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Extension workers' perception of the Farmer Field School and Training and Visit system for transfer of agricultural technologies to farmers in South-west Nigeria

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ABSTRACT

The study investigated the perception of agricultural extension personnel (AEP) towards Farmer Field School (FFS) and Training and Visit (T&V) system for the transfer of agricultural technologies to farmers in Southwest Nigeria. A two-stage sampling technique was used to select extension personnel form Agricultural Development Program (ADP). The first stage involves a random selection of three States from the six States in Southwest Nigeria namely; Lagos, Ogun and Oyo state ADPs, according to proportion. The second stage involved the purposive selection of 40% of AEP from each State making 153 AEP. Primary data were collected via the use of structured questionnaire. Descriptive statistical tools such as frequency counts, percentage and mean rank was used to analyse the data while inferential statistical tool such as chi-square was used to test the hypothesis. Results show that AEP had a mean age of 44.64 years, had spent more than 15 years ($\overline{x}$ = 15.37) in service and one AEP cover almost 2,000 ($\overline{x}$ = 1,901.19) households. On condition of service, AEP were not satisfied with the way their salaries were paid ($\overline{x}$ = 1.49) and lack sufficient access to mobility ($\overline{x}$ = 1.29). Although, AEP had both positively and negative perception towards FFS and T&V, the major problems identified were low extension-farmer ratio ($\overline{x}$ = 2.18; $\overline{x}$ = 1.78), non-conduciveness of training venues ($\overline{x}$ = 2.94; $\overline{x}$ = 1.93), to mention a few. Education was significantly (χ^2 = 32.066, P = 0.006) related to perception for FFS. It is recommended that the government at both state and local government level employ more AEP to close the gap of low extension-farmer ratio and also provide them with incentives to make them more efficient. A combination of extension systems can be used by AEP to transfer agricultural technologies to farmers to increase agricultural production and income.

Keywords: Extension personnel, perception, Farmer Field school, Training and Visit, agricultural technologies
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Introduction

The main function of agricultural extension is to transfer research findings to farmers in a way they can understand using different methods of communication and teaching to improve farming methods and techniques. The role of agricultural extension goes beyond the improvement of productivity but also includes the improvement of farmers' skills and knowledge through education and

training (Danso-Abbeam *et al.,* 2018). The work of agricultural research is not complete until it gets to the ultimate users (farmer) who are expected to adopt technologies for increase agricultural production, income and improve standard of living (Musa *et al.*, 2013). Agricultural extension has been the main public channel for spreading agricultural knowledge (technologies) for a long period (Feder & Slade, 1986) and different agricultural related agencies like the Federal Ministry of Agriculture and Rural Development (FMA&RD), research institutes, non-governmental organizations (NGOs), input agencies to mention few, have been paying more attention to improving the management and efficiency of extension systems. One of such is the training and visit extension system which was originally tested in Turkey in the late 1960's (Benor & Baxter, 1984) and was introduced in more than forty developing countries including the major countries of Asia and Africa (Hussein *et al.*, 1994) with the assistance of the World Bank.

In the early 1970s, Agricultural Development Project now Agricultural Development Program (ADP) was introduced in the country, with the support of the World Bank as a platform for effective extension delivery services, using the Training and Visit (T&V) model. Close to fifty countries utilized some form of T&V extension during the period 1974-1999 (Anderson *et al.*, 2006) The ADP recorded resounding success as extension personnel were recruited, trained and retrained with the World Bank's support. The success of the ADP system made all State Governments, as well as the Federal Government to adopt it all over the country. Presently, there are 37 ADPs in the 36 States of Nigeria including the Federal Capital territory, Abuja (Akinfenwa, 2018). Training and Visit (T & V) extension system was introduced to Nigeria in 1986 by the World Bank as a new approach to agricultural extension and was practiced by the Agricultural Development Program as a replacement for the former conventional approach to extension which has become weak and inefficient.

The system was introduced to strengthen research-extension-linkages by making research findings available and accessible to poor resource farmers and to facilitate regular training of agricultural extension workers. The principles of the system according to (Oladele *et al.*, 2006) includes (a) a singer line of command, so that extension workers are not responsible to other authorities (b) T&V also uses contact farmers to transfer information on new agricultural practices (c) fortnight training of village level staff, superiors and subject matter specialist (d) T&V uses a close relationship between research and extension (e) T&V also focuses on the most important crops and advices on the use of low cost improved practices so that farmers can benefit. According to (Oladele, *et al.*, 2006), the T&V has a well-defined organization and the mode of its operation can adjust to farmers need. Bindish & Evenson (1997); Musa *et al*. (2013) asserted that T&V management system has made extension more effective, led to agricultural growth and high rates of returns. The T&V system improved the accountability of village level workers to their superiors but the method (T&V) was later criticized to be expensive and with a lot of deficiencies which probably lead to the fall of T&V agricultural extension system (Hussein *et al.,* 1994). After the World Bank's support (counterpart funding) elapsed in the late 1980s, state governments became the major source of funding for the ADPs.

Recently, the Farmer Field School (FFS) have been promoted by Development Agencies, such as the World Bank, FAO and

Non-Governmental Organizations as a more effective approach to extend agricultural knowledge and practices to farmers combat farm and off-farm challenges (Gerraeaud *et al*., 2003; Mfitumukiza, 2017). The FFS started in Asia the late 1980's and it is being implemented in over 90 countries (FAO, 2020). It has improved skills of over 40 million farmers, pastoralist and fish folks (FAO, 2003; FAO, 2020). The FFS have become a participatory and learner centered approach for agricultural development which can be said to replace the T&V system of agricultural extension. FFS is an innovative, participatory and interactive learning approach that emphasizes problem solving and discovery base learning. It aims to build farmers capacity to analyse their production system, identify problems, test possible solutions and eventually encourage the participants to adopt the practice most suitable to their farming system (FAO, 2020).

FFS has evolved to address a range of topics ranging from Integrated Pest Management (IP to sustainable production system, agro-pastoralism, and value chain nutrition and life skills. FAO (2020) also asserted that FFS has shown improvement in farmers ways of farming, confidence in problem solving and decision making, some studies support that participation in FFS empowered and improved collaborative work. As impressive as FFS looks, it is not without its own limitations amongst which are dependence on external funding, inability to determine its cost effectiveness and whether its outcomes translate to greater productivity and yield. FFS is time bound and not all topics are addressed in a single season. Exploring past trends and current issues in the transfer of agricultural technologies, this study tried to look at two different agricultural extension systems of technology transfer among agricultural extension personnel to determine the most suitable.

Objectives of the study

The broad objective of the study is to investigate extension workers perception of Farmer Field School (FFS) and the Training and Visit (T&V) extension system for the transfer of agricultural technologies to farmers in South-west Nigeria. This study specifically sought to:

- Find out extension personnel job satisfaction,
- Investigate the perception of extension personnel on FFS and T&V System of agricultural extension as means of technology transfer.
- Find out the most preferred method of technology transfer amongst the two systems
- Identify problems encountered by extension personnel on these two methods of technology transfer.

Hypothesis

Ho1: Extension personnel personal characteristics have no significant relationship with their perception of FFS and T&V as methods for agricultural technology transfer.

Materials and Methods

The study area

The study was conducted in Southwest Nigeria which consists of six States, namely; Lagos, Ogun, Oyo, Ekiti, Ondo and Osun states out of which three Staes (Lagos, Ogun and Oyo) were selected for the study. Lagos State is the smallest and most populated state in Nigeria with over 20 million residents. It has a land area of 447, 500 Ha with 180 km Atlantic Ocean coastline most ideal for fishing and has a total cultivable land of 169,613 Ha. Lagos State borders Ogun

State and has three agricultural zones. Ogun State borders Lagos State to the South, Oyo and Osun States to the North, Ondo State to the East and republic of Benin to the West. It has a land area of 16,762 square kilometer. Ogun state has three agricultural zones. Oyo State covers approximately an area of 28, 454 square kilometers. It is bordered to the North by Kwara State, to the East by Osun State and to the South by Ogun State. Oyo State has four agricultural zones.

Sampling procedure and sample size

The study employed a two-stage selection process. First is the random selection of three states which were Lagos, Ogun and Oyo State, and also a random selection of two agricultural zones from each state to give a total of six agricultural zones. Forty percent (40%) of extension personnel were also purposively selected according to proportion from each State. This selection cut across Village Extension Agents (VEAs), Block Extension Supervisor (BES) and Block Extension Agents (BEAs). Forty (40), 57 and 56 agricultural extension personnel were selected from Agricultural Development Programs (ADP) of Oyo, Ogun and Lagos state respectively and this gave a total of one hundred and fifty-three (153) extension personnel.

Data collection and Analyses

Structured questionnaire was used to elicit information on agricultural extension personnel's personal characteristics, condition of service, their perception of FFS and T&V systems of technology transfer, the most preferred of the two systems and constraints in the use of these two systems for technology transfer. The dependent variable measured was extension workers perception of Farmer Field School (FFS) and Training and Visit (T&V) system for transfer of agricultural technologies. Frequency count, percentage and mean rank was used to analyze the personal characteristics of extension personnel, condition of service and the preferred method of technology transfer. AEP were also asked to rate their condition of service using six statement and response was rated on a 3-point scale of very satisfactory =3, fairly satisfactory =2, not satisfactory =1. On the perception of Extension personnel of FFS and T&V, AEP were asked to respond to 24 statements.

A five-point Likert scale was used to rate their response as strongly agree =5, agree =4, undecided =3, disagree =2, strongly disagree =1. The mean for each of the statement was calculated and used for discussion. The mean of the 24 statements was 3.35, therefore statements with mean less than 3.35 was considered to be a negative perception and above 3.35 was considered to be positive. Also, AEP were also asked to respond to nine statements on perceived problems associated with FFS and T&V, a three-point scale of major, minor and not a problem and a weight of 3,2,1 was assigned to the responses respectively. The average mean for FFS was 1.2 and that of T&V was 1.8, any statement that falls below the calculated mean is assumed to be a minor problem and above the mean is a major problem. Chi-square analysis was used to find the relationship between the EP personal characteristics and perception of extension workers towards FFS and T&V system of technology transfer.

Limitation of the study:

The study is limited to Agricultural extension personnel in the public service in Agricultural Development Program (ADP) of the States of study.

Results and Discussions

Personal Characteristics of Agricultural Extension Personnel (AEP)

Table 1 shows the personal characteristics of AEP, majority (66%) of them were males and 34% were females with a mean age of 44.64years. This is an indication that extension personnel interviewed were still in their middle age and will be active to carry out their primary assignment of disseminating agricultural technologies to farmers as at when due if given the adequate incentives. More than half (60.8%) of the extension personnel interviewed had Higher National Diploma (HND) certificates, 26.8% had Bachelor of Science (Bsc), 10.5% had Master of Science (Msc) and the least had Ordinary National Diploma (2%). This is an indication that agricultural extension personnel were educated as expected and will be a master in their discipline. Education according to (Nwosu *et al.,* 2015) is significantly related to job performance.

The average years spent in service was 15.37years and this implies that majority of the extension personnel interviewed have been on the job for a long time and must have undergone a lot of on-the-job training which would have made them experts on the job. Also, majority (62.7%) of Extension personnel interviewed (EP) cover 1,901.19 (ratio of extension personnel to farm families) households on the average which is above the recommended ratio of 1:800 by FAO (Akinfenwa, 2018). Asfaw *et al.* (2012) argued that inadequate extension services have been identified as one of the limiting factors to the growth of agricultural sector and rural community development.

TABLE 1
Personal Characteristics of Agricultural Extension Personnel n =153

Variables	***Frequency***	***Percentage***	***Mean***
Age (in years)			
	13	8.5	
< 30	18	11.76	44.64
31- 40	86	56.21	
41-50	24	15.69	
51- 60	12	7.84	
>60			
Sex			
Male	101	66.0	
Female	52	34.0	
Educational qualification	16	10.5	
Master of	41	26.8	
Science (Msc).	93	60.7	
Bachelor of	03	2.0	
Science (Bsc.)			
Higher National			
Diploma (HND)			
Ordinary			
National			
Diploma (ON**D)**			
Years in service			
(in Years)	06	3.92	
< 5	20	13.07	15.37
6 -10	56	36.60	
11-15	71	46.41	
> 15			
Rank			
Extension agents	96	62.7	
Block Extension	18	11.8	
Agent	39	25.8	
Block Extension			
Supervisor			
Number of farm			
families covered	3	2	1,901.19
500-1000	35	23	
1001-1500	107	70	
1501-2000	08	5	
>2000			

Condition of Service of Extension Personnel

Table 2 shows the results of condition of service of extension personnel. More than half (71.90%) of the agricultural extension personnel interviewed were not satisfied with

TABLE *2*
Condition of Service of Extension Personnel

Career advancement	34 (22.2)	83 (54.2)	34 (23.5)	2.00
Access to on-the-job training	59 (38.6)	48 (31.4)	46(30.1)	2.09
Regular promotion	33(21.6)	77 (50.3)	43(28.1	2.11

Source: Field survey, 2018

***Key**: VS= Very Satisfactory; S= satisfactory; NS= Not satisfactory. (Percentages are in parenthesis)*

Extension workers' perception of FFS and T&V system for transfer of agricultural technologies to farmers

Table 3 shows the result of respondents' perception of FFS and T&V system for the transfer of agricultural technologies to farmers. The average mean of total response was 3.35 therefore, statements less than 3.35 were considered to be a negative perception. Result from the table show that respondents have a positive perception that FFS and T&V enables farmers to help themselves ($\overline{x}$ = 4.39; $\overline{x}$ = 3.84), allows for collaborative work among farmers ($\overline{x}$ = 4.29; $\overline{x}$ = 3.74), educate farmers on how to solve problems ($\overline{x}$ = 4.42; $\overline{x}$ = 4.41), give room to farmers for self- expression ($\overline{x}$ = 3.29; $\overline{x}$ = 3.05) and that FFS and T&V requires expertise on the part of the extension agents ($\overline{x}$ = 3.97; $\overline{x}$ = 4.05). Also, extension personnel interviewed, perceive that FFS and T&V makes the transfer of technology easy ($\overline{x}$ = 4.0; $\overline{x}$ = 3.97), that the two system of technology transfer allows farmers to participate in finding solutions to their agricultural problems ($\overline{x}$ = 4.35; $\overline{x}$ = 3.95) and also strengthen research-extension farmers-linkage ($\overline{x}$ = 4.25; $\overline{x}$ = 4.13). Extension personnel have a negative perception that the two systems do not encourage group formation ($\overline{x}$ = 2.07; $\overline{x}$ = 2.51), does not straighten existing group ($\overline{x}$ = 2.18; $\overline{x}$ = 2.50), that cost of transportation to site of operation is high ($\overline{x}$ = 3.03; $\overline{x}$ = 3.17), and that the two systems is not useful for large scale farmers ($\overline{x}$ = 1.89; $\overline{x}$ = 2.07) amongst others.

Above all, out of the 24 statements asked as regards perception of these two systems for the transfer of agricultural technologies, 15 statements were positive for FFS and 14 were also positive for T&V system. Conclusively one can say that extension personnel have a positive perception towards the two systems (FFS and T&V) as methods for the dissemination of agricultural technologies. According to extension personnel interview, the two methods have almost the same method of technology transfer. That is, both methods employ education, training and visit as a follow up on technologies introduced to farmers. This corroborates the findings of (Abdullah *et al*., 2014) that there is no significant difference between FFS and T&V methods of agricultural extension approach of technology transfer.

TABLE 3
Extension Workers' Perception of FFs and T&V for Transferring Agricultural Technologies

S/N	Perception statement for FFS and T&V	FFS		T & V	
		Mean	SD	Mean	Sd
1.	Enable farmers to help themselves	4.39*	0.82	3.84*	1.08
2.	Allows for collaborative work among farmers	4.29*	0.59	3.74*	1.08
3.	Educate farmers on how to solve farm problems	4.42*	0.70	4.14*	0.80
4.	Give room to farmers on self-expression	4.24*	0.65	3.90*	1.02
5.	Require expertise on part of the farmer	3.29	1.30	3.05	1.30
6.	Requires expertise on the part of extension personnel	3.97*	1.10	4.05	0.10
7.	Does not encourage group formation	2.07	1.15	2.51	1.46
8.	Group formed sustains for a long time	3.51*	1.14	3.41*	1.19
9.	Does not strengthen existing groups	2.18	1.13	2.50	1.25
10.	Cost of transportation to site is high	3.03	1.30	3.17	1.32
11.	Have no effect on economic status of farmer	2.12	1.19	2.11	1.08
12.	Does not provide market network	2.33	1.19	2.81	1.32
13.	A platform for empowerment and capacity building	3.75*	1.19	3.68*	1.14
14.	Makes the transfer of technology easy	4.0*	1.04	3.97	1.09
15.	Particularly useful for small scale farmers	3.49*	1.19	3.57*	1.16
16.	Allow farmers to participate in finding solutions to agricultural problems	4.35*	0.81	3.95*	1.07
17.	Strengthen research-extension linkage	4.25*	0.82	4.13*	0.88
18.	Enables the delivery of recommended technologies	4.23*	0.65	4.23*	0.84
19.	Gives room for continuous supervision, monitoring and evaluation of extension activities	4.21*	0.72	4.15*	0.86
20.	Provide continuous adjustments to farmers need	3.78*	1.04	3.85*	1.00
21.	Does not demonstrate recommended technologies	2.44	1.36	1.96	1.19
22.	Contact farmers do not disseminate information in the system	2.26	1.15	2.43	1.22
23.	Extend technologies that are not suited to farmers condition	1.94	1.02	2,04	1.20
24.	Not useful for large scale farmers	1.89	1.02	2.07	1.22

*Source: Field survey, 2018. *Positive perception*

Most preferred method of technology

Table 4 shows the most preferred of the two methods for technology transfer. Results from the analysis revealed that 42.5% of the extension personnel interviewed and 45.8% preferred FFS and T&V respectively as a system for the dissemination of technology. This may be attributed to the fact that both systems employ almost the same method of technology transfer (Cai *et al.*, 2022) as both methods/systems have the goal of improving farming skill and knowledge of farmers on new agricultural technologies for increase production, income and better the standard of living of farmers.

TABLE 4
Preferred Method of Technology Dissemination

Method of technology dissemination	Frequency	Percentage
FFS	65	42.5
T&V	70	45.8
Both FFS and T&V	18	11.8

Source: Field survey, 2018

Problems Associated with FFS and T&V as Methods for Technology Transfer

Table 5 is the summary of results on problems associated with FFS and T&V. The average mean for FFS is 1.2 and for T&V is 1.8 and this was used as a bench mark to discuss major and minor problems. Any statement with a mean above the average mean is taken as a major problem. The result therefore, shows that high extension farmer ratio was a major problem for FFS ($\overline{x}$ = 2.18) and T&V ($\overline{x}$ = 1.78). Another major problem was incompetence on the part of the trainer for FFS ($\overline{x}$ = 2.47) and T&V ($\overline{x}$ = 2.52) respectively, non-conduciveness of training venue ($\overline{x}$ = 2.14, $\overline{x}$ = 1. 93), poor access to farmers ($\overline{x}$ = 2.17, $\overline{x}$ = 1.93), non- cooperative attitude of farmers ($\overline{x}$ = 2.17, $\overline{x}$ = 2.20), for FFS and T&V respectively. Some authors (Feder & Slade, 1986; GRAS, 2021) posited that FFS is quite expensive and labour intensive with plenty of programs, high travel cost (Oyegbami, 2018) and limited outreach. These also applied to T&V system of agricultural extension. Although, irregular funding of FFS and T&V was perceived as a minor problem ($\overline{x}$ =1.31, $\overline{x}$ =1.10), lack of mobility ($\overline{x}$ = 1.41, $\overline{x}$ = 1.25), irregular supply of training materials ($\overline{x}$ = 1.14) and lack of motivation for trainers ($\overline{x}$ =1.26) was also a minor problem in the T&V system. This may be because the farmers' field was used as a training ground and the system adopts the use of contact farmers to train other farmers. The result implies that each method of technology transfer (FFS and T&V) has its own constraints/problems as no one method is perfect for the transfer of agricultural technologies. Sustainable agriculture often requires different types of technology (Duveskog, 2013) which will require different methods of transfer of these technologies, the environment where these technologies would be implemented, the users of the technologies and the technology (complexity or simplicity) itself.

TABLE 5

Perceived problems associated with FFS and T&V as methods of technology transfer to farmers

	FFS		**T&V**	
Problem Statement	Mean	Std. Deviation	Mean	Std Deviation
Irregular funding of the system	1.31*	0.571	1.10	0.304
Low extension-farmer ration	2.18*	0.833	1.78*	0.907
Lack of mobility	1.41	0.681	1.25	0.538
Incompetence on part of the trainer	2.47*	0.715	2.52*	0.674
Irregular supply of training material	1.66*	0.763	1.14	0.458
Lack of motivation for trainers	1.64*	0.748	1.26	0.511
None –conduciveness of training venues	2.14*	0.715	1.93*	0.688
Poor access to farmers	2.17*	0.780	1.93*	0.688
Non-cooperative attitude of farmers	2.17*	0.803	2.20*	0.805

*Source: Field survey, 2018. FFS = Farmer Field School, T&V = Training and visit, * = Major problem*

Relationship between selected personal characteristics and perception of extension workers towards FFS and T&V as method for transfer of agricultural technologies.

The Chi-square analysis on table 6 show that sex (χ^2 = 3.499, P = 0.74; χ^2 = 7.975, P = 0.240), age (χ^2 = 1,693, P = 0.946; χ^2 = 6.345, P = 0.386), rank (χ^2 = 11.747 P = 0.228; χ^2 = 7.381, P = 0.597) have no significant relationship with perception of extension workers of FFS and T&V. This implies that the variables identified above do not affect the perception of extension

workers. Educational status was significantly related to farmers' perception in the T&V system. Education according to (Doumbia, 2013) is a socio-demographic factor that affects one's thinking pattern and makes it possible to interpret things among other things. Education and understanding of the method of operation of these two systems of extension methods may be important as this will influence the perception (positive or negative) of the extension personnel.

TABLE 6

Relationship between selected personal characteristics and perception of extension personnel towards FFS and T&V as method of agricultural technology transfer

Variables	**χ^2-value (FFS)**	**χ^2-Value (T&V)**	**Df**	**P-value (FFS)**	**P-value (T&V)**
Sex	3.499	7.975	6	0.74	0.240
Age	1.693	6.345	6	0.946	0.386
Rank	11.747	7.381	9	0.228	0.597
Educational Status	32.066	14.518	15	0.006*	0.487

Source: field Survey, 2018. Significant at 0.05

Conclusion and Recommendations

Findings from this study shows that agricultural extension personnel have spent many years in service, are educated and well graded in their job. Although, irregularities in the payment of their salaries, lack of incentives and a wide gap in extension-farmer ratio still remain a mirage in the transfer of technological messages. Results also show that FFS and T&V system of technology transfer have almost the same method of technology transfer; both methods have its own strength and weakness as extension personnel have both positive and negative perception towards them. Conclusively, one can say that different methods or systems of technology transfer have its good and bad angle, that is, no single method is perfect.

It is therefore recommended that a combination of different approaches be used by AEP to reach farmers provided the messages sent to the farmers are demand-driven and adopted by them for improved agricultural practices, increased productivity and improved standard of living. Agricultural extension work should be made attractive by the government at both state and local government level through prompt payment of salaries, provision of good working condition, provide incentives that will motivate AEP for more efficiency so that agricultural technologies can be made available to farmers as and when due to reduce the stress of solving agricultural problems and reduce food insecurity in the county. The government should also employ more AEP to fill the wide gap of low extension-farmer ratio for more efficiency and effectiveness in the delivery of agricultural technologies.

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