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LEAD FARMER EXTENSION APPROACH AND SUSTAINABLE EXTENSION SERVICE DELIVERY IN OYO STATE, NIGERIA *

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***Summary*:** Over the years, provision of extension and advisory services has been the main thrust of both the public and private extension services in Nigeria. Meanwhile, the lead farmer extension approach has been deployed for cost effectiveness, broader reach and sustainability. The utility value of this approach needs to be empirically established. This study therefore examined the extent to which the approach has achieved the intended objectives among randomly sampled maize farmers in Iseyin and Saki-West Local Government Areas (LGAs). Interview schedule and focus group discussion among farmer groups were used for the study. Lead farmer extension approach was cost and time effective vis-a-vis the number of farmers reached and the achieved outcome. Almost 70% of the lead farmers encountered late arrivals and impatience from group members during step-down training activities while all of them complained of insufficient funds for refreshment. About 65% of the farmers engaged in selective adoption of the training items owing to various reasons. There was also a significant difference between the knowledge level of the lead farmers and their respective group members while the group members' assessment of their respective lead farmers' performance was high. The study concluded that this extension approach was effective and could serve to complement the efforts of extension workers in the state.

Key words: *lead farmer extension approach, package of practice, maize farmers' groups.*

INTRODUCTION

Agricultural extension, according to Swanson and Claar (1984), is an on-going process of getting useful agricultural messages to farmers and assisting them to acquire the necessary knowledge, skills and attitudes to effectively utilise new information and technology. Agricultural extension services have been reduced in most developing countries, as posited by Isaac and Judith (2013), but competition for land and other crucial resources necessary for agricultural production is daily on the rise. As a result, it has become imperative to direct efforts towards increased productivity of farmers and not only towards increased production. However, adoption of improved technologies, such as improved seeds/cultivars, optimum use of fertiliser, and use of modern farming implements, is pivotal to achieving increased productivity. Smallholder farmers are therefore increasingly in need of effective extension services through which timely and relevant technologies could be disseminated to them. This is in consonance with Maunder (1973), who posits that agricultural extension is a service or system which assists farm

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people through educational procedures in improving farming methods and techniques, increasing production efficiency and income, and stimulating social and educational standards.

Agricultural extension was conceived originally as a service to "extend" research-based knowledge to the rural sector to improve the lives of farmers. It thus included components of technology transfer, broader rural development goals, management skills and non-formal education. The traditional view of extension in Africa was very much focused on increasing production, improving yields, training farmers and transferring technology. However, contemporary understanding of extension goes beyond technology transfer to facilitation, beyond training to learning and includes assisting farmer to form groups, dealing with marketing issues and partnering with a broad range of service providers and other agencies (Davis, 2008). It was in this vein that Birner et al. (2006) described agricultural extension to be evolving into a system that encompasses the entire set of institutions that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods and well-being rather than a top-down model of technology transfer.

According to Adebayo (2004), agricultural extension performs an important function worldwide in enhancing agricultural productivity. It is an applied and problem-solving science, and it generally engages evidence-based empiricism, action-research and participatory tools in developing theories, models and approaches. However, during the 1990s, economic and structural adjustment policies triggered government cut-backs in many countries that have led to a general crisis in public agricultural extension. GFRAS (2012) further corroborated this position by opining that nearly all governments invest in extension services, often with the help of donor funds and loans. Global public investments in extension were estimated at US$6 billion in 1988. But in subsequent decades, public investments have generally decreased. This is not unconnected with the recent food crisis, and concerns about the ability to meet the growing demand for agricultural products. Many private and third sector extension organisations have tried to fill the gap, however scarce resources and unfavourable policy environments kept challenging the effectiveness of their work. Remarking in a similar direction, Ladele (2015) posited that the current extension to farm family ratio of 1:3,000 in Nigeria is grossly inadequate. This further buttresses the challenge and confirms the need to urgently adopt strategies that could make up for the huge deficit in the number of extension workers on the field. It is important therefore that extension practitioners meet this challenge by fashioning approaches that will keep extension delivery efficient even in the context of many challenges to contend with.

One of such evolving approaches is the lead farmer extension approach. The lead farmer extension approach is an extension model wherein lead farmers from specific farmer groups are trained and technically empowered to disseminate the acquired technology to their peers using step-down trainings, field days on demonstration plots and other relevant methods. According to Isaac and Judith (2013), this model is now gaining wider acceptance even among several donor organisations. It is an extension approach that leverages on the multiplier effect derivable from the use of competent farmer group leaders tagged as lead farmers who are trained and given responsibility to step down the technology to their group peers. It is discovered that across Africa many extension agencies providing extension functions choose individual farmers to work with them in implementing their outreach programmes. Reasons for this include the ability to reach more farmers at less cost, the higher level of trust that farmers have in fellow farmers and the perceived enhanced sustainability of the approach. These selected farmers are referred to as model, master or lead farmers and are chosen based on their agricultural expertise among other factors. In other initiatives, they are called farmer promoters or trainers, emphasizing their networking or training skills. The lead farmer extension approach also known as farmer-to-farmer extension approach dates back at least to the 1950s, when it was used by the International Institute of Rural Reconstruction in the Philippines (Selener et al., 1997) and currently the approach has become quite common especially in Africa. For example, in Malawi a survey of 37 extension agencies found that 78 percent of the agencies used some form of farmer-to-farmer extension (Masangano and Mthinda, 2012). The Malawi Ministry of Agriculture alone works with more than 12,000 lead farmers. Similarly, in Nigeria the approach is gradually gaining increased attention and there is the need for it to be empirically reviewed.

The main objective of the study was to investigate the extent to which the lead farmer extension approach achieved the intended goals among maize farmers in Oyo state. The specific objectives of the study were to: describe the personal characteristics of maize farmers reached under the extension approach, determine the adoption level of the target farmers, determine the perceived competence level of the lead farmers and identify constraints faced by the lead farmers in their various step-down activities.

MATERIALS AND METHODS

The research design adopted for this study is participatory action research as well as a survey. The activities of this project, sponsored by USAID MARKETS II, NIGERIA, were carried out in 2014 and designed to increase productivity as well as follow through the maize value chain with clienteles from production to marketing. They were to be technically backstopped by using a specially designed maize package of practice which included training items such as farmland measurement techniques, modern land preparation, seed selection, planting practices, fertiliser application, pest management, weed management, harvesting, post-harvest management and farm records. Nonetheless, the focus of this paper was on the performance of this evolving extension approach.

Iseyin and Saki-West Local Government Areas (LGAs) were randomly selected from each of the two agricultural zones selected for the project. Each of these LGAs had a total of 20 maize lead farmers and 240 maize farmer group members. Data were collected from a sample of 108 maize farmers, and comprised of 38 lead farmers (19 from each LGA) and 70 group members (35 from each LGA) randomly selected from the list of farmer beneficiaries who were involved in the extension approach. Structured interview schedule and focus group discussion were used to obtain relevant data from the respondents. The data obtained were analysed using frequencies, percentages, means and pie charts, while t-test was used to measure the difference in the knowledge level between the lead farmers and their various group members.

Adoption level was determined by asking the respondents whether they adopted or did not adopt each of the 16 components of the package of practice disseminated to them. Each of the components adopted by the respondents was assigned a score of 1, while 0 was assigned if the components were not adopted by the respondents. The frequencies and percentages of the obtained responses were computed while the percentage adoption per component across respondents was analysed using a pie chart. The perceived competence of the lead farmers was determined by presenting competence statements to group members who received the training. This was measured on a five point Likert type scale of ‘Strongly Agreed’, ‘Agreed’, ‘Undecided’, ‘Disagreed’ and ‘Strongly Disagreed’ with scores of 5,4,3,2 and 1 assigned respectively for positive statements while the reverse was used for negative statements. The mean of group members’ perceived competence ratings was computed and used to categorise their ratings into high (≥ mean score) and low (< mean score) levels of perceived competence. Constraints faced by the lead farmers during step-down trainings were measured on a three point scale of ‘Severe’ (2), ‘Mild’ (1) and ‘Not a constraint’ (0). The obtained constraints scores were computed and the respondents’ mean scores were generated. These mean scores were then used to rank constraints faced by the lead farmers in their order of severity.

RESULTS AND DISCUSSION

The project was implemented in 2 agricultural zones in the state (Oyo and Saki), in which 2 and 4 LGAs were selected respectively. This selection of LGAs was done in accordance with their comparative advantages in maize cultivation. Two lead farmers were nominated per group which gave a total of 20 lead farmers from each LGA and 120 lead farmers in all. Using the lead farmer extension approach within one year of implementation, the project was able to train 1,500 maize farmers who were organised into 60 groups of 25 members in maize production technology following the specially designed package of practice (POP).

Training on the POP items was given to the lead farmers (two per group) by Pricewell’s technical experts while these lead farmers were instructed to step-down the training to their fellow group members during group meetings in their various localities. Pricewell used 4 technical experts in collaboration with 3 public extension personnel from Oyo State Agricultural Development Programme for these activities. Furthermore, field days for group members were organised on the farms of the lead farmers where the technology was properly implemented to enhance better understanding and increase rate of adoption. All through these stages however, facilitators under the project were playing supervisory roles to ensure that activities were carried out as designed. Figures 1 and 2 show some of the training sessions under the extension approach.

Fig.1: A training session for lead farmers
Source: USAID MARKETS II

Fig.2: Practice on fertiliser application
Source: USAID MARKETS II

One of the critical steps in the practice of the lead farmer extension model is the right selection of lead farmers. They serve as channels through which technologies are disseminated to appropriate target audience; therefore, wrong selection of lead farmers could mar all efforts invested into the model. So as to avoid the possibility of wrong selection, a participatory approach was used, whereby the farmer group members themselves are allowed to select lead farmers to represent them. This did engender a warm acceptance of the leadership and a good level of trust from all the group members.

However, the emphasis was on the facilitators' inputs in form of guidance referring to the basic qualities that the lead farmers must possess. These qualities, which are similar to those referred to by authors such as Isaac and Judith (2013), Franzel, Sinja and Simpson (2014) and Kaila, Tchuwa, Franzel and Simpson (2015), included: (i) Innovativeness, (ii) Good leadership qualities, (iii) Honesty, (iv) Ability to read and write, (v) A group membership (vi), Residence in the locality, (vii) Owning a farm and willingness to practice the technology in front of others, (viii) Financial strength, (ix) Mental alertness and (x) Good communication skills. Farmer groups were encouraged to select females as well as males for the purpose of gender balancing. Figures 3 and 4 show a male and female lead farmer addressing other group members during field days.

Fig.3: A female lead farmer with other farmers
Source: USAID MARKETS II

Fig.4: A male lead farmer with other farmers
Source: USAID MARKETS II

The personal characteristics of the respondents are presented in Table 1, which reveals that the mean age of the respondents was 44.2. This implies that most of the respondents were still in their active years and it is in consonance with the findings of Tijani and Mudashir (2013), who reported crop farmers in Oyo state to be either young or middle-aged and in their active years. The table further revealed that 74.1% of the respondents were males while 25.6% of them were females, implying that the farming population in the study area is still male-dominated. This result likewise corroborates the findings of Yekinni and Oguntade (2012) about crop farmers in Ogbomoso agricultural zone of Oyo state, which was found to be male-dominated. Most (43.5%) of the respondents had primary education while 36.1% had secondary education. This implies that most of the respondents to some extent were literate which could help them to easily adopt innovations. This is in line with the findings of Ebewore (2013) on cocoa farmers in Edo and Ondo States of Nigeria, who reported a positive influence of the farmers' literacy level to the adoption of technologies in cocoa production.

Table 1: Personal characteristics of the respondents

Variable	Frequency	Percentage	Mean	SD
Age				
24-31	5	4.6		
32-39	25	23.1		
40-47	45	41.7	44.2	7.9
48-55	26	24.1		
56-63	6	5.6		
64-71	1	0.9		
Sex				
Male	80	74.1		
Female	28	25.6		
Marital status				
Single	4	3.7		
Married	104	96.3		
Household size				
5-6	26	24.1		
7-8	57	52.8	7.3	1.3
9-10	25	23.1		
Level of education				
No formal education	15	13.9		
Primary education	47	43.5		

Secondary education	39	36.1		
NCE	6	5.6		
Polytechnic	1	0.9		
Religion				
Christianity	38	35.2		
Islam	70	64.8		
Membership of association				
Yes	108	100		
Farming experience				
14-22	30	27.7		
23-31	37	34.3		
32-40	34	31.5	28.9	8.9
41-49	5	4.6		
50-58	2	1.9		
Land owned status				
Inherited	108	100		

Source: Field survey, 2016.

There were 16 components of training from the package of practice for the farmers, and the components were itemised and the respondents were asked about the components they adopted or did not adopt and the reasons explaining their actions. Figure 5 reveals that pre-emergence herbicide application, timely weeding, timely harvesting, mechanical shelling, winnowing and bagging were the most adopted components of the disseminated technology as 100% of the respondents adopted them. This is because these operations were quite compatible with what farmers were used to, so adoption was possible with little improvement on what they normally do. This field reality points to the principle of compatibility in technology transfer implying that an innovation that is more consistent with the existing cultural values, norms and experiences of clienteles will be better adopted.

However, operations such as use of a spraying kit and timely application of the 2nd dose of fertiliser 6-8 weeks after planting were least adopted, as the respondents were not familiar with the use of a spraying kit and were unwilling to pick its cost. Poor planning was also responsible for failure to apply or untimely application of the 2nd dose of fertiliser as farmers often concentrate attention on the 1st application and devote less attention to acquiring inputs for the 2nd dose application. This implies that the farmers engaged in selective adoption of the technology components disseminated through the lead farmer extension approach in the study area. This is in consonance with other studies on adoption of innovation among smallholder farmers. More often than not, when smallholders are not fully bank-rolled and backstopped with necessary implements, they resort to selective adoption on account of various constraints such as insufficient funds, lack of appropriate implements, complexity of technology and others. Nkeme et al. (2009) discovered a similar result of selective adoption among fish processors from their study on the determinants of adoption of chorkor smoker kiln technology in Akwa-Ibom state. The implication of this selective adoption was that farmers were unable to attain the optimum yield target, even though they had a significant increase in their current yield compared to what they previously obtained. To improve the performance of this extension approach, the technology components that received poor adoption need to be examined vis-à-vis the farmers' complaints and repackaged to aid total adoption of the package of technology.

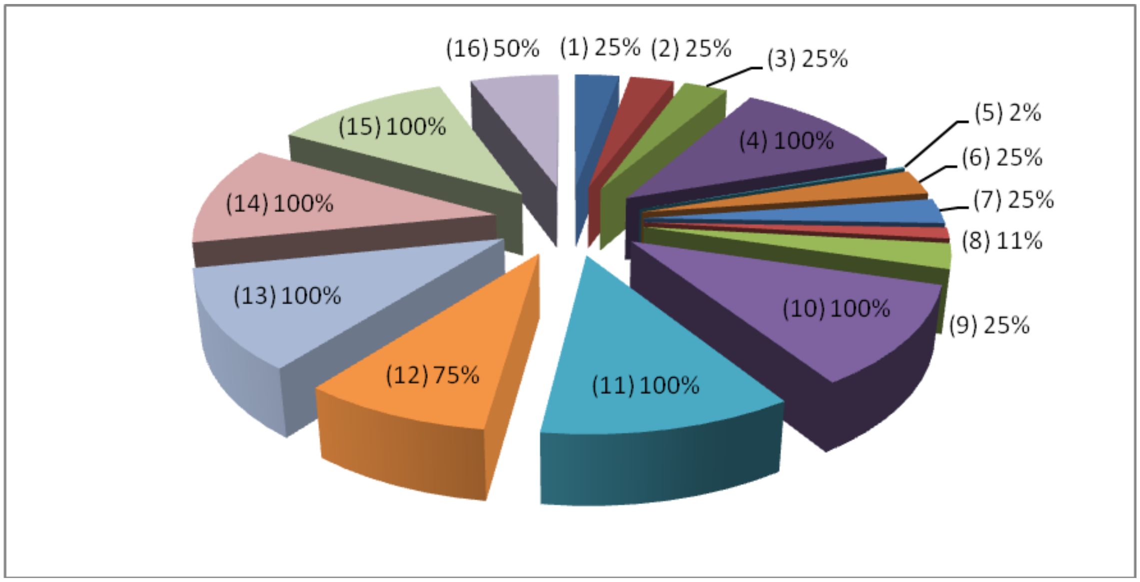

Figure 5: Adoption levels of respondents

1= Ploughing practice; 2= Planting spacing; 3= Seed per hole; 4= Pre-emergence herbicide; 5= Spraying kit; 6= Plant per stand; 7=1st dose fertiliser 2 weeks after planting; 8=2nd dose fertiliser 6-8 weeks after planting; 9= Cola-cola bottle cap full of fertiliser per stand; 10= Timely weeding; 11= Timely harvesting; 12= Storage in cribs/silo; 13= Mechanical shelling; 14= Winnowing; 15= Bagging; 16= Storage.

Table 2 shows how members from various farmer groups perceived their lead farmers' competence concerning their training task based on different competence quality check statements. The responses obtained from group members were further categorised (Table 3). The minimum and maximum scores were 25.0 and 30.0 respectively, while the mean was 27.0. According to Table 3, most group members (78.6%) rated the competence of their lead farmers high. This rating is relative to their previous experiences either with extension workers or other development workers. This implies that rightly selected lead farmers with required qualities could perform very well in technology dissemination among their peers.

Table 2: Perceived competence of lead farmers

Statements of perceived competence	**Strongly Agreed**	**Agreed**	**Undecided**	**Disagreed**	**Strongly Disagreed**
Lead farmers were versed in the contents of training	25.0	75.0	-	-	-
Lead farmers could not recollect well the contents of training	-	-	-	75.0	25.0
Lead farmers could not handle all questions and were pushing some to facilitators	-	-	25.0	75.0	-
Lead farmers were weak to control the group during step-down training	-	-	25.0	75.0	-
Step-down trainings appeared boring	-	-	25.0	75.0	-
Virtually nothing new was gained during step-down trainings	-	-	-	75.0	25.0
Lead farmers demonstrated effective teaching methods during step-down trainings	-	75.0	-	25.0	-

Source: Field survey, 2016.

Table 3: Perception categories of respondents on lead farmers competence

Perceived competence	Frequency	Percentage	Min. score	Max. score	Mean
Low	15	21.4			
High	55	78.6	25.0	30.0	27.0
Total	70	100.0			

Source: Field survey, 2016.

Table 4 reveals that the constraint ranked first was insufficient funds during step-down trainings. This implies that the respondents expected financial support for their step-down trainings beyond what was provided. The constraints that were ranked second (in ties) such as impatience, late arrival and poor attendance were all associated with the farmers' disposition to the step-down training events. This shows that the farmers need to be motivated further using some strategies and incentives to encourage better participation at the step-down level.

***Table 4*:** Constraints faced by lead farmers during step-down trainings

Constraints	Severe		Mild		Not a constraint		Mean	Rank
	f	%	f	%	f	%		
Difficulties in fixing a meeting for step-down trainings	-	-	26	68.4	12	31.6	1.68	6th
Poor attendance during step-down trainings	26	68.4	12	31.6	-	-	2.68	2nd
Arguments on components of training during step-down trainings	-	-	38	100.0	-	-	2.00	5th
Impatience from group members during step-down trainings	26	68.4	12	31.6	-	-	2.68	2nd
Insufficient funds for refreshment during step-down trainings	38	100.0	-	-	-	-	3.00	1st
Lack of space to accommodate all group members during step-down training	-	-	12	31.6	26	68.4	1.32	7th
Eventualities affecting step-down trainings	-	-	-	-	38	100.0	1.00	8th
Late arrival of group members	26	68.4	12	31.6	-	-	2.68	2nd
Distance of meeting place to group members	-	-	12	31.6	26	68.4	1.32	7th
Insufficient teaching aids to explain training items during step-down trainings	-	-	-	-	38	100.0	1.00	8th
Absence of facilitators to supervise during step-down trainings	-	-	12	31.6	26	68.4	1.32	7th

Source: Field survey, 2016.

As revealed in Table 5, the t-test analysis showing the difference in the knowledge levels between the lead farmers and group members indicated a significant difference. This implies that the lead farmers had a higher knowledge level than their respective group members. The lead farmers had first-hand training under a technical expert and subsequently went to train their various group members; they were further obligated to establish demonstration plots on their own fields. These exposures equipped the lead farmers better than the group members and invariably translated them to a higher knowledge level.

Table 5: T-test showing the difference in the knowledge of lead farmers and group members

Variables	Mean	SD	Mean difference	T	Sig
Lead farmers	78.9474	1.41321	3.00451	9.134	0.003
Group members	75.9429	3.00186			

Source: Field survey, 2016.

CONCLUSION

The lead farmer extension approach has been proven to be cost effective with broader reach among grassroots farmers, as 1,500 maize farmers were trained in just a year using only 4 technical experts and 3 public extension personnel. The lead farmers under the project were also found to possess desirable qualities as they were rated to be highly competent by their various group members. This was further confirmed by their level of knowledge on the technology which significantly differed from group members' because of the first-hand information they obtained from technical experts. Group members however engaged in selective adoption of the technology components disseminated to them owing to reasons such as inadequate funds, sharp departure from familiar farming operations and tediousness of operations.

The study therefore recommended that technologies to be disseminated to farmers should be as much as possible compatible with their current farming operations to aid full adoption. Facilitators of a project that intend using the lead farmer extension approach should plan to support beneficiaries financially as motivation during step-down activities. Strategies such as a reward and sanction system that will motivate farmers on punctuality and regular attendance should be adopted. The dwindling public extension system should adopt this approach and improve it to make up for the huge deficit in extension personnel in the state.

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