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ARABLE CROP FARMERS' PERCEPTION OF MODERN AGRICULTURAL EXTENSION APPROACHES IN OGUN STATE, NIGERIA

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ABSTRACT

It is crucial for Nigeria to enhance and increase agricultural food production in order to satisfy the country's expanding population's rising food needs. The study assessed the arable crop farmers' perception of modern agricultural extension approaches (MAEAs) in crop production in Ogun State, Nigeria. A systematic questionnaire guide was created to gather pertinent data from 144 randomly chosen crop farmers for the study, the specific objectives of the study include socioeconomic characteristics, the strategies deployed, their perceptions, and the challenges they encountered when evaluating and using the MAEAs. The findings revealed that the majority of arable crop farmers were married (89.6%), male (84.7%), and able to take part in one or more MAEAs. The results demonstrated that the majority of respondents knew of and took part in the Good Agricultural Practices (GAPs) extension approach. Majority of the respondents perceived that MAEAs had effectively disseminated relevant agricultural information to them **(**$\bar{x}$ = 4.40). Furthermore, crop farmers' insufficient financial resources was the main challenge leading to their inability to access and use MAEAs ($\bar{x}$ = 2.50). Arable crop farmers' perceptions of MAEAs had no significant relationship with sex, marital status, or level of education, as revealed by the chi-square test; however, the correlation analysis revealed that farm size (r=0.175, P<0.05) was significant. Arable crop farmers and other agricultural production stakeholders should put their best effort going forward to maintain the positive perceptions of MAEAs on crop production.

Keywords: MAEAs, perception, arable crop farmers, crop production.

INTRODUCTION

Over 70% of Nigerians are employed in agriculture, which accounts for more than 20% of the nation's GDP and is essential to its economic growth (Osabohien et al., 2019). However, the industry is confronted with many obstacles, including but not limited to low productivity, restricted access to inputs and loans, inadequate infrastructure, and a low uptake of contemporary agricultural technologies (Balana and Oyeyemi, 2022). Since smallholder farmers make up majority of farmers in rural areas, these issues are especially severe there because they lack access to the tools and knowledge necessary to enhance agricultural methods to boost their yields (Chiaka et al., 2022). Compared to other parts of the world, agricultural production has grown far more slowly in sub-Saharan Africa, and crops there only produce 20% of what could be produced (Bjornlund et al., 2020). Poor soil fertility status, which arises from ongoing cropping without replenishing the lost nutrients, is a major cause of the wide output discrepancies. In this context, the population is expanding quickly, and the effect of climate change is already being experienced (Aleminew and Alemayehu, 2020).

To satisfy the rising food demands of the expanding population, Nigeria must enhance and increase its agricultural food production. To guarantee food availability and sufficient reserves to meet the food needs and improved livelihood for the rural dwellers, economic growth, and agricultural expansion, there is a need for increased effort to produce indigenous plants (Olowo et al., 2022. Obiora et al., 2023).

However, arable crop farmers continue to be "strugglers/hustlers" who engage in a variety of businesses in order to make ends meet (Olowo et al., 2022). The opinions of crop producers, who are recognised in their local communities as authorities on native plants, are known to researchers. Many indigenous plant cultivation systems have inherent limitations that have led to low production and poor availability, such as low acceptability, limited input availability, land tenure issues, and a long maturity period. Despite these limitations, the cultivation of these plants continues in rural communities (Zhang et al., 2024). Whether they work alone or for a large farm or company, arable crop farmers are people who actively grow and harvest traditional

row crops like maize, soybeans, wheat, cotton, potatoes, canola, sunflowers, flax, sugar beets, field peas, and many others. The foundation of sub-Saharan Africa's food production system is provided by crop producers' farming operations (Negash et al., 2018). According to Franke et al. (2014) and Ritzema et al. (2017), crop farmers are hesitant to invest in their small farms because of the low returns in food and farm income. Instead, they concentrate on off-farm options to support their families. The possibility for sustainable growth and community empowerment is indicated by crop farmers' favourable opinions of the applicability and efficacy of modern agricultural extension approaches (Giller, 2021).

Therefore, the complete network of organizations that assist those working in agriculture in resolving issues and acquiring knowledge, skills, and technology to improve their well-being and standard of living is known as agricultural extension services (Antwi-Agyei and Stringer, 2021). Providing farmers with pertinent agricultural technologies and information is another aspect of agricultural extension. This leads to the agricultural extension technology transfer model, which is widely regarded as the primary goal of agricultural extension. This is predicated on the idea that knowledge is disseminated to recipient farmers through extension agents using "modern" agricultural extension practices (Azumah et al., 2018). Accordingly, agricultural extension is the deliberate dissemination of knowledge to assist farmers in developing sensible viewpoints and making wise farming decisions (Azumah et al., 2018). Nigerian agricultural extension has developed over time, offering insights into the historical background and laying the groundwork for modern agricultural extension approaches. These approaches include: ICT-Based Information Dissemination, Farmer Business Schools, Africa Cassava Agronomy Initiative (ACAI), Good Agricultural Practices (GAP), Value Chain Development Programme (VCDP), Cassava: Adding Value for Africa (CAVA), Good Agricultural Practices and Participatory Learning and Action (PLA).

ICT-based platforms, including websites, SMS services, and mobile applications, allow agricultural information to be widely and promptly disseminated to rural residents, by granting farmers access to weather forecasts, market pricing, crop management techniques, and other pertinent data, these platforms enable them to make well-informed decisions (Anteneh and Melak, 2024).

Farmer Business School (FBS) programs would focus on developing strong organizational and managerial skills in addition to technical talents. Consequently, FBS was created to help farmers improve their knowledge and abilities to increase the profitability of their enterprises and to further their understanding of business. Global farming is changing significantly as a result of industrialization, commercialization, liberalization, social change, and development, according to Adetarami et al. (2022). In reaction to these developments, the Food and Agriculture Organization of the United Nations has developed a range of specialized training resources on market-oriented agricultural business management. Adetarami et al. (2022) state that the Farmer Business School (FBS) is a Cocoa Livelihood Program (CLP) that was organized in 2010 by the German International Corporation (GIZ). It is intended especially to teach farmers business skills.

The Africa Cassava Agronomy Initiative (ACAI) was a project supported by the Bill & Melinda Gates Foundation that was implemented in five African countries: Nigeria, Tanzania, the Democratic Republic of the Congo, Ghana, and Uganda. The project's objective was to make more suitable and reasonably priced technology available in order to sustainably raise the target nations' short- and long-term cassava agricultural productivity (Andam et al., 2024).

The FAO defines good agricultural practices (GAPs) as the practices necessary to make agricultural production systems socially sustainable, economically profitable, and productive as well as to protect human health and the environment. GAPs will be crucial to improving Nigeria's overall agricultural output and exports to both domestic and international markets (Aydın & Aktürk, 2018).There have been demands for the employment of "good agricultural practices" in an effort to increase food production (Olayemi et al., 2020).

The Value Chain Development Programme (VCDP) was created by the Federal Government of Nigeria (FGN) and the International Fund for Agricultural Development (IFAD) to address the issues facing the nation's agriculture, realising that it has great potential if properly harnessed. Reducing rural poverty and achieving faster, sustainable economic growth in the program area are the main goals of the intervention. However, the study had four goals to evaluate how the program affected smallholder rice and cassava farmers (Adi et al., 2024).

Cassava: Adding Value for Africa (C:AVA): In order to improve the general well-being of rural communities, this strategy places a strong emphasis on capacity building, market accessibility, and sustainable farming methods. An ongoing initiative in Nigeria called Cassava: Adding Value for Africa (C:AVA) is funded by a grant from the Bill & Melinda Gates Foundation. Value chains for High Quality Cassava Flour (HQCF) is being developed as part of the initiative to directly benefit smallholder households, especially women and underprivileged groups, by increasing their earnings and standard of living (Adetarami et al., 2022).

Participatory Learning and Action (PLA): PLA is a method for understanding and interacting with communities. It is designed to support a process of group analysis and learning by fusing an ever-expanding toolkit of visual and participative techniques with organic interviewing methodologies. The method can be applied to project and program planning, monitoring, evaluation, and need identification. Despite being a potent instrument for consultation, it provides the chance to move beyond simple consultation and encourage communities' active involvement in the issues and interventions that influence their lives (Dara and Kesavan, 2024).

Arable crop farmers' perception about modern agricultural extension approaches is influenced by a number of factors. Among the main elements influencing their perception are sociocultural norms, educational background, accessibility to ICTs, and the availability of extension services. Furthermore, perception and adoption rates can be greatly impacted by the participation of women and young people in extension programmes as well as the function of community-based organizations.

Challenges in Ogun State, limited access to ICT infrastructure, poor finances, and undertrained extension staff are some of the obstacles that prevent modern agricultural extension practices from being successfully implemented in rural communities, despite the potential advantages (Aromolaran et al., 2024).

Modern agricultural extension approaches (MAEAs) have not been widely adopted by arable crop farmers in Ogun State, despite the Nigerian government's best attempts to promote them. This issue is impeding the ability of contemporary agricultural techniques and technology to raise crop producers' income and productivity in Ogun State. In the light of the fore-going, the study attempts to fill this knowledge gap by investigating arable crop farmers' perspectives of modern agricultural extension approaches and proffering ways to encourage their adoption in Ogun State, Nigeria. Additionally, the study particularly: described the socio-economic characteristics of arable crop farmers, identified the existing agricultural extension approaches available, determined the strategies deployed by the modern agricultural extension approaches, examined the effectiveness of the deployed strategies on the arable crop farmers, determined how arable crop farmers perceive the effectiveness of the different modern agricultural extension approaches in improving agricultural production and identify challenges faced by the arable crop farmers in accessing and utilizing modern agricultural approaches.

The Study Area

Nigeria's Ogun State served as the site of this study. One of Nigeria's 36 states, Ogun State was established on January 3, 1976, and has a population of over 5.2 million. It is primarily a Yoruba-speaking state. With Lagos State to the south, Oyo and Osun States to the north, Ondo State to the east, and the Republic of Benin to the west, it is situated in the South-West geopolitical zone. The state's capital and biggest city is Abeokuta (Adeleye et al., 2020). According to statistics, Ogun State's rural areas, which are the centre of agricultural activities, are home to roughly 3 million people. There are most likely more than 360,000 farming households, with an average family size of 4.8 people (Ityokumbul, et al., 2020). The State recently purchased more than 47,334 hectares of agricultural land in 28 communities spread across various Local Government Areas (LGAs) that are thought to be suitable for growing crops like oil palm, rice, cocoa, cassava, maize, and plantains (Adeleye et al., 2020). Ogun State is separated into four ecological zones based on soil characteristics, relative humidity, rainfall, vegetative cover, temperature variations, and day length that have been determined to be most suitable for the production of specific crops and livestock in order to guarantee food security. These areas are the Guinea savannah, the rain forest, the mid-region of the rain forest, and the freshwater swamp (Sanusi et al., 2021).

Sampling Techniques and Sample Size

Arable crop farmers in Ogun State make up the research population. When the research was conducted in the study region between October 2023 and March 2024, there was no full list of arable crop farmers.

A multistage purposive random sampling technique was used to select the respondents for the study. The Ogun State Agricultural Development Project (OGADEP) has

categorised four Agricultural Development Project (ADP) zones in the state namely Ilaro, Ijebu-Ode, Abeokuta and Ikenne zones, which are further divided into blocks and cells. The first stage involved the random selection of a block from each zone i.e. Ilugun, Ijebu-Ife, Someke, and Oke-Odan blocks. One extension cell from each block making a total of four cells, were randomly chosen premised on the high intensity of arable crop production by subsistence farmers in the cells.

In the second stage, three (3) villages were chosen at random from each of the chosen cells for a total of twelve (12) villages.

Hence, at the final stage, twelve (12) arable crop farmers were chosen at random, bringing the total number of respondents working on this project to 144.

Data Collection

In order to get pertinent information from the respondents, a structured questionnaire was employed in conjunction with primary data.

Measurement of the study variables

Strategies deployed by modern agricultural extension approaches to improve crop production were measured at ordinal level of 5-points Likert response type as: Always (5), Often (4), Sometimes (3), Rarely (2), Never (1). The effectiveness of the deployed strategies in promoting crop production was measured at ordinal level using 5-points Likert response format as: Very effective (1), Effective (2), Undecided (3), Slightly effective (4), Not effective (5). The respondents' perception of the effectiveness of modern agricultural extension approaches in crop production was measured at ordinal level using 5-points Likert response format as: Strongly agree (5), Agree (4), undecided (3), Disagree (2), and Strongly disagree (1). The challenges faced by the respondents in accessing and utilizing modern agricultural extension approaches in agricultural production was measured at ordinal level using 4-points Likert response type as: Not a challenge (1), somewhat of a challenge (2), Moderate challenge (3), Extreme challenge (4).

Data Analyses Technique

The socioeconomic backgrounds of the respondents and other objectives were described using descriptive statistics like percentage, mean, frequency distribution, and standard deviation, while the hypothesis was tested using Chi-square and Pearson and Product Moment Correlation (PPMC).

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

According to the results in Table 1, 84.7% of the respondents were men and only 15.3% were women. This result clearly shows that more men than women took part in one or more of the study's up-to-date agricultural extension approaches. Of the respondents, most (59.02%) are between the ages of 41 and 60, with a mean age of 47.89 years. This suggests that they were still actively engaged in farming and that they are important players in farming and associated activities. Additionally, 89.6% of arable crop farmers are married, which suggests that they have commitments to their families and may be more interested in making sure their farming methods are successful for the benefit of their households (Oke, et al., 2023).

Furthermore, every respondent has completed formal schooling, from elementary school to tertiary level. This conclusion was corroborated by Mapiye et al. (2023), who noted in a related study that most respondents are qualified to offer reliable information about modern agricultural methods in the field of crop production due to their educational backgrounds, guaranteeing the success of their agricultural methods for the welfare of their households.

The findings also indicated that the average household size of the respondents was five people. The results indicated that crop producers were included in the research area's family arrangement, which is typically thought to be significant for employment opportunities in agriculture. This result is consistent with that of Esteve et al. (2024), who found that households had an average of five people. Farm sizes ranged from 6 to 10 hectares for roughly 47.0% of the crop growers. Additionally, the data showed that the respondents' mean monthly income was ₦145,763.89. The majority of respondents (75.7%) used hired labours, according to the statistics. This suggests that when family labour was either unavailable or insufficient, hired labour filled the void.

Along with the findings, the data showed that 50.0% of the arable crop farmers had been farming for more than 15 years. This suggests that the responders have over ten years of experience in the agricultural production business. Additionally, the findings showed that mixed cropping was the cropping pattern of production for 50.0% of the crop farmers. All responders (100%) did, however, confirmed that they have access to extension services

Table 1: Socio-Economic Characteristics of Respondents (n=144)

Social- economic characteristics	Frequency	Percentage	Mean ($\bar{x}$)
Sex			
Male	122	84.7	
Female	22	15.3	
Age (year)			
≤20	-		
21-40	45	31.25	
41-60	85	59.02	47.89
≥60	14	9.72	
Marital Status			
Single	15	10.4	
Married	129	89.6	
Level of education			
No formal education	-	-	
Primary education	6	4.2	
Secondary education	54	37.5	
Tertiary education	84	58.4	
Household size (number)			
1-5	47	32.6	
6-10	45	31.25	5.08
11-15	17	11.8	
above 15	35	24.3	
Farm size (Ha)			
1-5	47	32.6	
6-10	67	46.52	7.08
11-15	6	4.16	
Above 15	22	15.27	
Monthly Income (naira)			
≤₦50,000	11	7.63	
₦50,001- 100,000	36	25.0	
₦100,001- 150,000	69	47.91	145,763.898
>₦150,000	28	19.44	
Labour			
Family labor	14	9.7	
Hired labor	109	75.7	2.05
Cooperative labor	21	14.6	
Years of farming experience (years)			
≤5	-	-	
6-10	51	35.41	
11-15	21	14.58	
>15	72	50.0	14.51
System of production			
Monoculture	34	23.6	
Mixed farming	72	50.0	
Crop rotation	23	16.0	
Inter cropping	-	-	
Organic farming	15	10.4	
Access to agricultural extension services			
Yes	144	100.0	
No	-	-	

Different Modern Agricultural Extension Approaches

All respondents were able to name at least one Modern Agricultural Extension Approach (MAEA), according to the results on Table 2. The data indicates that 53.5% of the participants were aware of and engaged in the Good Agricultural Practices (GAP) extension strategy. This is an effort to strengthen and improve food safety supervision by educating farmers on better agricultural techniques for the production of vegetables, cereals, pulses, roots, and tubers. It also reveals that 48.6% of the respondents were aware of the Africa Cassava Agronomy Initiative (ACAI), which seeks to help Nigerian crop producers realise their full potential by creating a value chain for commercially sustainable cassava seeds based on farmers purchasing high-quality seed from active and successful village seed entrepreneurs and basic seed production connected to cassava processors. About 46.0% of those who were aware of and took part in the Farmer Business School (FBS) extension method came next. Furthermore, the results showed that 38.6% of the respondents were aware of and took part in the Cassava: Adding Value for Africa (C:AVA), and 30.6% of the respondents were aware of and took part in Value Chain Development Program (VCDP). This shows that the Nigerian government is interested in processing and adding value to agriculture farmers' produce in order to reduce waste, boost income, and improve crop farmers' standard of living. Furthermore, advances in training are the focus of information and communication technology (ICT) (24.3%).

The result is consistent with those of Cafer and Rikoon (2018), who stressed that agricultural extension strategies can be an effective means of assisting smallholder crop producers in ending the cycle of poverty, vulnerability, and low productivity. Farmers are better able to access financing, market solutions, and information and resources regarding contemporary agricultural methods thanks to extension programs.

Table 2: The Different Modern Agricultural Extension Approaches (n= 144)

Modern agricultural extension approaches	Frequency**	Percentage
Good Agricultural Practices (GAP)	77	53.5
Africa Cassava Agronomy Initiative (ACAI)	70	48.6
Farmer Business School (FBS)	66	45.8
Cassava: Adding value for Africa (C: AVA)	56	38.9
Value Chain Development Programme (VCDP)	44	30.6
Information Communication Technology (ICT)	35	24.3

**= Multiple responses

Strategies Deployed by Modern Agricultural Extension Approaches

Table 3 presents the ranking order of the strategies used by modern agricultural extension approaches. The results indicate that among these strategies, training and workshops for arable crop farmers were ranked first, followed by soil fertility management and partnership and collaboration with farmers and other agricultural organisations, which were ranked second and third, respectively. This demonstrates how successful extension agents have been at spreading knowledge and encouraging cooperation among farmers. According to Azumah et al. (2018), agricultural extension is viewed as a human-centered endeavour that aims to change or improve knowledge, attitude, practices, and skills through education and other support services. It also provides farmers with technical advice on agriculture and the inputs and services they need to support crop production.

On the other hand, value addition and processing and environmental stewardship came in last (ranked 14th and 15th, respectively). This shows that among the strategies used by modern agricultural extension approaches, ecosystem and biodiversity conservation—which reflects a dedication to sustainable resource management and long-term environmental well-being—has not always been available. Modern agricultural extension approaches also used low-tech methods like value addition and raw material processing to help local development and economic diversification, create jobs, and improve the socioeconomic prosperity of communities by producing higher-value goods (Bergman and Feser, 2020).

Table 3: Strategies Deployed by Modern Agricultural Extension Approaches

Strategies	Mean ($\bar{x}$)	SD	Rank
Training and workshops	4.53	0.83	1st
Partnerships and collaboration	3.90	1.03	2nd
Farm management skills	3.83	1.24	3rd
Soil fertility management	3.79	1.21	4th
Record keeping and traceability	3.76	1.16	5th
Food safety practices	3.75	1.17	6th
Demonstration farms	3.61	1.27	7th
Access to finance and credit	3.50	1.39	8th
Farm business concept	3.40	1.45	9th
Market access and linkages	3.39	1.26	10th
Financial literacy	3.37	1.13	11th
Monitoring and evaluation	3.31	1.65	12th
Mobile apps and information systems	3.14	1.48	13th
Environmental stewardship	3.12	1.20	14th
Value addition and processing	3.06	1.11	15th

Effectiveness of the deployed strategies in promoting crop production

The outcome on Table 4 demonstrates how effective strategies deployed to support agricultural production worked in the study area. The results indicated that the efficacy of training and workshop sessions in improving crop farming knowledge and skills came first place, while the use of demonstration farms to assist arable crop farmers in better understanding and putting new farming techniques into practice came in second. In their various findings, Argaw et al. (2023), Bonilla et al. (2023), and Anil et al. (2024) stated that modern agricultural extension approaches, when used appropriately, provide the essential components that arable crop farmers require to increase their agricultural productivity. This supports their findings. Thus, it is imperative to develop the agricultural sector through a programme to enhance production as fast as possible in order to achieve self-sufficiency right away.

On the other hand, environmental stewardship that has helped farms adopt sustainable farming techniques, as well as the effectiveness of using mobile apps and information systems to provide pertinent agricultural information and assistance, were ranked 10th and 11th, respectively. This suggests that sustainable farming methods and biodiversity initiatives have not been successful in protecting the farm ecosystem. Additionally, farmers have found that using information systems and mobile apps to get essential agricultural information and assistance has not been successful.

Perception of the effectiveness of the different modern agricultural extension approaches in agricultural production.

The respondents' degree of perception regarding the effectiveness of the various modern agricultural approaches to extension was shown by the results in Table 5. According to the table, the respondents testified that modern agricultural extension approaches successfully provide farmers with pertinent information, which was ranked first with a mean score of 4.40. This finding supports the findings of Egwu (2015) and Ejem et al. (2023), who claimed that the foundation of "modern agricultural extension approaches" is that information is communicated to recipient farmers through extension agents, and that agricultural extension is the deliberate dissemination of information to assist farmers in developing sound judgments and making wise farming decisions. With a mean score of 4.27, the respondents also attested to the fact that the information they received from modern extension services improved their agricultural practices, this was ranked second. This suggests that the respondents strongly support and have a positive opinion of the efficient extension services offered by modern agricultural extension approaches.

The perceptual statements that were ranked lowest, with mean scores of 2.06 and 2.05, respectively, were that I would not recommend modern extension services to fellow farmers and that modern agricultural extension approaches have negatively impacted agricultural production. This suggests that more farmers should be aware of and involved in modern-day agricultural

extension approaches, emphasizing the potential for long-term, sustainable growth in the agricultural industry.

Table 4: Effectiveness of the deployed strategies in promoting agricultural production (n= 144)

Effectiveness of Deployed Strategies	Mean ($\bar{x}$)	SD	Rank
Workshops and training events to improve knowledge and abilities in crop farming.	4.33	0.97	Ist
Use demonstration farms to better comprehend and use innovative farming methods.	3.88	1.02	2nd
Techniques for managing soil fertility to increase crop yields and soil health.	3.76	1.12	3rd
Partnerships and affiliations with other farmers, regional institutions, and groups.	3.72	1.22	4th
The quality and safety of agricultural goods have been ensured with the use of strategies for food safety measures.	3.70	1.34	5th
Planning, organising, and supervising farming operations are now easier with the help of farm management skills.	3.65	1.29	6th
Agricultural products' value addition and processing enhanced income and expanded market opportunities.	3.64	1.22	7th
Traceability and record keeping have aided in farming operations management and enhanced decision-making.	3.53	1.27	8th
Financial decision-making for farming businesses was aided by strategies to increase financial literacy.	3.51	1.24	9th
Environmental stewardship techniques have helped to protect farm environments.	3.45	1.36	10th
Information systems and mobile apps that offer pertinent agricultural advice and information.	3.35	1.05	11th

Table 5: Perception of the effectiveness of the different modern agricultural extension approaches in agricultural production (n = 144)

Perceptual statements	Mean ($\bar{x}$)	SD	Rank
Modern agricultural extension methods efficiently provide farmers with pertinent information.	4.40	0.84	1st
Modern extension services give me information that helps me enhance my agricultural practices.	4.27	0.74	2nd
Modern agricultural extension approaches have given me access to better seeds, fertiliser, and other resources.	4.14	0.97	3rd
Farmers' active participation in workshops and training was encouraged by modern agricultural extension approaches.	4.12	0.87	4th
Access to new farming techniques and technologies is made possible by modern extension approaches.	4.03	0.89	5th
The information presented using modern extension approaches is simple for me to understand.	3.97	1.01	6th
I believe that the modern extension approaches are essential for the sustainable development of agriculture.	3.72	1.54	7th
Communication between farmers in the community has not improved with the use of modern extension approaches.	2.44	1.34	8th
I would not recommend the modern extension services to fellow farmers.	2.06	1.21	9th
The modern agricultural extension approaches have negatively impacted my agricultural production.	2.05	1.24	10th

Constraints faced by arable crop farmers in accessing and utilizing modern agricultural extension approaches.

The result in Table 6 reveals the constraints faced by arable crop farmers in accessing and utilizing modern agricultural extension approaches in the study area. The result shows that respondents with mean score of (2.50) claimed that limited financial resources was the major constraint faced among the problems confronting crop farmers in accessing and utilizing modern agricultural extension approaches. This was followed closely by climate change and limited access to information and communication technology (ICT) with the mean scores of (2.43 and 2.42) respectively. This finding implies that, farmers are willing and ready to work but are not given adequate financial resources required to carry out what they've been taught. Also, the findings implies that climate change-induced shifts in temperature and precipitation patterns has been a major cause of increased variability in crop yields, posing challenges to farmers as traditional growing seasons and conditions undergo alterations.

On the other way round, the result shows that respondents with mean scores of (1.75 and 1.61) claimed that communication barriers and information overload has not been a challenge to them in accessing and utilizing modern agricultural extension approaches in the study area. This is an indication that, extension agents has been clear and concise when communicating with farmers and also has been following the standard of teaching in order not to overload farmers with information which can impede collaboration and understanding and also hinder the smooth flow of information amongst the farmers.

Table 6: Constraints faced by arable crop farmers in accessing and utilizing modern agricultural extension approaches.

Challenges of modern agricultural extension approaches	Mean ($\bar{x}$)	SD	Rank
Limited financial resources	2.50	0.59	1st
Climate change	2.43	0.63	2nd
Limited access to Information and Communication Technology (ICT)	2.42	0.66	3rd
Insufficient training and capacity building	2.32	0.69	4th
Inadequate infrastructure (e.g.,electricity, internet connectivity)	2.28	1.16	5th
Modern Agricultural extension approaches coincide with farming seasons	2.15	0.63	6th
Shortage of inputs	2.14	0.69	7th
Lack of accessibility of inputs to demonstrate what is being taught by the extension agents	2.06	0.75	8th
Distance to extension centers	2.03	0.76	9th
Language barriers	1.83	0.81	10th
Gender and socio-cultural barriers	1.77	0.78	11th
Communication barriers	1.75	0.71	12th
Information overload	1.61	0.60	13th

Relationship between socioeconomic characteristics of arable crop farmers and their perception

The association between the respondents' perceptions and their socioeconomic factors is displayed in Table 7. The findings in Table 7 indicate that, at the 0.05 level of significance, arable crop farmers' perceptions of modern agricultural extension approaches were not significantly influenced by sex ($\chi^2 = 85.322$, $P > 0.05$), marital status ($\chi^2 = 210.274$, $P > 0.05$), or educational attainment ($\chi^2 = 261.228$, $P > 0.05$). This signifies that any farmer being male or female, singled or married, and educated or illiterate could participate in modern agricultural extension approaches, utilize and adopt them to boost their crop production.

Table 7: Test of the relationship between socioeconomic characteristics of arable crop farmers and their perception on modern agricultural extension approaches

Variables	Chi square (χ^2)	Df	p- value	Decision
Sex	85.322	4	0.052	NS
Marital status	210.274	16	5.401	NS
Level of education	261.228	12	0.403	NS

Df = degree of freedom, χ^2 is significant when p- value is ≤ 0.05, NS = not significant

Relationship between socioeconomic characteristics of arable crop farmers and their perception

The correlation analysis between the respondents' perceptions and socioeconomic variables is displayed in Table 8. It demonstrates a substantial relationship between arable crop farmers' perceptions and farm size (r=0.175, P<0.05). This suggests that arable crop farmers' perceptions of modern agricultural extension approaches are significantly influenced by farm size. Arable crop growers are more likely to use modern agricultural extension approaches to raise crop yields as their farms get bigger (Pretty and Bharucha, 2014).

Table 8: Test of the relationship between socioeconomic characteristics of arable crop farmers and their perception on modern agricultural extension approaches

Variables	r- value	Sig	Decision
Household size	-0.06	0.92	NS
Farm size	0.175	0.036	S
Monthly Income	-0.076	0.36	NS
Years of farming experience	-0.051	0.54	NS

Correlation is significant when the level of significance is ≤ 0.05 , r- value = correlation value, NS = not significant, S = significant

CONCLUSION AND RECOMMENDATIONS

The establishment of MAEAs aims to improve rural livelihoods, strengthen food security, and promote agriculture as a pro-poor economic growth engine by educating farmers about new technology, agricultural information, and other related topics. This study aimed at assessing arable arable crop farmers' perception on modern agricultural extension approaches in agricultural production in Ogun State, Nigeria. The study found out that Good Agricultural Practices (GAPs) was the major extension approach the arable crop farmers are aware of and participated more in the study area. The inability of arable crop farmers to perceive and utilize modern agricultural extension approaches before decisions are made on their crop production or proposed action, and solving agricultural problems by analyzing the components that affect or influence the adoption of multiple agricultural practices at their farm levels had resulted to climate and environmental challenges, value addition and processing challenges, mobile apps and information systems resource limitations, and social capital challenges.

In light of this, it is necessary to put pressure on the sponsors and contributors of agricultural projects to solve the unfavourable climate and environmental conditions that should encourage crop growers to use MAEAs. To maintain the positive perspectives about modern agricultural extension approaches to agricultural production, arable crop farmers and other stakeholders in agricultural production should put in their best effort going forward. Finally, arable crop farmers should have access to sufficient funding in the form of subsidies, low-interest or free loans, and farm inputs so they can implement the lessons they have learnt from MAEAs.

Author's Contribution

Oluwaseun Adetarami; the lead researcher, Onifade Precious Abimbola and Dada Emmanuel Olusegun designed the research article, collected, sorted, analyzed data and wrote the article. Jegede Olugbenga and Oloruntoba Bayosile Emmanuel provided literature review, supervised and proofread the work.

Conflict of interest

No conflicts of interest have been disclosed by the authors.

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