ash	4.0504	0.0780	0.9194	-1.30
Organic manure	4.1071	0.0809	0.9573	-1.61
Mulching	4.1071	0.0809	0.9573	-1.61
Bush fallowing	4.1214	0.0727	0.8605	-1.34
Sun drying	4.0214	0.0769	0.9093	-1.15
Harvesting with hand	4.0214	0.0769	0.9093	-1.15
Tilling land with local	3.9214	0.0843	0.9969	-1.08
Grinding with stone	4.0000	0.0810	0.9514	-1.19
Rain water harvesting	4.1357	0.0674	0.7976	-1.11
Use of sacks	4.1071	0.0763	0.9032	-1.40
Mixture of pepper for spraying	4.0571	0.0803	0.9504	-1.34
Pounding with locally ma	3.9429	0.0933	1.1044	-1.25
Wood ash application	3.829	0.101	1.199	-1.06
Mix cropping	3.829	0.101	1.199	-1.06
Ridging	3.829	0.101	1.199	-1.06
Intercropping	3.914	0.101	1.195	-1.23
Use of terracing	3.914	0.101	1.195	-1.23
Crop rotation	4.1929	0.0723	0.8558	-1.92
Use of locally made pest	4.1929	0.0723	0.8558	-1.92
Burying in soil moisture	4.1929	0.0723	0.8558	-1.92

It can be seen from the table above that most of the variable are significant since their mean are all greater than 3.00(x >3) and the standard error of the mean are also less than 0.01.This has confirm the fact that almost all the indigenous knowledge are frequently used by small scale farmers in the study area.

IV. CONCLUSION

The findings of the study shows that indigenous knowledge play a vital role in the day to day activities of the small scale farmers .It also provide a very effective alternative to western know how technology to farmers in their faming activities. A conclusion can be drawn from the study that Personal Experience, Parents/ Guardian/Family, Neighbour/Friends and Social group gatherings are some of the sources by which small scale farmers obtained indigenous knowledge for their farming activities. It can also be concluded, from the results of the study that small scale farmers in Kpando Municipality have frequently used system of indigenous knowledge such as use of ash in seed treatment, organic manure mulching bush fallowing and mixture pepper for spraying in their farming activities. The study therefore recommend that Government should put in place a policy to enable a policy for indigenous knowledge preservation.

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Francis Yao Anyan, A PhD Candidate at Open University of Malaysia (OUM) hosted by Accra Institute of Technology(AIT) and Lecturer Kumasi Technical University, Mathematics and Statistics, Department, P.O. Box 854 Kumasi, Ghana.

108