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# ARABLE CROP FARMERS' CLIMATE MITIGATION STRATEGIES THROUGH ORGANIC FARMING IN SOUTHWEST NIGERIA

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#### **ABSTRACT**

The study assessed arable crop farmers' climate mitigation strategies through organic farming in South West, Nigeria. It evaluated arable crop farmers' perception, examined the benefits, and described the constraints. A multi stage sampling procedure was used in selecting 381 respondents. Data were collected using questionnaire, structured interview schedule, FGD and analyzed using descriptive statistics and Regression Analysis. The study revealed that farmers' had positive perception, "cover crops reduces evaporation" as the highest ( $\bar{W}$  4.81). It was observed that arable crop farmers' most practiced climate mitigation strategy was especially soil water conservation techniques ( $\bar{W}$  2.83), followed closely by changing planting dates and periods ( $\bar{W}$  2.82), planting of improved crop varieties ( $\bar{W}$  2.81) diversification of farming activities ( $\bar{W}$  2.80). The most constraint was lack of financial support with ( $\bar{W}$  3.74). Regression test showed there was a moderate positive relationship between perception of organic farming practices and climate mitigation strategies of farmers, the result also revealed a weak negative relationship between constraints and climate mitigation strategies. Despite the financial constraints, farmers in Southwest Nigeria still had positive perception of organic farming practices which enabled them to adopt climate mitigation strategies, resulting in farmers benefiting from improved livelihoods, increased crop resilience, and reduced environmental degradation. The study recommends that there should be collaboration with local government agencies, NGOs and private sector organizations to support organic farming and to overcome financial constraints. Benefits of organic farming should be show cased and farmers should be given timely information on best organic practices, to make informed decisions.

Keywords: Knowledge, Climate Mitigation Strategies, Constraints

#### INTRODUCTION

There has been a tremendous development to the negative impact of conventional farming systems and it has become crucial to mitigate these effects but several factors exists that affects farmer's willingness to participate in organic farming practices (UNFCCC, 2025). As the world struggle with the challenges of climate change, there is growing recognition for the need for sustainable agricultural practices that can alleviate its impacts. Organic farming, with its weight on natural soil management, biodiversity, and efficient water use, has emerged as a hopeful approach to dropping the environmental impression of agriculture while encouraging climate resilience. By practicing organic farming, farmers can improve soil health, conserve water and reduce greenhouse gas emission, thereby contributing to climate change mitigation. On the other hand, organic farming practices can enhance farmers' adaptability to climate change by promoting ecosystem services, improving crop diversity and above all supporting rural livelihood. Since its inception in 1962, the Diffusion of Innovation (DOI) Theory by E.M. Rogers has concentrated on how an idea, practice spreads within a single social group or between various groups. The foundation upon which diffusion research is constructed is the innovationdecision process. The method by which a decision maker (representing any unit of analysis that is a farmer) decides whether to embrace, reinvent (modify), or reject organic farming training is described. The first step of decision-making is when the farmer becomes aware of the innovation's existence and discovers how it works. The farmers develops a

positive or negative attitude about the invention during the persuasive stage.

The decision made by the farmer to accept or reject the innovation is the subject of the third stage. The fourth step, implementation, involves putting the innovation to use (either in its chosen form or in a modified one). It comes after acceptance. In the last phase of confirmation, farmers evaluate and adopt innovation, get input from others, and then decide whether to keep using the innovation as it is, modify it (reinvent it), or reject it. A farmers who is willing to keep practicing or using the innovation is therefore said to be participating in the organic farming practices.

Despite the prospective benefits of organic farming, its practice among arable crop farmers remains limited, and but there is need to appreciate the climate mitigation strategies employed by those farmers that have adopted organic farming practices. (Omobere *et al.*, (2023).

The objectives of the study therefore sought to:

- i. identify the organic farming techniques that farmers practice to mitigate climate change;
- ii. evaluate the arable crop farmers' perception of organic farming practices and;
- iii. describe the constraints to the use of organic farming practices.

#### Statement of Hypotheses

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- There is no significant association between respondents' perception of organic farming practices and climate mitigation strategies.
- ii. There is no significant association between the constraints encountered while practicing organic farming and climate mitigation strategies of farmers.

#### **METHODOLOGY**

Sampling Area: Oyo, Osun and Ekiti States

## **Sampling Procedure:**

A multi stage sampling procedure was used for the study. In the first stage, three states out of the six states in Southwest Nigeria, namely Oyo, Osun and Ekiti, were selected. The second stage involved the purposive selection of eight blocks from the Agricultural Development zones from each state, but in Oyo state two zones were selected because the state has four zones, instead of the regular three zones in Osun and Ekiti. This purposive selection was as a result of the existence of Justice. Development and Peace Initiative (JDPI/JDPC/JDPM/JDPMC) (JDPI - Justice Development and Peace Initiative (Ekiti), JDPC – Justice Development and Peace Commission (Ibadan), JDPM - Justice Development and Peace Makers (Oyo) and JDPMC - Justice Development and Peace Makers Commission (Osun) trained arable crop farmers in the selected blocks. The third stage involved the selection of two (2) communities from each of the blocks in Ekiti and Osun, but three communities were selected from each LGAs in Oyo state, making eighteen (18) communities all together. From the list provided, a total of 141, 120, and 120 organic farmers were randomly selected from Ekiti, Osun and Oyo State. Therefore, a total of 381 respondents were interviewed.

#### **Data Collection**

Data for the study were collected through the administration of questionnaire, interview and focus group discussion to the respondents randomly drawn from the study area.

#### **Data Analysis**

Data collected were analyzed using both descriptive statistics and Regression Analysis. The descriptive statistic used were frequency, mean, percentages and weighted mean.

# RESULTS AND DISCUSSION Respondents' Perception towards Organic Farming Practices

Results shows the statements on perception of farmers towards organic farming practices such as: cover crops reduces evaporation, with weighted mean score of 4.81 while, organic farming increases crop productivity, organic farming is rooted in traditional knowledge, it increases soil organic matter, organic farming is sustainable & eco-friendly, it destroys soil micro-organisms, promotes uptake of nutrients, it increases drought, crops are healthier and palatable, increases farmers income, encourages severe storm, nutrient release is too slow, reduces input cost, it ensures crops are not contaminated, causes increased pest infestation, it causes excessive temperature rise, it causes low crop yield, opens gateway for

high value markets, it's very labour intensive, causes decreased level of income, I struggle to find lucrative market and organic farming doesn't offer any notable benefit, were also perception statement with mean score of 4.67, 4.57, 4.46, 4.38, 4.31, 4.31, 4.30, 4.24, 4.14, 4.13, 4.12, 4.08, 3.94, 3.93 3.86, 3.85, 3.71, 3.26, 3.25, 3.24 and 2.23 respectively.

Cover crops' ability to decrease evaporation shows that arable crop farmers recognize the role of cover crops in preserving water, these farmers also perceive cover crops as encouraging soil health through increased organic matter and nutrient uptake. Statements like "increases crop productivity", "is sustainable & eco-friendly", and "increases soil organic matter" suggest that arable crop farmers perceive organic farming practices as beneficial for production and sustainability. Statements like "crops are healthier and palatable" indicate that farmers believe organic farming practices have direct impact on crop quality, and potentially increasing their income and reducing input costs. The statements with high scores may be as a result of an increased recognition of organic farming's environmental advantages, increased demand of organic produce, support from NGOs and the constant change in consumer preference due to the health benefit. Statements, such as "it increases drought" and "encourages severe storm", may indicate misconceptions or a need for further education.

The implication of these is that there may be increased organic farming practices by farmers, increased food security, improved environmental results and enhanced market opportunities leading to improved farmers livelihood. This study is in agreement with Adeoye *et al.*, (2020) and Fanu, *et al.*, (2024b), they reported that organic farming increases crop production and improves farmers' well-being. Statement such as "Has increased pest infestation" suggests that some farmers believe organic farming can lead to pest problems. Statements like "It causes low crop yield" and "It causes excessive temperature rise" indicate concerns about the impact of organic farming on crop productivity and temperature.

Arable crop farmers also express concerns about accessing lucrative markets and experiencing decreased income. Furthermore, other negative perceptions such as "It's very labour intensive" suggests that some farmers find organic farming to be labor-intensive. The statement "It doesn't offer any notable benefit" indicates that some farmers may not perceive organic farming as beneficial. Some negative perceptions may be based on misconceptions or a lack of understanding about organic farming practices. Providing technical assistance and training on organic farming practices can help farmers overcome challenges related to pest management, yield, and labour intensity. By addressing these perceptions and providing support, it may be possible to increase the participation of organic farming practices among arable crop farmers.

This study is in agreement with (Gaya et al., 2020) who reported that organic foods are nutritious and healthier than the conventionally produced ones, he also believes that it gives

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access to lucrative market. Respondents who have faced difficulties or failure with organic farming in the past might have developed negative perceptions. Therefore it is crucial to promote organic farming, including incentives, subsidies, and regulatory framework that supports sustainable agricultural practices.

The contribution of FGD discussants substantiates this fact:

i. To me organic farming is preferable because before I could not spray chemicals on my farm myself before due to the fact that I usually react to it, but I don't react to any organic materials since I started practicing organic farming

ii. If I didn't have prior knowledge of organic farming practices, it would have been more difficult for me to quickly comprehend the trainings given to us on how to formulate our pesticides and herbicides."

The implication is that organic farming can provide useful benefits for farmers, such as reduced health risks and increased safety, which can contribute to the sustainability and attractiveness of organic farming. On the other hand, having prior knowledge or experience about organic farming can make it easier for farmers to appreciate and adopt new techniques, such as formulating organic pesticides and herbicides.

Table 1: Distribution of Respondents according to Perception towards Organic Farming

Perception of farmers	Total score	Weighted mean score (W)	Ranking
Cover crops reduces evaporation	1835	4.81	1 <sup>st</sup>
Increases crop productivity	1781	4.67	$2^{\rm nd}$
It is rooted in traditional knowledge	1736	4.57	$3^{\rm rd}$
Increases soil organic matter	1642	4.46	4 <sup>th</sup>
It is sustainable & eco – friendly	1657	4.38	5 <sup>th</sup>
It destroys soil micro – organism	1588	4.31	6 <sup>th</sup>
Promotes uptake of nutrients	1590	4.31	$6^{th}$
It increases drought	1539	4.30	$8^{th}$
Crops are healthier and palatable	1618	4.24	9 <sup>th</sup>
Increases farmers income	1513	4.14	$10^{th}$
It encourages severe storm	1334	4.13	11 <sup>th</sup>
Nutrients release is too slow	1485	4.12	12 <sup>th</sup>
It reduces input cost	1529	4.08	$13^{th}$
Ensures crops are not contaminated	1487	3.94	14th
Causes increased pest infestation	1349	3.93	15th
It causes excessive temperature rise	1130	3.86	16th
It causes low crop yield	1333	3.85	17th
Opens gateway for high value markets	1363	3.71	18th
It's very labour intensive	1216	3.26	19th
Causes decreased level of income	1073	3.25	20th
I struggle to find lucrative market	1155	3.24	21st
It doesn't offer any notable benefit	1073	3.23	22nd

Source: Field survey, 2024

Grand mean = 4.036

**Climate Mitigation Strategies in Organic Farming** 

Majority of farmers practiced organic farming techniques to mitigate climate change, it was observed that soil water conservation techniques had weighted mean score of 2.83 while changing planting dates and periods, planting of improved crop varieties, diversification of farming activities, crop diversification, increased farm size, farmers were not given timely information about climate change updates, were also climate mitigation strategies with mean score of 2.82, 2.81, 2.80, 2.74, 2.71, 1.85 respectively.

The result shows the efforts of arable crop farmers in practicing organic farming to mitigate climate change. The findings suggest that farmers are adopting various strategies to adapt to climate change, concentration on soil water conservation, adjusting planting dates, and using improved crop varieties. The weighted mean scores indicate that these practices are being implemented to a moderate extent. The most practiced method was water conservation, which shows efficient water use such as planting drought resistant varieties, irrigation and mulching. Changing planting dates and using improved crop varieties are also widely practiced, indicating farmers' efforts to adapt to changing climate conditions. Diversification of farming activities and crop diversification are also being practiced, which can help reduce risk and encourage resilience. The low score for timely information about climate change updates suggests that farmers need timely updates for prompt decision making.

The adoption of these practices suggests that arable crop farmers are taking steps to build resilience to climate change, which can have positive impacts on agricultural production and food security. The study also reveals the significance of be reduced to the barest minimum (FAO, 2022).

adaptation strategies, such as soil water conservation and planting strategies, in mitigating climate change impacts. The lack of timely information about climate change updates stresses the need for improved knowledge sharing and support systems for farmers to enhance their adaptive capacity.

The participation of arable crop farmers in organic practices and climate-resilient strategies can contribute to sustainable agriculture, promoting ecosystem services and thereby reducing environmental degradation. The implications for food security is that climate-resilient agriculture can help ensure stable food production and accessibility. The lack of access to timely climate information can make arable crop farmers vulnerable to climate-related shocks and stresses. This finding is in agreement with the findings of Obabire, et al., (2021) and Daudu et al., (2020) who indicated that rural dwellers utilized numerous coping strategies. According to Fanu, et al., (2024c), organic farmers have high level of water conservative utilization in Ekiti state. Also according to Dauda, (2023), water conservative practices can improve farm fertility, keep the much needed nutrients in the farm, reduce drought and also help reduce the adverse effect of high temperature. Organic agriculture is beneficial to mitigate climate change because it provides an important way to reduce greenhouse gas, and also reduces harmful exhaust emissions, making the gases which are released into the atmosphere like carbon dioxide, methane and nitrogen dioxide to

**Table 2:** Distribution of Respondents According to Their Practices of Climate Mitigation Strategies

Climate Mitigation	Total	Weighted	Ranking
Strategies	score	mean score (W̄)	
Soil/water conservation techniques	1080	2.83	1 <sup>st</sup>
Changing planting dates and periods	1077	2.82	$2^{\rm nd}$
Improved crop varieties	1074	2.81	$3^{\rm rd}$
Diversification of farming activity	1070	2.80	4 <sup>th</sup>
Crop diversification	1044	2.74	5 <sup>th</sup>
Increased farm size	1033	2.71	6 <sup>th</sup>
Farmers form groups to take loans	967	2.53	$7^{\text{th}}$
Livelihood diversification	923	2.42	$8^{th}$
Migration	825	2.16	9 <sup>th</sup>
Subsidized organic fertilizers and pesticides from NGO	804	2.11	10 <sup>th</sup>
Timely information	705	1.85	11 <sup>th</sup>

Source: Field survey, 2024

# **Constraints Arable Crop Farmers Faced while Practicing Organic Farming.**

The result of this study indicate that respondents encountered very high level of constraints such as: lack of financial support with a weighted mean score of 3.74 while organic material are bulky, preparation of compost manure is stressful, organic farming is time consuming, unavailability of organic inputs, poor institutional support, difficulty in transporting organic materials and poor knowledge of the practice were also constraints to organic farming with mean score of 3.49, 3.45, 3.45, 3.29, 3.31, 3.12 and 2.07, respectively.

Lack of financial support was the most significant constraint indicating that arable crop farmers struggle to access funds or capitals to invest in organic farming. Organic materials being bulky, preparation of compost manure being stressful, and organic farming being time-consuming suggest that farmers

face practical difficulties practicing organic farming. Unavailability of organic inputs and difficulty in transporting organic materials indicate that there were issues with accessing and using organic resources. Poor institutional support and poor knowledge of the practice indicated that farmers may not have had adequate training or support from institutions.

It therefore implies that, stakeholders will have to establish accessible financial support systems, such as subsidies, grants, or low-interest loans, nn help farmers to practice organic farming. More training programmes and workshops can help farmers develop skills in organic farming practices, composting, and manure management, reducing the stress and time associated with these tasks. Investing in infrastructure for transporting organic materials and making organic inputs more widely available can help alleviate operational difficulties. Strengthening institutional support systems, such as extension services, can provide farmers with technical assistance, and resources to overcome knowledge gaps and practical difficulties. Lastly, promoting the benefits of organic farming and raising awareness about its practices can attract more farmers and stakeholders, potentially increasing the availability of organic inputs and support services.

The constraints faced by farmers may hinder the long-term sustainability of organic farming practices, thereby inhibiting environmental benefits and ecosystem services. Limited adoption of organic farming practices due to constraints may affect food security, particularly in regions where organic farming is crucial for local food systems. The financial constraints and operational challenges faced by farmers may affect the economic viability of organic farming, possibly discouraging farmers from adopting these practices. Organic farming can contribute to climate change mitigation and adaptation, but the constraints faced by farmers may limit its potential to address these issues.

Obabire and Ogunjimi (2018) mentioned in their study that the constraints perceived to have caused poor institutional support of extension personnel are lack of incentives and shortage of extension personnel. Finch, (2020) reported that inadequate financial support from both the government and financial institutions in the form of loan or subsidy was mainly the cause of inconsistency in maize farmers' adoption level for organic farming practices. Fanu *et al.*, (2024b) in a study revealed that the cost of transportation of organic inputs to farms in Ekiti state was very high. The implication of this study is that, lack of skilled labour such as access to technical experts can inhibit a farmer's economic growth (Kimaro, 2019).

Table 3: Distribution of Respondents According to the Constraints Faced while Practicing Organic Farming

<b>Constraints to Organic Farming Practices</b>	Total score	Weighted mean score (W)	Ranking
Lack of financial support	1428	3.74	1 <sup>st</sup>
Organic materials are bulky	1332	3.49	2 <sup>nd</sup>
Preparation of the compost manure is stressful	1317	3.45	$3^{\mathrm{rd}}$
Organic farming is time consuming	1318	3.45	$3^{\mathrm{rd}}$
Unavailability of organic inputs	1254	3.29	5 <sup>th</sup>
Poor institutional support	1263	3.31	$6^{th}$
Transportation of organic materials for use is difficult	1192	3.12	$7^{ m th}$
Application of organic materials is tedious	1126	2.95	8 <sup>th</sup>
It encourages high growth of weeds	1118	2.93	9 <sup>th</sup>
Inadequate information	1086	2.85	$10^{th}$
It is an old fashioned practice	1080	2.83	11 <sup>th</sup>
Output market problem	1070	2.80	12 <sup>th</sup>
adopt No appealing odour and physical composition	1042	2.73	13 <sup>th</sup>
Lack of proper awareness of the practices	1019	2.67	14 <sup>th</sup>
Illiteracy	986	2.58	15 <sup>th</sup>
Poor extension contact	966	2.53	16 <sup>th</sup>
Lack of interest by farmers	956	2.50	17 <sup>th</sup>
Poor income from farmers	890	2.33	18 <sup>th</sup>
Poor knowledge of the practices	789	2.07	19 <sup>th</sup>

Source: Field survey, 2024

## **Hypotheses Testing**

Regression Test Showing the Association between Respondents' Perception of Organic Farming Practices and Climate Mitigation Strategies (Dependent Variable), and Regression Test Showing the Association between the Constraints Encountered While Practicing Organic Farming and Climate Mitigation Strategies of Farmers (Dependent Variable).

**Perception**: 0.391 shows a moderate positive relationship between perception and climate mitigation strategies. As perception increases, climate mitigation strategies using organic farming tends to increase moderately. The results

suggest that perception has a stronger positive influence on the climate mitigation strategies compared to constraints, which has a weak negative influence. Perception ( $\beta=0.391$ ) has a moderate positive influence on organic farming practices. This suggests that arable crop farmers who have a more positive perception of climate mitigation strategies by practicing organic farming are more likely to adopt and practice it. Their positive perception might be driven by factors such as perceived benefits to soil health, crop quality, or environmental sustainability.

Constraints: -0.15 indicates a weak negative relationship between constraints and climate mitigation strategies. As constraints increase, climate mitigation strategies using

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organic farming tends to decrease slightly. Constraints ( $\beta = -$ 0.15) has a weak negative influence on organic farming practices. This implies that as constraints (e.g., finance, knowledge, or resource-related) increase, farmers' adoption and practice of climate mitigation strategies by practicing organic farming might decrease slightly.

play significant roles.

The implications for arable crop farmers and their communities:

- 1. It promoting positive perceptions: by focusing on enhancing farmers' perceptions of its benefits, such as through training programs, demonstrations, or success stories can lead to increased adoption and practice of organic farming.
- 2. Addressing constraints: though constraints had a weak negative influence, it is still essential to address them to support farmers in adopting and practicing organic farming, this can be done by providing financial support, training, or inputs to help farmers overcome these constraints.
- 3. Targeted interventions: Policymakers, NGOs and extension services can plan targeted interventions to support farmers in Practices/Constraints Encountered while Practicing Organic Farming and Climate Mitigation Strategies of Farmers (dependent

It shows that about 18.7% of the variance in the outcome may include other factors which are not included in the model but adopting organic farming practices to enable them mitigate the effects of climate change easily. These can be done by providing incentives or subsidies for organic farming inputs, offering training on organic farming practices, facilitating access to markets and helping farmers on the certification for their organic produce.

- 4. Community engagement: engaging with local communities and promoting the benefits of organic farming can help build support and encourage more farmers to adopt organic farming practices in order to mitigate climate change.
- 5. Sustainable livelihoods: promoting organic farming practices will help farmers to potentially improve their livelihoods through increased crop yields, better soil health, and access to superior markets for organic produce.

The null hypotheses are therefore rejected, that there is no significant association between perception of organic farming practices/constraints encountered while practicing organic farming and climate mitigation strategies of farmers, while the alternative is accepted.

Table 4: Regression Test Showing the Association between the Respondents' Perception of Organic Farming

Variables	Beta (Standardized Coefficient)	
Constraints	-0.15	
Perception	0.3912	
R Square (R <sup>2</sup> )	0.187	
Multiple R	0.433	

Field survey, 2024

variable).

#### CONCLUSION AND RECOMMENDATION

The study concluded that despite financial constraints farmers encountered, they still had positive perception of organic farming which enabled them to adopt climate mitigation strategies, with a focus on soil/water conservation to reduce evaporation. The study also shows that it is important to promote positive perceptions (benefits) of organic farming and address constraints to support arable crop farmers in adopting climate mitigation strategies. Therefore, farmers, their communities, and the environment will benefit from improved livelihoods, increased crop resilience, and reduced environmental degradation.

1. There should be collaboration with local government agencies, NGOs and private sector organizations to support organic farming and to overcome financial constraints that can hinder their adoption of climate mitigation strategies.

- 2. Development of policies and programmes that promotes organic farming practices and provide incentives for farmers to adopt sustainable agricultural methods.
- Conduct demonstration or pilot projects to showcase the benefits of organic farming such as improved soil health, increased biodiversity, and enhanced ecosystem
- 4. There should be timely information dissemination to farmers on best practices, climate trends, and market demands to help them make informed decision.

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#### **ANNEX**

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- JDPC Justice Development and Peace Commission (Ibadan)
- JDPM Justice Development and Peace Makers (Oyo)
- JDPMC Justice Development and Peace Makers Commission (Osun)

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