



Indigenous Farm Management Practices among Rural Farmers: Implications for Sustainable Environment in South-East Agro-Ecological Zone, Nigeria

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Abstract

The study investigated the extents to which indigenous farm management practices can be used to sustain the environment in South East agro-ecological zone of Nigeria. Multi stage sampling procedure was used in the selection of the sample size. The South East agro-ecological zone is made up of Abia, Akwa Ibom and Ebonyi state. Two State, Abia and Ebonyi were purposively selected because they met the criteria for selection. From these two states one Local Government Area was randomly selected from each state. (Ohafia Local Government Area and Afikpo South Local Government Area respectively), and two communities were selected from each L.G.A and from these communities, 2 villages and 35 farm families were selected, bringing the total to 180 respondents. Data were generated through the use of structured questionnaire and Focus Group Discussion (FGD) and subsequently analyzed with the use of simple descriptive statistics major findings revealed all the indigenous management practices engaged by the respondents to sustain their environment. About 15 % of the respondents uses organic manure, inter-cropping 15 % , crop rotation 14 % , cover cropping 14 % , and shifting cultivation 10 % and other methods that were specific to their localities. The results show that the farmers in the study area use indigenous management of soils to sustain their environment. The paper recommends the need to incorporate these techniques into climate change polices as this can lead to the development of effective adaptive strategies that are cost-effective, participatory and environmentally friendly.

Keywords: Indigenous Knowledge, Soil Management Techniques and Rural Communities.

INTRODUCTION

Traditional and local knowledge constitutes an extension realm of accumulated generating capacity that is needed if sustainability and development goals are to be reached. The traditional knowledge, identities and practices of indigenous and local communities are recognized under the UN convention on biological diversity as embodying ways of life relevant for conservation and sustainable use of biodiversity; and by others as generated by the purposeful interaction of materials and non-materials worlds embedded in place based cultures and identities. Tella (2007) define indigenous knowledge as a systematic body of knowledge acquired by local people through accumulation of experience, informal experiment and in terminate understanding of the environment of a given culture and Horsthiuke (2008) suns up indigenous knowledge as a total knowledge and skills that are acquired by people in a given area which enables them to get the best of their environment. It refers to the unique, traditional local knowledge existing within and developed around the specific conditions indigenous to a particular geographic area. It includes a system of self management that governs resource use (Appiah-Opoku, 1999) and Duffer (2003) in his findings refers indigenous knowledge as the basic component of communities knowledge and it represent the successful ways in which people have death with their environment in the past. Indigenous people inhabits about 20 % of the planet (Martin and Haila, 1996). In Nigeria about

70 % of the population lives in the rural areas. Their knowledge and culture that constitute their social and livelihood systems are closely attuned to the natural ecosystem. The development of indigenous knowledge systems, covering all aspect of natural environment has been a matter of survival to the people who generated these systems (Tella, 2007). It is the basis for agriculture, food preparation, healthcare, education and training, environmental conservation and a host of other activities.

In the past half century, modern knowledge has provided new technologies in agriculture that has caused a main evolution in production process, and this technologies has caused problems in the environment.

One of the ways to solve these problem is the use of our ancestors tentative knowledge. Local knowledge or indigenous knowledge is the knowledge belonging to a specific community or group, that the people have developed over time and still continue to develop (Grohuk, 2005). It is based on experience, often tasted over time, and adapted to local culture and basis for natural resources management are seen in communities developed without direct inputs from the modern formal or scientific establishment.

The issue of environmental sustainability cannot be overemphasized in the south east ecological zone of Nigeria, as this is fundamental to the overall well being and the development of the area especially the well being of which generation. The south-east ecological zone is dominated by rural communities that depends solely on natural environment for their livelihood. Poor people are vulnerable to environmental dynamics because of social political and negative impact of industrialization.

Environmental degradation issues are of tropical concern to communities in the areas as it is a major cause of productivity losses (Opukiri and Ibaba, 2008). The word sustainability is derived from the Latin word *sustinae*, meaning to keep in existence, implying permanent or long term support.

In the context of agricultural production, Ikerred (1993) define sustainability as farming system that are capable of maintaining their productivity and usefulness to society indefinitely. According to him, such system must be resourceful, conserving, socially supportive, commercially competitive and environmental sound. Sustainable agriculture mean an integrated system of plant and animal production practices, having a site specific application that well over a long time, satisfy human food and fibre needs, enhance environmental quality and natural resources base (FAO, 2010). At this point agriculture economy makes the most efficient use of non-renewable source and on farming resources.

Innovation programmes are known to have been created, funded and managed by outside resources and introduced into rural communities with the hopes and promise of impacting their lives, without taking into consideration the existing practices of the people and has resulted in low adoption and success rates. As a result of these failures, there was a growing interest in the incorporation of the traditional practices to scale up adoption rate and also provide environmentally sound approach to development. Although research is gradually recognizing the important of indigenous knowledge system in development studies, the value of indigenous practices in sustainable agricultural studies and environment has received little attention in the study area.

Therefore, this study was designed to examine the indigenous farm management practices , practiced by the farmers and its implications for sustainable environment with the following specific objectives to;

1. identify the socio-economic characteristics of the respondents
2. ascertain their major sources of information
3. identify the type of crops grown in the study area
4. analyze the various indigenous farm management practices involved by the respondents
5. examine the factors influencing the use of the farm management practices adapted by the respondents.

Methodology

The study was conducted in South-east agricultural zone. The South-East zone of Nigeria lies between latitude $4^{\circ}20^1$ and $7^{\circ}25^1$ N and longitudes $5^{\circ}25^1$ and $8^{\circ}51^1$ E covering a land area of about 109,524 sq km, which represent about 11.86 % of the total area of Nigeria (Ekong, 2008). This area lies on mainly plains under 200m above sea level. It is bounded on the South by bight of Bonny, on the East by the Republic of Cameroun,, on the West by River Niger and on the North by Benue State. The zone has a population of 18.92 million or 21.48 % of the total population of Nigeria (FSON, 1988). About 60 – 70 % of the inhabitants resides in rural areas and with a population density of about 173 person per square kilometer, making it one of the most densely populated agricultural zones in Nigeria. The climate of the South-East zone is typically equatorial. It is influenced by the East line, namely the tropical continental and tropical maritime air masses. There are two distinct climate seasons the rainy and dry seasons. The rainy seasons starts from March/April and ends in October/November and dry season lasts till March of the following year. Crop farming is the dominant activities, while fish farming is the primary occupation of the river-rine areas (Anuebunwa, 1988).

For the purpose of this study, cluster sampling of the three major vegetative zones were delineated (mangrove/swampy area, rainforest and derived savanna). Then purpose sampling of a state each from the clusters was

made. Three states namely Abia and Ebonyi were selected for the study. Abia State is located within latitudes 40°N – 47°N of equator and longitude 70 – 80E of the Greenwich Meridian (NRCRI, 2010). The state has a total land area of about 5,410sq kilometers, with a human population of about 2,833,999 (NPC, 2006). The State is made up of 17 Local Government Areas (LGAs). Agriculturally, by the Agricultural Development Programme (ADP) structure, it is demarcated into three Aba, Umuahia and Ohafia. Abia State shares a common boundaries with Rivers State in the South, Imo in the West, Ebonyi and Enugu States in the North and Akwa Ibom and Cross River States in the East. The people are mainly farmers, producing such arable crops as cassava, yam, cocoyam, maize, vegetables, melon, banana/plantain and rice. The farm holding for each family is less than two hectares which makes for subsistence farming while Ebonyi State is an inland South-eastern State of Nigeria, populated primarily by Igbos. It has a land area of about 5,530km and population of about 4,339, 136 people (EBSG, 2005). It is on the coordinate of 6°15'N and 8°05'E. It has boundaries with Benue State to the North, Enugu State to the North-west, Abia to the South-east and Cross River to the East. Agriculture is the major occupation of the people. The crops produced are yam, cassava, plantains, maize, palm produce, cocoa, rubber, rice and soon. Multi-stage sampling procedure was used in the selection of the sample size. In the first stage, two States Abia and Ebonyi were selected. In the second stage, two local government areas were selected (Afikpo South and Ohafia L.G.A were selected). In the third stage, two communities (Edda in Afikpo and Isingwu in Ohafia L.G.A) were selected. Finally 90 farmers that were involved in tubers and vegetable production were selected from each community, bring the total sample to 180). Semi-detailed surveys were conducted, and data consisting of the following information: soil and cultural management soil conservation and soil fertility management practices and socio-economic determinants. Farm management skills on the indigenous/traditional practices of farmers were documented mostly in tubers and vegetable production. Focus group discussions in the selected communities were facilitated to gather actual farmers farming experiences. The information obtained from the surveys was complemented by interviews of extension agents attached to each community. Data collected were analyzed with simple descriptive statistics like frequency distribution and means.

Results and Discussion

The demographic characteristics of the respondents analyzed in this study, which are relevant to individual's perceptions of indigenous knowledge and farm management practices, include age, educational level, income, gender, marital status and extension contact. The findings revealed that most of the respondents 34 % were between the ages of (60 – 65), youths comprised only about 17 % . This agrees with the findings of Solomon (2008) that the mean age of farmers was 51 years, meaning that older people were involved in organic agricultural activities using indigenous knowledge than younger ones. The implication of this is that the youths are not involved in the practices of organic farming to any appreciable extent. As a result, the older farmers may not be willingly to adopt new technologies as expected, as adoption can vary inversely with age (Ogunnyene, 2005). Some of the respondents complained about non-availability of information on new technologies made them to stick to their old ways of farming. The result on Table 1, also revealed that about 38 % of the respondents had no formal education, primary 31 % , secondary 23 % while tertiary 8 % . This implies that learned people are involved in farming. It is assumed that high literacy level may influence adoptions of innovations that are related to modern farming but the degree of educational level did not influence their use of indigenous knowledge in farming. According to one of the respondents "organic agriculture builds on and keep alive our rich heritage of traditional knowledge and traditional agricultural varieties".

The results depicted in Table 1, also show that some of the respondents, 34 % earned between (₦160 – 200) per annum indicating low level of income. This corroborated the views of International Bank for Economic Reconstruction and Development (IBRD) which ranked Nigeria with a per capita income of ₦1254.60 per dollar and which placed her as one of the poorest nations in the world (Oladoja *et al.*, 2008). They respondents collectively cited that the practices involved little risked, required few, if any fixed investment and they are less dependent on external resources and experience more stable yields.

From Table 1 as well, majority of the respondents were male, suggesting that farming in this area may mostly be practiced by males, well depending on household heads, most of the farming operations like weeding, harvesting, processing women and marketing are usually engaged by women.

The results also shows that majority of the farmers 84 % were married while very few 16 % were single or widowed. This means that married people are more involved in farming and may receive assistance from their spouses in carrying out some activities on the farm. Great importance is attached to marriage institution in the society and this can impact on the extent information on agricultural activities are shared among spouses and other community members.

Major crops are referred to as crops commonly grown in a large quantity for commercial purpose by the farms. The comprehensive list of crops was developed during the Focus Group Discussion. Table 2 shows that majority of the respondents grow the following staple food crops Rice 17.3 % , cassava 17.0 % , okra 16.1 % , yam 15.5 % . Other

Table 1. Demographic characteristics of the respondents

Variables	Frequency	Percentage
Age		
30 – 35	30	16.7
40 – 45	41	22.8
50 – 55	47	26.1
60 – 65	62	34.4
Educational level		
Non-formal	69	38.3
Primary school	55	30.6
Secondary school	41	22.8
Others	15	8.3
Level of Income in N'000		
40 – 80	53	29.4
120 – 140	45	25.0
160 – 200	61	33.9
240 – 300	21	11.7
Gender		
Male	99	55.0
Female	81	45.0
Marital status		
Ever married	152	84.4
Single	28	15.6

Source: Field Data, 2013

Table 2. Distribution of respondents based on type of crops grown by the respondents

Variables	Frequency	Percentage
Crop		
Maize	138	13.7
Yam	156	15.5
Cassava	171	17.0
Plantain	62	6.2
Vegetables	141	14.0
Okra	162	16.1
Rice	174	17.3

Source: Field Data, 2013

crops were seen as complimenting the major crops. Some of these crops were planted in between the major crops for intercropping and green manuring (e.g. hydrogen fixation by leguminous crops) which are important activities in organic farming. The green manure crops will improve the soil condition as was cited by (Taiwo *et al.*, 2006).

Sources of information on farming activities are channels through which farmers gain access to information on farming activities and other aspects of livelihood such as marketing. Information sources were evaluated by presenting respondents with a list of sources developed from the literature and asking them to indicate which one, they regularly uses. The result in table 3 reveals respondents access to agricultural information. Most of the respondents 38 % had access to radio followed by groups 14 % while mobile phone scored the least. This result agrees with Nwachukwu (2003) that emphasized the use of agricultural programmes on radio to improve and change the live of farmers in agricultural advancement. Sources of information and its contents of rural setting becomes important because information transform knowledge and practices.

The soil is the greatest possession of the farmer: therefore, it has to be carefully managed to avoid extreme depletion of

Table 3. Distribution of respondents based on sources of agricultural information

Variables	Frequency	Percentage
Radio	68	37.8
Extension contacts	34	18.9
Friends	17	9.4
Groups	24	13.3
Relatives	25	13.9
Newspaper	9	5
Mobile phone	3	1.6

Source: Field Data, 2013

Table 4. Distribution of respondents based on farm management practices for sustainable environment.

* Variables	Frequency	Percentage
Organic manure	172	14.8
Crop rotation	157	13.5
Mix farming	62	5.3
Shifting cultivation	110	9.4
Mulching	181	13.6
Cover-cropping	97	8.3
Inter-cropping	174	14.9
Bush fallowing	67	5.8
Use of natural materials/timeliness of crop cultivation for pest control	96	6.2

* Multiple response

Source: Field Data, 2013

its resources. Table 4 shows various indigenous practices used by farmers to sustain their environment. The table reveals that about 15 % of the respondents uses organic manure (Plant and animal residues) which the farmer add to the soil to maintain soil fertility. According to them when added to the soil puts back nutrients and improve the soil structure. The table also shows that about 5 % of the farmers practices mix-farming. They grow crops and rear animals on the same land, the chopping are used as manure to result also reveals that some of the respondents 14 % practices crop rotation methods which involves planting of crops with different feeding habits to reduce soil depletion.

The same table 4, reveals that some of the farmers were practicing shifting cultivation. According to them, the practices involved cultivating the land for some years and when its nutrient is exhausted, is then allowed to go fallows for about 7 years before it is used again. The decayed leaves and plants, parts helped to enrich the soil during the fallows and the decayed leaves from humus, thereby improving the soil structured check erosion, they concluded.

Some of the respondents practices mulching in their farms by covering the soil surface with grass, crop residues ongoing corn cobs to regulates soil moisture.

About 8 % of the respondents uses legumes as cover-crops in their farms because apart from covering the soil to suppress weed growth, they also protect the soil from direct impact of rainfall and erosion. The table also reveals that about 15 % of the respondents practices intercropping, according to them two crops are planted on a piece of land, and the last crop is harvested before the first one, and the mixture of crops, covers the soil thereby suppressing weed growth and control erosion. Some of the respondents practices bush fallowing.

Results from Table 5 shows factors influencing their practice despite the level of technological advancement recently in agriculture. About 16 % of the respondents stated that the practice is specific to their culture and have emerged from years of practice and critical reflection on how best to farm in nature's image using on-farm resources and not depending on destructive purchased inputs.

About 15 % of the respondents complained about inadequate access to farm inputs. Poor access is a problem in the production process because input utilization is not mutually exclusive.

They are not mutually exclusive because all the inputs needed during production must be available and at the right time or else they will use what is available within the farming communities. The result show that most of the respondents were attended secondary schools. This is encouraging because Imonikhe 2010) states that education enhances

Table 5. Factors influencing indigenous farm management practices

*Variables	Frequency	Percentage
Culture	117	16.0
Farm-size	96	13.0
Low extension contact	162	22.0
Educational level	102	14.0
Poor access to credit	85	12.0
Cosmopolitaness	96	13.0
Inadequate access to farm input	110	15.0

** Multiple responses

Source: Field Data, 2013

farmer's ability to make accurate and meaningful management decisions Abdulsalam, Yaro and Aloba (2010) also stated that a farmer's level of education is an important factor in determining his/her ability to understand policies or programmes that affect farming, to accept and adopt agricultural innovations. Also, Nwaru (2007) further added that education and training help to unlock the natural talents and inherent enterprising qualities of farmers and enhance their abilities to understand and evaluate new production techniques. According to a prior expectations, their level of education did not affect their utilization of indigenous knowledge in managing their farms. About 12 % of the respondents complained about poor access to credit. Inability to provide acceptable assets as collateral reduces their possibility of obtaining credit facilities to be used for their farming activities which invariably limits their use of renewable on-farm resource. Some of the respondents complained about low-extension contact. According to (NAERLS APS,2011). One obstacle to the realization of extensive delivery is the high extension agents (EAs): farmer ratio which stood at 1: 2500. Mundy and Sultan (2001) further stated that the huge research organization whose sole purpose is to develop new farming technologies and communication part to the dust and so the farmers make do with their local technologies. About 13 % of the respondents had just travelled outside their locality in the last 12 months. The irregular contact with urban areas and limited interactions with other farms also limit them to the use of available technologies within them.

Conclusion and Recommendation

The study tried to assess the various farm management practices employed by the respondents to increase production and sustain their environment. Findings show that they practices mulching, planting of legumes as color crops to regulate, soil moistened suppresses weed growth and control of erosion. Incorporating indigenous knowledge farm management into climate change polices can lead to the development of effective adaptation strategies that are cost effective, participatory and sustainable.

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