

CHALLENGES OF EXTENSION SERVICES DELIVERY OF ARABLE FARMERS IN DELTA STATE, NIGERIA

Odjebor, Ufuoma¹ Giweze, Emeka, Alex² Ovwigho, O. Bishop³ Ebewore, O. Solomon⁴

^{1,2}Department of Agricultural Extension and Rural Development, Dennis Osadebay University, Asaba, Delta State, Nigeria.

^{3,4}Department of Agricultural Extension, Delta State University, Abraka, Delta State, Nigeria.

***Corresponding author.** Odjebor, Ufuoma. Odjebor.ufuoma@dou.edu.ng; OrcidNumber. 0000-0002-3152-8284

ABSTRACT

This paper examines the challenges of extension services delivery to arable farmers in Delta State. Simple random sampling procedures done on multi-stage was used for the study. Seven hundred and thirty two(732) respondents were randomly selected from the three agricultural zones in the study area. The instrument for data collection was the use of questionnaire. Data were analyzed with descriptive and inferential statistics. Advisory services on crop and animal production comprised the majority of extension services accessible to arable farmers (68.0%), introduction of new technology (78.46%), marketing information (71.7%), credit information (77.3%), input distribution (63.3%), education on weed control (63.4%), education on disease control (57.5%), information on savings and financial management (57.9%) and advisory services on record keeping (66.4%). Challenges to effective extension services delivery to arable farmers were identified. The result indicates that there was a significant difference in the challenges to effective extension services delivery to arable farmers within the three agricultural Zones ($f=18.241, p<0.05$). It was suggested that in order to increase farmers' income and standard of living, more extension agents should be trained and visit farmers frequently.

Keywords: Extension Services, Challenges, Delivery, Arable Farmers

INTRODUCTION

Many shortcomings characterize Nigeria's current public agricultural extension service, including: a very weak system linking farmer inputs, research, and extension; top-down, supply-driven extension approaches; and inadequate targeting of women, youths, and vulnerable groups, among others (Osonduet *al.*, 2015; World Bank, 2020). Critical challenges include low-cost credit facilities that small-scale farmers can easily access, a lack of career ladders for ADP staff, a lack of coordination or networking among extension providers, a variety of extension approaches, the misallocation of subsidy priorities, negative political influences in extension management, and poor loan recovery rates when credit is available. Because

agricultural extension staff numbers are low compared with the farming population (Banfuleet *al.*, 2010; Omotayo, 2010), not all farmers' concerns can be addressed concurrently. In their quest to serve the most marginalised farmers in rural Nigeria, agricultural extension services face a number of obstacles, such as decaying infrastructure, insufficient transportation and low levels of farmer education (FMARD, 2016), retiring staff who need to be replaced (Banfuleet *al.*, 2010), and a staffing deficit (Banfuleet *al.*, 2010).

With their existing methodologies, the bulk of agricultural extension workers in Nigeria are too thinly distributed to properly service the intended geographic areas. Furthermore, women farmers face unique difficulties when trying to integrate with agricultural extension organisations, as most of the staff members are men (Banfuleet *al.*, 2010; Osaze, 2015). Other major issues facing Nigeria's agricultural extension and advisory services include a very weak system of linkages between research extension and farmer inputs, a lack of a legislated agricultural extension policy, which is made worse by the sector's policy whirlwinds, glaringly inadequate and delayed funding, inadequate leadership and coordination, a low level of private sector participation, and ineffective top-down, supply-driven extension approaches.

As a result, rural consumers' increasingly varied extension demands cannot be met by the public extension system. Additionally, there hasn't been much oversight, coordination, or regulation of NGOs' and the primary commercial sector's operations at the federal or state levels to guarantee service quality because they were not registered with the Ministry of Agriculture and Natural Resources or the ADPs in charge of grassroots extension in almost all of the federation's states (FMARD, 2016). In the agricultural and rural development sector, there are many different types of quality assurance and control agencies, but none of them concentrate on providing agricultural extension and consulting services, which could expose farmers to unwholesome products and/or sharp methods.

By transferring technology, promoting adult learning in rural areas, helping farmers solve problems, and encouraging their active participation in the agricultural knowledge and information system,

extension plays a crucial role in tackling rural poverty and food insecurity (DansoAbbea *et al.*, 2018). It also offers advisory services (Harry and Abudu, 2022; Msuya *et al.*, 2017). Agricultural extension agents are crucial allies in advancing evidence-based farm health and safety in communities, claim Shannon *et al.* (2020). But in more recent times, the emphasis of agricultural advisory and extension services has shifted from technology transmission to supporting a variety of solutions in intricate situations.

As the connecting actor in complex agricultural innovation systems, the system faces challenges from Kaynakçi and Boz (2019); from technology transfer to facilitation and from training to learning; from helping farmers form groups to addressing marketing issues and public interest issues in rural areas like resource conservation, health, food security and agricultural production monitoring, food safety, nutrition, family education, and youth development; and from collaborating with a wide range of service providers and other agencies (Chikaire *et al.*, 2018).

Over the past few decades, there has been a growth in the number and diversity of organizations providing advisory and extension services, and extension is now needed to play a bigger role in mediating and facilitating the application of new knowledge (GFRAS, 2012; AESA, 2016; GFRAS, 2017). These include producer groups, cooperatives, and associations; independent consultants as well as those connected to or employed by agri-business/producer associations; and information and communication technology (ICT)-based services. These are some of the private sector organizations that deal with agriculture inputs, agribusiness, and finance (both local and international). Scholars (Kolawole *et al.*, 2016; Manohar and Pooja, 2019) have ascribed this to a variety of developments in the context of agricultural development.

Consequently, the job market for extension professionals has thus changed and now demands quite different competencies than were required many decades ago. Above all, emergent methodological changes such as privatization of extension, cyber extension/extension, market-led extension, farmer-led extension, expert systems, social media, and media mix strategies, etc., jointly demand new competencies from extension educators. Agbamu (2006) and Omotayo (2011) stated that the disproportionate extension agent to farm family ratio in the developing countries has led to a situation in which many farmers do not benefit from the services of agricultural extension. The goal of agricultural extension agents is to visit as many farm families as they can, but this will have the unintended consequence of poor agricultural technology extension, low innovation popularization, and low productivity, all of which could eventually hurt the farmer, his family,

and the country's economy. According to Oyegbami (2018), a poor road network is a significant barrier to the provision of agricultural extension services. This could have a detrimental impact on farmers' and agricultural extension agents' mobility. A poor road network can lead to a number of detrimental effects, such as increased transportation costs for farmers and extension agents, a rise in the market price of farm produce, a decline in the uptake of agricultural technologies, and underdevelopment.

Walker, *et al.*, (2004) stated that agricultural extension had a negative and statistically insignificant impact on individual household income. To this end, this study has been designed to examine the challenges of extension services delivery to arable farmers.

OBJECTIVES OF THE STUDY

The main objective of this study is to examine the challenges to effective extension service delivery to arable farmers in Delta State. The specific objectives are to:

- i: identify the types of services available to farmers in the study area,
- ii: identify the challenges to effective extension service delivery in Delta State.

HYPOTHESIS

Ho: There is no significant difference in challenges of agricultural extension within the three (3) agricultural zone.

METHODOLOGY

The study was conducted in Delta State. Delta State was created out of the former Bendel State on August 27th 1991. It lies within approximately latitude 5⁰⁰' and 6³⁰' North and longitude 5⁰⁰' and 6⁴⁵' East of the equator. It is bounded on the North by Edo State, East by Anambra State, South-East by Bayelsa State and on the Southern flank by the Bight of Benin which covered about 160 kilometers of the state's coastline. The state has a wide coastal belt interlaced with rivulets and streams, which formed part of the Niger Delta. The state has a total land area of 18,050km² (NPC 2006). The state has a population of Six million, Thirty Seven thousand, and six hundred and sixty seven (6,037,667) (NIPC, 2024).

Delta State is made up of twenty-five (25) Local Government Areas. The Delta State Agricultural Development Programme (DADP) classified the state into three agricultural zones namely Delta North, Delta Central and Delta South. Delta North has nine (9) Local Government Area (LGAs), namely Aniochia North, Oshimili North, Oshimili South, Ika North East, Ika South, Ukwani, Ndokwa West and Ndokwa East. Delta central has eleven (11) Local Government Areas (LGAs), namely Sapele, Ethiope West, Ethiope East,

Okpe, Uvwie, Udu, Ughelli North, Ughelli South, Patani, Isoko North and Isoko South. Delta South has five (5) Local Government Area (LGAs) namely Warri North, Warri South, Warri South West, Burutu, and Bomadi.

Simple random sampling done on multi-stage basis was used to compose the sample for the study. The list of arable farmers was taken from Delta Agricultural and Rural Development Authority (DARDA). Fifty (50) percent of the extension blocks was randomly selected from each agricultural zone. This gave five (5) extension blocks from Delta North, six (6) extension blocks from Delta Central and three (3) extension blocks from Delta South. At the second stage, twenty (20%) extension cells were randomly selected from the selected blocks which gave Twenty Eight (28) cells. The third stage, twenty percent (20%) of participants arable farmers were randomly selected. One non participant arable farmers was identified by one participants arable farmer to be included in the sample size. Thus, brought the total sample size was 732 arable farmers made up 366 participants and 366 non- participants arable farmers. Structured Questionnaire was use in data collection. Data generated was analysed using both descriptive and inferential statistics

Validity of Instrument

The instrument was subjected to the scrutiny and approval by an expert in the Department of Agricultural Extension to ensure content and face validity of the instrument.

Reliability of Test Instrument

The test instrument was subjected to test retest to ascertain the reliability of the test instrument. Thirty percent of the test instrument was administer to the respondents and after two weeks it was administer to the same set of respondents. This will account for the degree of consistency of the test items on the test

instrument. The reliability of the instrument was achieved using pearson R with R value of 0.819.

RESULTS AND DISCUSSION

Types of extension services available to farmers

The types of extension services available to farmers were advisory services on crops and animal production (68.9%), introduction to new technology (76.2%), marketing information(71.9%), credit information (77.3%), input distribution (63.4%), education on disease control(57.4%), education on weed control (63.4%)I, information on savings and financial management (57.9%), and advisory services on record keeping(66.4%). The findings indicates that credit information and introduction of new technology to the farmers were among the most extension services available to farmers followed by marketing information ,input distribution, education on weed control, advisory services on record keeping and information on financial savings enable farmers improve on their farming and increase their income in the study area. This implies that access to input distribution ,new technology sand credit information will enhances productivity and increase in the income of arable farmers in the study area. The results agrees with Mesterhazy, Olah and Popp (2020) who stated that agricultural extension programmes have facilitated and promoted farmers knowledge and skills in terms of seed storage, plant protection and irrigation to increase agricultural productivity. According to Bashasha, Manghemi, and Nkoya (2011), agricultural extension and advisory services are essential to agricultural growth and have the potential to improve the welfare of farmers and other rural residents. Increased agricultural productivity as well as personal and financial rewards have an impact on farmers' participation in extension programs (Nachoyo, Omondia, Zharg, Pan, and Joseph, 2017).

Table 4.3: Responses according to types of extension services available to farmers (N=366)

S/N	Types of extension services	Yes	No	Remarks
1.	Advisory services on Crops and Animal production	252 (68,9%)	114 (31.1%)	Available
2.	Introduction of new technology	279 (76.2%)	87 (23.8%)	Available
3.	Marketing information	263 (71.9%)	103 (28.1%)	Available
4.	Credit information	283 (77.3%)	83 (22.7%)	Available
5.	Input distribution	232 (63.4%)	134 (36.6%)	Not Available
6.	Integrated pest management	176 (48.1%)	190 (51.9%)	Available
7.	Education on disease control	210 (57.4%)	156 (42.6%)	Available
8.	Education on weed control	232 (63.4%)	134 (36.6%)	Available
9.	Information on savings and financial management	212 (57.9%)	154 (42.1%)	Not Available
10.	Information on soil fertility	173 (47.3%)	193 (52.7%)	Available
11	Advisory services on record keeping	243 (66.4%)	123 (33.6%)	

Source: Field Survey, 2023

Responses on the challenges of extension services delivery

From Table 4:9 the challenges of extension services were inadequate extension workers (\bar{x} =3.74), poor road network (\bar{x} =3.51), poor popularity of extension services (\bar{x} =3.39), language barrier (\bar{x} = 3.22), poor education of farmers (\bar{x} =3.17), poor funding (\bar{x} =3.49), irregular visit and supervision of farmers by extension agents (\bar{x} =3.39), lack of low cost credit facilities (\bar{x} =3.57), cultural barriers (\bar{x} =3.42), untimely visit of extension workers to farmers (\bar{x} =3.32), inertia to travel to seek for extension services (\bar{x} =3.19), inadequate research extension – linkage (\bar{x} =3.18), lack of cooperation of farmers with extension agent (\bar{x} =3.17), poorly trained extension personnel (\bar{x} =3.34), poor remuneration of extension workers (\bar{x} =3.32), saddling extension workers with non-extension responsibilities (\bar{x} =3.29), inadequate qualified extension personnel (\bar{x} =3.43), access to research institute (\bar{x} =3.47), inadequate information and communication technology by farmers (\bar{x} =3.41) and farmers lack of interest in participating in extension programmes (\bar{x} =3.53) were the challenges of

effective extension service delivery to arable farmers. The result indicates that extension services in the study area is faced with numerous challenges ranging from bad road, poor funding low extension ratio, inadequate qualified extension workers ,etc. This implies that farmers income and productivity will continue to dwindle if appropriate measures are not put in place to address the above challenges . The results agrees with Bello, Agwale and Peter (2004) who stated that the most serious problems facing agricultural extension services delivery in Nigeria is illiteracy levels of farmers, inadequate funding, poor remuneration and non provision of transport facility for extension agents to visit the farmers and low ratio of extension agents to farmers. Oyegbami (2018) stated that bad road network were major constraints to agricultural extension services delivery. Omotayo (2011) stated that the disproportionate extension agents to farm family ratio in the developing countries has led to a situation in which many farmers do not benefits from the services of agricultural extension. Inadequate extension agents hinder full exploitation of extension services in Nigeria (Aderinkto, Agbelemogo and Dada, 2017).

Table 4.8: Responses according to challenges of extension services delivery (N=732)

S/N	Challenges of extension services delivery	Mean	Std. Deviation	Remarks
1.	Inadequate extension workers to go round the farmers	3.74	.51100	Agreed
2.	Poor road networks	3.51	.60658	Agreed
3.	Poor popularity of extension services in the area.	3.39	.66654	Agreed
4.	Language barrier	3.22	.83079	Agreed
5.	Poor education of farmers.	3.17	.86084	Agreed
6.	High rates of inputs to farmers	3.49	.79605	Agreed
7.	Irregular supervision of farmers by extension agents	3.39	.70900	Agreed
8.	Inadequate training materials	3.57	.58132	Agreed
9.	Cultural barrier	3.42	.72314	Agreed
10.	Untimely of visit of extension workers to farmers	3.32	.62234	Agreed
11.	Inertia to travel to seek extension services	3.19	.68549	Agreed
12.	Lack of cooperation of farmers with extension workers	3.17	.77546	Agreed
13.	Poorly trained extension personnel	3.34	.68167	Agreed
14.	Farmers not having access to research institute.	3.47	.63911	Agreed
15.	Inadequate information and communication Technologies by farmers.	3.41	.69330	Agreed
16.	Farmers lack of interest in participating in Extension programmes	3.53	.64562	Agreed

Source: Field survey, 2023

Difference in challenges of effective agricultural extension within the three (3) agricultural zones

The hypothesis was tested using analysis of variance (ANOVA). The result of the analysis of variance (Table 4.12) indicates that there were significant difference among the three agricultural zones on the challenges to effective agricultural extension service delivery ($F=18.241$; $p<0.05$). A further post hoc analysis using LSD multiple comparison (Table 4.13) shows that there were significant differences in the challenges to

effective agricultural extension service delivery in Delta Central and Delta South Agricultural zones.

This is in line with the findings of Adesoji and Aratunde (2012), who discovered that the difficulties in providing agricultural extension services differ depending on the location and include funding, inadequate farmer connections, and low extension Due to factors like ratio and a poor road system, many farmers are unable to take advantage of agricultural extension services. According to Oyegbami (2018), poor road infrastructure significantly hinders the provision of agricultural

extension services. This could have a detrimental impact on farmers' and agricultural extension agents' mobility. A poor road network can have a number of detrimental effects, such as increased transportation costs for

farmers and extension agents, a rise in the market price of farm produce, a decrease in the pace at which agricultural innovations are adopted, and underdevelopment.

Table 4.12: Difference in challenges of agricultural extension within the three (3) agricultural zones

	Sum of squares	df	Mean square	f	Sig.
Between groups	937.114	2	468.557	18.241	0.000
Within groups	25.687	726	25.687		
Total	19586.000	728			

Source: Field survey, 2023

Table 4.13: Difference in challenges of agricultural extension within the three (3) agricultural zones (Post hoc, LSD multiple comparison).

Agricultural zones	Agricultural zones	Mean	Std. Error	Sig.	95% Confidence interval	
					Lower Bound	Upper Bound
Delta North	Delta Central	-2.545*	.433	.000	-3.39	-1.69
	Delta South	-2.281*	.552	.000	-3.37	-1.20
Delta Central	Delta North	2.545*	.433	.000	1.69	3.39
	Delta South	.264	.505	.602	-.73	1.25
Delta South	Delta Central	2.281*	.552	.000	1.20	3.37
	Delta North	-.264	.505	.602	-1.25	.73

*The mean difference is significant at the 0.05 level

Source: Field survey, 2023

CONCLUSION AND RECOMMENDATION

The proficiency and technical know-how of the extension workers are essential to the success of extension service delivery to arable farmers. Advisory services on Crops and Animal production, Introduction of new technology, Marketing information, Credit information, Input distribution, Education on weed control, Education on disease control, Information on soil fertility and Advisory services on record keeping were the types of extension services available to farmers. Poor road network, Inadequate extension workers, poor education of farmers, poorly trained extension personnel, High rate of inputs to farmers, lack of interest in participating in extension programmes, lack of cooperation of farmers with extension workers, cultural barrier, irregular supervision of farmers by extension agents amongst others were the challenges of extension services delivery in the study area. The results indicates that there was a difference in the challenges to extension services delivery to arable farmers within the three Agricultural Zones in the study area. It was recommended that more extension agents should be trained and regularly visit arable farmers to improve their income. Agricultural inputs should be made available to arable farmers at affordable rates.

REFERENCES

- Aderinto, A., Agbelemoge, A. & Dada, O. M. (2016). Effectiveness of Extension Service Delivery and Productivity of Cassava Farmers in Southern Nigeria. *The Journal of Agricultural Sciences*. Vol. 12 No. 1. pp14-23. <http://dx.doi.org/10.4038/jas.v12i1.8202>
- Adesoji, S. A and Aratunde, T. (2012). Evaluation of the linkage system of research extension farmers in Oyo State, Nigeria: Lesson for agricultural extension administrators. *Journal Of Agricultural Extension and Rural Development*. 4(20): 561-568.
- Agbamu, J. U. (2005). Problem and Prospects of Agricultural Extension Service in Development Countries in *Agricultural Extension in Nigeria* S. F. Afolayan (ed) Ilorin AESON, : 159 – 169
- Banful, A. B., Nkonya, E., & Oboh, V. (2010). Constraints to fertilizer use in Nigeria: Insights from agricultural extension service. International Food Policy Research Institute. <https://www.ifpri.org/publication/constraints-fertilizer-use-nigeria-0>

- Bashasha .B .M. .Mangheni. M. N. and Nkonya, E. (2011). Decentralization and Rural service in Uganda. International Food policy Research Institute (IFPRI) .Discussion paper. International food policy Research Institute
- Chikaire, J. U., Emerhirhi, E., Anyoha, N. P., &Onoh, P. A. (2018).Perceived competencies of agricultural extension and advisory services providers in building rural farmer capability in Imo State Nigeria. International Journal of Research in Agriculture and Forestry, 5(6), 25 – 32.
- Danso-Abbeam, G., Ehiakpor, D. S., &Aidoo, R. (2018). Agricultural extension and its effects on farm productivity and income: insight from Northern Ghana. Agriculture & Food Security, 7(1), 1-10.
- FMARD. (2016). The agriculture promotion policy (2016 – 2020): Building on the successes of the ATA, closing key gaps. Retrieved from https://fscluster.org/sites/default/files/documents/2016-nigeria-agric-sectorpolicy-roadmap_june-15-2016_
- GFRAS. (2017). The new extensionist learning kit. Global Forum for Rural Advisory Services, Switzerland. <http://www.g-fras.org/en/knowledge/new-extensionist-learning-kit-nelk.html>
- GFRAS. (2012). The new Extensionist: Roles, strategies, and capacities to strengthen extension and advisory services. (Sulaiman, R.V., and Davis, K., Eds.).Global Forum for Rural Advisory Services, Switzerland. <http://www.g-fras.org/en/knowledge/gfras-publications.html?Download=126:the-new-extensionist-position-paper>
- Kolawole, E.A., Isitor, S.U., &Owolabi, A. O. (2016). Determinants of training needs of extension personnel of agricultural development programme (ADP) Ekiti State, Nigeria. Agro-Science Journal of Tropical Agriculture, Food, Environment and Extension, 15 (3), 13 – 17.
- Mesterhazy ,A., Olah ,J., and Popp, .J. (2020).Losses in the grain supply chain: causes and solutions. Sustainability, 12(6),2342. .
- Msuya, P. C., Annor-Frempong, F. K., Magheni, M. N., Agunga, R., Igodan C. O., Ladele, A. A., Zwane, E. (2017).The role of agricultural extension in Africa's development, the importance of extension workers and the need for change. International Journal of Agricultural Extension, 5 (1), 59-70.
- Nahayo ,A.,Omondi, M. O.,Zhang, X.,H.,LI, L.Q., Pann, G.,X., and Joseph ,S.(2017).Factors influencing farmers participation in crop intensification program in Rewanda. Journal of integrative agriculture.16(6), 1406-1416
- Nwaekpe, J. O., Anyeagbunam, H. N., Asumugha, G. N., Ekwe, K. C. &Okoye, B. C. (2014). Challenges to the Effectiveness of Extension Methods Adopted by National Root Crops Research Institute for Agricultural Technology Dissemination in South East Nigeria. Proceedings of the 48th Annual Conference of the Agricultural Society of Nigeria, Abuja 2014. 93-97.
- Nwaobiala, C. U. (2017). Effect of Agricultural Extension Delivery Methods on Arable Crop Farmers' Cropping Systems in Kaduna State, Nigeria. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development 17 (1) 225-230.
- National Population Commission (NPC) (2006) Nigeria Investment Promotion Commission (NIPC,2024).
- Omotayo ,A.M .(2011). Sustainable Extension Delivery System in changing Economic and Political Environment: A keynote address delivered at the 24th Annual Southwest REFIL's Workshop, institute of Agricultural Research and Training, Moor plantation, Ibadan.
- Omotayo, A. M. (2010). University of Agriculture Abeokuta Nigeria 30th inaugural lecture 2010: The Nigerian farmer and the elusive crown. Department of Agricultural Extension and Rural Development, University of Agriculture Abeokuta. <https://unaab.edu.ng/inaugurallectures/>
- Omotayo, A. O. (2017). Economics of farming households food intake and health capital in Nigeria. A two stage profit regression approach, Journal of Development Areas, 51:109-125.
- Osaze, E. L. (2015). The role of women in agricultural production in Ovia Southwest Local Government Area of Edo State, Nigeria. (Master's thesis), Ahmadu Bello University. <http://kubanni.abu.edu.ng/jspui/handle/123456789/7892>
- Osondu, C. K., Ijioma, J. C., Udah, S. C., &Emerole, C. O. (2015). Impact of national Fadama III development project in alleviating poverty of food crop farmers in Abia State, Nigeria. American Journal of Business, Economics and Management, 3 (4), 225-233.
- Oyegbami .B.A.(2018). Location and Distance of Farmers to Agricultural Extension service:

- Implication for agricultural Development in Oyo State, Nigeria. *South Africa Journal of Agricultural Extension*. 46(2), 14-23.
- Shannon, S., Joan, M., Glenn, I., Sebastian, G., & Cassandra, W. (2020). Competing roles and expectations: Preliminary data from an agricultural extension survey on COVID-19 impact. *Journal of Agromedicine*, 25 (4), 396–401
<https://doi.org/10.1080/1059924X.2020.1815619>
- Tambari, I. W., Abubakar, B. Z., Attahiru, M. & Moyi, S. S. (2014). Strengthening the Capacity Building of Extension Workers of Sokoto Agricultural Development Project Towards Enhancing Agricultural Transformation Agenda in Nigeria. *Proceedings of the 48th Annual Conference of the Agricultural Society of Nigeria*. Abuja 2014. 578-581.
- Walker. T., Tschirley, D., Low, J., Pequenino Tanque, M., Boughton, D., Payongayong, E., and Weber, M. (2004). Determinants of Rural income, poverty, and perceived well-being in Mozambique in 2001-2002 (Research Report No.57E)
- World Bank. (2020). Agriculture, forestry and fishing value added (% of GDP) – Nigeria. Retrieved from: <https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=NG>