P-ISSN 2322 - 0678 & E-ISSN 3048 - 9946
https://doi.org/10.56572/gjoee.2026.41.2.0021

BENEFITS OF CLIMATE SMART AGRICULTURAL PRACTICES BY VEGETABLE FARMERS IN OGBOMOSO AGRICULTURAL ZONE OF OYO STATE, NIGERIA

Oyerinde, C. M[1]; Kolawole A. E.[2] and Omede, U. D.[3]

1 Ph.D. Scholar Department of Agricultural Extension and Rural Development Landmark University Omuaran Kwara State Nigeria.
2 Senior Lecturer Department of Agricultural Extension and Rural Development Landmark University Omuaran Kwara State Nigeria.
3 Ph.D. Scholar Department of Agricultural Extension and Rural Development Landmark University Omuaran Kwara State Nigeria and Principal Lecturer Department of Agricultural Education, Federal College of Education, Odugbo Benue State
Email : omede.ugbede@lmu.edu.ng

ABSTRACT

The study analysis the benefit of use of Climate Smart Agricultural Practices (CSAP) by vegetable farmers in Ogbomoso Agricultural Zone of Oyo State, Nigeria. A multistage sampling technique was adopted for this study, 197 vegetable farmers was selected and data collected were analyzed using descriptive statistics such as weighted mean score (WMS), frequency, percentage, mean and standard deviation while Pearson Product Moment Correlation (PPMC), Regression analysis and Spearman rank were the inferential tools used to test the hypotheses of the study. The mean age of the vegetable farmers was 50 years, with males constituting 85.5percent of the vegetable farmers. About 89% were married, with an average household size of 5 members. The most commonly used CSAP was intercropping (WMS equals 2.77). The categorization of respondents based on the level of utilization of climate smart agricultural practices by the respondents in the study area revealed majority (mean equals 27.7) of the vegetable farmers utilized climate smart agricultural practices on a moderate level. Also, the major benefit derived from the use of CSAP in the study area was increase in farmers' production with WMS (1.88). The Summary of correlation analysis showing relationship between the benefit derived from the use of climate smart agricultural practices and the use of climate smart revealed that, increase in farmers production. The study recommends that Government and all other concerned agencies should render financial and legislative support for progressive innovations regarding climate smart agricultural.

***Keywords:** vegetable farmers, climate smart agriculture*

INTRODUCTION

Agriculture is the predominant economic industry in many countries and is key to meeting basic needs and livelihoods for 70% of the world's poorest people (GCEC, 2014**.** Climate is an important factor for agricultural productivity and any variation in these factors is bound to result in a larger impact on crop yield (Ashalatha,. 2012). Climate change and its impacts are global, affecting both developed and developing economies. However, the consequences are more severe in developing countries because many farmers have not adopted climatesmart agricultural practices (Bamiro, 2020). Particularly due to climate change, rainfall patterns in the derived savanna agroecology of Nigeria have become unpredictable (Oyekale, 2025). The challenge of rapidly boosting productivity is compounded by the current and expected impacts of climate change among many others. Changes to in precipitation and temperature, especially in marginal areas, are expected to reduce productivity and make production more erratic (Cline, 2008; Lobell and Burke, 2008; Boko 2014). Therefore, agriculture in developing countries must undergo significant transformation mention if it is to meet the growing and interconnected challenges of food insecurity and climate change (FAO, 2010). Vegetable production which deals with the production of this this and that has the potential to increase food security and create employment (Smith and Eyzaguirre 2007). According to Ogunbo *et al.,* (2015) smallholders' farmers make up large number of vegetable producers in Nigeria. The World Health Organization recommended consumption of 400g of fruits and vegetables daily to maintain good health. Vegetables production is profitable, and the actors will require adequate knowledge, capital, and new methods (Dias, 2010). Tomato, pepper, and onion are important vegetables in the global economy due to their high consumption (Schreinemachers**,** *et al.,* 2018). Despite the importance of vegetable in the daily diet, the competitive and comparative advantage in its production still fluctuates in the country Nigeria (Ogunbo *et al.,* 2015). The climate change is drastically affecting its production. The concept of Climate Smart Agriculture (CSA) offers a suite of approaches for transforming and reorienting agriculture systems to support food security in the face of climate change, by focusing on the potential synergies and trade-offs between agricultural productivity and food security, adaptive capacity, and mitigation benefits (Campbell *et al.,* 2014; Vinaya and Gadde, 2025). Climate Smart Agriculture (CSA) is defined as an approach that aims at addressing the challenges of food security and climate change by ensuring there is resilient sustainable systems to increase food productions that may lead to increase of farm income from smallholder's farmers. The use of CSA technology has been widely campaigned for because it is considered to be an efficient way of high productivity in agriculture. This is due to its ability in offering farmers with a "triple win effect" through reduced greenhouse gas emissions, increased production and increased adaptation to climate change especially in countries which highly dependent on agricultural products. To ensure resilience, the use of climate smart practices among small-scale farmers is required. However, Despite the vital role played by climate smart practices in not only enhancing resilience, but also increasing productivity, reducing greenhouse gas emissions, and addressing environmental degradation, their usage by small-scale farmers has been low globally (FAO, 2013). This is due to several lapses and challenges that have not been explored. Efforts to increase food production have only encouraged more synthetic fertilizer and agrochemicals use, as well as encroaching on desertification from agricultural extensification, which are potential sources of GHGs. Sustainable agriculture and now climate smart agriculture has been identified as the way forward in achieving this goal. Similarly, in response to the effects of vagaries of weather attributed to climate change, climate smart practices have been disseminated for several decades (ASDSP, 2014). Despite these efforts, the adoption of climate smart practices has also remained low among small-scale farmers (ASDSP, 2014). In view of the foregoing, it is important to analyze the benefit of use of climate smart agricultural practices among vegetable farmers.

OBJECTIVES

(1) The following specific objectives were set to describe the socio-economic characteristics of the vegetable farmers in the study area,

(2) The following specific objectives were set to determine to what extent do vegetable farmers use climate smart agricultural practices and

(3) The following specific objectives were set to identify the benefits derived from the use of climate smart agricultural practices by the farmers.

METHODOLOGY

Research design

A cross-sectional survey design was adopted to obtain primary data from vegetable farmers.

Study area

The study was carried out in Ogbomoso Agricultural Zone of Oyo State. Ogbomoso Agricultural Zone has five Local Government Areas (L.G.A), namely Ogbomoso North Local Government Area (L.G.A.), Ogbomoso South L.G.A, Ogo-Oluwa L.G.A, Oriire L.G.A and Surulere L.G.A. The estimated population of Ogbomoso during the 2006 population census was 1,200,000 (NPC, 2006). The people of Ogbomoso are predominantly farmers who specialize in growing of vegetables and arable crops. However, other income generating activities includes: trading, carpentry, blacksmithing, weaving, hair dressing, garment making and so on. The residents are majorly Yoruba with few immigrants from the northern and southern part of the country.

Population of the study

The target population of the study comprises all vegetable farmers in Ogbomoso Agricultural zone of Oyo State. A Multistage sampling method was adopted for this study. The study was conducted in Ogbomoso Agricultural zone of Oyo State. A Multistage sampling method was adopted for this study. The study was conducted in Ogbomoso Agricultural zone of Oyo State. Ogbomoso Agricultural zone consists of five local Government Area (LGAs) with each of them representing a block. The first stage involved purposive selection of three blocks from Ogbomoso Agricultural zone, that is, Ogo-Oluwa, Oriire and Surulere blocks respectively due to their rurality and high presence of vegetable farmers. The second stage involved random selection of 33% of the cells in each blocks therefore Lagbedu, Odo-Oba and Ayetoro were selected from Ogo-Oluwa, Iluju, Tewure and Idi Emi was selected from Orire block while Iwofin, Orile-Igbon and Abogunde cells was selected from Surulere block. The last stage involved random selection of 20% of registered farmers in each cell. So therefore a total of 197 respondents was used for the study.

Ethical consideration

The full consent and permission of the respondent were obtained before collecting data. The respondents were not forced to respond to questions or sit for the interview. The privacy of each respondent was taken into consideration. The collected data was presented and analyzed with honesty and transparency. There was also no bias while collecting and presenting the collected data.

Measurement of variables

Data collected for this study were analyzed using descriptive statistics such as weighted mean score (WMS), frequency, percentage, mean and standard deviation while Pearson Product Moment Correlation (PPMC), Regression analysis and Spearman rank were the inferential tools to test the hypotheses of the study. Data was collected from the farmers through the administration of a well-structured interview schedule that contained both open and close ended questions. The interview schedule contained questions that aid the collection of useful information in relation to the stated objectives of this study. The dependent variable is extent of use of climate smart agricultural practices among vegetable farmers and this was measured using a four-point rating scale of always (3), sometimes (2), rarely (1) never (0). Responses generated was computed and categorized into high, moderate and low using mean plus or minus standard deviation.

Data analysis

Data analysis was carried out using descriptive statistics such as frequency distributions and percentages.

RESULTS AND DISCUSSIONS

Socio economic characteristics of the vegetable farmers

Sex

Table 1 shows the distribution of respondents according to their socio-economic characteristics. The result indicated that majority of the respondents (85.8%) were male while 14.2% were female. This indicates that majority of the respondents in the study area were male and it implies that men were the major user of climate smart agriculture for vegetable production in the study area. This result agrees with (Obaniyi, *et al.,* 2024). who opined that, males were more engaged in farming activities than their female counterpart.

Marital status

The distribution of respondents according to marital status, shows that majority (88.8%) of the respondents indicated that they were married, 7.6% were single, 2.0% were separated while 1.5% were divorced. This implies that majority of the respondents had marital experience which will influence their rate of engagement in climate smart agriculture for vegetable production due to high household size. This finding corroborates Solaja *et al.,* (2024) who opined that, agriculture is very much practiced by married people.

Household size

Majority (66.0%) of the respondents' household size range between 1 to 5 members and 34.0% of the respondents' range above 6 members. The result of the findings indicated that the mean household size is 5 members in the study area. This implies that each household has notable number of members in their household that are readily available to engage in climate smart agriculture and this could be as a result of their marital status. This result agrees with Adebayo and Ojogu (2019) who opined that, rural farmers have advantage of family labour availability if many household members participate in farm.

Farming experience

The result in Table 1 further revealed the year of farming experience, it shows that 45.2% of the respondents had farming experience within the range of 21 and 40years and 1 and 20years respectively, while 9.6% had above 40years farming experience. The mean year of farm experience was 25 years. The result of the findings implies that the respondents are quite aware of the various farming technique which they have mastered over the years which could be a validating factor for utilizing climate smart agriculture. The result finding disagrees with Adebayo and Ojogu (2019) who opined that, larger percentage of farmers were young and has lesser years of farming experience.

Size of vegetable farm

The size of vegetable farm by the respondents were revealed in Table 1, it shows that majority (83.3%) had within 1 and 2acres of vegetable farm, 15.2% had within 3 and 4 acres while 1.0% had above 4 acres of vegetable farm land. This implies that the respondents have access to limited land to practice climate smart agriculture.

Table 1: Socio-economic characteristics of the respondents

(n=197)

Socio-economic characteristics	Percentage	Mean
Age(years)		
31-40	0.5	50.80
41-50	13.7	
51-60	35.0	
Above 60	34.5	
Sex		
Male	85.8	
Female	14.2	

Socio-economic characteristics	Percentage	Mean
Marital status		
Single	7.6	-
Married	88.8	
Separated	1.5	
Divorced	2.0	
Level of education		
No formal	9.1	-
Primary education	22.3	
Secondary education	22.8	
Tertiary education	45.7	
Household size		
1 – 5	66.7	-
Above 6	34.0	
Farming experience(years)		
1-20	45.2	25.05
21-40	45.2	
Above 40	9.6	
Size of vegetable farm Acres)		
1-2	83.8	1.95
3-4	15.2	
Above 4	0.5	

Source: Field survey, 2023.

Frequency of use of climate smart agricultural practices

Table 2 shows the frequency of use of climate smart agricultural practices used by the respondents in the study area. Based on the result findings, it was revealed that, intercropping was ranked first with the weighted mean score (WMS) 2.77 as the most used climate smart agricultural practices used by the respondents, residue management was ranked second (WMS= 2.19), planting of improved crop varieties ranked third with (WMS=2.12), use of inorganic fertilizer was ranked fourth (WMS=2.09) while, planting across the slope ranked fifth with (WMS =2.03). Also, the findings of the study revealed that, planting of legumes in crop rotation was ranked sixth (WMS= 2.01), using of animal dungs was ranked seventh (WMS=1.99), reduced/minimum/zero tillage was ranked eighth (WMS =1.95), use of improved vegetable seed variety was ranked ninth (WMS = 1.87) while planting of cover crops was ranked tenth (WMS=1.85). Furthermore, the table revealed that, changing planting dates was ranked eleventh (WMS= 1.64), irrigation was ranked twelfth (WMS =1.51), agroforestry practices was ranked thirteenth (WMS= 1.15), and mulching was ranked fourteenth (WMS =1.21). Lastly, based on the findings of the study, the result revealed that shifting cultivation was ranked fifteenth, (WMS =1.20) and using of compost manure was ranked least (WMS =0.17). This result implies that, intercropping, residue management and planting of improved crop varieties were the majorly used climate smart agricultural practices by the respondents while, mulching, shifting cultivation and use of compost manure were the least used climate smart agricultural practices in the study area. This disagrees with the findings of Yusuf and Ukoje (2012) that application of organic fertilizer is the most utilized climate smart agricultural practice by the farmers but conforms with the findings of Girma (2017) that planting of improved seed varieties is a well-practiced climate smart agricultural practice by the farmers which can improve the yield potential of crops significantly and thus, is one of the most economic and efficient inputs to agricultural development, this is in line with (Ojo *et al.,* 2024).

Table 2: Distribution of respondents by Frequency of Use of Climate Smart Agricultural Practices Used by the Respondents. (n= 197)

Frequency of use of climate smart agricultural practices	WMS	Rank
Planting of improved crop varieties	2.12	3rd
Planting of legumes in crop rotation	2.01	6th
Planting of cover crops	1.85	10th
Changing planting dates	1.64	11th
Intercropping	2.77	1st
Using of compost manure	0.17	16th
Using of animal dung	1.99	7th
Irrigation	1.51	12th
Mulching	1.21	14th
Trees on cropland	1.15	13th
Reduced/minimum/zero tillage	1.95	8th
Residue management	2.19	2nd
Planting across the slope	2.03	5th
Inorganic fertilization	2.09	4th
Shifting cultivation	1.20	15th
Use of improved vegetable seed variety	1.87	9th

Source: Field source, 2023.
Weighted mean score (WMS)

Benefits derived from the use of climate smart agricultural practices.

Table 3 shows the benefit derived from the use of climate smart agricultural practices in the study area, the result revealed that increase in farmers' production was the major benefit derived from the use of climate smart agricultural practices and it was ranked first with weighted mean score (1.88), this was followed by increased income which was ranked second (WMS= 1.85), improved soil

Table 3: Distribution of respondents by benefit derived from Climate Smart Agricultural Practices Used by the Respondents. (n= 197)

Benefit derived from climate smart agricultural practices	WMS	Rank
Improved food security	1.64	4th
Increase in farmers production	1.88	1st
Improved water management	0.99	5th
It safes time	0.62	7th
Increase income	1.85	2nd
Reduced land degradation	0.63	6th
Improved soil fertility	1.67	3rd

Source: Field source, 2023. Weighted mean score(WMS)

fertility was ranked third (WMS =1.67) and improved food security was also ranked fourth (WMS =1.64). Furthermore, the result revealed that improved water management was ranked fifth (WMS =0.99). Reduced land degradation was ranked sixth (WMS=0.63) while, the least was that, its safes times (WMS=0.62). The result of the findings implies that increase in farmers production was the major benefit derived from the use of climate smart agricultural practices while it safes times was the least benefit derived from the use of climate smart agricultural practices. This implies that, climate smart agricultural practices when optimally utilized has huge effect on the economy of the farmers and rural areas at large. The result finding conforms with the findings of Zewdie and Gastel (2008) that security of improved seed varieties by farmers, both in normal and disaster years, is a prerequisite for increasing food production, improving farmers' income, alleviating poverty and ensuring food security in the rural area and the nation at large.

CONCLUSION

From the research findings, it is confirmed that climate smart agricultural practices were being used in the study area with intercropping, residue management and planting of improved crop varieties were mostly utilized based on their weighted mean score. It was also established that climate smart agricultural practices has benefitted the vegetable farmers in various ways through increase in farmers production, increase income, improved soil fertility based on weighted mean score. Thus, this study recommends that, Government and all other concerned agencies should render financial and incentives support for progressive innovations regarding climate smart agricultural practice focusing on lowcost, easytomanage practices and farmer-to-farmer learning can help vegetable farmers in Ogbomoso agricultural zone.

CONFLICT OF INTEREST

This is to declared that there is "No conflict of interest" among researcher.

REFERENCES

Erick, S. B., Mbwambo, J. S., & Salanga, R. J. (2025, January 1). Adoption of climate-smart agricultural practices among smallholder leafy vegetable agripreneurs in semi-arid regions. A bibliometric review. Social Sciences and Humanities Open. Elsevier Ltd. https://doi.org/10.1016/j.ssaho.2025.101428

Vinaya Kumar, H. M. and Gadde, S. (2025). A tool to measure livelihood vulnerability of climate-sensitive farming communities. Indian Journal of Extension Education, 61(4), 160–164. https://doi.org/10.48165/IJEE.2025.614RT01

Jones, K., Nowak, A., Berglund, E., Grinnell, W., Temu, E., Paul, B., … Kimaro, A. A. (2023). Evidence supports the potential for climate-smart agriculture in Tanzania. Global Food Security, 36. https://doi.org/10.1016/j.gfs.2022.100666

Onyeneke, R. U. (2020). Climate change adaptation measures by smallholder farmers in southeastern Nigeria. GeoJournal, 85(3), 819-835.

Devkota, R., & Bhattarai, S. (2018). Climate change and its impact on agricultural livelihood in the mountain region of Nepal. Journal of Agriculture and Environment, 19, 23-34.

Received : April 2026 : Accepted : June 2026