# Comparative Economic Evaluation of Adopters and Non-Adopters of Some Selected Technologies in Abia State

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# COMPARATIVE ECONOMIC EVALUATION OF ADOPTERS AND NON-ADOPTERS OF SOME SELECTED TECHNOLOGIES IN ABIA STATE

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**Abstract**
This study was carried out in Abia State, Nigeria in 2007, to compare the output, cost and returns of Adopters and Non-adopters of some selected farm technologies. Data was collected from the respondents (120) Adopters and (120) Non-adopters) using well structured questionnaire. The data was analyzed using descriptive statistics, students't' test and profitability analysis. The results show that there were significant differences in farm size, expenditure, income and profit of adopters and non-adopters. The calculated't's calculated were greater than't' tabulated at P = 0.05. This implies that adopters of farm technologies had more output, made more expenditure and generated more income and profit than the non-adopters of the selected farm technologies. Therefore, farmers are advised to adopt innovations to increase output and generate more profit.

## Introduction

Under the combined pressure of the climatic disturbances and human activities, the ecosystem of many countries in Sub-Saharan have undergone intense degradation over the years. The natural resources are threatened by deforestation for extensive agriculture (Amadji and Adje, 2004). Increase in population, urbanization and rampant poverty also contribute to decline in food production. Prospects for a sustainable food security in the sub-region will remain uncertain if strategies are not developed to increase food production (Amegbero *et al*., 2001). The benefits of improved technology are obvious and they are realized by individual farmers as well as the nation in terms of increased farm output, high income and improved standard of living. This is dependent on the ability of the government to modernize agriculture through mechanization and adoption of improved and more efficient technologies by farmers which include improved seeds, breeds, agrochemicals and farm implements (Olayide, 1980). This is also in agreement with Sidlin (1975) who noted the supply of fertilizers, herbicides and pesticides which he called crucial inputs were necessary to accelerate growth in agriculture and that these inputs must reach farmers in the right quantities, in the right time and prices for them to be reasonably adopted by farmers. Nwawuisi, et al (2007) show that farmers decision to use particular crop cultivars were influenced by a number of reasons, some of which are socio-culturally based. Therefore, this study aimed at determining the farm size, output, cost and returns of adopters and non-adopters of some selected technologies, and determining the constraints to adoption of these technologies.

## Methodology

Abia State was purposively chosen for the study because it is one of the major food producing states in Nigeria. The data for the study were collected through structured questionnaire interview schedule. A multistage random sampling was used to select 240 respondents comprising of 120 Adopters and 120 non-adopters from the three agricultural zones of the state, namely: Aba, Ohafia and Umuahia. The analysis was done using descriptive statistics such as percentages, frequency counts, profitability analysis and the student't' test model. The model is expressed implicitly as follows:

$$T = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2 + S_2^2}{n_1 + n_2}}}$$ with $n_1 + n_2 = 2$ degrees of freedom

Where
T = Students't' statistic
$\bar{X}_1$ = mean values of 1st population
$\bar{X}_2$ = mean values of 2nd population
$S_1^2$ = variance of 1st population
$S_2^2$ = variance of 2nd population
$n_1$ = number of observation (sample size of 1st population)
$n_2$ = number of observations (sample size of 2nd population)

## Results and Discussion

Table 1 shows that the result of the t-test for a difference between means of farmers sizes of adopters and non-adopters was 0.7, 't' = 6.3 was greater than tabulated 't' value = 1.9 at P = 0.5. There was a significant difference in farm sizes

of adopters and non-adopters. The income generated from various crops by adopters and non-adopters are also revealed in table 1. The mean difference from improved cassava, maize and yam minisett technologies were N9, 316.67; N4,658.37 and N5, 099.67 per ha respectively. The 'ts' calculated 8.0, 7.0 and 4.18 were greater than tabulated't' value = 1.9 at 0.05. This implies that there were significant differences in incomes generated by adopters and non-adopters from the various food crops.

Table 2 shows the expenditure and total output of adopters and non-adopters of modern technologies. The expenditure involves total money spent in the procurement of fertilizers, seeds, herbicides, use of tractors and farm inputs by farmers in the study area. The mean difference in expenditures between adopters and non-adopters on fertilizers, herbicides and use of tractors were significant (P=0.5) since't' calculated in each case were greater than tabulated't'. The mean difference in output of adopters and non-adopters (3, 400t/ha) was significant (P=0.5). It suggests that adopters of farm technologies spent more money in procurement of farm inputs than non-adopters. These inputs invariably influenced output.

Table 3 shows the total income and profit generated by adopters and non-adopters of innovations. The total expenditure made by adopters were N41, 841.00 and N8, 057.16 respectively. Non-adopters generated a total income of N22, 091. 00 and made a total expenditure of N1, 212.50. Adopters consequently made a profit of N33, 789.84 while non-adopters profit was N20, 878.50. The inference is that adopters of innovations generated more profit than non-adopters.

**Summary and Conclusion**

The results of the study show that adopters of innovations acquired more farm land had increased output than non-adopters. They also incurred more expenditure, generated more income and subsequently had more profit than non-adopters. This has confirmed the earlier studies by Sidlin (1975) and Olayide (1980) which stated that adoption of innovations resulted to increase in output and income of small-scale farmers. Therefore, farmers are advised to intensify efforts in the use of technologies to improve the income of their families.

**Table 1: Paired Treatment Means of the difference in Farm Sizes and Incomes of Adopters and Non-adopters from various Crops.**

| Category of Adopters and Non-adopters | Mean (x) difference | Standard Deviation | 95% Confidence Interval of the difference | | |
|---|---|---|---|---|---|
| | | | Lower | Upper | t |
| $x_1$-$x_2$ | 0.667ha | 1.1601 | 0.4574 | 0.8768 | 6.299 |
| $x_3$-$x_4$ | N9316.37 | 12754.293 | 7011.2318 | 11622.102 | 8.002 |
| $x_5$-$x_6$ | N4658.33 | 7274.33 | 3343.4429 | 973.2237 | 7.015 |
| $x_7$-$x_8$ | N5091.67 | 13355.51 | 2677.5570 | 505.7763 | 4.176 |
| $x_9$-$x_{10}$ | N682.33 | 51382.70 | 4989.326 | 355.9931 | 0.239 |

**Source: Field Survey Data, 2007.**

Where:

$x_1$ = Adopters farm size
$x_2$ = Non-adopters farm size
$x_3$ = Adopters cassava income
$x_4$ = Non-Adopters cassava income
$x_5$ = Adopters maize income
$x_6$ = Non-adopters maize income
$x_7$ = Adopters yam minisett income
$x_8$ = Non-adopters yam minisett income
$x_9$ = Adopters rice income
$x_{10}$= Non-adopters rice income

**Table 2: Expenditure on fertilizers, herbicides and tractors by adopted and on-adopters and total output from various crops**

| Category of Adopters and Non-adopters | Mean (x) difference | Standard Deviation | 95% Confidence Interval of the difference | | |
|---|---|---|---|---|---|
| | | | Lower | Upper | t |
| $x_{11}$-$x_{12}$ | N5558.33 | 477.39 | 4749.0119 | 6367.6548 | 13.599 |
| $x_{13}$-$x_{14}$ | N550.00 | 1611.93 | 258.63114 | 841.3686 | 3.738 |
| $x_{15}$-$x_{16}$ | N733.33 | 1889.75 | 394.7470 | 1074.9196 | 4.251 |
| $X_{17}$-$x_{18}$ | 3400.00ha | 7563.60 | 2032.8218 | 4767.1782 | 4.924 |

**Source: Field Survey Data, 2007.**

Where:

$x_{11}$ = Expenditure on fertilizer by adopters
$x_{12}$ = Expenditure on fertilizer by non-adopters
$x_{13}$ = Expenditure on herbicides by adopters
$x_{14}$ = Expenditure on herbicides by non-adopters
$x_{15}$ = Expenditure on tractors by adopters
$x_{16}$ = Expenditure on tractors by non-adopters
$x_{17}$ = Total output from various crops by adopters
$x_{18}$ = Total output from various crops by non-adopters

**Table 3: Total income and profit generated by adopters and non-adopters**

| Variables | Adopters | Non-adopters |
|---|---|---|
| Total Income | ₦ | ₦ |
| Cassava | 16, 050 | 6, 733 |
| Maize | 10, 050 | 5, 616.67 |
| Yam | 9, 750 | 4,658 |
| Rice | 5, 766 | 5, 083.33 |
| Grand total (A) | 41, 841.10 | 20, 878.50 |
| Total Expenditure | | |
| Fertilizer | 6, 642. 83 | 1, 087.50 |
| Herbicides | 633.33 | 83. 33 |
| Tractors | 775. 00 | 41. 67 |
| Grand total (B) | 8, 051 | 1, 212.50 |
| Profit (A – B) | 33, 789.84 | 20, 878.5 |

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