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Assessment of the Challenges Faced by Smallholder Farmers in the Adoption of Soil Conservation Practices in Benue State, Nigeria

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ABSTRACT

In Nigeria, soil degradation poses a serious risk to food security and agricultural production, especially for smallholder farmers. This study evaluated the obstacles smallholder farmers in Nigeria's Benue State experienced when implementing soil conservation techniques. A systematic questionnaire was used to interview 150 smallholder farmers. The findings demonstrated that the main obstacles to smallholder farmers implementing soil conservation methods are a lack of knowledge, restricted access to loans and extension services, and insufficient markets for their output. In order to encourage the adoption of soil conservation methods, the report advises policymakers and development organizations to give priority to raising awareness, enhancing capacity, and offering smallholder farmers finance and extension services

1. Introduction

Millions of Nigerians, especially smallholder farmers, rely on agriculture as their primary source of employment and income. However, soil erosion, which is made worse by insufficient soil conservation measures, poses a threat to Nigeria's smallholder farmers' output. One of Nigeria's top agricultural producers is Benue State, which is situated in the North Central Zone. Smallholder farmers play a vital position in the state's farming industry. Mohammed Alkali (2022). Even though soil conservation techniques are crucial for preserving soil fertility and minimizing soil erosion, many smallholder farmers in Benue State find it difficult to implement these techniques. Lack of knowledge, restricted access to loans and extension services, insufficient markets for their produce, and other issues are some of the causes of these difficulties restricted ability to embrace new technologies. Anzak, Iliyasu M. (2022). In order to preserve soil fertility, lessen erosion, and advance environmental sustainability, soil conservation is crucial. Smallholder farmers, who frequently lack the finances and expertise to implement sustainable agricultural methods, dominate the nation's agricultural sector. Benue State is a key agricultural producer in Nigeria with significant agricultural output potential, according to the Nasarawa Agriculture Development Project (2020).

The sustainability of agricultural production is threatened by soil deterioration, a problem that the state's agricultural sector must deal with (Alkali M., 2022). The fast population growth in Benue made the use of sustainable agriculture practices essential. In order to avoid or minimize soil particle detachment and transportation in water or air, soil conservation measures refer to farming operations and management strategies. It is a mix of methods that affect the soil's chemical, biological, and physical conditions (Abdulallah, 2017). The process of embracing and utilizing a new technology or practice, such soil conservation techniques, is called adoption. The practices that promote soil fertility and lessen soil erosion are known as soil conservation.

Adopting soil conservation techniques is characterized as a management approach and practice that eliminates the components of deterioration that are currently present in traditional management systems by eliminating monoculture, improper return of organic matter to the soil, actions that break down soil organic matter and degrade soil structure, and unprotected surface soil. Mohammed Alkali (2022). The purpose of this study is to evaluate the obstacles smallholder farmers in Benue State experience while implementing soil conservation techniques. The study's goals are to determine the obstacles smallholder farmers encounter when implementing soil conservation techniques, examine the factors that contribute to these obstacles, assess the effects of these obstacles on smallholder farmers' productivity and livelihoods, and develop strategies for encouraging sustainable soil management practices among Benue State's smallholder farmers.

3. Methodology

3.1 Study area

Benue State, the study area, is situated in Nigeria's North Central Zone and has a total land area of about 34,059 square kilometers. With a population of more than 4.2 million, the state's economy is based mostly on agriculture. In Benue State, smallholder farmers grow a range of crops, such as millet, cassava, sorghum, and maize. One of Nigeria's 36 states, Benue State is situated in the nation's North Central Zone. On February 3, 1976, the state was established from the former Benue-Plateau State. The Benue River, which runs through Benue State, is the source of the state's name. With more than 30 ethnic groups, including the Tiv, Idoma, Igede, and Etulo, among others, the state boasts a rich cultural legacy. The state's agricultural products, such as millet, cassava, sorghum, and maize, are well-known. Benue State is situated in Nigeria's North Central Zone and is bounded to

the north by Nasarawa State, to the east by Taraba State, to the south by Cross River State, to the southwest by Enugu State, and to the west by Kogi State.

The tropical savanna climate of Benue State features two distinct seasons, including the rainy season, which runs from April to October. November through March is the dry season. The state receives 1,200 mm of rain on average each year, which is a substantial quantity. Throughout the year, the temperature fluctuates between 22°C and 30°C.

Benue State is separated into three agricultural zones: the Derived Savannah Zone, which has low rainfall and is appropriate for crops like millet, sorghum, and maize; the Guinea Savannah Zone, which has high rainfall and is ideal for crops like millet, yams, and cassava; and the Sudan Savannah Zone, which has moderate rainfall and is ideal for crops like cowpeas, yams, and cassava.

the Alfisol soil type, which is ideal for crops like millet, sorghum, and maize and is distinguished by its high fertility. With its moderate fertility, the Ultisol soil type is ideal for crops like cowpeas, yams, and cassava. On the other hand, the Oxisol soil type has a low fertility level and is appropriate for crops like millet, sorghum, and maize.

3.2 Research design

The study used a mixed-methods approach, gathering and analyzing data using both quantitative and qualitative techniques. Using sampling techniques such as multi-stage sampling and sampling of local government areas, which selected five LGAs from the twenty-three LGAs in Benue State, as well as 15 villages from each LGA of respondents, the population sampling includes a sample size of 150 smallholder farmers, or 30 from each LGA.

3.2 Sampling Method

The respondents will be chosen using a multi-stage sampling method. In the first stage, three local government areas will be selected from Benue State's 23 local government areas. Three villages will be chosen from each of the chosen local government regions for the second stage. The selection of fifty will be the third step for smallholder farmers from every village that was chosen.

3.3 Methods of data collection

A systematic questionnaire is utilized to gather information from the respondents. interviews with smallholder farmers in-depth. Discussions in focus groups with groups of smallholder farmers were held to learn more about their demographics, challenges, and soil conservation techniques. Adopted, effects of obstacles and tactics for encouraging soil conservation methods. Steps in the analytical framework include the use of descriptive statistics to compile the respondents' demographic data and the implementation of soil conservation techniques. Regression analysis and inferential statistics are employed to determine the variables impacting the adoption of soil conservation techniques.

4. Result discussion

Table 1: Challenges faced by smallholder farmers in the adoption of soil conservation

Challenges	Frequency	Percentage
Lack of funds	26	17.3
High cost of inputs	19	12.7
Limited access to credit	15	10
Limited access to markets	13	8.7
Climate change	23	15.3
Soil degradation	19	12.7
Limited access to extension services	15	10
Limited access to technology	13	8.7
Lack of knowledge and skills	5	3.3
Other	2	1.3
Total	150	100%

Source: field survey 2025

Table 2: Demographic Characteristics

Characteristics	Frequency	Percentage
Age (years)		
20-30	30	20%
31-40	45	30%
41-50	40	26.7%
51 and above	35	23.3%
Total	150	100
Sex	Frequency	Percentage
Male.	90	60%
Female	60	40%
Total	150	100

Education	Frequency	Percentage
No formal education	20	13.3%
Primary education	30	20%
Secondary education	40	26.7%
Tertiary education	60	40%
Total	150	100

Table 3 Soil Conservation Practices Adopted

Practices	Frequency	Percentage
Contour farming	56	37.3
Terracing	41	27.3
Mulching	26	17.3
Cover cropping	16	10.7
Other (please specify)	11	7.3
Total	150	100

Barrier to the adoption of soil conservation practice among smallholder farmers

Economic Difficulties: According to the study, smallholder farmers' adoption of soil conservation techniques was significantly hampered by financial difficulties. The respondents listed lack of cash, high input costs, and restricted credit availability as the main economic problems. These issues included expensive labor, input, and technology prices, as well as restricted access to markets and financing.

Marketing challenges: An obstacle to smallholder farmers' adoption of soil conservation techniques. The respondents mentioned poor market knowledge, difficulty accessing marketplaces, and trouble selling their produce at competitive prices.

Environmental issues: Including as soil erosion, climate change, and water scarcity, were also mentioned as significant obstacles to smallholder farmers in Benue State implementing soil conservation techniques. According to the respondents, two major environmental issues are limited access to water and soil deterioration caused by climate change.

Institutional issues: Were also found to be significant obstacles to smallholder farmers in Benue State adopting soil conservation techniques. These issues included limited access to technology, lack of training, and restricted access to extension services. According to the respondents, a lack of training, restricted access to extension programs, and limited access to technology were significant

Table 4 Factors Contributing to Challenges in Adoption of Soil Conservation Practices

Factors	Frequency	Percentage
Lack of awareness	30	20
Limited access to credit	24	16
High cost of inputs	21	14
Limited access to extension services	17	11.3
Climate change	15	10
Soil degradation	14	9.3
Limited access to markets	12	8
Lack of training	10	6.7
Inadequate policy support	7	4.7
Total	150	100

Source: field survey 2025

Correlation Analysis

Factors	Correlation Coefficient
Lack of awareness and Limited access to extension services	0.75
Limited access to credit and High cost of inputs	0.7
Climate change and Soil degradation	0.65
Limited access to markets and Lack of training	0.6

Source Field Survey 2025

Regression Analysis

Factors Beta Coefficient	p-value
Lack of awareness 0.35	0.01
Limited access to credit 0.28	0.05
High cost of inputs 0.22	0.1
Climate change 0.20	0.15

Source Field survey 2025

The frequency and proportion of respondents who cited each of the factors as a contributing cause to the difficulties in implementing soil conservation methods are displayed in the table. The correlation between every pair of components is displayed by the correlation analysis. For every factor, the regression analysis displays the p-value and beta coefficient.

Table 5: Strategies for Promoting Sustainable Soil Management Practices among Smallholder Farmers

Strategies	Frequency	Percentage
Training on sustainable soil management practices	90	60%
Capacity building on soil testing and analysis	30	20%
Extension Services	105	70%
Regular visits by extension agents	75	50%
Demonstration plots for sustainable soil management practices access to Credit Markets	30 90	20% 60%
Access to credit facilities for purchasing inputs	60	40%
Total	150	100%
Access to markets for selling produce	30	20%
Soil Testing and Analysis	75	50%
Regular soil testing and analysis	45	30%
Total	150`	100%
Interpretation of soil test results	30	20%
Use of Organic Amendments	60	40%
Use of compost manure	30	20%
Use of green manure	30	20%
Total	150	100%
Conservation Agriculture Practices	45	30%
Reduced tillage or no-till farming	30	20%
Permanent soil cover	15	10%
Total	150	100

Source: field survey 2025

Strategies	Frequency	Percentage
Training Building and Capacity	120	80%
Training on sustainable soil management practices	90	60%
Capacity building on soil testing and analysis	30	20%
Extension Services	105	70%
Regular visits by extension agents	75	50%
Demonstration plots for sustainable soil management practices	30	20%
Access to Markets Credit and	90	60%
Access to credit facilities for purchasing inputs	60	40%
Access to markets for selling produce	30	20%
Soil Testing and Analysis	75	50%
Regular soil testing and analysis	45	30%
Interpretation of soil test results	30	20%
Use of Organic Amendments	60	40%
Use of compost manure	30	20%
Use of green manure	30	20%
Conservation Agriculture Practices	45	30%
Reduced tillage or no-till farming	30	20%

Source: field survey 2025

Table 6: Rating of the Effectiveness of Each Strategy

Strategies	Very Effective	Effective	Not Effective
Training and Capacity Building	80%	15%	5%
Extension Services	70%	20%	10%
Access to Credit and Markets	60%	25%	15%
Soil Testing and Analysis	50%	30%	20%
Use of Organic Amendments	40%	35 %	25%

Source: field survey 2025

5 Findings and recommendation

In Nigeria, where agriculture is the backbone of the economy, soil conservation is essential for both sustainable agriculture and food security, especially in Benue State. However, there are a number of obstacles that Benue State's smallholder farmers must overcome in order to implement soil conservation techniques, including institutional, marketing, environmental, and financial ones. This study evaluated the obstacles smallholder farmers in Benue State experienced when implementing soil conservation techniques. According to the report, smallholder farmers confront several significant obstacles, including a lack of funding, the high cost of inputs, restricted access to markets and financing, soil degradation, climate change, and limited access to technology and extension services. Giving smallholder farmers in Benue State access to markets, loans, training, extension services, and technology should be a top priority for politicians and development organizations. Benue State's smallholder farmers should have better access to markets and loans through the implementation of policies and initiatives. Smallholder farmers in Benue State should have access to extension services and training to help them become more knowledgeable about soil conservation techniques. Benue State should adopt policies and initiatives that support climate-resilient agriculture, such as conservation agriculture methods and the adoption of drought-tolerant crops. Benue State's smallholder farmers should have better access to technology through policies and initiatives that support digital extension services and precision farming.

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