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ASSESSMENT OF THE LINKAGE OPTIONS OF EXTENSION PRACTITIONERS IN RESEARCH-EXTENSION-FARMERS-INPUT LINKAGE SYSTEM IN NIGERIA

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ABSTRACT

Effective linkage between extension practitioners and other stakeholders in the Research Extension Farmers Input linkage System (REFILS) is germane to increased agricultural productivity. Hence, the present study assessed the linkage methods of extension practitioners in Research –Extension –Farmers –Input linkage system in Nigeria. Seventy one (71) extension practitioners were randomly selected through a multi-stage sampling procedure and well structured questionnaire was used to elicit data which were analyzed using descriptive and inferential statistic. Results indicated that the mean age of respondents was 43.8 years, majority were male (71.8%), married (91.9%) and possessed HND/PGD (63.4%).The respondents' linkage option was high (60%) and the training program (mean = 2.54) ranked first among the list of the linkage options used by the respondents . There was a significant difference in the linkage options of the extension practitioners across the zones (F = 6.07, P = 0. 000) . It was concluded that extension practitioners utilized different linkage methods to interact with other stakeholders in REFILS and the need to intensify efforts on the linkage system with farmers in order to increase the rate of technologies dissemination was recommended.

Keywords: REFILS, MTRM, cost-effective, linkage.

INTRODUCTION

Research Extension Farmers Input linkage System (REFILS) is defined as the interplay of research, extension, farmers and input supply agencies in a cost-effective manner aimed at rapidly increasing agricultural production and productivity of resource-poor farmers (Adebowale and Amusat, 2005). The REFILS represents the framework of the coordination of research and extension activities in all agricultural zones of the country. Major REFILS activities under the framework are; conduct of diagnostic survey, monthly technology review meetings, fortnightly training of extension personnel, On Farm Adaptive Research and core extension activities through media like demonstrations such as Small Plot Adoption Technique, Management Training Plots (MTP), extension publications and annual REFILS workshops.

According to Kolo (2012), REFILS consist of four major components for effective and successful agricultural production and the linkage mechanism *viz*:

a) R- research –to generate technologies
b) E- extension – to disseminate technologies to farmers
c) F- farmers –to embrace adoption
I- input – (agencies) – provide inputs
d) L- linkage – (Communication) for success and sustainability.

The target of REFILS is the small scale resource poor farmers who produce 90 percent of the food eaten in the country (Ogunbodede, 2011). Arokoyo (2019) asserted that the rationale for REFILS is to link the various components in order to create a flow of information from research to farmers so as to address the problem of incessant low productivity in agriculture. The extension component of the agricultural system is generally referred to as the "King Pin" in the entire mechanism of agricultural development strategy (Oni, 2004).

The REFILS was initiated in order to minimize identified constraints such as linear information flow, basic and upstream research, low adoption of technology, technology development without farmers' involvement and lack of feedback from farmers to research which affect effective research extension farmers' linkages among others in the country (Tologbonse, 2012). Also to bring all the key stakeholders in agriculture together in participatory technology development, adaptation, dissemination and utilization of sustainable agricultural development.

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The National Agricultural Research Extension System (NARES) has been plagued by a weak, dysfunctional and uncoordinated REFILS which may mar the ultimate aim of agricultural extension delivery to farmers. Extension services are important elements with the array of market and non-market entities and extension agents provide human capital, enhancing inputs as well as flow of information that can improve farmers and other rural people welfare. According to Qamar (2005), services that are not related to farm activity such as health, nutrition and home economics are also being provided by extension. According to Agbamu (2005), extension is concerned with the three basic tasks of dissemination of appropriate information, practical application and helping people to use information appropriately.

Agricultural extension service has been providing the vital link between research and farmers (Sanyaolu, 2008). Among the key personal qualities for extension workers are commitment to extension work, reliability, humility in his work with farmers and confidence in his own abilities and determination to achieve something (FAO, 2019). Therefore to bridge the gap between findings of researchers and growing information and knowledge needs of the farmers; extension is important. Unfortunately, agricultural extension is bedeviled in Nigeria with ineffective linkage and as such confronted with poor feedback from farmers to researchers. This situation must not persist, as such appreciable measures need to be taken to improve extension component on one hand and bridge the gap between extension and farmers on the other.

The concept of linkage implies the communication and working relationship established between two or more organizations pursuing commonly shared objectives in order to have regular contact and improved productivity. Havelock (1986) contended that linkage is a term used to indicate that two systems are connected by message so as to form a greater system. He argued that if barriers between two systems are permeable enough for messages and responses to flow in and out of the other, then a link has been created between the two. According to Arokoyo (2019), experience has clearly shown that sustainable agricultural development cannot be achieved without strong and sustained linkages between research , extension ,farmers and the private sectors (Input supply, financing and marketing).

The REFILS concept was introduced in 1994 by the World Bank assisted National Agricultural Research Project (NARP) to all National Agricultural Research Institutes (NARIs) in order to ensure effective agricultural research and extension services in Nigeria (Unnama, 2001) and in a way forms the backbone of the extension through effective linkage with farmers in order to find solutions to his problems.

According to Oyebanji (2012) with the REFILS under operation in Nigeria, farmers are expected to fully participate in planning, execution and selection of technologies relevant to them by serving as a major source of field/research problem identification, diagnosis and prioritization (e.g. via group interviews and provision of information on indigenous knowledge systems), serving as key actors in proffering possible solutions to identified field problems and constraints and being consulted before finalization of trial designs and conduct by OFAR team.

If there is ineffective linkage or low use of the available linkage options among the extension practitioners , all these would remain a mirage. Hence, the assessment of the available linkage options among extension practitioners in Research –Extension –Farmers –Input Linkage System in Nigeria.

The broad objective is to assess the linkage options employed by extension practitioners in Research – Extension - Farmers – Input linkage System in Nigeria while the specific objectives were to: describe the personal characteristics of the respondents, determine the available linkage options of the respondents assess the level of use of the linkage options in the different agricultural zones.

MATERIALS AND METHODS

Methodology

The study area is Nigeria with an area of 923,770 Km^2 and lies between latitudes 4^0 and 14^0 north of the equator and longtitudes 3^0 and 14^0 east of the Greenwich meridian (Nworgu, 2006). The population of the study consists of all extension practitioners in the agricultural development programs of Nigeria. The country has 6 agricultural zones out of which 3 zones (Northwest, Northcentral and Southwest) were purposively selected based on effectiveness of REFILS in the zones.. 3 states (Kaduna, Niger and Oyo states) where the coordinating research institutes for REFILS were domiciled in the three zones were also purposively selected. Twenty percent (20%) of the extension practitioners in the sampled states (28 ,15 and 28 from Niger, Oyo and Kaduna states, respectively) were also randomly sampled to give a total of 71 extension practitioners used for the study. Data were collected through a well structured questionnaire and analyzed using descriptive (frequency counts, means and percentages) and inferential statistic (ANOVA). The extension practitioners were asked to indicate their linkage options with farmers from the listed options through Yes or No and scores were assigned respectively. Respondents were later asked to indicate the extent to which they use the listed options through a 3 point scale of large extent, less extent and not at all. Scores were

assigned respectively and the means were later used to categories respondents into high and low.

Hypothesis of the study

There is no significant difference in the linkage options used by extension practitioners in REFILS across the zones.

RESULTS AND DISCUSSION

Distribution of respondents based on personal characteristics

The data on extension practitioners' age shows that the highest percentage of the respondents in the Northwest (46.4%), Northcentral (67.9%) and majority in Southwest (86.7%) were between 30-39 years, 40-49 years and 50-59 years, respectively. However, across the study area, less than half (40.8%) of the extension practitioners' age fell between 40-49 years with the mean age of 43.8±5.8 years. This infers that most of the practitioners are still in their active age except in the Southwest where most of the extension agents are on the verge of retirements. This is similar to the finding of Yekinni (2010), who reported the mean age of 42.8 years for extension practitioners in Nigeria. The distribution of extension practitioners by sex reveals that majority (71.8%) were male, while (28.2%) were female. This means that most of the extension practitioners were male. This may be due to the itinerant nature of extension work which requires that the personnel move about the different villages within their cells on motorcycle. This finding is consistent with Alao (2004) and Olajide and Amusat (2013) who reported male domination of the extension personnel in the country. Table 1 reveals that 91.5% of the extension practitioners in the study area were married. This reveals that most of the practitioners were married. This is in line with Sulaiman *et al*. (2015) who also found that 91.9% of the extension practitioners in the national agricultural extension system were married. The data reveals that majority (60.7%) of the respondents in the Northwest had below 10 years of working experience, while the highest percentage (46.4 %) and (80.0 %) had between 22-27 years of working experience in Northcentral and Southwest respectively. It can be inferred here that extension practitioners in the Northwest were younger and were of less experience than the practitioners in the Southwest and Northcentral. The data on extension practitioners academic qualifications reveals that majority of the practitioners in the Northwest (82.2%) and Northcentral (64.2%) had HND/PGD ,while about one third in the Southwest (33.3%) possessed B.Sc. and M.Sc., respectively. One respondent (6.7%) in the Southwest had PhD. However, majority of the respondents across the zones had HND/PGD certificates. The implication of this finding is that majority of the extension practitioners had pre-requisite qualifications and should be able to act as the bridge between researchers and end users of research result. This finding is in tandem with that of Yekinni (2010), who reported that most of the extension practitioners in Nigeria had diploma certificates.

Extension practitioners' linkage options with farmers

Table 2 reveals that majority of the extension practitioners in the Northwest indicated that they always link or disseminate information to farmers through workshops (100%), joint field visits (96.0%) and field demonstration (SPAT/MTP) (96.0%), while majority in the Northcentral agreed that they used MTRM (89.3%), training program (78.6%) and field demonstration (75.0%). In the same vein, the extension practitioners in the Southwest always link farmers through MTRM (86.7%), field demonstration (86.7%) and seminar (80.0%). The findings above reveal that extension practitioners in the study area were involved in interpersonal/group communication. According to Oyebanji (2012), when an extension worker communicates one on one with farmers or delivers a lecture to a group of farmers, he is actually involved in interpersonal/group communication.

Among media of mass communication used by extension practitioners like radio, ICT /internet, print and television for communicating or linking up with end users of research results, radio (57.7%) was mostly used across the zones. This finding is supported by Sulaiman *et al*. (2015), who reported that most extension organizations use radio to disseminate information to farmers. Radio could be used as a complement to extension agents whose populations are getting dwindled on the field. This is corroborated by Ifejika *et al*. (2019) who asserted that extension agents are decreasing on the field and being over labored and unequipped to reach out to millions of men, women and youth attracted to modern agricultural business in Nigeria.

Extension practitioners' extent of using the linkage options

Table 3 reveals that training program (2.54±0.65), radio (2.53 ±0.65) and workshop (2.40 ±0.80) ranked 1st, 2nd and 3rd, respectively among the linkage methods that the extension practitioners used to link up with farmers to a large extent. It can be deduced here that training program, radio and workshop are veritable tools through which extension personnel disseminates innovations on maize production to farmers. According to Rachael and Abiodun (2019) extension practitioners should also try to utilize ICT for agricultural information since farmers can now access the information on their mobile phones.

Table 1. Distribution of extension practitioners' personal characteristics.

Variable	NW (n=28)		NC (n=28)		SW (n=15)		Total =71	
Age	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
30 – 39	13	46.4	8	28.6	2	13.3	23	32.4
40 – 49	10	35.7	19	67.9	-	0.0	29	40.8
50 – 59	4	14.3	1	3.6	13	86.7	18	25.4
> 59	1	3.6	-	0.0	-	0.0	1	1.4
Mean age	41.8±5.8		45.9±6.5		51.1±6.3		43.8±7.4	
Total	28	100.0	28	100.0	15	100.0	71	100.0
Sex								
Male	21	75.0	22	78.6	8	53.3	51	71.8
Female	7	25.0	6	21.4	7	46.7	20	28.2
Total	28	100.0	28	100.0	15	100.0	71	100.0
Marital Status								
Married	25	89.3	26	92.9	14	93.3	65	91.5
Single	2	7.1	1	3.6	-	0.0	3	4.3
Divorced	-	0.0	1	3.6	1	6.7	2	2.8
Widowed	1	3.6	-	0.0	-	0.0	1	1.4
Total	28	100.0	28	100.0	15	100.0	71	100.0
Years in service								
< 10 years	17	60.7	-	0.0	-	0.0	17	23.9
10 – 15 years	6	21.4	4	14.3	1	6.7	11	15.5
16 – 21 years	2	7.1	11	39.3	1	6.7	14	19.7
22 – 27 years	1	3.6	13	46.4	12	80.0	26	36.7
> 28 years	2	7.1	-	0.0	1	6.7	3	4.2
Mean								
Total	28	100.0	28	100.0	15	100.0	71	100.0
Academic qualifications								
NCE	1	3.6	-	0.0	-	0.0	1	1.4
HND/PGD	23	82.2	18	64.2	4	26.7	45	63.4
BSc	4	14.3	8	28.6	5	33.3	17	23.9
MSc	-	0.0	2	7.2	5	33.3	7	9.9
PhD	-	0.0	-	0.0	1	6.7	1	1.4
Total	28	100.0	28	100.0	15	100.0	71	100.0

Source: Field survey, 2015

Table 2. Distribution of extension practitioners according to their linkage options with farmers on REFILS.

Variable	North West (n = 28)		North Central (n = 28)		South West (n = 15)		Total n = 71	
Linkage options	Yes %	Rank	Yes %	Rank	Yes %	Rank	Yes %	Rank
Formal meeting	5		-		-		5	
	(17.9)	14th	(0.0)	14th	(0.0)	14th	(7.0)	14th
MTRM	14		25		13		52	
	(50.0)	9th	(89.3)	1st	(86.7)	1st	(73.2)	3rd
Workshop	28		12		10		50	
	(100.0)	1st	(42.9)	5th	(66.7)	7th	(70.4)	5th
Seminar	26		4		12		42	
	(92.9)	4th	(14.3)	11th	(80.0)	3rd	(59.1)	7th
Exhibition	21		1		11		33	
	(75.0)	6th	(3.6)	13th	(73.3)	4th	(46.5)	10th
Farm/Home visit	16		19		11		46	
	(57.1)	7th	(67.9)	4th	(73.3)	4th	(64.7)	6th
Committee membership	8		10		5		23	
	(28.6)	13th	(35.7)	10th	(33.3)	13th	(32.3)	13th
Joint field visit	27		15		11		53	
	(96.4)	2nd	(53.6)	5th	(73.3)	4th	(74.6)	2nd
Training program	22		22		8		52	
	(78.6)	5th	(78.6)	1st	(53.3)	10th	(73.2)	3rd
Field demonstration (SPAT/MTP)	27		21		13		61	
	(96.4)	2nd	(75.0)	3rd	(86.7)	1st	(85.9)	1st
ICT / Internet	14		14		10		38	
	(50.0)	9th	(50.0)	7th	(66.7)	7th	(53.5)	9th
Radio	16		15		10		41	
	(57.1)	7th	(53.6)	5th	(66.7)	1st	(57.5)	8th
Television	13		3		8		24	
	(46.4)	11th	(10.7)	11th	(53.3)	10th	(33.8)	12th
Print	10		12		8		30	
	(35.7)	12th	(42.9)	7th	(53.3)	10th	(42.2)	11th

Figures in parentheses are percentages.
Source: Field survey, 2015

Table 3. Distribution of extension practitioners' extent of using the linkage options.

Linkage options	North West (n = 28) Yes/%	Large Ext	Mod. Ext	Less Ext.	Mean	Rank	North Central (n = 28) Yes/%	Large Ext	Mod. Ext	Less Ext.	Mean	Rank	South West (n = 15) Yes/%	Large Ext	Mod. Ext	Less Ext.	Mean	Rank	Total n = 71 Yes/%	Large Ext	Mod. Ext	Less Ext.	Mean	Rank
Formal Meeting	25	17 (60.7)	4 (14.3)	4 (14.3)	2.25 ± 1.07	9th	27	12 (42.9)	15 (53.6)	- (0.0)	2.35 ± 0-.67	3rd	15 (100)	6 (40.0)	3 (20.0)	6 (40.0)	2.00 ± 0.92	12th	67	35 (49.3)	22 (31.0)	10 (14.1)	2.23 ± 0.95	9th
MTRM	26	17 (60.7)	6 (21.4)	3 (10.7)	2.35 ± 0.95	7th	27	12 (42.9)	15 (53.6)	- (0.0)	2.35 ± 0-.67	3rd	14	6 (40.0)	3 (20.0)	5 (33.3)	1.93 ± 1.03	14th	67	35 (49.3)	24 (33.8)	8 (11.3)	2.26 ± 0.87	6th
Workshop	28	21 (75,0)	4 (14.3)	3 (10.7)	2.64 ± 0.67	2nd	26	13 (46.4)	8 (28.6)	5 (17.9)	2.14± 0.76	8th	15	8 (53.3)	7 (46.7)	- (0.0)	2.53± 0.51	4th	69	42 (59.2)	19 (29.6)	8 (11.3)	2.40 ± 0.80	3rd
Seminar	28	21 (75.0)	4 (14.3)	3 (10.7)	2.64± 0.67	2nd	26	13 (46.4)	8 (28.6)	- (0.0)	2.07 ± 0.37	9th	14	9 (60.0)	3 (20.0)	2 (13.3)	2.33 ± 0.79	9th	68	28 (39.4)	36 (50.7)	3 (4.2)	2.25 ± 0.75	7th
Exhibition	28 (100)	16 (57.1)	11 (39.3)	1 (3.6)	2.53 ± 0.57	4th	28 (100)	1 (3.6)	25 (89.3)	2 (7.1)	1.96 ± 0.33	10t h	14	6 (40.0)	8 (53.3)	- (0.0)	2.26 ± 0.79	9th	67	23 (32.4)	44 (62.0)	- (0.0)	2.25 ± 0.60	7th
Home/farm visit	28 (100)	7 (25.0)	18 (64.3)	3 (10.7)	2.14 ± 0.59	10th	28 (100)	- (0.0)	18 (64.3)	10 (35.7)	1.64 ± 0.48	11th	15 (100)	6 (40.0)	7 (46.7)	2 (13.3)	2.26 ± 0.70	9th	71 (100)	13 (18.3)	43 (60.6)	15 (21.1)	0.97 ± 0.63	11th
Committee membership	28 (100)	4 (14.3)	20 (71.4)	4 (14.3)	2.00 ± 0.54	11th	25	- (0.0)	12 (42.9)	13 (46.4)	1.32 ± 0.66	13th	15 (1oo)	6 (40.0)	9 (60.0)	- (0.0)	2.40 ± 0.50	7th	68	10 (14.1)	41 (57.7)	17 (23.9))	1.81 ± 0.72	13th
Joint field visit	25	7 (25.0)	15 (53.6)	3 (10.7)	1.92 ± 0.89	13th	25	7 (25.0)	5 (17.9)	13 (46.4)	1.57 ± 0.99	12th	15 (100)	8 (53.3)	6 (40.0)	1 (6.7)	2.46 ± 0.63	5th	65	22 (31.0)	26 (36.6)	17 (23.9)	1.90 ± 0.11	12th
Training program	28 (100)	20 (71.4)	7 (25.0)	1 (3.6)	2.67 ± 0.54	1st	27	13 (46.4)	12 (42.9)	2 (7.1)	2.32 ± 0.77	5th	15 (100)	11 (73.3)	4 (26.7)	- (0.0)	2.73 ± 0.45	1st	70	44 (62.0)	23 (32.4)	3 (4.2)	2.54 ± 0.65	1st
Field demonstration (SPAT/MTP)	28 (100)	5 (17.9)	18 (64.3)	5 (17.9)	2.00 ± 0.60	11th	28 (100)	13 (46.4)	9 (32.1)	6 (21.4)	2.25 ± 0.79	6th	15 (100)	6 (40.0)	7 (46.7)	2 (13.3)	2.26 ± 0.70	9th	71 (100)	24 (33.8)	34 (47.9)	13 (18.3)	2.15 ± 0.71	10th
Radio	28 (100)	19 (67.9)	6 (21.4)	3 (10.7)	2.57 ± 0.69	3rd	28 (100)	14 (50.0	13 (46.4)	1 (3.6)	2.46 ± 0.57	1st	15 (100)	11 (73.3)	2 (13.3)	2 (13.3)	2.60 ± 0.73	2nd	71 (100)	44 (62.0)	21 (29.6)	6 (8.5)	2.53 ± 0.65	2nd
ICT/Internet	28 (100)	19 (67.9)	6 (21.4)	3 (10.7)	2.57 ± 0.69	5th	28 (100)	12 (42.9)	11 (39.3)	5 (17.9)	2.25 ± 0.75	6th	15 (100)	9 (60.0)	6 (40.0)	- (0.0)	2.60 ± 0.50	2nd	71 (100)	38 (53.5)	23 (32.4)	10 (14.1)	2.39 ± 0.72	4th
Television	27	18 (64,3)	3 (10.7)	6 (21.4)	2.35 ± 0.95	7th	27	13 (46.4)	14 (50.0)	- (0.0)	2.39 ± 0.68	2nd	14	9 (60.0)	1 (6.7)	4 (26.7)	220 ± 1.08	8th	68	40 (56.3)	18 (25.4)	10 (14.1)	2.33 ± 0.87	5th
Print	22	2 (7.1)	11 (39.3)	9 (32.1)	1.32 ± 0.63	14th	23	1 (3.6)	6 (21.4)	16 (57.1)	1.10 ± 0.73	14th	15 (100)	8 (53.3)	6 (40.0)	1 (6.7)	2.46 ± 0.53	5th	60	11 (15.5)	23 (32.4)	26 (36.6)	1.43 ± 0.93	14th

Figures in parentheses are percentages Source: Field survey, 2015

Extension practitioners' level of using the linkage options

As revealed in Table 4, extent of using the linkage options among the extension practitioners was generally high (60.6%). However, the disaggregated data shows that the extent of using the linkage option among extension practitioners was low in Southwest (53.3%) and high in Northwest (71.4%) and Northcentral (60.7%), respectively. This implies that the linkage options were less used by extension practitioners in Southwest than the other zones. This is not surprising as the Agricultural Development Programs in the Southwest seems to be less funded compared to the ADPs in the other zones (Oluwatosin, 2015).

Table 4. Extension practitioners' level of using the linkage options.

	Northwest (n = 28)		North Central (n = 28)		Southwest (n = 15)		Total (n = 71)	
Linkage Options	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
High	20	71.4	17	60.7	7	46.7	43	60.6
Low	8	28.6	11	39.3	8	53.3	28	39.4
Total	28	100.0	28	100.0	15	100.0	71	100.0
Mean± SD		31.6±4.9		33.0±4.5		28.2±5.8		30.5±5.5

Sources: Field survey, 2015

Hypotheses

Table 5 shows that there was a significant difference in the linkage options of the extension practitioners in the study area (F = 6.07, P = 0. 000).This infers that the methods by which the extension practitioners connect with maize farmers in each zone differs. The type of linkage options used by extension practitioners in each zone may depend on the available methods, costs and the population of farmers and other stakeholders dealing with.

Table 5. Difference in linkage options among extension practitioners in REFILS across zones.

Variable	Sum of Squares	Df	Mean squares	F	Sig
Between group	307.725	2	153.86	6.07	0.00
Within group	1724.162	68	25.36		
Total					

Post hoc (DMRT)

The result of the Duncan test on Table 6 shows that linkage options of the extension practitioners significantly differ from those of the Northcentral. This result suggests that extension practitioners in Northwest zone with the highest mean (19.55) had the best linkage with maize farmers .

Table 6. Post hoc (DMRT).

Zones	Frequency	Mean	Duncan	Group
Southwest	28	14.79	A	1
Northcentral	28	18.71	B	2
Northwest	15	19.53	C	2

CONCLUSION AND RECOMMENDATIONS

The findings of the study show that different methods were being used by extension practitioners to link up with other stakeholders in REFILS continuum and the most common methods in the study area are joint field visit, field demonstrations and MTRM. Radio was the most common method of linkage used among media of mass communication. Extension practitioners in the Southwest zone used the least linkage options among the zones studied. There was a significant difference in the linkage options of the extension practitioners in the study area.

Based on the findings of this study, the following recommendations are proffered.

Extension practitioners need to intensify their efforts on the linkage system with farmers in order to increase the rate of technologies dissemination. The use of Information Communication Technologies (ICT) such as mobile phone should be embraced by the change agents because of its numerous advantages .Extension practitioners in the Southwest zone need to step up their linkage activities with farmers in the zone with a view to rapidly improve the dissemination and adoption of modern system of farming.

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