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ASSESSMENT OF AGRICULTURAL EXTENSION WORKER'S PERFORMANCE DURING THE COVID-19 PANDEMIC IN AKWA IBOM STATE, NIGERIA

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ABSTRACT

The study assessed the performance of Agricultural extension workers to deliver services during the Covid-19 pandemic in Akwa Ibom State, Nigeria. A multi-stage sampling procedure was used in selecting 192 respondents comprising 42 extension workers and 150 farmers. Data were collected on the services delivered by agricultural extension workers before and during the pandemic to farmers; agricultural extension workers' capacity to deliver services during the pandemic and factors influencing extension workers' capacity for service delivery during the Covid-19 pandemic. Descriptive and inferential statistics were used for analysis. The findings revealed that before the pandemic, extension workers delivered all the identified services as shown by a grand mean of $\tilde{x}$ = 2.75, but during the pandemic, of the 17 identified services, extension workers were able to deliver only 5 which were: Communicating information on health problem to farmers($\tilde{x}$= 2.88), rendering of technical advice to farmers ($\tilde{x}$=2.74), record keeping ($\tilde{x}$ =2.62), linking young farmers with agricultural opportunities ($\tilde{x}$ =2.60) and introducing farmers to market linkages ($\tilde{x}$=2.55). The findings also revealed that extension workers were capable of delivering services to farmers during the pandemic with simple ICT gadgets such as cell phones through calls and SMS. Findings also revealed 6 major dimensions of factors influencing the capabilities of extension workers in delivering services during the Covid-19 pandemic including inadequate training of extension agents, limited digital communication infrastructure, fear of death and poor network, poor infrastructure, cost of coverage and lack of data/airtime subscription as well as the absence of digital-based training. Agricultural extension workers in the State lacked the human and material resources necessary for critical service delivery to farmers during the pandemic. It is necessary to employ more extension workers, improve rural infrastructure, digitalize the extension system, and train extension workers and farmers on the use of modern digital tools in communication in cases of a future pandemic.

Keywords: *Agricultural extension workers capacity; service delivery; Covid-19 pandemic.*

INTRODUCTION

Agricultural extension workers are trained personnel in extension service delivery who link up farmers with different facets of agricultural technology for higher productivity. The agricultural extension workers are not classroom oriented but are intermediaries who train, build capacity, and transfer agricultural technology to farm families to improve farming systems through informal techniques, practices, and performances (Ovharhe *et al*., 2020). Many authors have described agricultural extension workers based on their various responsibilities; According to Davies, *et al.,* (2021), they are innovators who change their modes of operation and information based on environmental changes faced by farmers such as disasters, outbreaks of epidemics, or pandemics. Agricultural extension workers in Nigeria had interfaced with farmers during the outbreak of avian influenza, ebola outbreak, HIV/AIDS, and most recently, the coronavirus pandemic (Oladipo, *et al.,* 2020; Kumar, 2020). Nigerian agricultural extension workers have played the role of assisting farmers to sustain productivity amid several environmental disasters, avian influenza, political disruptions, and conflicts, human and animal health emergencies such as Lassa fever, pest outbreaks such as desert locust and armyworm infestation (McNamara & Moore, 2017; Bello-Bravo *et al.,* 2017; FAO, 2020).

The coronavirus erupted in 2019 in Wuhan China and was declared a pandemic (WHO 2020) due to its rapid global spread and economic and social disruptions. The pandemic was characterized by global movement restrictions, a new normal way of living with nostrils and mouth constantly covered with face masks, frequent washing of hands with water, and sanitizers, and observing human social distance. The Food and Agriculture Organization (FAO, 2020) declared that the impact of the coronavirus pandemic had the worst hit on the farming population whose livelihood is rested on human agriculture and dependency on agricultural extension workers. However, a wide gap exists between agricultural extension workers and farmers posing barriers to effective service delivery. These barriers include; total lockdown, agents' inability to visit farms/farmers/offices, No training, diseases, and death of both agents and farmers, insufficient knowledge and skills among farmers, inadequate training of extension workers, and poor use of modern ICT tools for communication among farmers and agricultural extension workers, and the like. Since agricultural extension service delivery is mostly human and information-based (Aliyu & Safiu 2017), the characteristics of the coronavirus which were, movement restriction, social distancing, and more inclined to the use of digital communication technologies, would not prevent communication between farmers

and agricultural extension workers if they were trained to use all forms of computer-based internet technology (Akpabio, *et, al.,* 2021) to deliver extension services.

The study assessed the performance of agricultural extension workers during the pandemic. Specifically, the study sought to: determine the services delivered by the extension workers before and during the pandemic; examine the agricultural extension workers' capacity to deliver services during the Covid-19 pandemic, and identify the factors influencing the agricultural extension workers' capacity to deliver services during the pandemic in the study area. Technically, such capacities are digital skills and knowledge competencies of internet technology usage, with resources aiding effective information dissemination.

METHODOLOGY

The study was conducted in Akwa Ibom State. The population of the study constituted all public agricultural extension workers and farmers in Akwa Ibom State. Akwa Ibom State comprises 31 Local Government Areas with six agricultural zones. A multistage sampling technique was used in the sample selection for the study. At Stage one, 3 out of the 6 agricultural zones were purposively selected (Abak, Etinan & Oron) because of the presence of extension workers. At stage two, a block was purposively selected from each of the three zones, and two cells were randomly selected from the blocks making up 6 cells. From each of the six cells, 25 farmers were selected randomly which resulted in a sample size of 150 farmers. The sampling frame also included all the agricultural extension workers (42) in the state ADPs, hence a sample size of 192 respondents were used for the study with two sets of structured questionnaires administered.

Information on the services delivered by extension workers to farmers before and during the pandemic as well as the responses of farmers as regards delivered services were listed out and measured with a 4-point Likert-type scale of Always (4), sometimes (3), rarely (2) and never (1). Tools enabling the capabilities of service delivery by Extension workers and the frequency were measured using a four-point Likert-type scale of Always (4), sometimes (3), rarely (2), and never (1). The cut-off mean was 2.5. To identify the factors influencing the capacities of agricultural extension workers to deliver services to farmers during the pandemic, a five-point Likert-type scale of strongly agree (5), agree (4), undecided (3), disagree (2), and strongly disagree (1). The cut-off mean was 3.0. Factor analysis consistent with the recommendations of Spector, 1992, Churchhill, 1995 & Hair, *et al.,* 1998 was used in the generation of 6 major factors influencing the capabilities of extension workers to deliver services during the Covid-19 pandemic. The IBM-SPSS statistical package version 22 was used for data analysis.

RESULTS AND DISCUSSION

Services delivered by Agricultural Extension Workers before and during the Pandemic

As shown in Table I,17 identified services with a mean score above $\tilde{x}$ = 2.5 for individual items were the services delivered by extension workers to farmers before the pandemic. These include, organizing fortnightly training ($\tilde{x}$ = 2.90), Rendering technical advice to farmers ($\tilde{x}$ = 2.86) Establishment of small plot adoption techniques (SPAT)($\tilde{x}$ = 2.81), farm visits ($\tilde{x}$ =2.81). This agrees with the findings of Maertens & Nourani (2020) that extension workers were always involved in normal farm visitations, demonstrating innovations on plots and

engaging in different personal and group training. Again, the same table shows 5 out of 17 identified services, as those extension workers were able to deliver during the pandemic: Communicating information on health problems to farmers ($\tilde{x}$ = 2.8), rendering technical advice to farmers ($\tilde{x}$ = 2.7), linking young farmers with agricultural opportunities ($\tilde{x}$ = 2.6), record keeping ($\tilde{x}$ = 2.6) and introducing farmers to market linkages ($\tilde{x}$ = 2.5). From the findings, extension workers were not able to deliver their normal services during the pandemic and it is obvious that the pandemic affected their service delivery. This finding agrees with Murhuringi, *et al.,* (2021) that during the emergence of Covid-19, there was a reduction in service delivery in all sectors including the agricultural sector. Whereas, Davies, *et al.,* (2021), stated that Extension Workers are innovators who change their modes of operation and information based on environmental changes faced by farmers. This perhaps provides the reason the extension workers switched to the use of digital tools of communication to reach out to their clients.

Table I: Services delivered by agricultural extension workers before and during the covid-19 pandemic

S/N	Statement	Mean scores before the pandemic	Standard deviation before the pandemic	Mean scores during the pandemic	Standard deviation during the pandemic
1.	Establishment of small plot adoption technique (SPAT)	**2.81***	**1.347**	2.31	0.9497
2.	Farm visit	**2.81***	1.3478	2.33	0.7213
3.	Provision of farm inputs	**2.57***	0.9913	2.21	0.7820
4.	Record keeping	**2.81***	1.3296	**2.62***	**0.9358**
5.	Assisting the subject matter specialist	**2.71***	1.2932	2.33	0.8458
6.	Training farmers on the proper usage of agrochemicals/fertilizers	**2.81***	1.3051	2.38	0.7636
7.	Selection of contact farmers	**2.86***	1.3357	2.43	0.8007
8.	Assisting in cooperative formation	**2.69***	1.2971	2.36	0.8211
9.	Rendering technical advice to farmers	**2.86***	1.3538	**2.74***	**0.8851**
10.	Introducing farmers to market linkages	**2.76***	1.1001	**2.55***	**0.8025**
11.	Training of women in food processing for value addition	**2.71***	1.3304	2.36	0.821
12.	Formation of women's groups	**2.93***	1.1130	2.24	0.7590
13.	Linkages to credit facilities	**2.60***	1.1056	2.19	0.8913
14.	Nutrition and food utilization demonstration	**2.69***	1.2195	2.33	1.0969
15.	Communicating information on health problems to farmers.	**2.67***	1.0281	**2.88***	**0.9160**
16.	Linking young farmers with agricultural opportunities	**2.69***	1.0474	**2.60***	**0.8571**
17.	Organizing fortnightly meetings	**2.90***	1.3217	2.36	0.9833

Source: Field Survey, 2022, Cut-off=2.5

Farmers' Responses on Services Delivered by Extension Workers during Covid-19 Pandemics

Entries in Table 2 show that services with mean scores greater than 2.5 were those communicating safety during the pandemic to the farmers such as; enforcing social distancing ($\tilde{x}$ = 3.2), enforcing the use of face masks ($\tilde{x}$ = 3.2), awareness creation on the symptoms of coronavirus ($\tilde{x}$ = 3.1), encouraging coronavirus test for farm families ($\tilde{x}$ = 3.0) and enforcing

the mandatory washing of hands ($\tilde{x}$ = 2.8). These services were delivered with unconventional methods such as; the use of cell phones (SMS & Only calls) and there were not agriculturally related but were inclined to pandemic information. This corroborates the studies of Davies, *et al.,* (2021) that extension workers are innovative and will change their modes of operation and the content of the information as changes occur in the environment.

Table 2: Farmers' responses on services delivered by extension workers during the Covid-19 pandemic

S/N	Statements	Mean Scores	Standard Deviation
1.	Establishment of small plot adoption technique (SPAT)	2.10	0.712
2.	Frequent farm visitations	2.11	0.569
3.	Record keeping	2.14	0.695
4.	Selection/delivery of information through contact farmers	2.33	0.764
5.	Rendering technical advice to farmers	2.13	0.757
6.	Training farmers on the proper usage of agrochemicals/fertilizers	2.04	0.759
7.	Linking producers to farm inputs/fertilizers delivery services	2.15	0.730
8.	Training of women in food processing	2.01	0.746
9.	Providing information on proper pest control measures	2.09	0.736
10.	Introducing farmers to market linkages	2.06	0.762
11.	Assisting in the formation of cooperative societies	1.93	0.743
12.	Nutrition and food utilization demonstration	1.97	0.763
13.	Solving gender problems relating to information flow	1.95	0.736
14.	Emergency calls from mobile phones	2.17	0.833
15.	Linkages to credit facilities	2.23	0.837
16.	Communicating information on health problems to farmers.	2.12	0.777
17.	Linking producers to market opportunities	2.01	0.945
18.	Awareness creation on the symptoms of the virus	**3.05***	**0.801**
19.	Train farmers on production and the use of locally made hand sanitizers through phone or online meetings	2.35	1.044
20.	Enforcing the mandatory washing of hands	**2.80***	**1.010**
21.	Enforcing social distancing	**3.16***	**0.836**
22.	Enforcing the use of face masks	**3.16***	**0.828**
23.	Encouraging coronavirus tests for farmers /farm families	**2.97***	**0.941**

Source: Field data, 2022; cut-off=2.5

Extension workers' capability to deliver services during the Covid-19 pandemic

Table 3 shows the tools that helped the extension workers in their service delivery to farmers during the coronavirus pandemic. The results indicate that cell phone ($\tilde{x}$ = 3.0) was the major tool used as the farmers were reached through calls and SMSs. This corroborates Dhulipala, (2020) that mobile phones were used for communication between extension workers and farmers during the pandemic. Also, radio with the mean score of ($\tilde{x}$ = 2.7) aided the extension workers in service delivery. This is in line with the assertion of (SAA 2020) that during the pandemic, radio talk shows were used to disseminate information to farmers on market prices and market operations. Television broadcast ($\tilde{x}$ = 2.6) was another tool that aided extension service delivery. This agrees with Even & Nyathi, (2020) that television programs were used to disseminate information on management practices, weather, and the location of agricultural inputs and output markets to farmers during the coronavirus outbreak. WhatsApp platforms ($\tilde{x}$ = 2.6) were also utilized in the discharge of extension services during the pandemic. This result is consistent with Fabregas, *et al.,* (2019), that in developed nations, extension workers used radio, social media, text messaging, and WhatsApp group platforms to disseminate information to farmers. Extension workers also used POS service ($\tilde{x}$ = 2.6) and mobile banking application ($\tilde{x}$ = 2.6) to deliver services to some innovative farmers. This agrees with Dharmwan, et al., (2020) that extension workers were ready to be involved in cyber extension but most farmers do not have smartphones.

Table 3: Extension workers' capability to deliver services during the Covid-19 pandemic

S/N	Statements	Mean Scores	Standard Deviation
1	Use of phone for calls and SMS	**3.07***	0.808
2	Use of radio	**2.76***	1.078
3	Use of online virtual platforms/zoom	2.40	1.062
4	Use of television broadcast	**2.67***	0.902
5	Use of WhatsApp platforms	**2.64***	1.008
6	Use of (POS) service for money transactions.	**2.62***	1.168
7	Use of mobile banking application	**2.62***	0.882
8	Provision of toll-free mobile numbers to farmers	2.40	1.037
9	Use of hangout applications	2.02	1.070
10	Use of dispatch riders for delivery of farm inputs	1.93	1.091
11	Use of skype/video chat	1.90	1.122
12	Use of telegram	1.88	1.131
13	Use of Instagram	1.86	1.160
14	Use of twitters	1.83	1.080

Source: Field Survey, 2022 cut-off=2.5

Farmers' Responses on Capabilities of Extension Workers to deliver Services during the Pandemic

Table 4 shows the tools that helped farmers to receive services from extension workers during the coronavirus pandemic. This result also confirms that extension workers communicated with farmers through simple phones ($\tilde{x}$ = 3.0), radio ($\tilde{x}$ = 2.9), television broadcast ($\tilde{x}$ = 2.5), and WhatsApp platform ($\tilde{x}$ = 2.6). This result is consistent with Fabregas, *et al.,* (2019), Dhulipala, (2020), and Even & Nyathi, (2020) that in developed nations, extension workers used radio, television broadcast, social media, text messaging, and WhatsApp group platforms to disseminate information to farmers. Farmers had limited knowledge of the use of specialized ICT tools and applications, such as toll-free mobile numbers ($\tilde{x}$ = 2.3), point of sale (POS) service ($\tilde{x}$ = 2.1), virtual platforms ($\tilde{x}$ = 2.0), Instagram ($\tilde{x}$ = 1.8), twitters ($\tilde{x}$ = 1.8). This agrees with the findings of Ekanem & Ekerete (2018) that farmers are still most conversant with the operation of older ICT such as radio, television, mobile phones, SMS, and VCDs than the newer versions of modern ICT. However, this work disagrees with Erjavec, *et al.,* (2021) that during the pandemic, younger farmers and farmers relied on online conferences and social networking sites.

Table 4: Farmers' responses on the capabilities of extension workers to deliver services during the pandemic

S/N	Statements	Mean Scores	Standard Deviation
1.	Use of radio messages	**2.97***	0.688
2.	Use of television broadcast	**2.50***	0.129
3.	Provision of toll-free mobile numbers to farmers	2.31	0.289
4.	Use of phone SMS	**3.04***	0.810
5.	Use of Whatsapp platforms	**2.55***	0.168
6.	Use of online virtual platforms/zoom for fortnightly meetings	2.03	0.121
7.	Use of twitters	1.81	0.108
8.	Use of telegram	1.79	0.122
9.	Use of skype/video chat	1.78	0.129
10.	Use of Instagram	1.86	0.078
11.	Use of hangout	1.83	0.096
12.	Use of mobile banking applications	1.89	0.625
13.	Use of dispatch riders for delivery of essential farm inputs	1.52	0.384
14.	Use point of sale (POS) service centers for their financial/retail transactions through phones	2.18	0.001

Source: Field data, 2022, Cut off=2.5

Major Dimensions of Factors influencing the capabilities of Extension Workers in delivering services during the Covid-19 Pandemic.

In Table 5, The 6 major factors were named as follows: 1. Factors due to inadequate training of extension workers which exposes their inadequacies in communication know-how and procedures. This agrees with Umar, *et al.,* (2021) that agricultural extension workers need to be sufficiently trained to boost their skills in information dissemination. 2. Factors due to limited digital communication infrastructure. This had been a challenge as earlier opined by USAID, (2018) that there was a perpetual lack among most rural communities. 3. Factors due to fear of death and poor network. These borders on the lives of agricultural extension workers in situations where they contact the virus but cannot communicate to receive aid due to poor network coverage. The factor of fear is domiciled in humans and agrees with Menzies & Menzies (2020) that during the coronavirus pandemic, the anxiety of death was common in the thoughts of humans, particularly in areas of poor internet signals. This agrees with Dharmawan, *et al.,* (2020), that most farming villages have poor or no internet signals and this poses a hindrance to effective service delivery during the pandemic. 4. Factor due to poor infrastructure and lack of personal protective equipment (PPE) agrees with Tajeri, *et al.,* (2020), that most farming communities do not have social infrastructure which supports the well-being of extension workers thereby encouraging them to live in close proximity with their clients. This is also consistent with Gaveta, (2021) that majority of farmers had no PPE and as such, extension workers avoided contact with them. 5. Factors due to numerous villages and lack of airtime subscription as an influence on the delivery of services to farmers by extension workers is in line with Antwi-Agyei & Stringer (2021) that where too many farming communities are assigned to extension workers, the frequency of their visits will be reduced, and this will also have an attendant effect on the cost of airtime subscription used by extension workers for communication. Further to this, the redeployment of extension workers to the Ministry of education increased the number of villages assigned to extension workers. 6. Factors due to the absence of digital-based training rises from the absence of digital-based training facilities in the study area. This agrees with Akintunde *et al.* (2019) that the lack of digital-based training of agricultural personnel limited the utilization of ICT tools during the pandemic.

Table 5: Rotated component matrix on factors influencing the capabilities of extension workers in delivering services during Covid -19 pandemic

Factors	Rotated component matrix*						CEI
	Fac 1	Fac 2	Fac 3	Fac 4	Fac 5	Fac 6	
Poor digital knowledge	.793						.780
Limited trained extension workers	.737						.745
Poorly trained extension workers	.818						.786
Inadequate interpersonal communication strategy	.808						.691
Limited covid-19 coping skills							.727
No transportation subsidies							.732
Too many villages per clientele					.578		.676
No subsidies or provision of airtime credit					.816		.724
Poor infrastructures in farm communities				.653			.707
Absence of digital-based training						.583	.666
Unstable power supply							.815
No subsidies for purchases of face mask				.806			.763
Discomfort associated with the observance of covid-19 protocols							.759
Poor network coverage in farm communities			.782				.641
Fear of death from contacting coronavirus			.766				.817
Gender issues							.638
Restriction of movement							.681
Lack of digital communication gadgets		.790					.818
Low digital knowledge of farmers		.836					.718
Lack of rural e-centers to ease inter and intra communication		.566					.692
Diagnostic Statistics							
Initial Eigenvalues	3.824	3.151		2.176	2.159	1.724	1.542
% of Variance	19.118	15.756	10.882		10.796	8.618	7.709
Cumulative %	19.118	34.874	45.757		56.553	65.172	72.881

Source: Computed from field survey, 2022. Extraction method: a principal component analysis. Rotation method: Varimax with Kaiser Normalization. A. Rotation converged in 10 iterations.

Note: CEI = Communality Extraction Index, Fac = Factors

CONCLUSION AND RECOMMENDATIONS

Agricultural extension workers in the State delivered services that had health and safety-related information to farmers during the covid-19 pandemic and not the conventional agricultural-based information. The capability to deliver services from extension workers to farmers was limited to using simple phones for audio calls and SMSs. Extension workers and farmers were unable to use specialized ICT tools such as telegram, Instagram, Twitter, zoom, skype, and virtual platforms. Therefore, the study concludes that extension workers were unable to deliver services to clientele during the pandemic due to the inability of respondents (farmers and extension workers) to adequately utilize ICT gadgets. It is pertinent for the government, private sector, and policymakers to encourage the digitalization of the agricultural extension system, by ensuring that digital tools are affordable to extension workers and farmers. Human resources within the extension system should be trained to meet digital needs, and digital technologies should be integrated into the farmer education teaching approaches**.**

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