

## **ENHANCING AGRICULTURAL AND SOIL CONSERVATION PRACTICES AMONG FARMERS IN CROSS RIVER STATE IN AN ERA OF ECONOMIC UNCERTAINTIES.**

**<sup>1</sup>Oku Martha Okabe Ph.D, Ekurisong Isong and Isong Lawson**

<sup>1</sup>Department of Agricultural Education  
Faculty of Entrepreneurship Education  
University of Education and Entrepreneurship,  
Akamkpa  
e-mail: okumartha@gmail.com

### **Abstract**

This study was conducted in Cross River State of Nigeria. The researcher adopted a survey research design. Three specific purpose guided the study with three corresponding research questions. The population of the study was 520 crop farmers and the sampling for this study was 243 respondents. Data were collected from the respondents with the aid of structured questionnaire. The instrument was validated by 4 experts, in agricultural education, measurement and evaluation. And the staff of State Ministry of Agriculture. The data were analysed using mean and standard deviation. Based on the data analysed, it was discovered that mulching, ridging, bush fallowing, cover cropping, mixed, agroforestry and others are major conservation practices adopted by crop farmers. Based on the findings of the study, the researcher recommended among others that farmer education an outreach training and capacity building programmes to inform farmers about the advantage of soil conservation measures should be given to farmers by specialists in collaboration with the state government.

**Key words:** Agriculture, Soil Conservation, Economic uncertainties.

### **Introduction**

Agriculture is the largest economic activities in rural areas, where almost 75% of the population engage in agricultural activities at the subsistence level (Simon, 2021). Before the discovery of oil (petroleum), agriculture occupies a position in the Nigeria economy. This is so because food is a primary necessity of man and agricultural products provide needed for fibre and raw materials for man's manufacturing and processing industries. It contributes a significant part of the Gross Domestic Production (GDP). For instance, between April and June, 2021, it accounted for 22.35% of the national GDP (Federal Office of Statistics, 2021). But, many people in agricultural production are rural farmers who are into agricultural practices.

Agricultural practices are essentially a set of principles that must be applied to agricultural processes in order to attain better agricultural products (Egbe, (2016), Agricultural practices means all activities conducted by a farmer on a farm to produce agricultural products which are inherent and necessary to the operation of a farm including, transportation, storage, distribution and land application of animal waste. Ajayi (2015) stated that agricultural practices means basically a collection of principles to apply to farm production process in order to get better agricultural products. In this study, agricultural practices are simple practices used in agriculture to facilitate farming. Nowadays, decent agricultural practices are some of the method applied to agriculture, it helps to create food for consumers. Agricultural practices can be effective in addressing soil as they reduce soil

erosion, improve soil structure and enhance fertility, all of which can help to improve productivity and sustainability of farmers (Egbe 2017).

Agricultural practices such as water and soil conservation appears to be a step in the right direction to meet global food demand in a more environmental manner (Fontes, 2022). Without soil and water conservation regulations, the productivity would continue to decline, and thereafter it would continue to lower agricultural export revenue and increase food insecurity (Darkwah, 2019). Therefore, there is a need to augment the soil back. One of the way to ensure this is by effectively utilizing conservation practices.

Soil conservation referred to as the practices and strategies implemented to prevent soil erosion, maintain soil fertility and ensure a healthy soil ecosystem. It's about managing the soil to prevent its destruction, which could be caused by a variety of factors including agricultural activities (FAO, 2020). Soil conservation are tools the farmers can use to prevent soil degradation and build organic matter (Ajiji, 2022). Soil conservation is the prevention of loss of the topmost layer of the soil from erosion or prevention of reduced fertility caused by over usage, acidification, salinization or other chemical soil contamination. In the context of this study, soil conservation practices involve the application of practices that are economically viable, socially acceptable, environmentally friendly and technically appropriate for planting of crops; which in turn reduces soil erosion, increase soil fertility, increase soil organic matter and increase agricultural productivity. Farmers implement conservation measures such as crop rotation, mulching and use of compost manure. This is because the use of these conservation measures has positive effect on their yield; it increases the sustainability of farming and reduce soil erosion. The use of conservation measures should practice among rural farmers to enhance soil resources management to meet up with the food demand in an era of economic uncertainty.

### **Statement of the Problem**

Despite the seriousness of soil degradation (decline in soil quality, decrease in crop productivity and high cost of food crop) prevalent in the country, limited information and empirical data exist on agricultural practices and soil conservation. Now, farmers find it difficult to preserve and manage degraded soil (Eni, 2017). It is essential to environmental protection, food security worldwide, and sustainable agriculture. The Food and Agriculture Organization (FAO) of the United Nation (2018) estimates that around 24 billion tons of fertile soil are lost annually. This is mainly due to the world expanding population, force farmers to clear forest and cultivate marginal region, which lowers production and has numerous catastrophic effects for the land. If farmers are allowed to continue farming on unfertilized plot of land without proper management, greater insecurity of food is likely to occur.

It is therefore necessary to determine agricultural practices and soil conservation in an era of economic uncertainties. This is possible as the study sought to determine, identify agricultural practices and soil conservation, factors influencing the effective use and reason for practicing soil conservation.

### **Purpose of the study**

The main purpose of this study was to determine agricultural practices and soil conservation in an era of economic uncertainty in Nigeria. Specifically, the study seek to.

1. Identify the level of adoption of soil conservation practices among the farmers?
2. Ascertain constraints to the adoption of soil conservation practices by farmers?
3. Determine the reasons for practicing conservation practices by farmers?

### Research Questions

1. What level of adoption of soil conservation is been practice among the farmers in Cross River State?
2. What are the constraints to the adoption of soil conservation practice by farmers in Cross River State?
3. What are the reasons for practicing soil conservation by farmers in Cross River State?

### Methodology

This study was carried out in Cross River State. The design of this study was descriptive survey. The population of the study was 520 respondents made up of 320 registered farmers and 200 unregistered farmers. The sample for this study was 243 respondents. The instrument used for the study was self-developed questionnaire with 37 items. The instrument was validated by four experts, two experts from the Department of Agricultural Education and one experts from measurement and evaluation from the University of Calabar and one from State Ministry of Agriculture, Calabar. Mean statistics was used to answer the research question. The decision rule was that any item statement that attained a mean of 2.50 or above was regarded as agreed while those below 2.50 was regarded as disagreed by the respondents.

### Research Question 1

What level of adoption of soil conservation is been practice among the farmers in Cross River State.

**Table 1:** Mean rating of the respondents on level of adoption of soil conservation in an era of economic uncertain tips. (N = 243)

	Item statement on practices adopted	X	SD	Remarks
1	Mulching	3.05	0.50	Agreed
2	Planting Cover Crops	2.54	0.56	Agreed
3	Crop Rotation	3.28	0.58	Agreed
4	Ridging	2.59	0.56	Agreed
5	Bush Fallowing	2.93	0.51	Agreed
6	Mixed Cropping	3.03	0.74	Agreed
7	Alley Cropping	2.55	0.51	Agreed
8	Agro Forestry	3.53	0.60	Agreed
9	Conservation Tillage	2.82	0.34	Agreed
10	Contour Farming	2.76	0.45	Agreed
11	Application of Animal Manure	3.53	0.60	Agreed
12	Application of Green Manure	3.28	0.58	Agreed
13	Living Crop Residue in the Field to Decay	2.82	0.34	Agreed
	<b>Grand Mean</b>	<b>3.01</b>		

Key: X = Mean, SD = Standard Deviation

Table 1 shows that the mean response of the respondents ranges between 2.54 and 3.53 which are highly adopted and their standard deviation ranged between 0.34 to 0.74. This indicated close relationship in their response. The grand mean is 3.01

### Research Question 2

What are the constraints to the adoption of soil conservation practice by farmers in Cross River State.

**Table 2:** Mean rating of the respondents on constraints to the adoption of soil conservation. (N = 243)

	Item statement on practices adopted	X	SD	Remarks
1	Population Pressure on Land	3.69	0.58	Agreed
2	Availability of Labour	2.91	0.51	Agreed
3	Availability of Funds	3.11	0.34	Agreed
4	Farmers Experience	2.46	0.64	Agreed
5	Management Ability	2.70	0.54	Agreed
6	Knowledge of the Practices	2.63	0.58	Agreed
7	Climatic Conditions	2.62	0.55	Agreed
8	Issue of Land Tenure	2.67	0.43	Agreed
9	Fertilizer and Input Cost	2.79	0.53	Agreed
10	Government Policy	2.61	0.47	Agreed
11	The Skill of the Farmer	2.76	0.48	Agreed
12	Availability of Conservation Materials	2.59	0.47	Agreed
	<b>Grand Mean</b>	<b>2.79</b>		

Data presented in table 2 shows that all the items had their own mean above the cut-off point of 2.50. This signifies that the twelve items are factors influencing soil conservation measures. Their standard deviation range from 0.34 to 0.58 showing close range. The grand mean is 2.79 which is above 2.50.

### Research Question 3

What are the reasons for practicing soil conservation?

**Table 3:** Mean rating of the respondents on reasons for practicing soil conservation. (N = 243)

	Items on reasons for soil conservation	X	SD	Remarks
1	It helps in erosion control	2.42	0.54	Agreed
2	It enhances soil fertility	3.23	0.65	Agreed
3	Improves soil structure	2.70	0.43	Agreed
4	Promotes soil and water conservation	3.13	0.62	Agreed
5	Helps to recycle soil nutrients	2.70	0.43	Agreed
6	It help in controlling of weed	2.65	0.50	Agreed
7	It reduces production cost	2.67	0.43	Agreed
8	It enhances soil water storage	3.07	0.59	Agreed
9	For long-term continuity of yield from the land	3.23	0.65	Agreed
10	For long-term sustainability and productivity of land	3.28	0.54	Agreed
11	It increase soil water holding capacity	2.91	0.47	Agreed
12	It leads to increase yields	3.42	0.54	Agreed
	<b>Grand Mean</b>	<b>2.98</b>		

Table 3 revealed that all the items on this table had their mean score between 2.65 and 3.42 which is above the criterion level of 2.50. Indicating that the twelve items are reasons of soil conservation. Their standard deviation value range from 0.43 to 0.59. Indicating that the respondents where not far from each other in their responses.

### Findings of the study

The study found out that mulching, planting of cover crops, crop rotation, ridging, bush fallowing, mixed cropping, alley cropping, agroforestry, conservation, tillage, contour farming, application of animal manure, application for green manure and living crops residue

in the field to decay are soil conservational practices. Population pressure on land, availability of labour, availability of funds, farmers experiences, management ability, knowledge of the practices, climatic condition, issue of land tenure, fertilizer and input cost, government policy, the skill of the farmer and availability of conservation materials are factors influencing soil conservation while erosion control, enhancing soil fertility, improving soil structure, promoting soil and water conservation, recycle soil nutrients, controlling of weed, reducing production cost, enhancing soil waste storage, continuity of yield from farm land, increasing yield are all reasons for practicing soil conservation.

### **Discussion of findings**

Finding on research question one revealed that mulching, crop rotation, planting cover crops, ridging, bush fallowing, mixed cropping, agroforestry are all practices of soil conservation. The findings is in line with the findings of Tsado (2021). In his findings, mulching, crop rotation, planting cover crops and ridging were the major conservation practices adopted by farmers in Osun State on farm land. Also, Nyirahabimana (2021) noted that mulching is widely adopted among farmers in Kenya and Uganda. The result of this study further show that the respondent practice ridging because most of the farmers cultivated arable crop which demands them to make ridges for planting and erosion reduction, hence making it a useful practice. The findings is in Tandem with Akplo (2019) that ridging is significantly adopted and practiced to control soil erosion. The result further show that arable farmers were involved in crop rotation as a conservation practice. This help to return nutrient to the soil and also interrupts pest and diseases. The findings is in agreement with the findings of Remigio (2022), that crop rotation is dominant and 51% of farmers in Uganda practiced crop rotation by succeeding different crop on the same piece of land seasonally.

Another major practices identified by this study were agroforestry, application of animal manure and application of green manure. Agroforestry is the integration of trees, shrubs, crop and animals to enhance soil quality, biodiversity. The findings agree with the report of Ajiji (2020) reports that organic matter is continuously supplied by the leaf litter and biomass of trees and shrubs, which strengthen soil structure and boost water-holding. It was observed that farmers leave crop residues in the field to decay. Materials are left on cultivated land after the crop have been harvested. The findings is in line the findings of Valanzuela (2020) noted that crop residue add nutrients to the soil. In addition to this, crop residue absorb rain drop impact and keep the wind off the soil surface.

The study revealed that they are factors influencing effective use of conservation practices. The major factors influencing the effective use of conservation include population pressure on land, availability of fund, and availability of land. Conservation practices are inherently long-term, requiring land for an extended period. As population of community increase, the land resources becomes scarce, because the population is greater than the available land, hence resulting in increased exploitation of resources to provide food and water to the growing population, and this in turn would result in soil degradation, loss of vegetation and loss of biodiversity. This finding also collaborated with the findings of FAO (2021) that population pressure on the world's land is a factor limiting food production. Availability of funds is an important factor in effectively using conservation practices on farm land because farmers need funds to purchase inputs and materials needed to practice conservation techniques on their farmland. They also need fund to pay extra labour when the practice requires activities during peak periods of normal field work. This findings is in agreement with the findings of Ajiji (2022) that finance is a key factor in adopting technology among farmers. Labour availability is one of the most important types of diagnostic information that aid in selecting appropriate conservation practices and in defining farmers with high usage potential. Some conservation practices required extra work to effectively

carry out the practice. If the labour is scarce at a particular period that will hinder farmers from practicing such conservation practices. The findings is supported by the findings of Etsay (2022) that availability of labour force was found to have a significant positive influence on farmers' decision to continuously use conservation.

Also, the study revealed that there are reasons for conservation practices. It is evident in table 3 that long-term continuity of yield from land, long-term sustainability and productivity of land, and increase yield were the utmost reasons for conservation practices by the respondents. As an approach, conservation measures are important to improve crop yield increment, particularly in high degraded areas. Conservation practices are to improve crop yield by enhancing soil moisture and controlling erosion. The practice improve the retention of moisture and soil particles, together with fertilizer, within cropland which might otherwise be washed away by water erosion. This Barrera (2019) that, conservation in agriculture increases yields. Conservation practices also help to replenish soil nutrient thereby aiding productivity and sustainability. This finding is also supported by the finding of Ajiji (2022) that conservation is an important step to increase productivity and ensure sustainability in agriculture. The findings also affirm that practising conservation improved soil structure, enhanced soil fertility, serves as erosion control, recycled soil nutrient, serves as soil and water control and increase soil water holding capacity. Conservation practices improve soil structure through that formation of the soil aggregates and increase porosity resulting in better aeration and water retention. Enhanced soil fertility is the ability of soil to sustain plant growth and optimize crop yield and this is achievable through practicing bush fallowing conservation practices. Erosion control is the prevention of wind and water, planting cover crops to help to achieve this benefit. Recycled soil nutrients are the return of the nutrients used by plant back into the soil through the direct application of animal manure. Increase soil water holding capacity is also one of the reason in that application of organic matter enhances soil ability to absorb water, leading to less water stress during dry and wet periods.

## **Conclusion**

Sustainable agriculture and soil conservation depend heavily on agricultural practices. Farmers can reduce soil erosion, improve soil fertility, decrease nutrient run-off, and increase overall soil health by implementing diverse practices such as crop rotation, mulching, cover cropping, ridging, bush fallowing, mixed cropping and agroforestry. These procedures not only help to protect top soil, but they also improve biodiversity, water quality, and climate change mitigation. The major factors influencing the effective use of conservation practices include population pressure on land, availability of funds and availability of labour. Also the reasons for conservation of soil were continuity of yield, sustainability and productivity of land, increase yield, erosion control and recycle of soil nutrients among others. To ensure improvement in yield, farmers should extensively encouraged through access to land and funds to promote the adoption of conservation practices.

## **Recommendations**

1. Farmer education and Outreach Programmers Training and Capacity Building: to inform farmers about the advantage of soil conservation. Workshop, field demonstration or venues for farmer-to-farmers information can all be used to provide these programmes.
2. Financial Incentives: By offering financial incentives like grants and subsidies. Financial assistant can encourage farmers to spend money on soil conservation practices and increase their economic viability.

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