

Effect of T&V innovation on income and farmers performance in Edo State Nigeria

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Abstract: The study examined the effect of training and visit innovation on the income and farmer performance in two out of three agro ecological zones of Edo State, Nigeria. This study focused on contact crop farmers drawn from two out of three agro-ecological zones of Edo State, namely Edo central and Edo south. A multi-stage random sampling method was used both for economic reasons and especially because the sampling units occur in strata such as zones, blocks and cells. Data were collected from randomly sampled respondents from two senatorial districts in Edo State. Edo state is divided into three agro-ecological zones- Edo North, Edo Central and Edo South, out of which Edo Central and Edo south were randomly selected. Two blocks each were selected randomly from a total of five and seven blocks in Edo central and Edo south zones respectively. These blocks were Igueben and Esan North East in Edo central and Oredo and Egor in Edo south senatorial zone. Each block consists of eight cells. A random selection of four cells was made from each block and total of sixteen cells were chosen and eight from each zone and ten farmers were randomly selected from each of the 16 cells, giving a total of one hundred and sixty farmers/respondents for the study but only a hundred and fifty six copies of a questionnaire were found useful for the study. Data collected were subjected to descriptive statistics and budgetary tools. The outcome of the study indicated that training and visit innovation had increasing effect on farm size and income of farmers in the study areas.

Keywords: Income, Training, Visits, Innovation, Edo

1. Introduction

1.1. The T&V Extension System and Agricultural Food Production

Daniel Benor's Training and Visit (T&V) extension system was vigorously introduced to Nigeria in 1986 by the World Bank and was subsequently adopted in all the 36 states and the federal capital territory. It is regarded as a potent weapon for heralding a true agrarian revolution. (Ilevbaoje, 2004). Agricultural extension system is the primary delivery system for information to farmers (Munyua *et al.* 2002). Improving agricultural productivity may not be achieved without relevant and reliable agricultural information. The objective of any extension system is to be effective in communicating information that helps people in decision-making. The T&V extension system modified to suit each country's agricultural goals is

a dominant extension approach used in reaching farmers with information on agricultural production.

Agricultural extension has the potential to stimulate agricultural development and is often used as a tool for implementing government policy. It is recognized as the main link between the farmers and research and crucial in communicating improved practices needed in agricultural development (Rivera and Carey, 1997 and Van den Ban and Hawkins, 1996). As indicated by the World Bank (1997), supply of appropriate technology is essential if extension investments are to be worthwhile and especially for public sector extension.

According to Sappho (1993) research and extension should be closely linked in order to contribute appreciable and sustainable increase in food production. The goal of agricultural extension is to facilitate farmers' acceptance of innovative practices from research which should lead to increased output, productivity and incomes. This agrees

with FAO (1997) which states that improved agricultural extension management system is recognized as a central mechanism to achieving increased food productivity through technology transfer. The T & V is one of the foreign innovations introduced to improve farmer's performance in Nigeria. What is the effect of this innovation on farmer's income and performance? The specific objectives of the study include:

A To examine the socio-economic characteristics of farmers in Edo State

B Determine the effect of T&V innovation on farmer's income.

C Identified the perceived benefits derived by farmers from T&V innovation in Edo State, Nigeria

Nigeria is one of the 60 countries now using the T&V extension system. Like many developing countries, Nigeria adopted the T&V extension system in 1986 because of its promise of improving extension management which is the key to increased agricultural production and national development. It was formally introduced through pilot testing in Oyo, Kaduna, Imo and Plateau states. Guided by experience from the pilot ADPs, implementation assistance terms (IATs) were mounted by Federal Agricultural Coordination Unit (now Project Coordination Unit (PCU)) to rapidly and systematically replicate the T&V extension model in all the state ADPs (Ilevbaoje, 2004). There is a general consensus that farm level utilization of agricultural research institutes' results (developed technologies) has not made the expected impact on agricultural production in Nigeria. Research Institutes' results differ markedly from actual farm yields indicative of development-adoptive (use) gap. For instance, in the Nigerian Institute for Oil palm Research (NIFOR), the yield per hectare on experimental plots range from 15 to 18 tonnes per annum, while yield on farmers' field is 8-10 tonnes per annum (Omokhudu, 1998). The difference between experimental station yield, the potential farm yields and the actual farm yields has been attributed to biological and socio-economic constraints as well as the communication channels through which these technologies get to the (end users) farmers (Akinbode, 1976).

Many valuable results have been obtained from most of the agricultural research institutes, but these agricultural practices do not get to the farmers.

This situation has created a wide gap between research and the utilization of the research results. To enable effective service, the ideal ratio of extension agent to farm family should be 1:250 (Benor and Baxter, 1984).

This clearly suggests that one of the strategies of developing the agricultural sector in Nigeria is to ensure that these developed technologies get to the farmers through the Training and Visit system. But unfortunately, because the farmers are scattered and isolated, extension agents are very few to be able to carry out this effectively by individual contact, a communication channel that has been regarded to be the most effective in disseminating technologies to the target audience (Laogun 1985).

Table 2.1 below shows the extension agent/ farm family ratio as at the year 2000 in 27 States in Nigeria. Majority (96%) of the states have more than 1000 farm families to one extension agent. The state with the highest ratio is Lagos with 1:5800, while the state with the least ratio is Gombe with 1:826. None of the 27 states achieved the recommended extension agent/farm family ratio of 1:250.

Table 1. Extension agent/farm family ratio in Agricultural Development Programmes in 27 states in Nigeria

S/N	State ADP	Extension Agent- Farm Family Ratio
1	Abia	1:1000
2	Adamawa	1:1452
3	Akwa-IBOM	1:2320
4	Anambra	1:3084
5	Bauchi	1:1238
6	Bayelsa	1:2893
7	Benue	1:1460
8	Borno	1:1268
9	Ebonyi	1:5320
10	Edo	1:1500
11	Ekiti	1:2800
12	Enugu	1:4041
13	Gombe	1:826
14	Imo	1:2861
15	Jigawa	1:1075
16	Kaduna	1:3500
17	Kano	1:2267
18	Katsina	1:1750
19	Kebbi	1:1000
20	Kwara	1:1000
21	Lagos	1:5800
22	Nasarawa	1:1381
23	Niger	1:5000
24	Ogun	1:1857
25	Ondo	1:1900
26	Taraba	1:1065
27	Yobe	1:1120

Source: Project Coordinating Unit, Abuja (2000)

The nation-wide adoption of T&V extension approach is perhaps the most outstanding development in agricultural extension in Nigeria over the past two decades or so. According to Ilevbaoje (2004), some of the problems which the T&V extension system attempt to solve are:

- to improve the organization of extension by introducing a singular direct line of technical support and administrative control,
- to change the multi-purpose nature of many extension workers to a clearly defined, single-purpose role involving only education and communication activities,
- to improve coverage by limiting the number of farm families or households one extension worker is expected to visit
- to improve mobility by providing appropriate transport so that each worker can regularly visit his/her contact farmers

More than 70% of the population of Edo State make their living from agriculture. They cultivate cash crops such as rubber (*Hevea brasiliensis*), oil palm (*Elaeis guineensis*) and cocoa (*Theobroma cacao*), food crops such as yam (*Dioscorea specie*), cashew (*Anacardium occidentale*),

Cassava (*Manihot esculenta*), rice (*Oryza species*), plantain (*Plantago media*), maize (*Zea mays*), sugar cane (*Saccharum officinarum*), groundnuts (*Arachis hypogea*), soya-beans (*Glycine max*) and coco yams (*Xanthosoma sagittifolium*). Fruits like pine –apple (*Ananas Specie*), coconut (*Cocos nucifera*), Oranges (*Citrus species*), paw-paw (*Carica papaya*) and mango (*Mangifera indica*).

2.2. Study Population and Sample Size

This study focused on contact crop farmers drawn from two out of three agro-ecological zones of Edo State, namely Edo central and Edo south. The population of farmers in this area is about 1,007,929.

A multi-stage random sampling method was used both for economic reasons and especially because the sampling units occur in strata such as zones, blocks and cells. The sampling process proceeded as follows:

Zonal Level- Edo state is divided into three agro-ecological zones- Edo North, Edo Central and Edo South, out of which Edo Central and Edo south were randomly selected.

Block Level- Two blocks each were selected randomly from a total of 5 and 7 blocks in Edo central and Edo south zones respectively. These blocks were Igueben and Esan North East in Edo central and Oredo and Egor in Edo south senatorial zone.

Cell Level- Each block consists of 8 cells. A random selection of 4 cells was made from each block. A total of 16 cells were thus chosen, with 8 from each zone.

Farmers' level- 10 farmers were randomly selected from each of the 16 cells, giving a total of 160 farmers/respondents for the study. However, only 156 copies of respondents' interview schedule were useful for analysis.

Zones	Blocks	Cells
Edo Central	Igueben	Ekekhen/Idumugo
		Eguare/Oyomon
		Afuda/Idumuka
		Uhe/Idumogbo
Edo South	Esan North East	Uzaha
		Emendokhian
		Ivua/Obedu
		Isua/Arue
	Oredo	Ogbe-ebuya
		Iyeko-Ogba
		Uzebu
		Esigie
	Egor	Urelu 1
		Urelu 2
		Ohoro
		Ugbowo

This study made use of both primary and secondary sources to obtain data. An interview schedule was employed in getting primary data. The secondary data were sourced from textbooks, journals, previous articles, State Agricultural Development Programme, the internet and related literature on the topic.

A structured interview schedule was employed in gathering primary information from the respondents. The instrument utilized a combination of close-ended and open-ended questions but with emphasis on the former to facilitate the analysis of the results. The structured interview guide was divided into four sections. The first section was on the socio-economic characteristics of farmers while the second was on the improved practices disseminated and adopted by farmers. The third section attempted to determine the impact of adopted practices on farmers' food productivity. The judgments and opinions of agricultural extension workers who were regarded as experts were used to validate the instrument. The experts selected for this task included

Lecturers in Department of Agricultural Economics and Extension Services.

Experienced extension agents from ADP.

The experts independently judged the instrument based on the objectives of the study and made correction. The reliability of the instrument was obtained from pre-test results collected from 20 farmers outside the sample group, specifically from Jattu and Agenebode in Edo North Agro-ecological Zone. Using the split-half method, the researcher obtained a reliability coefficient (*r*) of 0.84. This result certified the instrument good to be used for the research.

Data collected was analyzed using both descriptive statistics and budgetary tools.

3. Results

3.1. Socio Economic Characteristics of the Respondents

3.1.1. Sex

Farmers' personal and socio-economic characteristics are presented in Tables 2 and 3. More than half (57.7%) of the respondents were female and the remaining 42% were male.

3.1.2. Age

The age distribution as shown in Table 2 indicates that majority (60.2%) of the respondents were above 41 years of age.

3.1.3. Marital Status

Table 2 shows that a high proportion (62.2%) of the respondents was married while 9.6% were single. The divorce rate seemed low at 7.1% but the proportion of respondents that was widowed was significantly high (21.2%).

3.1.4. Educational Qualification

The level of education of the respondents is shown in Table 2. Majority of the respondents, (56.4%) had only primary education and about 23.7% had no formal education. About 13.5% of the respondents had secondary education while only about 6.4% had tertiary education. This result shows that a majority of the respondents have a low level of education

3.1.5. Number of Dependents

As shown in Table 2, a significantly high proportion of respondents (69%) had more than 6 dependents; while only 7.7% of the respondents had 2 dependents.

3.1.6. Type of farmer

As shown in table 3, majority of the respondents (73.7%) were subsistence farmers while only 26.6% were commercial farmers.

3.1.7. Experience in Farming (in Years)

Only 20% of the respondents had less than 5 years' experience in farming. The rest had more than 5 years' experience, with 32.4% having more than 15 years' experience.

3.1.8. Farm Size (Ha)

About half of the population (49.4%) owned farms less than one hectare large, 25% owned farms 2-3 hectares large, while those that owned farms 4-5 hectares large were 19.2%. Only 6.4% of the respondents owned farms more than 5 hectares large.

3.1.9. Type of Crops Planted

Majority of the farmers (72.4%) planted food crops while only 27.6% planted export crops.

3.1.10. Holding Type

Sixty-five percent of the farmers claimed to own the land on which they are farming. However, 21.7% and 13.3% rented and leased the land they were using for farming.

3.1.11. Type of Labor

The farmers and their families did most of the work in the farms. Only 21.7% of the labor used by the farmers was hired.

4. Discussion

Farmers' personal and socio-economic characteristics are presented in Tables 2 and 3. More than half (57.7%) of the respondents were female. Sixty percent of the respondents were above 41 years old, while only 6.4% were less than 21 years and 33.3% were between 21-40 years. This result shows the aged nature of most respondents and the need to encourage most young people to take up agriculture as a profession.

Sixty-five percent of the respondents claim to own their farmlands, while 21.7% and 13.3% rented and leased land for farming. Majority (72.4%) of the respondents planted food crops while only 27.6% dealt with export crops. About half (49.4%) of the respondents, owned farms less than one hectare large. The real big timers with farms larger than five hectares constitute only 6.4% of the farmers. This result shows the subsistence nature of agriculture in Edo State. This is further corroborated by the number of dependents, which shows that most of the farmers (69.2%) have more than six dependents. Most of the work in the farms is done by the farmers themselves

and their families. Hired labour constitutes only 21.7%. About half (56.4%) of the respondents had primary education, while 13.5% had secondary education. However, 23.7% had no formal education and only 6.4% had tertiary education. This result shows that the educational level of the farmers is quite low. This finding is in agreement with that of Fabiyi and Doma (2001) who reported a low level of education among rural women in Dass Local Government Area. Tologbonse and Osanyintade (2001) also reported that the low level of education among the farmers in the Federal Capital Territory, Abuja affected their level of adoption of cowpea crop protection recommendations.

Education places farmers in a position to be receptive to innovative ideas, as it is known to create a positive mental attitude towards adoption of modern farming techniques (1976). Egbugara (1993) noted that the level of a farmers' education is related to the level of innovations he or she adopts. This is also in line with Adams (1982) who proffered that the main way to improve farm efficiency and to increase agricultural production is to educate farmers. Ogunbameru and Pandey (1992) working in Adamawa and Taraba States saw education as a tool for realizing fullest potentials for contribution to agricultural development.

Table 2. Social characteristics of Respondents (n=156)

Variable	Frequency	Percentage
Sex		
Male	66	42.3
Female	90	57.7
Age		
Less than 21 years	10	6.4
31-40 years	23	14.7
41-50 years	37	23.7
51-60 years	58	37.2
Above 60 years	28	17.9
Marital status		
Married	97	62.2
Single	15	9.6
Divorced	11	7.1
Widowed	33	21.1
Educational Qualification		
No formal education	37	23.7
Primary Education	88	56.4
Secondary Education	21	13.5
Tertiary Education	10	6.4
Number of dependents		
2	12	7.7
3-5	36	23.1
6-8	64	41.0
Above 8	44	28.2

Table 3. Economic characteristics of respondents (n=156)

Variable	Frequency	Percentage
Type of farmer		
Subsistence farmer	115	73.7
Commercial farmer	41	26.3
Experience in farming (in years)		
Less than 5 years	31	20.0
6-10	27	17.3
11-15	47	30.3
More than 15 years	51	32.4
Farm size (Ha)		
Less than hectare	77	49.4
2-3	39	25.0
4-5	30	19.2
Above 5 hectares	10	6.4
Type of crops planted		
Food crops	113	72.4
Export crops	43	27.6
Holding type		
Rented	34	21.7
Leased	21	13.3
Owned	101	65.0
Type of labor		
Self-only	60	38.3
Family labor	62	40.0
Hired labor	34	21.7

Source: Field survey data (2%)

4.1. Effect of T&V on Farmers Farm Size

As shown in table 4, before the commencement of T&V, majority (63.5%) of the respondents owned farms less than one hectare in size. Only 2.6% of the respondents own owned farms larger than five hectares in size. The rest of the respondents owned farms with sizes between one and five hectares.

Table 4 shows that after the commencement of T&V the percentage of respondents owning farms less than one hectare dropped from 63.5% to 49.4%. Consequently, the percentage of respondents owning farms 2-3 hectares large increased from 18.6% - 25%, those owning farms 4-5 hectares large from 15.4% - 19.2% and those owning farms greater than five hectares increased from 2.6% - 6.4%.

Table 4. Farm sizes of respondents before and after the commencement of T&V

Farm size (ha)	Before		After	
	F	%	F	%
<1	99	63.5	77	49.4
2-3	29	18.8	39	25.0
4-5	24	15.4	30	19.2
>5	4	2.6	10	6.4

4.2. Effect of T&V on the Incomes of Farmers in The study Areas

As shown in table 5, majority of the respondents (70.5%) earn less than 5000 Naira monthly from their farms, while only 29.5% earn more than 5000 Naira monthly from their farms.

After the commencement of T&V, as shown in table 5, the percentage of respondents who earn less than 5000 Naira monthly dropped from 70.5%-54.5%. On the other hand, the percentage of farmers earning more than 5000 Naira monthly from their farms increased from 29.5%-45.5%. The results show that there was a general increase in income of the farmers after the commencement of T&V. Logically, usage of improved varieties coupled with best practices in the farms led to increased yield which brought more money to the farmers.

Table 5. Monthly Income of farmers before and after the commencement of T&V (Naira)

Monthly Income	Before		After	
	F	%	F	%
>1000:00	42	26.9	15	9.6
1001-5000	68	43.6	70	44.9
5001-9000	39	25.0	47	30.1
>9000	7	4.5	24	15.4

4.3. Respondents' Perceived Benefits from Training and Visit Extension System

The result in Table 6 shows the respondents' perceived benefits from Training and Visit. The respondent's perceived increased yield at harvest as the first benefit and this was followed by increased income. Other benefits include improved household food security and nutrition, proper use of improved varieties, purchase of articles of convenience, increased access to research information, purchase of more farming equipment, improved housing conditions, improved educational status, increased farm sizes, reduced farm losses, enhanced social status in community, access to credit facilities and more labor employed

The distribution of respondents by their perception of the impact of adopted farming practices on farm productivity before and after adoption of improved practices is shown in table 6. Majority of the farmers had positive perception that the adopted farming practices had increased their income (84.6%), increased their yield at harvest (84.0%), improved their feeding habits/household food security (83.3%), and they were able to make use of improved varieties (75.2%). Many of the respondents had positive perception of increased ability to purchase articles of convenience such as cars and cooking gas (70.1%) due to their increased income. They also felt positively that their social status in community had been enhanced (73.1%). Most of the

farmers (82.6%) had positive perception that they experienced reduced farm losses as a result their adoption of improved farming practices. This finding agrees with Ogunwale et al. (2006) who reported that contact with extension agents and the use of various recommendations had positive impact on the standard of living of farmers as a result of increased income. Majority of the respondents (78.4%); however, perceived that access to credit facilities had not been improved, which was evident in the negative perception indicated by farmers. This development is worrisome and calls for concern by the authorities concerned.

Table 6. Respondents' perceived benefits from T&V Extension System

T&V strategy	Mean	Standard deviation	Rank
Increased yield at harvest	2.17	1.33	1
Increased income	2.55	1.15	2
Improved household food			
Security and nutrition	2.30	0.95	3
Purchase of farming equipment	2.20	0.97	4
Increased access to research			
Information	2.19	0.93	5
Purchase of articles of			
Convenience	2.71	0.89	6
Use of improved varieties	2.16	0.85	7
Increased farm sizes	2.15	0.98	8
Improved housing condition	2.12	0.99	9
Improved educational status	2.01	1.00	10
Reduced farm lose	2.01	1.00	11
Enhanced social status in			
Community	1.81	0.97	12
More labour employed	1.68	0.91	13
Access to credit facilitates	1.51	0.82	14

5. Conclusion

The study established the following findings from the study:

1. Women dominated the farming population in the study area and majority of the farmers were above the age of 41 years.
2. The level of education of the respondents was low with majority having only primary education while some had no formal education.
3. Most of the respondents were married with a household size of more than six.
4. Majority of the respondents were subsistence farmers.
5. The findings also showed that respondents generally increased their farm sizes after the commencement of T&V.
6. There was a general increase in the income of respondents after the commencement of T&V

compared to before. Many of the farmers now earn monthly salaries above the 7500 Naira minimum wage set by the Government for all federal civil servants in Nigeria.

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