

## SUSTAINABLE ENVIRONMENTAL MANAGEMENT PRACTICES USED BY FARMERS IN ORON AGRICULTURAL ZONE OF AKWA IBOM STATE, NIGERIA

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### ABSTRACT

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*The natural environment with all its ecosystem services comprises the entire basis for life on earth, and there is a strong link between the state of the environment and food production. This is true because the environment directly influences soil nutrient availability, rainfall planting season and preponderance of pests and diseases which collectively determines farm management practices. The study was therefore, conducted to assess the extent of usage of sustainable environmental management practices by farmers in Oron Agricultural Zone of Akwa Ibom State. A multi-stage random sampling technique was used in selecting ninety farmers as the sample size. The first stage involved the use of purposive sampling technique to select 3 out of the 5 Blocks in Oron Agricultural Zone with the aid of Extension Workers because most of the farmers are located in the Blocks. This was followed by random selection of three Extension Cells from each of the selected Blocks. Ten farmers were selected randomly from each of the selected Extension Cells. Structured questionnaires and oral interviews were used to collect the primary data. Primary data were gathered through the use of a structured questionnaire and oral interview schedule. Descriptive statistics and a 4-point Likert rating techniques were used to analyse the data. Findings showed that, majority (89%) of the respondents acquired various levels of formal education while 66.6% had between < 1-2 ha as farm size. Farming experience of the respondents was 15years and most (65.5%) of the farmers belonged to Co-operative Societies. The farmers utilizes mixed cropping, legume application, mulching and crop rotation, Flooding was the major cause of environmental hazards that affect food crop production. Insufficient farm land (91.8%) was identified was the outstanding constraint. The study recommends, among others, vigorous enlightenment campaign, training of farmers on the need to form or join Co-Operative Organizations, strengthening of extension service to encourage effective strategies in controlling environmental hazards so as to enhance food crop production.*

**Keywords:** *Sustainable, environmental, hazard, practices, crop production.*

### INTRODUCTION

Global food crisis has not only resulted in a 50-200% increase in food prices but has driven 110 million people into starvation (Abduraham, 2013). In Nigeria, Kumolu (2010) indicated that about 40 million people are believed to be hungry and a large percentage of the population lack access to adequate food. With the rapid increase in Nigeria's population, there is a reduction in the available land space for farming and consequently reduced food production. Iheke and Onyenorah (2012) reported that out of the approximately 2,976 million hectares of total land area in Nigeria, 2,145 million hectares (72%) are faced with different food production constraints such as erosion, acidity, steeply slopes, low fertility, shallow and stony, saline and poorly drained soils). Out of these areas, about 490 million hectares are affected by different types of hazards that include over cropping, over grazing, deforestation, inappropriate agricultural practices and over exploitation. It has been further noted that poor and inappropriate soil management are the main causes of physical, chemical and biological degradation of cultivated land (Adediji, 2000 in Jimoh, and Ifabiyi, 2013; Fakayo, 2000; Oyekale, 2008) Akwa Ibom State is one of the most densely populated States in Nigeria with densities as high as 634 persons per square kilometre and with 87.89% of its population being rural dwellers (National Population Commission (NPC, 2006). As a result they are faced with constraints like increased expenditure on land, cultivation, availability of fertilizers, agrochemicals and transportation and other farm inputs (Bassey, 2012).

All these factors have major impact on crop production, leading to food and fibre insufficiency as well as nutrition related issues (Nwachukwu and Nnadozie, 2011). Ndem (2011) reported that crop performance in the study area is experiencing reduction in all ramifications though the task of producing enough food for the teeming population has received considerable policy attention. Nevertheless, the production rate of crop is far below the population growth rate with adverse consequences on the State's food situation (Umoh, 2006). Hence, crop production is mostly practiced on subsistence scale by the farmers who are resource- poor. Abdulrahman (2013) reported that due to the declining food production in Nigeria, food production no longer keep with population growth and thus creating a wide gap between food demand and supply. In the study area also the situation is not different. For food production to keep pace with the rapid population growth and demand for food, agriculture needs to grow as a major source of food, income and livelihood in the study area (Bassey, 2012). Ibia (2016) indicated that over 90 percent of commercial supply of food consumed in the State is supplied from other States. Food production is mostly practised on subsistence scale, thus this monumental increase in food import is a clear indication that domestic agricultural output is not in tune with our domestic needs for essential food items and raw materials for

agro-industries (Ukpong, 2010). The resulting effect of this imbalance is malnutrition, poverty and deteriorating living. To avert this prevailing situation, farmers have to use different intense environment friendly technologies to obtain optimum crop growth, improve yields and increase income.

Environmental hazard is as a result of unsustainable human practices and activities which of recent seriously endangers the entire food crop production platform of the planet (Iheke and Onyenorah, 2012). Leading to reduction in crop yield, a decline in food production and farmers income. Kumolu, (2010) explained that the major causes of environmental hazards in the south-south Nigeria are soil erosion due to high rainfall, deforestation, fragile nature of the soil and farming activities. Nigeria loses from environmental hazard was estimated to be about \$5 million annually (Ezeaku, 2012). It also indicated that each year an estimated 10 million hectares of cropland Worldwide are abandoned due to soil erosion and diminished production caused by erosion. Erosion is the washing away, transportation or impoverishment of top soil by water and / or wind. It is as a result of erodible soil, strong winds and high annual total rainfall characterized by high intensity. Another 10 million hectares are critically damaged each year by salinization and improper drainage methods. This loss amounts to more than 1.3% of total cropland annually. Primarily farmers depend on rich topsoil for production of crops but about 1.9 billion tons of topsoil washes or blows away each year with 1.3 billion tons of excessive erosion. Most of the severe and frightening soil erosion problems and disastrous events threatened the soil structure, livelihood activities and productive capacity of the farm, hence severe ecological damage.

Furthermore, cropland losses comes from deforestation of fragile land over cutting of vegetation, exploitation, shifting cultivation, unbalance fertilizer use and husbandry destroys replanting efforts of about 25% hectares a years and refurbishes about 4% of the losses ( Garcia, 2010). Consequently the soil is exposed to erosion devastation, flooding, desertification and soil infertility. Deforestation is also undertaken for a number of purposes such as in farming activities which accounts for 60-70% of annual clearing of tropical forest; fuel wood gathering, which accounts for the greatest proportion of the wood used in the developing countries and commercial logging, which accounts for 10-20% (Agbarevo, 2013). Akolade (2003) stated that constant deforestation has caused the extinction of plant and have result in low agricultural production.

Ezeaku (2012) reported that cropland required a set of agricultural management strategies for prevention of cropland eroded from the earth's surface or becoming chemically altered by over use, salinization, acidification, or other chemical soil contamination. It also needs the combination of all methods of management and land use to guard against soil depletion or deterioration by natural or man-induced factors. Thus, farmers need to be mainstreamed into effective environmental friendly practices and activities designed for protection such as crop rotation, mulching, alley cropping, farm fallowing, taungya system, legume application, mono cropping, mixed cropping and terrace hedge planting. Reflecting on the prime importance of agricultural sector as the source of food to the people, provider of income, raw materials for industries, its crucial role as employer of labour, its contribution to foreign exchange and the fact that domestic supply has not been able to meet up with domestic demand. In this regard, there is need to assessed the sustainable environmental practices utilized by crop farmers in order to step up food production. Therefore, the study intend to: examine the socio-economic characteristics of the farmers, ascertain the sustainable environmental management practices used by the farmers, assess the presumed causes of environmental hazards and identify constraints to the use of sustainable environment practices.

## METHODOLOGY

This study was conducted in Oron Agricultural Zone of Akwa Ibom State, which is one of the six agricultural zones in the State. It is made up of five differences Local Government Areas namely; Oron, Mbo, Uruefong Oruko and Okobo. There are two distinct climate seasons in the zone, rainy season, from March to October and dry season from November to February. The annual rainfall varies from 2,942 mm to 3,424 mm. The average temperature is about 28 °C. The zone is characterized by the presence of numerous ecological and geographically important high gradient streams. Fishing and subsistence agriculture are the main occupation of the people. Crops grown in the locality include cassava, pineapple, plantain, banana, maize, yam, oil palm, cocoyam, vegetables and cocoa among others (Ukpong, 2010).

### Sampling procedure and sampling size

A multi-stage random sampling technique was used in selecting ninety farmers as sample size for the study. The first stage involved the use of purposive sampling technique to select 3 blocks from 5 blocks existing in Oron agricultural zone. This was done because many farmers are located there through the aid of extension workers in the zone. The second stage involved selecting three extension cells at random from each of the selected blocks to maintain uniformity. Ten farmers were selected randomly from each of the selected extension cells. Structured questionnaires and oral interviews were used to collect the primary data.

### Data analytical techniques

Descriptive statistics were used to analyse the socio-economic characteristics of the respondents and causes environmental hazard. A 4-point rating scale of least utilized =1, less utilized = 2, utilized =3, highly utilized =4 with a mean cut off point of greater than or equal to 2.5 as mostly utilized and less than 2.5 as less utilized was

used to ascertain the sustainable environmental practices used by the farmers, Also the respondents were asked to indicate among the listed constraints they encountered.

## RESULTS AND DISCUSSION

### Socio-economic characteristics of the respondents

Results show that 24% of the respondents were between 31 and 40 years of age (Table 1). Majority of the respondents (45.5%) fell within the age range of 41-50 years, while 21% of the respondents fell between the age-range of 51 years and above. The result implies that majority of the respondents were still active and economically productive. The result also shows that most the respondents (75.6%) were female while males accounted for the rest. This implies that more female are involved in farming activities than male in the area. Majority of the respondents (62.2%) were married with large household size of 5 to 10 persons (53.3%). This is an indication that the farmers have a relatively large household size, with relatively available free labour for carrying out farming activities in the area. The educational level of the respondents indicates that majority (89%) of the respondents have acquired various levels of formal education. The breakdown reveals that most (47%) of the farmers obtained primary education. Thirty three percent of the farmers attained secondary education while only 7% had tertiary education. Unamma (2004) showed that formal education is an important tool for understanding the environmental protection technologies by farmers. Practices, strategies, ideas and innovations in farming can only be effective when farmers are able to appreciate the needs and understand their application in

Table 1: Distribution of socio-economic characteristics of the respondents in Oron agricultural zone of Akwa Ibom State, Nigeria

Variables	Frequency	Percentage
Age (years)		
<30	18	8.89
31-40	22	24.44
41-50	41	45.56
>51	19	21.11
Sex		
Male	22	24.44
Female	68	75.56
Household size		
1-5	8	8.98
5-10	48	53.33
11-15	34	37.78
Marital status		
Single	17	18.84
Married	56	62.22
Divorce	6	6.67
Widow	11	12.22
Educational level		
Non formal	11	12.22
Primary	43	47.78
Secondary	30	33.33
Tertiary	6	6.67
Farm Size (ha)		
< 1-2	80	6.6
3-4	40	33.4
Farming experience (years)		
0-10	14	15.56
11-20	39	43.33
21-31	28	31.11
<31	9	10.00
Extension contact (monthly)		
None	37	41.11
Once	40	44.45
Twice	11	12.22
Thrice	2	2.22
Members of Co-operative Societies		
Yes	31	34.44
No	59	65.56

Source: Field Survey, 2014.

the day-to-day business of farming. This implies that most of the farmers are literate and thus have necessary educational background required to be mainstreamed into environmental management technologies efforts needed to combat the effects of environmental hazards in the area. The average farm size of one hectare per farmer was revealed, with most (66.6%) of the respondents having between < 1-2 ha while (33.4%) of the respondents had between 3-4ha. This implies that the farmers are still small holders, who produce mainly for their consumption while the excess is sold in the market. The mean farming experience of the respondents was 15years, implying that these farmers have engaged in farming for a long time. As such, they are well knowledgeable to understand the effects of environmental hazard on crop production in the area. Douben (2009) reported that farmers gain more expertise with the length of time they spent in their farming activities and this also influences perception and understanding of the causes and factors that affect their activities over the years. Most of the farmers (44%) were visited once in a month by the extension agents. This may be attributed to the many cells that one extension agent needs to cover. The result also reveals that 65.5% of the farmers are members of Co-operative Societies while 34% of the farmers do not belong to any Co-operative Society. Co-operative societies are of significant importance in farming as they often serve as channels for obtaining agricultural information, loans, procuring equipment, inputs and supplies at reduced prices for members.

#### Sustainable environmental practices utilized by the farmers

Table 2 reveals very high utilization on levels for mixed cropping, legume application, mulching and crop rotation. These practices help to safeguard food crop from pest/disease attack, maintain soil fertility, increase the levels of soil nitrogen and prevent soil erosion by giving continuous vegetative cover. Practices that recorded low utilization level among the farmers did not consider the foremost priority to use due to little technical knowhow and low environmental management skills. This also shows that farmers have not been sufficiently trained on the importance of conserving their natural environment.

#### Causes of environmental hazard presumed by farmers

Table 3 reveals causes of environmental hazards presumed by food crop farmers. The result shows that the most common causes of environmental hazards is flooding (43%) followed by bush burning (23%), erosion (15%), felling of trees (8.6%), use of fuel (6%) and irregular pattern of rainfall (2%). This has affected the farmers immensely as much of their production in terms of yield per hectare is affected. Flooding is the major environmental hazards that affect food crop production in the study area more than any other hazard. This confirms the report of Onumandu *et al.* (2000) that flood hazard disrupts agricultural calendar and crop yield.

Table 2: Distribution of respondents according to sustainable environmental management practices utilized by farmers in Oron agricultural zone of Akwa Ibom State, Nigeria

	4 SA	3 A	2 D	1 SD	Cum	Mean	Rank	Decision
Mixed cropping	76(84.4)	14(15.6)	0(0)	0(0)	346	3.9	1 <sup>st</sup>	Accepted
Legume application	57(63.3)	19(32.)	14(15.5)	0(0)	343	3.8	2 <sup>nd</sup>	Accepted
Mulching	71(78.9)	10(11.1)	6(6.7)	3(3.3)	329	3.7	3 <sup>rd</sup>	Accepted
Crop rotation	64(71.1)	21(23.3)	4(4.4)	1(1.1)	328	3.6	4 <sup>th</sup>	Accepted
Farm fallowing	20(22.2)	15(16.7)	3(3.3)	52(57.8)	183	2.0	5 <sup>th</sup>	Rejected
Mono cropping	0(0)	11(12.2)	37(41.1)	40(41.2)	149	1.7	6 <sup>th</sup>	Rejected
Alley Cropping	0(0)	0(0)	58(64.4)	32(33.3)	148	1.6	7 <sup>th</sup>	Rejected
Taungya systems	0(0)	5(5.6)	43(47.8)	42(46.7)	143	1.5	8 <sup>th</sup>	Rejected
Terrace hedge planting	7(7.8)	0(0)	28(31.1)	55(3.3)	132	1.4	9 <sup>th</sup>	Rejected
Grand mean							2.6	

SA-Strongly Agree, A = Agree, D = Disagree; SD = Strongly Disagree, Critical level =2.5

Source: Field Survey, 2014.

Table 3: Distribution of respondents according to presumed causes of environmental hazards in Oron agricultural zone of Akwa Ibom State, Nigeria

Causes of Environmental Hazard	Frequency	Percentage
Bush Burning	21	23.3
Irregular Rainfall	2	2.22
Flooding	39	43.3
Erosion	14	15.6
Felling of trees	8	8.6
Use of fuel	6	6.7

Source: Field Survey, 2014

#### Distribution of respondent according to constraints

Table 4 reveals that insufficient farm land (91.8%), high labour involvement (81.7%) and not readily available (80.0) were identified as the most pressing constraints. Insufficient farm land is associated with fragmentation of

lands and pressure due to high population which force crop farmers to intensively cultivate on a small plot land yearly. Farmers complained the high labour

Table 4: Perceived Constraints to the use of Sustainable Environmental practices by crop farmers in Oron agricultural zone of Akwa Ibom State, Nigeria

Constraints	Major	Minor	Not a constraint
Regular weed growth	0(0.0)	17(14.2)	73(81.1)
Reduction in soil fertility	0(0.0)	0(0.0)	90(100.0)
Increase pest and disease infestation	4(3.3)	10(8.3)	76(84.6)
Insufficient farm land	81(90.0)	9(7.2)	0(0.0)
High labour involvement	79(87.8)	11(12.2)	0(0.0)
Inadequate capital/credit	68(75.7)	22(18.3)	0(0.0)
High cost of transportation	74(82.4)	4(4.4)	12(13.3)
Raw material unavailability	56(62.2)	7(7.8)	27(30.0)
Require several Application	60(66.7)	22(24.4)	8(9.0)
Not readily available	66(73.3)	24(26.7)	0(0.0)

Percentages are in parenthesis, Source: Field Survey, 2014

involvement due to the drudgery, free education and high rate of rural-urban migration leading to reduction of labourers and poor access to some of the materials. The result also reveals that sustainable environmental practices suppress weed growth, cover the soil, increase water infiltration, promote soil biological activities, increase soil fertility and reduce the risk of serious pest disease outbreak. This agrees with the views of Nkeme and Ndaeyo (2011) that major agronomic practices / strategies utilized by farmers protect the environment.

## CONCLUSION

This study has revealed that incidence of environmental hazard directly influences crop growth and yield, soil nutrient availability and the effects of pests and diseases. In this regard, farmers appear to suffer most from the effect of environmental hazard as their means of livelihood is devastated in addition to other debilitating effects. This has a serious implication for food crop production in the area. It is therefore, recommended that enlightenment campaigns should be intensified through extension agent to sensitize farmers on the benefit of conserving the environment. Also, farmers should form association or unions that will organize and disseminate relevant information about protection and preserving of environment as this will enhance food crop production. The use of effective and efficient extension services geared toward promoting knowledge and capacity building among the farmers on strategies for combating environmental hazards should be organized for the farmers in the area.

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