EFFECT OF TRAINING ON KNOWLEDGE OF EXTENSION PERSONNEL IN SELECTED AGRICULTURAL VALUE CHAINS IN OGUN STATE, NIGERIA

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ABSTRACT

This study examined the effect of Federal Ministry of Agriculture and Rural Development (FMARD) training on extension personnel's knowledge of selected agricultural value chains in Ogun State, Nigeria. All 40 extension personnel participating in the FMARD training held at the Ogun State ADP Headquarters, Abeokuta, were selected for this study. The questionnaire was designed to collect data from the extension personnel. Collected data were subjected to descriptive and inferential analytical techniques. Results revealed that the majority (72.5%) of the participants were from Ogun ADP. Extension service delivery was dominated by males (62.5%), aged 31-40 years (57.5%), married (82.5%), had HND/B.Sc (82.5%), and studied agriculture-related courses (90.0%). Almost all (95.0%) of the extension personnel positively perceived the FMARD training. Knowledge gain was highest in extension service delivery (66.5%) and least in vegetable production (46.5%). The majority (85.0%) indicated they needed more training in the future. The training needs were primarily in the areas of crop production (52.9%), livestock production (50.0%) and fisheries (20.6%). It was revealed that there were significant differences in the pre and post-training knowledge of extension personnel in extension (t=9.962), livestock (t=10.811), vegetable production (t=9.595), and maize production (t=8.486) at p≤0.01. It was also revealed that extension personnel generally had significantly higher knowledge after the training. The study concluded that the FMARD training positively affected extension personnel's knowledge of the different agricultural value chains. It was recommended that more training should be organized by the FMARD for extension personnel, especially on the livestock production and fisheries value chains.

Keywords: ***Agricultural value chain, Extension service delivery, FMARD training, Knowledge gain, Training needs***

1. INTRODUCTION

Agriculture has a great role to play in accomplishing the key principles behind the sustainable development agenda because the sector is crucial for ending poverty and hunger and improving food and nutrition security (Moore, 2017; Senanayake and Premaratne, 2014). The contribution of agriculture to any nation's socio-economic growth and development cannot be over-emphasized (Odetola and Etumnu, 2013). In Nigeria, the sector is currently accounting for

close to one-quarter of the nation's gross domestic product (GDP), creating employment for all (young and old, including women), and serving as an important means of attaining improved food security while also playing active roles in poverty reduction/alleviation (Federal Ministry of Agriculture and Rural Development - FMARD, 2016; Oyaniran, 2020).

Effective extension service delivery is crucial to attaining a sustainable development agenda through the agriculture sector (Ogunremi and Olatunji, 2013). Despite all these and the natural endowment, the country is still plagued with hunger, malnutrition, poverty, food insecurity, youth unemployment, and increased crime rate resulting from low agricultural productivity (International Food Policy Research Institute - IFPRI, 2017; World Bank, 2017). These are attributed to the fact that the sector has received less attention than necessary from the successive Nigerian government. This made agriculture unattractive to most Nigerians, especially the youths, leading to increased rural-urban migration.

According to Arokoyo, cited in Iwuchukwu *et al.* (2018), extension is concerned with three tasks - disseminating useful and practical information, applying such knowledge to farm and home situations, and helping the people to utilize the information in order to help themselves. Effective extension service delivery is instrumental to achieving increased agricultural productivity, which is essential for fighting against poverty, hunger and malnutrition, and improving food security (Ahmed *et al.*, 2018). However, the Nigerian extension service is grossly inadequate, ineffective and inefficient due to the continued use of top-down, non-participatory, and supply-driven extension approaches; poor targeting of vulnerable groups; lack of synergy with the donor-supported projects domiciled within the Agricultural Development Programme (ADP); low staff strength; poor quality of staff; and poor conditions of service (Izuogu and Atasie, 2015).

Therefore, it becomes imperative to devise means of improving the quality of extension service delivery by improving the competency skills of the extension agents. Though increasing the workforce of extension agencies will significantly contribute positively to quality extension service delivery, training the existing extension personnel will also make a significant impact. The Federal Government, through the recommendations from different agencies, policy briefs, working papers, and research reports, has finally recognized the need to increase the number of extension personnel and train the existing personnel through in-service or on-the-job training as means of revitalizing the extension system in Nigeria. The government has decided to increase the number of extension workers to 75,000 from about 45,000 within three years (Vanguard News Nigeria, 2021).

The training is being implemented in phases, with the first phase targeting about 1110 extension workers and the second phase targeting 401 extension personnel in all the States and the Federal Capital Territory (FCT). The Federal Department of Agricultural Extension organized Federal Ministry of Agriculture and Rural

Development training in collaboration with National Agricultural Extension and Research Liaison Services (NAERLS) and Sasakawa Africa Association Global 2000. The training was on extension tools, methodologies and selected agricultural value chains. For Ogun State, the participants included ADP staff, N-Agro (NPower) volunteers, and private extension agents. It, therefore, becomes pertinent to assess the effect of the training on participants' knowledge with respect to the four key agricultural value chains: extension service delivery, livestock production, vegetable production and maize production covered during the training.

The specific objectives were to describe the participants' personal characteristics, examine participants' extension training history, determine the participants' perception of the training, examine the participants' knowledge before and after the training, and identify future training needs of the participants. The study also tested a hypothesis that "There is no significant difference in the participants' knowledge of the key agricultural chains before and after the training."

2. MATERIALS AND METHODS

This study was conducted among extension personnel in Ogun State. Ogun State Agricultural Development Programme (OGADEP) is the primary agency responsible for agricultural extension service delivery in the State with some private extension agencies. This study involved the complete census of all 40 participants at the FMARD training held at the Ogun State ADP Headquarters, Idi-Aba, Abeokuta. Public and private extension agents and NPower volunteers were invited to the meeting across the 20 LGAs in the State. Participants' perception of the training was measured using a 12-item Likert-type scale on a 5-point response option of Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree, with ordinal scores of 5, 4, 3, 2 and 1, respectively for all positively framed items.

In contrast, the scores were reversed for all negatively framed questions. The minimum and maximum perception scores were 12 and 60, respectively, while 36 served as the cut-off point. Extension personnel with a perception score range of 36-60 are considered to have a positive perception, while those who score otherwise are considered to have a negative perception. Knowledge was measured at interval level with a 34-item scale consisting of four components – Extension (9 items), livestock (8 items), vegetable (8 items) and Maize (9 items). Respondents indicated their knowledge level of the different items before and after the training with a score range of 1 - 10. Data were collected from the participants on the fourth day of the training with the aid of a questionnaire and analyzed using frequency count, percentage, mean, standard deviation and sample paired t-test analytical techniques.

3. RESULTS

Personal Characteristics

As shown in Fig. 1, the majority (72.5%) of the training participants in Ogun State were from the State's Agricultural Development Programme, with 17.5 percent and 10.0 percent representatives of the N-Agro component of the Federal Government's N-

Power programme and the private extension agencies respectively.

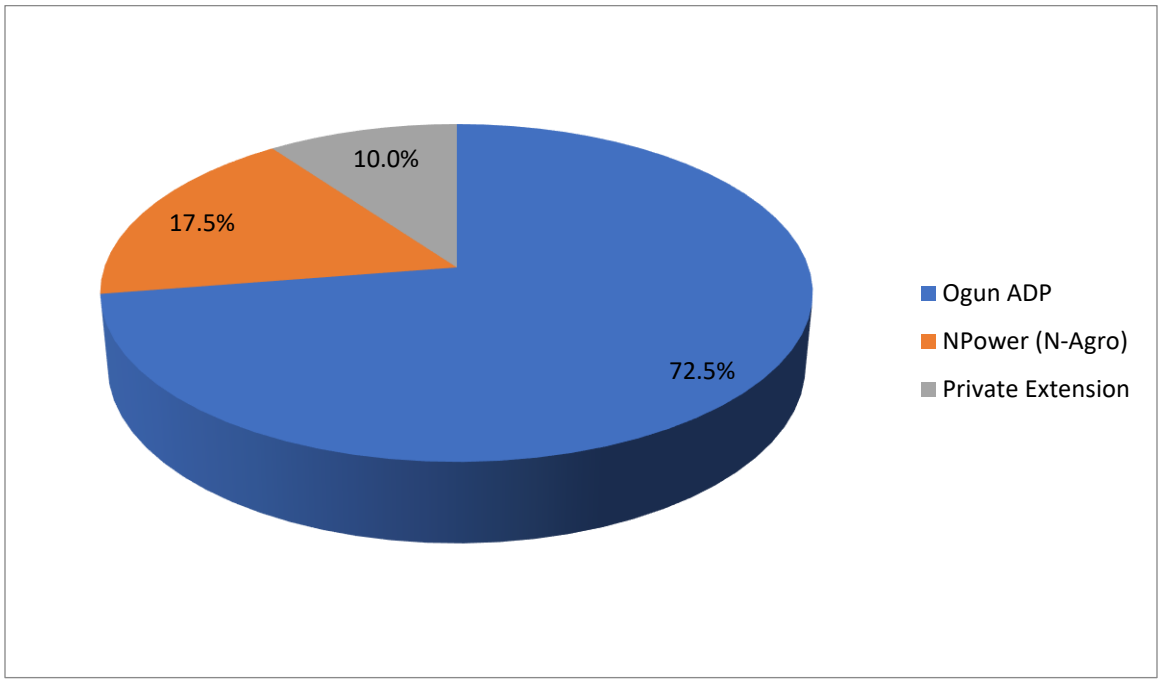

Fig. 1: Distribution of training participants by categories
Source: Field Survey (2021)

Results on the personal characteristics of the participants are presented in Table 1. It shows that 62.5 percent of the participants were male. More than half (57.5%) of the participants were in the age bracket of 31-40 years, with a mean age of 38.28±9.18 years. Also, the majority (82.5%) were married. The highest proportion (60.0%) of the participants was holders of Bachelor's degrees, while 22.5% and 15.0% had Higher National Diplomas (HND) and Master's degrees, respectively.

Cumulatively, 90.0 percent of the participants studied different agriculture-related courses such as Agricultural Extension (22.5%), Agricultural Economics (10.0%), Animal Science (22.5%) and Crop Production (25.0%). Finally, the information in Table 1 reveals that the highest proportion (62.5%) of the participants had 1-10 years of experience in extension service delivery. In contrast, 17.5 percent had spent less than one year as extension personnel. The mean experience of the participants was 7.04±4.21 years.

Table 1: Personal characteristics of participants

Personal Characteristics	Frequency	Percentage	Mean	Standard deviation
Gender				
Male	25	62.5		
Female	15	37.5		
Age (years)				
≤30	7	17.5		
31-40	23	57.5	38.28	9.18
41-50	3	7.5	years	
51-60	7	17.5		
Marital status				
Married	33	82.5		
Single	7	17.5		
Highest educational attainment	6	15.0		
Master's degree	9	22.5		
HND	24	60.0		
Bachelor degree	1	2.5		
Postgraduate Diploma				
Course of Study				
Agricultural Extension	9	22.5		
Agricultural Economics	4	10.0		
Agricultural Engineering	2	5.0		
Animal Science	9	22.5		
Crop production/Agronomy	10	25.0		
General Agriculture	2	5.0		
Non-Agriculture courses	4	10.0		
Experience (years)				
<1	7	17.5		
1-10	25	62.5	7.04 years	4.21
11-20	2	5.0		
>20	6	15.0		

Source: Field Survey (2021)

Training history

Table 2 presents the results on the history of extension training undertaken by the participants. It reveals that the majority (72.5%) of the participants have had an extension and advisory service training. Also, 69.0% of the previously trained participants were trained between 2016 and 2020, while 20.7% were trained in 2021. The highest

proportion (34.5%) of the previously trained participants was trained by Agricultural Development Programme (ADP), followed by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (24.1%) and International Institute of Tropical Agriculture (IITA) (17.2%).

Table 2: Distribution of participants by training history

History of training	Frequency	Percentage
Previous training in extension and advisory service		
Yes	29	72.5
No	11	27.5
Year of last training (n = 29)		
Current year (2021)	6	20.7
2016-2020	20	69.0
Before 2016	3	10.3
Training organization (n = 29)		
International Institute of Tropical Agriculture (IITA)	5	17.2
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	7	24.1
NPOWER	3	10.3
Agricultural Development Programme (ADP)	10	34.5
National Centre For Agricultural Mechanization (NCAM)	1	3.4
JILA	1	3.4
Federal Ministry of Agriculture and Rural Development (FMARD)	2	6.9

Source: Field survey (2021)

Perception of FMARD Training

Results presented in Table 3 reveal that positive perception statements (item numbers 1, 4-5, and 8-12) had mean values greater than 3.00, ranging from 4.10 to 4.53. In contrast, the negative perception statements had mean values ranging from 1.25 to 2.20, less than 3.00. Information in Table 3 indicated that the training was timely ($\bar{x}$ = 4.13), had the potential to improve extension agents' deliverables ($\bar{x}$ = 4.53) and job performance as change agents ($\bar{x}$ = 4.40), and enhanced respondents' skills and expertise ($\bar{x}$ = 4.50). Extension personnel largely disagreed that the training was not considered a waste of time and resources ($\bar{x}$ = 1.25) and not practical oriented ($\bar{x}$ = 1.68).

Also, the extension personnel agreed that the resource persons for the training were experienced and highly competent ($\bar{x}$ = 4.43) while disagreeing that the training sessions were not interactive enough ($\bar{x}$ = 1.90). Furthermore, extension personnel disagreed that the training manual was too general while agreeing that the use of audio-visuals during the training facilitated the assimilation of taught topics ($\bar{x}$ = 4.35). The extension personnel also

agreed that the provided writing materials were very useful during the training ($\bar{x}$ = 4.40). Fig. 2 reveals that almost all (95.0%) had a positive perception of the FMARD training, while 5.0 per cent had a negative perception of the training.

Table 3: Distribution of participants by their perception of FMARD training

Item no.	Perceptual statements	Mean	Standard deviation
1	The training is timely	4.13	0.966
2	The training is a waste of time and resources	1.25	0.439
3	This training is not practical oriented	1.68	0.917
4	This training will improve my deliverable as an extension agent	4.53	0.554
5	The resource persons are experienced and highly competent in the training	4.43	0.747
6	The training sessions are not interactive enough for effective training	1.90	1.033
7	The training manual is too general and not specific to our environment	2.20	1.285
8	The training has enhanced my skill and expertise	4.50	0.555
9	The venue is very conducive for the training	4.10	0.709
10	The use of audio-visuals during the training facilitated the assimilation of taught topics	4.35	0.533
11	This training will enhance our job performance as change agents	4.40	0.496
12	The provided writing materials were very useful during the training	4.40	0.496

Source: Field Survey (2021)

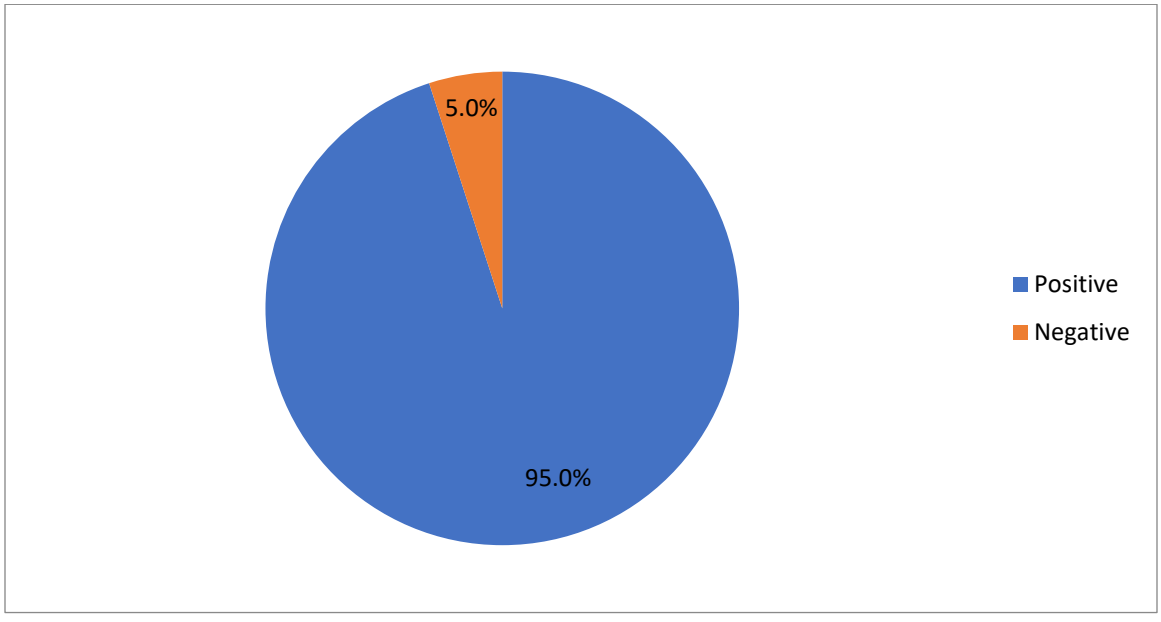

Fig. 2: Distribution of participants' perception of the training
Source: Field Survey (2021)

Knowledge level of participants before and after the training

The participants at the training were trained on four modules to enhance extension service delivery in Ogun State. The modules included extension, livestock, vegetable, and maize production. The results are presented in Table 3. It shows that the average score of the participants before the FMARD training ranged from 5.13 for the extension module to 5.93 for vegetable production, out of a maximum score of 10. The scores increased from 8.54 for the extension module to 8.96 for the maize production module. The knowledge gains ranged from 2.76 to 3.41. It further shows that the highest knowledge gain was in extension (66.5%), followed by livestock (58.2%), while the least knowledge gain was displayed in vegetable production. High per cent knowledge gain will be reflected in areas where the extension personnel require more training, part of which has been met by the FMARD training.

Table 3: Knowledge gains through FMARD training

Agricultural value chains	Before	Now	Knowledge gains
Extension service delivery	5.13	8.54	3.41 (66.5)
Livestock (Poultry, Sheep and Goat) production	5.41	8.56	3.15 (58.2)
Vegetable production	5.93	8.68	2.76 (46.5)
Maize production	5.86	8.96	3.10 (52.9)

*Figures in parentheses () are per cent knowledge gain

Source: Field Survey (2021)

Future training needs

As shown in Fig. 3, the majority (85.0%) of the participants indicated that they needed future training, as against 15.0 per cent who did not need training in the nearest future.

Areas of future training needs, as indicated by at least half of those who needed future training, are arable crop production (52.9%) and livestock production (50.0%). Other areas of need include fisheries (20.6%), financial inclusion (8.8%), tree crops (8.8%) and ICT (8.8%).

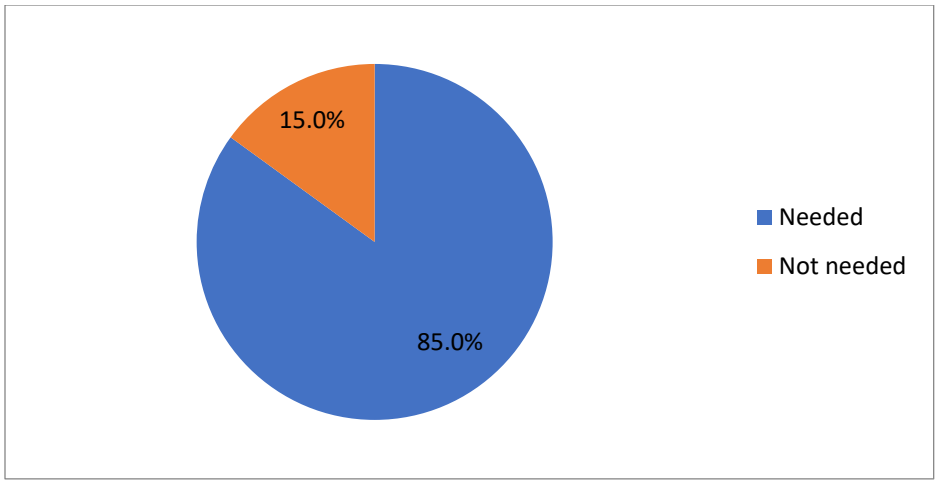

Fig. 3: Distribution of participants by future training needs
Source: Field Survey (2021)

Table 4: Areas of training needs (n=34)

Training need areas	Frequency	Percentage
Arable crop (Cassava, Rice, Millet, Yam, Potato, Groundnut, Sesame, Tomato) production	18	52.9
Livestock (Cattle, Snail, Pig, Rabbit, Turkey) production	17	50.0
Fisheries	7	20.6
Financial inclusion (business opportunities and financing agricultural value chain)	3	8.8
Tree crops (plantain, rubber)	3	8.8
Information and Communication Technology - ICT	3	8.8
Honey production	1	2.9
Soil management	1	2.9
Market linkage	1	2.9
Field demonstration	1	2.9
Modern tools for data collection	1	2.9
Food preservation	1	2.9
Farm input assistance	1	2.9
Updated technologies in agriculture production	1	2.9

Source: Field Survey (2021)

Test of difference in participants' knowledge before and after the training

Results on the test of difference in participants' knowledge before and after the training are presented in Table 5. It reveals that participants' post-training knowledge in extension service delivery ($\bar{x}$ = 76.850), livestock production ($\bar{x}$ = 68.500), vegetable production ($\bar{x}$ = 69.475), and maize production ($\bar{x}$ = 82.600) were significantly higher than their pre-training knowledge at $p \leq 0.01$. The t-values for the different modules were 9.962, 10.811, 9.595, and 8.486, respectively. It further reveals that the

overall level of participants' knowledge in post-training was significantly higher than their pre-training knowledge (t=11.334, p≤0.01).

Table 5: Results of sample paired t-test on the differences in participants' knowledge before and after the FMARD training

		Descriptive			Paired differences			t	p
		Mean	Std. Deviation	Std. Error Mean	Mean	Std. Deviation	Std. Error Mean		
Extension	Before	46.125	14.3083	2.2623	30.725	19.505	3.084	9.962	0.001*
	After	76.850	13.4270	2.1230					
Livestock	Before	43.275	16.0304	2.5346	25.225	14.757	2.333	10.811	0.001*
	After	68.500	9.5997	1.5178					
Vegetable	Before	47.400	14.7974	2.3397	22.075	14.550	2.301	9.595	0.001*
	After	69.475	7.8348	1.2388					
Maize	Before	52.550	17.5907	2.7813	30.050	22.396	3.541	8.486	0.001*
	After	82.600	19.6584	3.1083					
Overall knowledge	Before	189.350	54.1416	8.5605	108.075	60.306	9.535	11.334	0.001*
	After	297.4250	40.0557	6.3334					

df= 39, * indicates mean differences are significant at p≤0.01.
Source: Analyzed data from Field Survey (2021)

4. DISCUSSION

Though the training was dominated by ADP staff, NPower volunteers and private extension personnel were also included. On the one hand, the dominance of the ADP staff could be attributed to the fact that extension service delivery in Nigeria and Ogun State, in particular, has been in the purview of the public extension agencies with the State ADPs. On the other hand, the inclusion of the private extension staff and N-Agro (NPower) volunteers is an indication that the Nigerian government at the Federal and State levels has recognized the significant roles of the private sector in the extension service delivery and is therefore reinforcing the public-private partnership in ensuring effective extension service delivery. This conforms with the opinions shared by Yahaya and Luka (2012) that the private sector remains an indefatigable partner with the Federal Government of Nigeria in promoting profitable agriculture through extension service delivery. The opportunity given to NPower volunteers is also a great means of equipping them with the required competencies of good agricultural extension workers.

Findings further indicated that most participants were younger than 40 years old, with a mean age of 38.28±9.18. This implies that the workforce in the extension service delivery is dominated by non-disabled men and women who could be categorized as a youth. People within this age group are assumed to be highly productive (Iwuchukwu

et al., 2018). Due to inherent strength and energy and their responsive nature to innovations/ new techniques, this training is expected to affect the participants' Ogun State performance positively. By implication, this is likely to translate to the prompt delivery of up-to-date farming techniques to their clientele and, in turn, has the potential to increase agricultural productivity. Extension service delivery was also found to be male-dominated, probably because of the stress involved in going from one remote farm/village to another. It therefore positioned extension agencies in Ogun State as one of the gender-insensitive institutions in favour of the male gender. This finding is supported by previous studies (Ayansina and Adeogun, 2017; Omoregie and Koyenikan, 2020) on extension personnel which also reported that male extension agents dominated the agency. Hence, there was gender inequality in the distribution of extension workers.

As expected from the age distribution, extension service delivery was dominated by married persons characterized as mature and responsible. Ayansina and Adeogun (2017) also reported the dominance of married men among extension personnel. Due to their maturity, married personnel are likely to relate better with their clientele, most of whom are also married. Many extension agents may be away from their marital homes due to their deployment to remote rural farming communities. This may also be the reason for having few women in extension service. Therefore, it requires diligence, commitment and the ability to balance work and home lives to succeed in extension service.

On the participants' educational attainment, this study indicated that extension agents in Ogun State possessed the educational qualification required, with some having up to Master's degrees. This gives credence to the extension personnel's high educational attainment, which enabled them to discharge their responsibilities diligently (Ayansina and Adeogun, 2017). However, holding higher education certificates in Agricultural Science does not qualify one as an extension agent because the curriculum for Agricultural Science does not include teaching, which is part of extension education. Though ninety percent of the participants studied agriculture-related courses, only about one-quarter had specific qualifications in agricultural extension. This affirmed the need for this training, as most participants need the professional qualification to act as extension workers because they need to gain basic knowledge of extension principles, practices, and philosophies. Nonetheless, their background knowledge of other aspects of agriculture is also equally essential in discharging their duties effectively if more on-the-job training, in-service training and refresher courses are provided for those categories of extension personnel.

It was also deduced that the training was dominated by personnel who had spent ten years or less in extension service, with some few ones having spent more than 20 years. Previous studies (Ogunremi and Olatuni, 2013; Okeowo, 2015) on training needs of extension also reported that extension service delivery was dominated by personnel with 1-10 years of working experience. This implies that Ogun State ADP had a good succession plan in its structure. Though the training

could be essential to extension personnel who are relatively new in the service, it is equally essential for re-training experienced personnel. As such, new principles, improved farming techniques, etc., were taught during this training for all the extension agents to have updated information on good agricultural practices, which are expected to be disseminated to the farmers. This study's findings included that most participants have had previous training(s) on extension and advisory services organized by ADP, FMARD, GIZ, IITA, NCAM, JILA and NPower, mostly within the last six years (2016-2021). This further affirms the significant roles public and private institutions play in training the extension agency's workforce.

Through the findings of this research, almost all participants indicated a positive perception of the FMARD training as they considered the training as being timely, not a waste of resources, and practical-oriented, and that the invited resource persons were experienced and highly competent. They also noted that the training would improve their deliverable by enhancing their skills and expertise. The study also established meaningful knowledge gains across the four key components of the training. The t-test further indicated that the participants had better post-training knowledge, significantly higher than the pre-training knowledge in the four components covered during the training. This suggests a positive relationship between the training of extension performance and their knowledge, which tends to improve job performance. The findings support previous studies (Onyango and Wanyoike, 2014; Halawi and Haydar, 2018), which reported that training positively impacts workers' performance and productivity.

Despite the significant knowledge gains, most participants still indicated an interest in future training in important arable crops, livestock and fisheries, which should have been covered in the current training. Adamu *et al*. (2021) also observed that most of the extension workers in Bauchi State need animal production and crop protection training. Extension personnel still needed training on arable crop production such as cassava, rice, millet, yam, potato, groundnut, sesame and tomato. This could be adduced to the fact that most of these crops are not commonly grown in southwestern Nigeria. The extension personnel also indicated training interests in rearing cattle, snails, pigs, rabbits and turkeys, and fisheries. This agrees with the findings of Okeowo (2015), who reported that extension personnel in Lagos State ranked extension dissemination, livestock production and crop production technology as their most areas of training need.

5. CONCLUSION AND RECOMMENDATIONS

Evidently, extension personnel in Ogun State are married, highly educated, inexperienced, and agriculture graduates, and positively perceived the FMARD training. Extension personnel gained sufficient knowledge in extension service delivery, livestock and maize production; and needed training on arable crop production and livestock production. It was established that the FMARD training improved the knowledge of extension personnel in the selected agricultural value chains. The study

concludes that extension personnel's job performance can be enhanced through training programmes executed based on needs. It was recommended that more training be organized by the Federal Ministry of Agriculture and Rural Development for extension personnel, especially on the crop production and livestock production value chains. The private sector is also encouraged to invest in the regular training of extension personnel in Ogun State.

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