

Farmers' Perceptions of Agricultural Extension Agents' Performance in Sub-Saharan African Communities

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Abstract— Considering the important role extension agents perform in the rural community, potential exists to measure the performance of extension workers from the smallholder perspective. The study investigated farmers' perceptions of agricultural extension agents' performance in Kaduna State, Nigeria. Data were collected with structured questionnaires distributed to 200 rural smallholder farmers and 20 agricultural extension agents using a multiple stage sampling technique. The main aim of the study was to evaluate the performance of extension agents on agricultural production. Data were analyzed using descriptive statistics and Chi-square analysis was used to test significant relationship between farmers' perception regarding the role of extension services and increase in crop production. The result of the socio and demographic characteristics of the farmers showed that more than half (59%) are within the active age and are married and had one form of education or the other. The estimated chi-square value of 12.84 revealed that there is no statistical significant relationship between extension services and increase in crop production among farmers in the study area. In addition, majority (89%) of the respondents perceived lack of regular contacts with extension agents as a great challenge in the area, while a large proportion (82%) of the respondents reported that extension services was not effective in the area. However, since contact with extension agents was ineffective, the results obtained showed that smallholder farmers preferred traditional ICT, mainly radio (63%) as their main source of accessing agricultural information. The study however recommends that government should employ and train more agricultural graduates. More extension workers need to be hired in order to significantly reduce the problem of the extension workers to farm families' ratio which is currently 1:3000 in Kaduna State, Nigeria.

Keywords— Extension agents, smallholder farmers, perception, extension ratio, village.

I. INTRODUCTION

Agriculture extension primarily deals with human resource development and the transfer of technology and knowledge from agricultural research centers to rural farmers. Extension agents are professionals in the extension system responsible for developing individuals in the community (Oladele 2015). However, a key failure point of traditional extension models is the number of farmers per extension officer – they cannot visit all the smallholder farmers effectively and in a timely manner. The ratio in Nigeria is currently one extension worker: 3000 farmers (Fawole and Olajide, 2012; Ogbe, 2016; Sennuga, 2019). This ratio is grossly inadequate and highly disturbing considering the World Bank's standard which is 1:500 (World Bank, 2010). Where extension workers act as bridges between researchers and farmers, for example, in traditional Training & Visit extension the ratio should be 1:200 farmers within a cluster so that they can have a meaningful impact by effectively teaching and monitoring the farmers' progress (Ogundele, 2016; Sennuga, *et al.* 2020). Furthermore, by focusing on lead farmers backed up by farmer to farmer extension, then a ratio of 1: 500 advocated by the World Bank could be effective.

Key challenges facing extension workers in Nigeria include extremely low extension agent to-farmers ratios; a lack of essential technical and communication skills for efficient functioning; a lack of a definite plan of work; too few qualified and trained extension staff using outdated information; under resourced transport and logistics; poor, weak and deteriorated infrastructure; extension organization and management problems; unclear extension mandates; lack of job descriptions for staff; poor remuneration of the personnel; and a high rate of absenteeism among staff (see Naswem *et al.* 2008; Baig and Aldosari 2013; Sennuga, *et al.* 2020). Consequently, in a reaction to the worrisome performance in the agricultural sector, the Nigerian Government embarked on several agricultural interventions and reforms, with policies and programs explicitly designed at reinvigorating the sector to its enviable position in the Nigerian economy between 1959 and 2003. The use of ICT potentially allows extension workers to contact more farmers with appropriate and up-to-date information in a timely manner. Asenso-Okyere and Ayalew-Mekonnen (2012) stressed that traditional ICT, particularly radio, can enable extension

worker to reach out to half a million smallholder farmers simultaneously in their local language with knowledge and information which enables farmers, strengthens them, assists smallholders in problem solving and allows farmers to make informed decisions.

1.1 Evolution of Agricultural Extension in Africa

Africa is the only continent in the world where agricultural productivity is largely stagnant whilst populations grow rapidly, resulting in food insecurity and malnutrition among the populace (Madhusudan, 2005; FAO 2015). Agricultural production has been limited by various constraints, such as lack of adequate research in science and technology, inadequate dissemination of research, ineffective utilization of soil resources, low commodity prices and unstable markets for agricultural products, as well as storage issues (Awoyinka, 2009; Saingbe, 2010; Awerije, 2014; Sennuga, *et al.* 2020).

All these constraints are frequently emphasized by the lack of capital which is fundamental for agricultural development (Kennedy, 2005). According to Simpson and Owen (2012) there are six key challenges facing agricultural extension in Africa:

1. Relevance and responsiveness of research to local concerns.
2. Systems learning and the generation of new knowledge.
3. Information flow and farmer-to-farmer communication.
4. Institutionalization and Local Organizational Development.
5. Changes in relationships.
6. The integration of the Farmer Field School into the existing program.

Experience from other parts of the world, particularly in the developing countries of Asia and Latin America, shows that agriculture has been rapidly transformed in recent years into a progressive commercial industry and treated as a full business (Thirtle and Piesse, 2013). Investment in the agricultural sector with adequate agricultural information technology has enabled farmers to intensify production and lead to sustainable development which enhances their standard of living as well as contributing significantly to national and rural prosperity within environmental constraints (Ali, 2011). This could also happen in Africa if smallholder farmers could be assisted with the necessary resources to intensify their farming activities through increased use/effectiveness of agricultural extension services delivery and information technology. There is a general consensus that extension services, if successfully applied, could result in outcomes which include observable changes in attitudes and adoption of Good Agricultural Practice technologies and improve the quality of lives of farming households (Yegbemey, *et al.* 2014, Sennuga, 2019). Similarly, it has been recognized that effective agricultural extension services could accelerate development in the presence of other important factors such as markets, agricultural improved technology, availability of supplies, production incentives (quality seeds, fertilizers and herbicides) and transport. Over the years, a number of extension models have been adopted in developing countries to enhance the effectiveness of agricultural extension services and service delivery. According to Anandajayasekeram *et al.* (2008) a model may be defined as a schematic description of a system, or phenomenon that accounts for its known or inferred properties and may be utilized for the further study of its characteristics.

Top-down extension approach is a system whereby agricultural information from the Universities or Ministry of Agriculture is disseminated to farmers through extension agents and is directly related to the diffusion of innovation theory. This extension structure is known as Transfer of Technology (TOT) through extension workers who are also passive recipients of technology from the researchers to farmers. Top-down methods characterized the United States extension model, which was also instituted by many colonial governments in Africa (Anandajayasekeram, *et al.* 2008). In Africa, the system helps to promote agricultural messages that have been designed and developed by research scientists, with limited input by the ultimate users (farmers) of the technologies. Technologies are spread vertically in the top-down approach (Anandajayasekeram, *et al.* 2008).

In developing countries, agricultural extension services have been the exclusive domain of the public sector and government responsibility, while in most developed countries, extension services are mainly privatized (Swanson and Samy, 2012) as agriculture becomes more commercial. Public extension deals with diverse policy issues, including responsiveness; relevance; cost-effectiveness and accountability (Swanson and Samy, 2012). The overall objective has constantly been to contribute to the increase of agricultural production and productivity of the rural population (Shinn *et al.* 2009), utilizing

mainly a top-down approach, through the Transfer of Technology (TOT). As mentioned previously, this model is strongly linked to the diffusion of innovation theory proposed by Rogers. This theory is known for the linear technology transfer which tends to work better only in the developed nations. Rogers himself moves away from linear technology process with the convergent model in the latest version of his theory (Rogers, 2003, Anandajayasekeram, *et al.* 2008). In this model, technologies are generated at research stations and diffused to extension agents who in turn disseminate them to the farmers (Davis and Place, 2003), in other words a one-way transfer of information.

The information flow from the Ministry of Agriculture is absolutely supply-driven and not area-specific (Raabe, 2008), meaning that in most cases the technical knowledge transferred into the field is distorted, outdated and often wrong for the specific situation. Thus, farmers see the quality of the information provided by the public extension staff as a major shortcoming (Oladele, 2015), where a top-down approach continues to hinder the full potential of the extension service delivery system (Raabe, 2008). Under the Ministry-based extension model, smallholder farmers' access to extension is also an issue, because of the low level of outreach by public extension services. The public extension model often has little to offer in terms of messages to a large section of the rural population. In fact, there is no specific answer to farmers' problems because it has not been a research concern to reach the farming community (Eicher, 2007). The top-down approach to information dissemination to farmers in Nigeria has indeed received various criticisms, while calls for participatory approach in both agricultural policy formulation and information dissemination that incorporates farmers' contribution persists (Emeana, *et al.* 2019).

As a result, public extension came under attack in the 1980s because of the cost of financing it coupled with condemnations of insignificance, inefficiency, ineptness and lack of equity (Rivera 2001). In addition, the current ratio of extension agents to farm families is extremely low in most developing countries and this has been a continual threat to efforts in achieving food sufficiency. This case is not different in Nigeria even with the current ratio of 1:3000 farm families; some states such as Lagos, Nigeria reported 1:10,000 (Ogundele 2016; Sennuga, 2019). Ideally, the ratio should be 1:200 farmers within a cluster so that they can make a meaningful impact by effectively training and monitoring the farmers' progress. Since the mid-1980s, agricultural extension has become a "pluralistic" method (Birner and Anderson, 2007). Public extension leaders have recognized the interdependent economic and social roles of NGO and private sector extension models in agricultural and rural development projects. The new ideas include decentralization, cost-recovery, outsourcing and involvement of other key stakeholders (Ferroni and Zhou, 2012). According to Swanson and Samy (2002), collaboration among the three key stakeholders is important to effectively work together in partnership for the development of the agricultural sector and rural community (Figure 1).

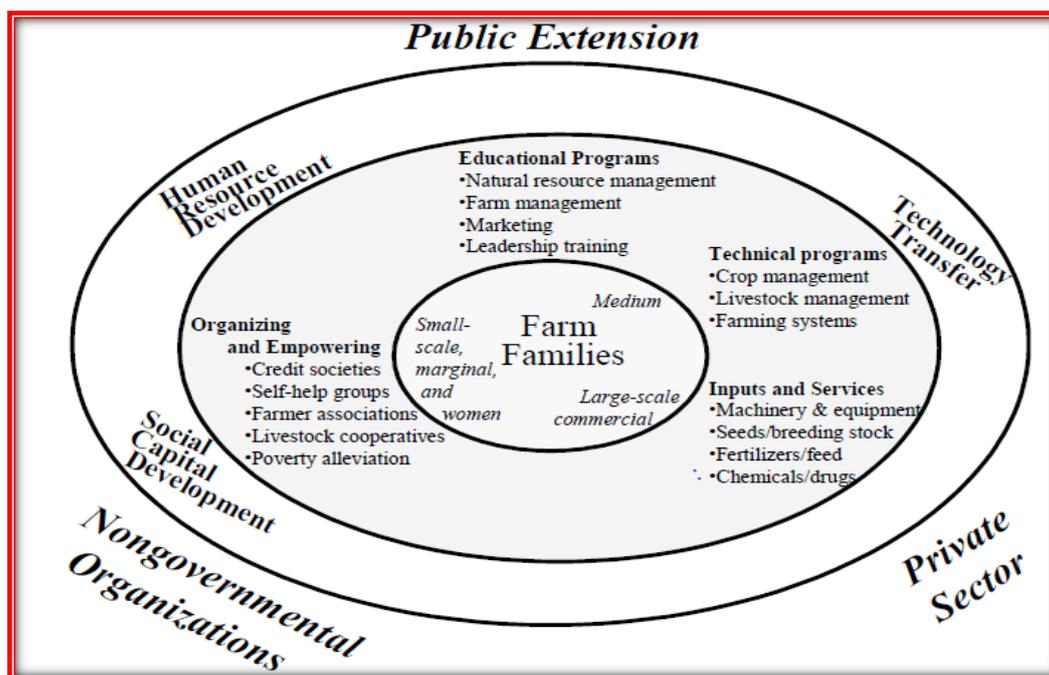


FIGURE 1: Conceptual framework depicting a Public, Private and NGO Partnership Adapted from Swanson and Samy 2012

This model also describes the partnership between the key players in agricultural extension and advisory services for sustainable agricultural development. The major responsibility of public extension is typically human resource development, technology transfer and educational programs in order to complement the social capital development of NGOs and the role of private sector extension model (Swanson and Samy 2012; Figure 1). In developing countries, there is a lot of collaboration between private sector, government, non-governmental organization and international donors to address food security issues and sustainable development (Sennuga and Fadiji, 2020).

According to World Bank (2010), public extension is incapable of serving resource-poor farmers due to inadequate linkages between research and extension; inadequate finance support; and poor human resource and facilities. In addition, the system's designer stressed the following characteristics: 1) a single line of command, with several tiers of management between the field and supervisor; 2) in-house technical expertise, whereby subject matter specialists are to provide training; 3) exclusive dedication to information dissemination; and, 4) a seasonal workshop with research personnel among others (Anderson and Feder, 2003). Farmers' perceptions regarding agricultural extension agents' performance in Northern Nigeria is yet to be established and this is why this study was conducted. Therefore, the main objective of this study is to investigate farmers' perceptions regarding agricultural extension agents' performance in Kaduna State, Nigeria.

The specific objectives of this study are to:

- i. Examine the socio-economic characteristics of the farmers and extension agents;
- ii. Investigate farmers' perceptions regarding extension agents' performance;
- iii. Examine the relationship between farmers' perceptions regarding extension agents' role in helping smallholders to increase crop production;
- iv. Explore the preferred sources of agricultural information among smallholder farmers;
- v. Highlight the current problems affecting extension services in the study area.

II. METHODOLOGY

2.1 Kaduna State of Nigeria as the study area

This study was conducted in two randomly selected Local Government Areas of Kaduna State, Northern Guinea Savannah ecological zone of Nigeria, West Africa. Kaduna State is located between latitudes $9^{\circ} 03'$ and $11^{\circ} 32'$ North of the equator and longitude $6^{\circ} 05'$ and $8^{\circ} 38'$ East of the Greenwich Meridian (Kaduna State Ministry of Agriculture, 2014). However, two rural communities (Bassawa and Shika) were purposefully due to active engagement of the rural farmers in agricultural production in the district and for its proximity to Ahmadu Bello University, Zaria to facilitate access for the researchers. The major economic activity conducted by the rural dwellers in the two communities is farming. Very few people engage in hunting and smallscale business. The major food crops grown are yam, maize, millet, groundnut, rice, beans, melon, sweet potato, cassava, guinea corn and vegetables such as pepper, tomato and carrot.

2.2 Population of the study and research design

The study involved rural farmers in the two communities including those who had access to agricultural extension workers and those who do not. The study employed case study research design in order to explore and obtain in-depth information related to farmers' perceptions regarding agricultural extension agents' performance in Northern Nigeria and extension workers in their real-life settings.

2.3 Sample Size and Sampling Techniques

Purposively sampling techniques was employed to select the sample size for the study. Two rural communities (Bassawa and Shika) were purposely selected out of 22 villages primarily because of their age-long agricultural practice and presence of adoption practices noted there. Moreover, Bassawa community benefited in the Adopted Village Concept project initiated by National Agricultural Extension and Research Liaison Services (NAERLS), Zaria in 2012, while Shika community did not (Sennuga, 2019). Conversely, the two communities are the same in every respect except that one (Bassawa) is an adopted village from NAERLS. The two communities are similar in agro-climatic, ethnic group, religion and cultural settings.

However, Shika community gets only public extension services with about 3000 smallholder farmers per extension agent while Bassawa community receives extension services plus the research education establishment from Adopted Village Program with estimated ratio 1:85 farm families (Sennuga, *et al.* 2020).

2.4 Sample size

The sample size for the study was 200 smallholder farmers. It consists of 100 farmers from each community. Also, agricultural extension agents were purposively selected – 5 agents each from four (4) institutions that provide extension and advisory services in the country namely; the government (ADPs), Non-Governmental Organization (NGO), Academia (NAERLS) and the Private sector. A total number of 20 agricultural extension agents participated in the study.

2.5 Data collection

Primary data were collected using structured questionnaires, focus group discussion and in-depth interview from both rural dwellers and extension workers. Secondary data which relate to the objectives of the study were collected from the office Kaduna State Agricultural Development Project (ADP) and National Agricultural Extension and Research Liaison Services (NAERLS), ABU, Zaria.

2.6 Data analysis

The data collected were analyzed using descriptive statistics such as frequency count and percentages. Chi-square technique was used to test the significant relationship between extension services performance and crop production among farmers.

III. FINDINGS AND DISCUSSION

3.1 Socio-economic characteristics of the rural dwellers in the study area

The results of socio-economic characteristics of the respondents were presented in Table 1. The variables investigated in the study included: age, sex, marital status, household size, level of education, major crops cultivated, household assets and income level. The age of the farmers in the households ranged from 20 to 70 years. 59.2% of them fell within the middle age of 31-50 years in both communities. This suggests that the majority of the respondents were within their economic active age and this enhances their productivity in order to be food secure (Table 1). The old age group (51-70) had the lowest impact in farm work with 24.2% contributing to active farming among the sampled population. However, it is generally assumed that younger people tend to be more productive than their older counterparts (Sennuga, 2019). In the same vein, the results in Table 1 below showed that all the respondents were males; this is because the cultural traditions of the study area do not allow females to be actively involved in farming activities (Sennuga, *et al.* 2020).

In term of the marital status of the respondents, overwhelming majorities (96.7%) of the respondents were married with half of these households having 10 or more members; the remainder had larger families of 21 plus members reflecting polygamy within the communities. The result is not surprising because large family sizes are the norm in the Northern Nigeria and large families provide accessible workforces. Furthermore, the cultural tradition and religion allows the men to marry at most four wives. The use of household labour for several activities was very common in the study area with activities such as ploughing, harrowing, planting, weeding, chasing away straying domestic animals, irrigation activities and harvesting. In the same vein, large household may also help to access more agricultural information.

Educationally, 44% of the respondents had acquired primary education, while 17% had secondary education. Only 7.5% of the respondents possessed higher education (Table 1). This suggests that the respondents in the study area obtained the basic education required for better understanding and ability to embrace new technologies especially the adoption of GAPs modern farming technology. In addition, it is generally thought that the level of education enhances the ability to comprehend and adopt relevant agricultural information. Indeed, according to Kalungu and Filho (2016), and Sennuga (2019) highly educated farmers tend to adopt relevant agricultural technologies better than illiterate ones. In term of household asset, 58% of the household keep poultry, a greater proportion (61.7%) keep sheep and goats. A sizeable proportion of the respondents (42%) also indicated that they rear cattle and only 6.5% specified that they keep other livestock such as camel, duck, turkey etc. The baseline livelihood survey shows that no single household keeps pigs in the study area. This was attributed to the religion (Muslims) of the respondents. It was revealed during the focus group discussion that the Muslim faithful do not rear pigs.

TABLE 1
DEMOGRAPHIC REPRESENTATION OF THE SOCIO-ECONOMIC CHARACTERISTICS OF THE SMALLHOLDER FARMERS (n= 200)

Variables	Percentage
Age (years)	
20-30	15.8
31-40	31.7
41-50	27.5
51-60	17.5
61-70	6.7
>70	.8
Gender (Sex)	
Male	100
Female	0
Marital Status	
Single	100
Married	0
Household size	
≤10	50.8
11-20	36.4
21-30	12.1
>31	0.7
Level of education	
No education	30.8
Primary	44.3
Secondary	17.0
Tertiary	7.5
Family education	
No education	3.3
Primary	55.0
Secondary	35.8
Tertiary	2.5
No Children yet	3.3
Household Asset	
Poultry	58.0
Sheep and goats	61.7
Cattle	42.8
Other livestock	6.5
Pig	0

3.2 Demographic Characteristics of the Extension Agents

The demographic characteristics of the extension agents who participated in the focus groups are reported here (Table 2). The 20 extensionists were selected and the foremost rationale was based on those who volunteered from academia - National Agricultural Extension and Research Liaison Services (*NAERLS*); government - Agricultural Development Programme (ADP); Non-Governmental Organizations (NGOs) and the private sector. A breakdown of the sample and where they are working is provided in Table 2 below.

TABLE 2
DISTRIBUTION OF EXTENSION WORKERS ACCORDING TO THE ORGANIZATION

Organizations	Working with Bassawa	Working with Shika	Total	The type of focus group discussion
Academia (NAERLS)	5	0	5	Extension in Nigeria.
Government (ADP)	3	2	5	How to improve it.
NGOs	2	3	5	Motivating extension workers.
Private sector	2	3	5	Summary of discussion
			20	

Source: Field survey 2016

The majority (16) of them were between 30-49 years old. Most (17) of the participants were males, while 3 were females. The study results show that 18 extension workers were married and 13 were from the household size of 10 or fewer members. Most (11) of the participants had Higher National Diploma Certificate (HND), followed by those (4) who had Ordinary National Diploma (OND) and (3) of them who had B.Sc. certificates, all in agriculture related subjects and signifying that they are literate (Table 3).

On secondary occupation, 14 of the extension workers were involved in farming as outside income-generating activities to complement their extension work, while 4 were involved in trading as a secondary occupation. The study results suggest that the majority of extension specialists have outside work to support their families. During the focus group discussion, extension workers reported that *there is a considerable economic pressure on agricultural extensionists as on other government employees in Nigeria, this situation forces them to diversify and supplement their incomes with other activities*. However, it seems that such pressure, or the opportunity for outside employment, is greater for the extension workers in Kaduna state as 18 out of 20 extension workers are involved in alternative/secondary occupations. Also, four in-depth interviews were conducted with senior extension managers from the four extension sectors. Three of the senior extension managers had more than 25-years' experience, while one had 33 years of experience and he reiterated that *"I am currently preparing for my retirement"* (Extension manager no.3 - in-depth interview). All the four participants were male.

TABLE 3
DEMOGRAPHIC REPRESENTATION OF THE SOCIO-ECONOMIC CHARACTERISTICS OF THE EXTENSION AGENTS
(n= 20)

Variables	Frequency
Age (years)	
20-30	01
31-40	11
41-50	04
51-60	04
Gender (Sex)	
Male	17
Female	03
Marital Status	
Single	18
Married	02
Divorced	-
Level of education	
HND	11
OND	04
B.Sc degree	03
Secondary Occupation	
Farming	14
Trading	04
No Secondary occupation	02

3.3 Farmers' Perceptions Regarding Agricultural Extension Agents' Performance

As part of the evaluation survey, five point-Likert scales were used to elicit information on farmers' perceptions regarding extension agents' effectiveness in the study area. The scale was: *strongly agree = 5, agree = 4, indifferent = 3, disagree = 2 and strongly disagree = 1*. Figure 1 revealed that 89% of the farmers in Bassawa perceived lack of regular contacts with extension officers a challenge, while 82% in Shika reported likewise (Figure 2).

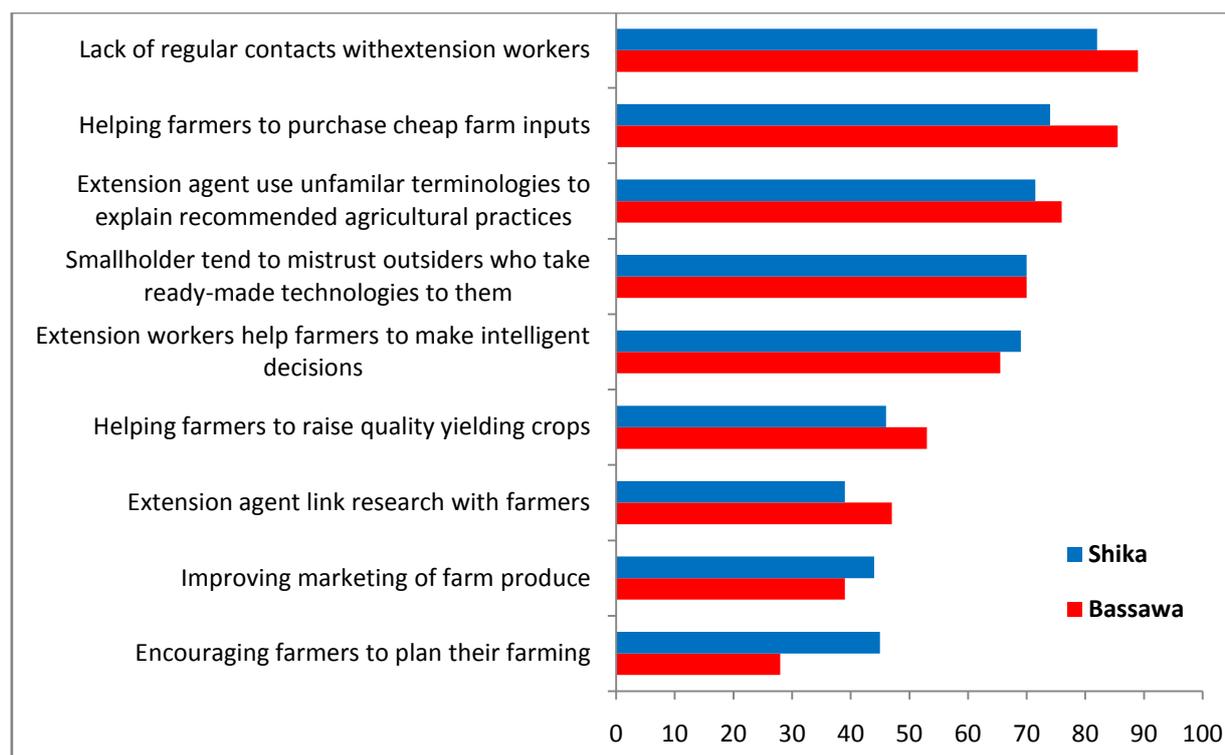


FIGURE 2: Perceptions of Shika and Bassawa communities regarding agricultural extension agents' performance before the intervention

Source: Survey 2016; Shika n=100; Bassawa n= 100

Scale: %

Results in Table 4 revealed that the majority (86%) of farmers from Shika community reported that extension services were not effective, while 75% of the farmers from Bassawa reported likewise. The results also show that 67% and 73% of the smallholders surveyed disagreed with the statement 'extension workers play a role in helping rural farmers to increase crop production', whereas 25.5% and 24% from Shika and Bassawa respectively agreed with the statement and the remaining 7.5% and 3% responded that they didn't know. Further investigation reveals that the majority of those who disagreed with the statement explained that extension workers did not visit them and most of the time they source advice from their fellow farmers in the village or telephone the NEARLS staff. As depicted in Table 4, Chi-square analysis was used to test significant relationship between farmers' perception regarding the role of extension services and increase in crop production. The results revealed that there is no statistical significant relationship between extension services and increase in crop production. This may be because of the ineffectiveness of the extension services in the study area.

TABLE 4

CHI-SQUARE ANALYSIS OF RELATIONSHIP BETWEEN FARMERS' PERCEPTIONS REGARDING EXTENSION AGENTS' ROLE IN HELPING RURAL FARMERS TO INCREASE CROP PRODUCTION

Do you believe that extension workers play a role in helping rural farmers to increase crop production	Shika n=100	Bassawa n=100	Chi-Square	df	p-value
Yes	25.5	24	12.84	1	0.14**
No	67	73			
I don't know	7.5	3			
Do you think extension services is effective your area?					
Effective	9	23	22.29	1	0.16**
Not effective	86	75			
I don't know	5	2			

$X^2 = \text{Chi-square}; ** = P < 0.001$

Source: Survey; Shika n=100, Bassawa n=100

3.4 Preferred Sources of Agricultural Information among Smallholder Farmers

Information has become a critical factor to increase smallholders' production and productivity. As a result, the most preferred sources of information by smallholder farmers were investigated and respondents were requested to rank the sources of agricultural information used. As presented in figure 3a-b, the findings revealed that smallholder farmers preferred traditional ICT, mainly radio (36%) as their main source of accessing agricultural information followed by mobile phones (28%) for Shika community, while 39% and 31% of smallholder farmers from Bassawa community indicated that they prefer radio and mobile phone respectively.

The study results further indicate that agricultural extension agents, personal sources and social media were not considered as significance in obtaining agricultural information by the respondents. The findings of the study show that radio and mobile phones were relevant agricultural information which helps farmers to make informed decisions about what crops to plant and where to purchase affordable farm inputs and which market to sell their produce. In this regard, the need and choice of the sources of information on improved agricultural technology, and how the timely and relevant information is disseminated to the targeted smallholder farmers should be of paramount concern to both agricultural development practitioners and agricultural extension workers. However, the chi-square test shows that there were no statistically significant differences between the farmer's present sources of agricultural information.

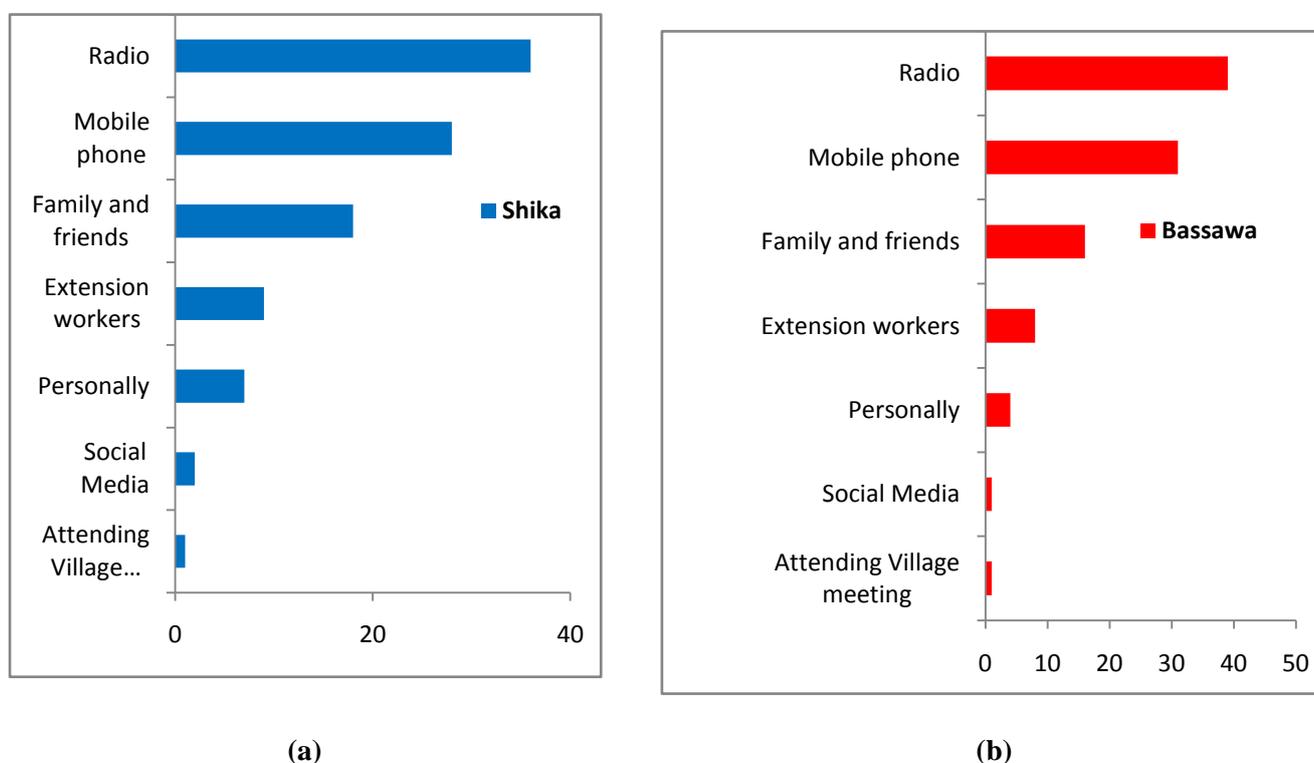


FIGURE: 3 a-b Present sources of agricultural information among smallholder farmers
Source: Survey; Shika n=100% Bassawa n=100 Scale: %

3.5 Current Problems Affecting Agricultural Extension Services in the Study Area

During the focus group discussions, extension workers were asked to highlight and rank the current problems affecting extension organizations in the study area. As shown in Figure 4, of the ten problems mentioned, all of them seem to be affecting agricultural extension services in the area. However, the most significant of these problems ranked by the extension workers was the exceptionally low number of extension workers in the area, while poor funding of Agricultural Development Programme by the Government, lack of regular training for agents, inadequate ICT amenities and lack of incentives for field personnel were among the least important problems identified (Figure 4). Of course, this study acknowledges that ICT are not a panacea to social and economic development problem of the rural communities in Nigeria. Nevertheless, they have potential to help the smallholder farmers to leap some of the traditional obstacles to development by improving access to appropriate and timely information. Therefore, ICT can be used to support traditional extension models.

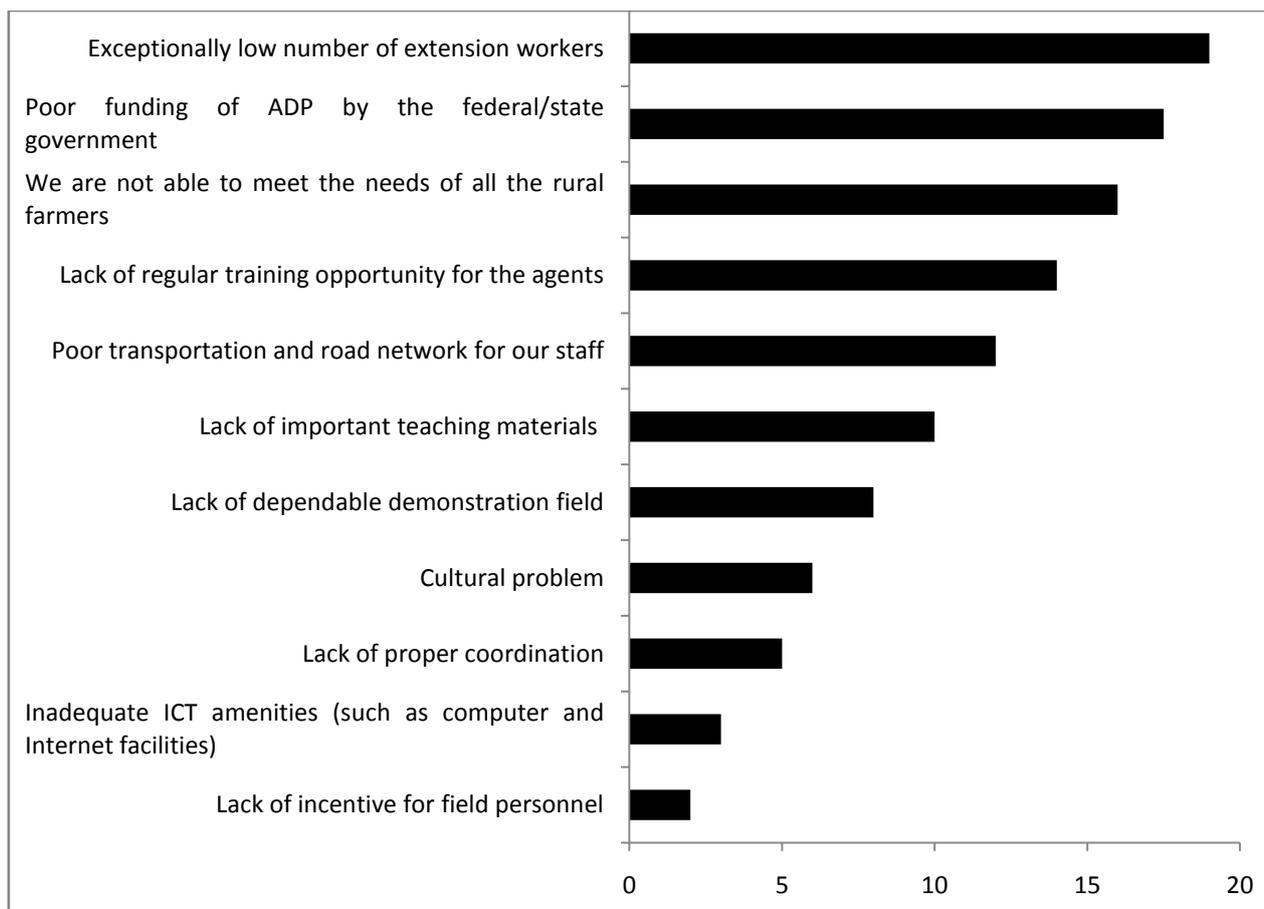


FIGURE 4: Problem affecting agricultural extension services in the study area Source: Survey; Extension workers n=20; Scale: 20 Extension workers

IV. CONCLUSION

The result of the study revealed that smallholder farmers do not have favorable perception regarding the effectiveness of agricultural extension agent in the area. A great proportion (89%) of the farmers perceived lack of regular contact with extension agents as a major challenge. Similarly, the majority of smallholders reported that extension services were not effective. The results of the chi-square analysis also showed that there was no statistical significant relationship between agricultural extension services and increase in crop production of the smallholder farmers. On the other hand, our results also revealed that radio is the most preferred source of agricultural information among the smallholder farmers in the area since extension services and delivery were not effective to meet their needs. On the contrary, extension agents suppose to be the best source of agricultural information and training for smallholders' participatory development, hence their credibility is very important for effective extension services. When smallholders have more regular contact with extension agents then they can get more timely and accurate information. However, the most significant of these problems ranked by the extension workers was the exceptionally low number of extension workers in the area, while inadequate ICT amenities and lack of incentives for field personnel were among the least important problems.

RECOMMENDATIONS

In view of the findings, the paper recommends that Government should employ more agricultural graduates' youths and train them. More extension workers need to be hired in order to significantly reduce the problem of the extension workers to farm families' ratio which is currently 1:3000 in the Kaduna State. Similarly, Federal Ministry of Agriculture should make an effort to provide additional funding support to Agricultural Development Programme for effectual extension services delivery to the rural farmers. Moreover, State Ministry of Agriculture can also improve the quality of extension services by conducting need assessment programme. Finally, Federal Government should support the development of other development partners that are involved in extension service delivery to rural farmers such as NGOs, private sectors, academia and farmer cooperative societies.

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