



ADOPTION OF SUSTAINABLE AGRICULTURAL PRACTICES BY FARMERS IN OTUKPO LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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ABSTRACT

In spite of the vast agricultural potential of Nigeria, the issue of food security is still a major challenge because till date, the agricultural potential has not been harnessed properly. The study examined the adoption of sustainable agricultural practices by farmers in Otukpo Local Government Area of Benue State, Nigeria. Five council wards were purposively selected based on intensity of sustainable agricultural practices adopted. Nineteen respondents (farmers) were selected in each of the three council wards and 20 from the remaining two council

wards were randomly selected thus, given a total of 97 respondents. Data collected were analyzed through descriptive statistics and t test. The results of the findings revealed that 60.80% adopted planting of leguminous crops and use of compost to improve soil fertility, 42.30% got information on sustainable agricultural practices from friends, there were significant difference in the output of soybean, potato, banana and rice after adoption of sustainable agricultural practices at $P < 0.05$, 54.60% lack of agricultural extension workers to create awareness on sustainable agriculture practices. It is recommended that more sustainable agriculture practices should be introduce to farmers and extension workers should be employed and trained on sustainable agriculture.

KEYWORDS: adoption, sustainable agriculture, practices, farmers.

INTRODUCTION

In the past three decades the concept of sustainable agriculture evolved as an answer to the negative impacts of conventional farming. Sustainable agriculture is a key element of sustainable development and essential to the future well being of the planet. Sustainability aims to achieve adequate safe and healthy food production, improved livelihoods of food producers and the preservation of non-renewable resources.^[1] Chemicals and fertilizers that enabled dramatic production increases have also demanded large-scale use of resources. Furthermore, conventional agricultural practices consume large amounts of non-renewable resources.^[2]

The past decades have witnessed a dramatic change in agriculture with food production soaring due to the Green Revolution. The Green Revolution entailed the use of improved technologies; particularly the breeding of high yielding food crop varieties, the expansion of irrigation, mechanization, specialization and the use of chemical fertilizers and pesticides. However, the Green Revolution has caused a lot of adverse human health and environmental impacts. For example, agricultural intensification through excessive and inappropriate use of chemical fertilizers and pesticides have polluted water bodies and degraded soils, led to biodiversity loss by killing beneficial plants, insects and other wildlife and in some cases poisoned farm workers, to mention but just a few. Sustainable agriculture has emerged as an alternative agricultural system that addresses the many constraints faced by poor-resource farmers and at the same time ensures environmental sustainability.^[3]

Concerns for food security have become widespread the world-over. Many of these have risen as a result of doubts expressed about the world ability to feed the growing masses of people. Even a cursory look at the massive malnutrition and wide spread starvation in the world indicates the mammoth task the world faces in the future. Many concerns for the present generation also lead to the ability of future generations to feed themselves properly.^[4] Sustainable agriculture as a practice that meets current and long-term needs for food, fibre, and other related needs of society while maximizing benefits through conservation of resources to maintain other ecosystem services, functions, and long-term human development is the only option. Agricultural sustainability is not about technical fixes and expertise. It is development processes that need to integrate ecological and societal knowledge through changes in policy, institutions, and behaviour.^[5]

Sustainable agriculture considers not only the future requirements of production increase, but also maintains the quality of environment, water and soil. Due to technological advances and governmental support, intensive agricultural production has continued to increase exponentially over the past half-century. In developed countries, particularly in the United States of America despite the fact that the number of farmers have decreased from 40 percent to less than 2 percent over the past 100 years, farmers today are producing far more food and fibre than ever. On average, one American farmer produces enough food to feed over 130 people. Rural communities and rural quality of life has also been harmed. Farmers attempting to make a living in agriculture are now faced with low commodity prices, costly equipment, high labour and maintenance expenses, and increased dependence on governmental subsidies.^[6]

MATERIALS AND METHODS

The study was conducted in Otukpo Local Government Area (LGA) of Benue State. The LGA is located between 7⁰45' to 18⁰15' East and latitude 7⁰45' North. It has an estimated population of about 236, 587.^[7] It experiences dry and rainy seasons, the inhabitants of Otukpo take farming as major occupation. Farmers cultivate crops like yam, cassava, soybeans, pepper, banana, potato, groundnut, rice among others. Among the farmers, a few diversify their farming activities by keeping livestock alongside crop production activities. Other occupation such as hunting, civil service and commerce also offer employment to residents of the area. Both primary and secondary data were gathered, primary data were obtained from questionnaire administered on the respondents, while secondary data were collected from journals, documents, proceedings. Simple random sampling was adopted for the study; five council wards were purposively selected, nineteen (19) respondents (farmers) from three (3) council wards, were randomly selected and twenty (20) respondents were also randomly selected from the remaining two council wards making a total of 97 respondents (farmers that adopted sustainable agricultural practices). The difference in selection of respondents from the sampled wards council was because one of the council wards was larger than others. Data collected were analyzed through descriptive analysis and T-test. T- test formula as shown below:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

Where:

t = the value by the statistical significance of the mean difference will be judged

x_1 = the mean of output before adoption

x_2 = the mean of output after adoption

S_1^2 = standard deviation of output before adoption

S_2^2 = standard deviation of output after adoption

N_1 = number of respondents before adoption

N_2 = number of respondents after adoption

RESULTS AND DISCUSSION

Results in Table 1 showed that planting of leguminous crops and use of compost to improve soil fertility 60.8%, water conservation and water harvesting practices 50.5%, integrated pest management 42.3% and conservation tillage practices to control soil erosion 37.1%. Majority 60.8% adopted sustainable agricultural practices like planting of leguminous crops and used compost to improve soil fertility introduced in the area. The adoption of planting of leguminous crops and the use of compost is particularly advantageous for the protection of soil against any kind of erosion. Other advantages of these practices include improvement of soil fertility; most of the farmers plant crops and rear animals, this practice would also make feeds available to farmers for their livestock when the crops are harvested. Planting of leguminous crops also add nitrogenous compounds to the soil thereby improving the soil fertility. More sustainable agricultural practices should be introduced to farmers in the study area for adoption.

Table 1: Distribution of Respondents by Sustainable Agricultural Practices Adopted.

| Sustainable Agricultural Practices Adopted | Frequency | Percentage |
|---|-----------|------------|
| Planting of leguminous crops and use of compost to improve soil fertility | 59 | 60.80 |
| Water conservation and water harvesting practices | 49 | 50.50 |
| Integrated pest management | 41 | 42.30 |
| Conservation tillage practices to control erosion | 36 | 37.10 |

* Multiple Responses

*

Results in Table 2 showed that farmers got information on sustainable agricultural practices from friends 42.3%, agricultural extension workers 27.8%, relatives 15.5% and community leaders 14.4%. A reasonable proportion 42.3% got information about sustainable agricultural practices from friends; this might be due to the fact that agricultural information obtained from friends over the years have been very useful to the farmers, which is why the respondents rely on friends for their agricultural information. Despite that, the information obtained from friends does not cost any money, the idea/information is shared freely sometime during the leisure time and there is also time to seek for more detail explanation of the idea. Farmers should be encouraged to share agricultural information among them in order to breach the agricultural innovation information gap that exists among farmers in the rural areas.

Table 2: Distribution of Respondents According to Sources of Information on Sustainable Agricultural Practices.

| Source of Information | Frequency | Percentage |
|--------------------------------|-----------|------------|
| Friends | 41 | 42.30 |
| Agricultural extension workers | 27 | 27.80 |
| Relatives | 15 | 15.50 |
| Community leaders | 14 | 14.40 |
| Total | 97 | 100 |

Results in Table 3 revealed that there were significant differences in output of soybeans, potato, banana, and rice before and after adoption of sustainable agricultural practices at 5% level of significance, the results further shows that there were no significant difference between the output of yam, cassava, pepper and groundnut before and after adoption of sustainable agricultural practices. This means that the adoption of sustainable agricultural practices had a positive effect on the farmers producing soybeans, potato, banana and rice. While the adoption did not have any significant effect on the farmers output as regards to yam, cassava, pepper and groundnut. This means the adoption of sustainable agricultural practices have brought significant increase in output of certain crops. This finding confirms ^[8,9] who endorsed that adoption of sustainable agricultural practices in Burkina Faso, Niger and Ethiopia have led to increase in their farm output.

Table 3: Effects of Adoption of Sustainable Agricultural Practices on Selected Crops Output.

| Crop | Paired sample | Mean | Mean difference | Standard deviation | t-value | Sig. |
|-----------|---------------|-----------------------|-----------------|--------------------|---------|-------|
| Yam | A b a-b | 2,739.53 19,857.00 | 1,7110 | 150,741 | 1.497 | 0.264 |
| Cassava | a b a-b | 55,795 149,450 | 93,650 | 555,690 | 1.651 | 0.102 |
| Soybean | a b a-b | 5,722.8 9,264.7 | 3,541 | 6,604.55 | 4.613* | 0.000 |
| Potatoes | a b a-b | 2,829.6 4,683.5 | 1,853 | 7,212.85 | 2.056* | 0.044 |
| Banana | a b a-b | 6,619.6 10,638 | 4,018 | 14,243.68 | 2.586* | 0.011 |
| Rice | a b a-b | 2,680.2 4,013.5 | 1,333 | 5,326.94 | 2.348* | 0.021 |
| Pepper | a b a-b | 1,978.5 432.2 | 1,546.2 | 13,138.67 | 0.896 | 0.374 |
| Groundnut | a b a-b | 924.89 5,254 | 4,330 | 29,149.75 | 1.170 | 0.247 |

*Significant at 5%

a = quantity of output before adoption and

b = quantity of output after adoption.

Results in Table 4 indicated that lack of extension workers to create awareness 54.6%, lack of biomass 24.7%, political constraints 15.5% and inadequate land 13.4%. Majority 54.6% of the respondents' lack of agricultural extension agents (workers) to create awareness as one of the prominent factors affecting adoption of sustainable agricultural practices in the area. This is a clear indication that most of the farmers depended on information obtained from

agricultural extension agents to adopt sustainable agricultural practices furthermore, non-availability of agricultural extension workers made them to resort to friends for agricultural information. The inadequate number of agricultural extension agents to inform farmers of the importance of sustainable agricultural practices is capable of slowing down the process of adoption of sustainable agricultural practices in the area. This agrees with ^[9, 10] who reported that factors affecting adoption of sustainable agricultural practices are land issues, political constraints, inadequate agricultural extension services among others.

Table 4: Factors Affecting Adoption of Sustainable Agricultural Practices.

| Factors | Frequency | Percentage |
|---|-----------|------------|
| Lack of extension workers to create awareness | 53 | 54.60 |
| Lack of biomass | 24 | 24.70 |
| Political constraints | 15 | 15.50 |
| Inadequate land | 13 | 13.40 |

* Multiple Responses

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CONCLUSION

Adoption of sustainable agricultural practices is no doubt a key element of sustainable development and essential to the future well being of the planet. Sustainability aims to achieve adequate safe and healthy food production, improved livelihoods of food producers and the preservation of non-renewable resources. The adoptions of sustainable agricultural practices have led to increase in food production among farmers that adopted the practices. It is recommended that more sustainable agriculture practices should be introduced to farmers in the area and more agricultural extension workers should be employed and trained on sustainable agriculture in order to increase food production.

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