



## **ADOPTION AND CHALLENGES ASSOCIATED WITH ORGANIC FARMING IN BOGORO LOCAL GOVERNMENT AREA, BAUCHI STATE, NIGERIA**

**<sup>1</sup>Tikon, F. U., <sup>1</sup>David, A. H., <sup>1</sup>Gadu, H. O. and <sup>2</sup>Apeh, C. C.**

<sup>1</sup>Department of Agricultural Economics and Extension,  
Faculty of Agriculture and Life Sciences,  
Federal University Wukari, Taraba State, Nigeria

<sup>2</sup>Department of Agricultural Economics,  
University of Agriculture and Environmental Sciences, Umuagwo, Imo State, Nigeria  
**Correspondence Author's E-mail:** fomatikon@yahoo.com **Tel.:** +2348035220259

### **ABSTRACT**

The study investigated the adoption and challenges associated with organic farming in Bogoro local government, Bauchi State, Nigeria. A snowball sampling technique was employed to contact 90 respondents. Data was gathered using a well-constructed questionnaire and was examined using both descriptive and inferential statistics. Logistic regression analysis was employed to examine the components that affected organic farming adoption. The outcomes revealed that the majority (98.9%) of the respondents were aware of organic farming due to visits by extension agents. Socio-economic factors such as education (0.065), gender (0.548), visits by extension agents (0.313), household size (0.094), source of information (0.453), access to credit (1.552) and farmers' cooperative membership (0.902) positively influenced their organic farming adoption. Conversely, age of the farmers (-0.532) and farm size (-0.083) negatively influenced farmers adoption of organic farming. Constraints/challenges faced by farmers include; the high cost of organic farming, unavailability of organic inputs, low technical know-how, consumers yet to appreciate the difference between the production of the two farming systems, poor market outlet, poor storage facilities and inadequate information. It was recommended that to take advantage of the components, policies that guide farmers' decisions on the adoption of organic farming should be framed and if well implemented could boost agricultural production and help in environmental sustainability.

**Keywords:** Organic farming, Conventional agriculture, Snowball, Adoption, Challenges, Awareness.

### **INTRODUCTION**

Conventional agriculture (non-organically certified) is the direct inverse of organic agriculture which involves farmers typically utilizing synthetic and chemical inputs in their agricultural practices and 98.9% of the world's foods are provided through this inorganic system (Willer & Lernoud, 2017). The quest of farmers to open up a large expanse of land because of population pressure brought about the vast and conventional utilization of agrochemicals and synthetic means in boosting their productivity and yield as well as reducing the drudgery nature through herbicide applications for controlling weeds and pests.

However, analogous to the imperative need to increase yield and the need for reduction in the drudgery of agricultural practices is the importance of ensuring sustainable agriculture, as well as the safest means of production which would not hurt final consumers of the products. The need for integrating both the goal of increasing yield and sustainable safe agricultural practices has led to the concept of organic agriculture. The prominence of organic farming as a safe alternative for improved agricultural practices while ensuring its safety, sustainability and high yield in Nigeria came to the limelight after the second national conference on organic



agriculture in Nigeria sponsored by the International Federation of Organic Agricultural Movement (IFOAM) (IFOAM, 2007).

Organic farming is an all-inclusive management system where production is aimed at promoting and enhancing agrosystems' healthiness increased functional biodiversity, natural cycles and soil biotic activities (Ibeawuchi *et al.*, 2015). Quality of food production that is sustainable with minimal or zero impact on the surroundings is the major aim of organic farming (Oyesola *et al.*, 2010), this system of agriculture also promotes ecological resilience and it's capable of mitigating many environmental hazards. The practice of organic farming is multifunctional such that its benefits encompass different sectors such as environmental, economic and social functions (Atoma *et al.*, 2018). Organic farming aligns with natural surroundings and not against them thereby embracing approaches that reduce non-rechargeable energy usage (Oyedele *et al.*, 2018) thus a dependable ecological substitute for the inorganic form of agriculture. Organic agriculture has been considered by the Food and Agriculture Organization (FAO) as an adequate approach to curb climate change and build healthy soils that will adapt well to dangerous weather situations related to climate change (IFOAM, 2009). Organic farming encourages the resilience of the ecology, bio-diversity development, improves farm management and surroundings, and builds civic understanding and strength (FAO, 2010).

According to Adekoya & Tologbonse (2011), adoption is the choice of a person or group of individuals to adopt and use innovation. An individual's choice to either adopt or reject a reputable agricultural practice is seen to happen over a while in stages rather than immediately. In developing countries, the majority of the studies carried out on significant factors affecting organic farming centred on farm and farmers features as factors of adaptation to organic farming (Isin *et al.*, 2007). Captured in other studies is a comprehensive detail of farmers' intentions and attitudes for organic farming adoption (Karki *et al.*, 2011).

Despite global awareness of environmental degradation as a major part of the challenges of inorganic farming, and the resultant acceptance of organic farming as a better and vital alternative to plummeting these injurious effects on the farmers and the environment, farmers are still holding on to the inorganic system of farming (Willer & Lernoud, 2017). This, prompted this study to therefore, ascertain the level of organic farming awareness among farmers, factors affecting their adoption of organic farming and the challenges associated with the adoption of organic farming.

## **MATERIALS AND METHODS**

This research was conducted in Bogoro Local Government Area in Bauchi State, Nigeria. The headquarters is in Bogoro town and the majority of its inhabitants are the Za'ar or Sayawa people. Bogoro local government area lies between longitude 10° to 30°N and latitude 9°E to 30°E. The town is situated in the north of guinea savannah ecological region of the country, covering an area of 894 km<sup>2</sup> with a population of 83,809 people (National Population Commission (NPC), 2006). Notable about the climate is seasonal rainfalls and intense heat. The average minimum temperature varies between 10°C -12°C in December and January, however, the average maximum is about 30°C-32°C in March/May. The rainfall of (1000-1250mm per annum) is unimodal which lasts from June to October while the dry season begins from late October through to May. The soil is clay-loam in texture but has a slight acidity; the predominant occupation of the populace is farming due to its vast fertile soil which is an added advantage to agricultural production of both crop cultivations and livestock production. Other occupations include fishing, hunting, blacksmith, crafting and trading (Wikipedia, 2007).



A snowball sampling technique was employed to contact 90 respondents for this research. This technique enables the contacted respondents to further identify subsequent respondents. Data analysed for this research was gathered with the help of well-structured questionnaires from 10 wards in the local government area viz: Banram/Tadnum, Mwari/Bar, Gobbiya, Badagari, Bogoro, Lusa, Boi, Gambar, Dutsen Lawan and Dazara.

Frequencies, means and percentages were used to analyse farmers' awareness level and challenges associated with organic farming while logistic regression was employed to analyse farmers' adoption of organic farming in the study area. Logistic regression was adopted because of the dummy dependent variable (organic farming adopter = 1 and non-adopter = 0). A 5-point Likert-type scale rating was employed to measure adoption based on years (1 for a year, 2 for two years, 3 for three years, 4 for four years and 5 for five years) with a cutoff point of 3. Adopter if the mean score is  $\geq 3$  and non-adopter if the mean score is  $< 3$ . This model is expressed mathematically as shown below;

$$Y_i = \beta_0 + \sum_{j=1}^k \beta_j X_{ij} + e_i$$

where;

Y = Adoption of organic farming (adopter = 1 and non-adopter = 0)

X<sub>1</sub> = Level of education (years)

X<sub>2</sub> = Farming experience (years)

X<sub>3</sub> = Age (years)

X<sub>4</sub> = Gender (Female 1, Male 0)

X<sub>5</sub> = Extension visits (Yes 1, 0 otherwise)

X<sub>6</sub> = Marital status (single 1, married 2, widowed 3 and separated 4)

X<sub>7</sub> = Farm size (hectares)

X<sub>8</sub> = Household size (number of persons)

X<sub>9</sub> = Occupation (farming 1, 0 otherwise)

X<sub>10</sub> = Source of organic farming information

X<sub>11</sub> = Credit access (yes 1, 0 otherwise)

X<sub>12</sub> = Farmers' cooperative membership (yes 1, 0 otherwise)

X<sub>13</sub> = Access to market (yes 1, 0 otherwise) and

X<sub>14</sub> = Distance to farm.

## RESULTS AND DISCUSSION

Figure 1 presents the respondents' level of organic farming awareness. The results showed that 98.9% of the farmers in the area were cognizant of organic farming while 1.1% were unaware. This is in agreement with the findings of Fasina, (2013); Iyagba and Amesi (2016), that large numbers of farmers are aware of organic farming.

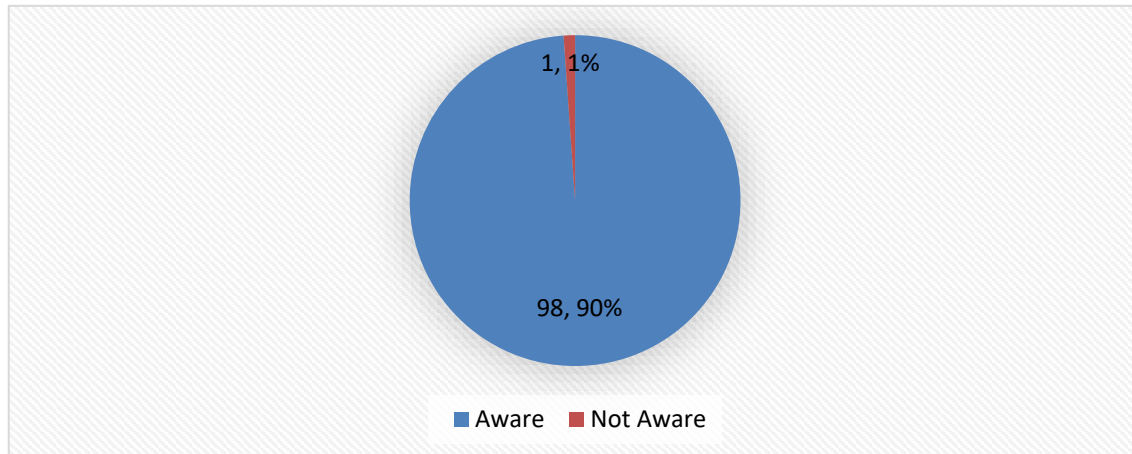


Figure: 1 *Farmers' organic farming awareness level*  
 Source: Field Survey, 2022

Table 1 shows that education was positively significant at 10% which implies that the likelihood of educated farmers adopting organic farming is 0.065 higher in the study area; education through impartation enables farmers to be knowledgeable and have mastery of the use and economic importance of innovation (Wu, 2022). Age was negatively significant at 5% which means that the older the respondents the lower their level of adoption of organic farming; older people are oftentimes regarded as laggards that do not partake in innovative practices (Loos *et al.*, 2021). Gender was positively significant at 5% which reveals that an increase in male farmers increased the adoption rate of organic farming. According to Cheryl and Michael (2001), women farmers are slow adopters of improved technologies than male farmers. Extension visits by agents was significantly positive at 1% which implies that an increase in extension visits increased farmers' adoption of organic farming; extension efforts promote the acceptance of future important agricultural innovations (Montes *et al.*, 2021). Farm size was negatively significant at 1% which implies that an increase in farm size decreased the rate of adoption of organic farming; household size was seen to be positively significant at 10% which infers that an increase in the size of household increased the rate of adoption of organic farming by farmers; farm size and household are among the most frequently tested characteristics in adoption for their association with testing and continued use of a practice (Franzel *et al.*, 2001). Source of information was positively significant at 5% which implies that access to information increased the adoption rate of organic farming; proper dissemination of information can improve farmers' understanding, mastery and adoption of new technologies (Abebaw and Haile, 2013). Credit access was positively significant at 1% which means that an increase in credit access can increase the farmers organic farming adoption rates; ease of access to credit by farmers enables them to construct agricultural infrastructure, apply advanced agricultural innovation and purchase machinery and equipment thereby addressing the issue of insufficient funds (Mishra *et al.*, 2016). Farmers' cooperative membership was positively significant at 5% which means that the more farmers participate in cooperative membership/groups the more likely they are to adopt organic farming in the study area. This is in agreement with the results of Abdullahi *et al.* (2018).



**Table 1:** Farmers' Level of Adoption of Organic Farming

Variables	Coefficient	Std. Error
Education level	0.065*	0.856
Farming Experience	0.158	0.275
Age	-0.532**	2.907
Gender	0.548**	0.126
Extension Visit	0.313***	9.199
Marital Status	0.387	0.120
Farm size	-0.083***	0.126
Household size	0.094*	1.737
Occupation	5.723	0.246
Source of Organic farming information	0.453**	1.235
Credit access	1.552***	357.463
Farmers' cooperative membership	0.902**	0.123
Access to market	1.056	0.473
Distance to farm	0.595	0.389
<b>Constant</b>	<b>-128.245***</b>	<b>5.896</b>
<b>LR Chi<sup>2</sup> (14)</b>	<b>123.212***</b>	
<b>Number of Observations</b>	<b>135</b>	
<b>Prob &gt; Chi<sup>2</sup></b>	<b>0.000</b>	

Note:  $p < 0.1^*$ ,  $p < 0.05^{**}$  and  $p < 0.01^{***}$

Source: Field Survey, 2022

Table 2 shows among others, some challenges faced by farmers; high costs of organic farm inputs (55.55%), unavailability of organic input (47.77%), low technical know-how (60.00%), consumers yet to appreciate the difference between the production of the two-farming system (57.77%), poor market outlet (54.44%), poor storage facilities (35.55%) as well as inadequate information (48.88%). The rigorous nature of organic farming practices, trouble with disease and pest control, lack of organic products in the market and poor extension services have hindered crop farmers from adopting organic farming practices (Bwambale, 2015).





**Table 2:** Challenges associated with Organic Farming (n = 90)

Challenges	Frequency	Percentage
Organic farming is time-consuming	28	31.11
Transportation of organic materials	15	16.66
Low technical know-how	54	60.00
Poor training of extension agents	33	36.66
Inadequate information	44	48.88
Consumers have yet to appreciate production difference	52	57.77
Labour intensive	12	13.33
Unavailability of organic input	55	61.11
No encouragement from the government	43	47.77
Not appreciated therefore, no benefit	09	10.00
No access to organic inputs	43	47.77
Weed presence in organic farms	31	3.44
High cost of organic inputs	64	71.11
Poor market outlet	50	55.55
Poor storage facilities	49	54.44
Difficulty in disease & pest management	32	35.55
Bulkiness of organic materials	06	6.66
Total	620*	

\*Multiple responses recorded

Source: Field Survey, 2022

## CONCLUSION AND RECOMMENDATIONS

The study investigated the farmers' organic farming adoption and challenges in Bogoro LGA, Bauchi state, Nigeria. The findings revealed that the majority (98.9%) of the respondents involved in organic farming were aware of the innovation as a result of visits by extension agents. Socio-economic factors such as education (0.065), gender (0.548), visits by extension agents (0.313), household size (0.094), source of information (0.453), access to credit (1.552) and farmers' cooperative membership (0.902) positively influence d farmers choice of organic farming adoption. Conversely, age of the farmers (-0.532) and farm size (-0.083) negatively influenced farmers decision to adopt organic farming. Major challenges among others faced by farmers in the study area include; the high cost of organic farm inputs, unavailability of organic input, low technical know-how, poor market out-let, poor storage facilities and inadequate information. Based on our findings we recommended that policies should be formulated to take advantage of the factors (education, extension visit, household size, information access on organic farming, credit access and farmers' cooperative membership) that positively influence farmers' organic farming adoption decision which could boost agricultural production and help in environmental sustainability.

## REFERENCES

- Abdullahi, A., Salihu, I. T., Umar, I. S. & Hassan, S. (2018). Adoption Of Organic Farming Practices Among Rural Maize Farmers In Niger State, Nigeria. *Nigerian Journal of Rural Sociology* 18 (2), 14-19.
- Abebaw, D. & Haile, M. G. (2013). The impact of cooperatives on agricultural technology adoption: empirical evidence from Ethiopia. *Food Policy*. 2013, 38, 82-91. <https://doi.org/10.1016/j.foodpol.2012.10.003>



- Adekoya, A. E. & Tologbonse, E. B. (2011). Adoption and diffusion of innovations. *Agriculture extension in Nigeria. 2nd edit.* pp 36-48
- Atoma, C. N., Adesope, O. M., & Familusi, L. C. (2018). Organic Farming Practices Among Livestock and Fish Farmers in Southern Nigeria, UK: Intech Open; 2018, DOI: <http://dx.doi.org/10.5772/85522>.
- Bwambale, N. (2015). Farmers' knowledge, perceptions, and socioeconomic factors influencing decision-making for integrated soil fertility management practices in Masaka and Rakai Districts, Central Uganda. *Journal of Graduate and Dissertations, Paper 15231*, 21pp
- Cheryl, R. D. & Michael, L. M. (2001). How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana, *Agricultural Economics*, Volume 25, Issue 1, 2001, 27-39, ISSN 0169-5150, [https://doi.org/10.1016/S0169-5150\(00\)00096-7](https://doi.org/10.1016/S0169-5150(00)00096-7)
- Fasina, O. O. (2013). Determinants of Perceived Effectiveness of Organic Fertilizer used by Farmers in Oyo State, Nigeria, *Agricultural Tropicaet Subtropica* 46(1), 23-28.
- Food and Agriculture Organization (FAO) (2010). *Organic Agriculture: A Guide to Climate Change & food security*. Food and Agriculture Organization and International Federation of Organic Agriculture Movements working document, 2010. [http://www.fao.org/fileadmin/user\\_upload/rome2007/docs/Agriculture%20\\_a\\_Guide\\_to\\_Climate\\_Change\\_%26\\_Food\\_Security%C2%A0.pdf](http://www.fao.org/fileadmin/user_upload/rome2007/docs/Agriculture%20_a_Guide_to_Climate_Change_%26_Food_Security%C2%A0.pdf). (Accessed on 13 July 2019).
- Franzel, S., Coe, R., Cooper, P., Place, F. & Scherr, S. J. (2001). "Assessing the adoption potential of agroforestry practices in Sub-Saharan African." *Agricultural Systems*. 69 (1-2), 37-62.
- Ibeawuchi, I. I., Obiefuna, J. C., Tom, C. T., Ihejirika, G. O. & Omobvude, S. O. (2015). Indigenous and Current Practices in Organic Agriculture in Nigeria: A Review, *Agriculture, Forestry and Fisheries*, 4(6), 257-262.
- International Federation of Organic Agriculture Movement (IFOAM) (2007). *Africa Organic*, International Federation of Organic Agriculture Movement Newsletter, 1(7). <http://www.ifoam.org/newsletter/newsletter-africa/Africa-organic-news-vol.1-No.7.html> (Accessed on 13 July 2019).
- Isin, F., Cukur, T. & Armagan, G. (2007). Factors affecting the adoption of the organic dried fig agriculture system in Turkey. *Journal of Applied Sciences* 2007 (7), 748–754.
- Iyagba, A. G. & Amesi, K. (2016). Awareness and Practice of Organic Farming among Agricultural Science Undergraduate Students in Rivers State, Nigeria, *International Journal of Agriculture Innovations and Research*, 5(3), 403-409.
- Karki, L., Schleenbecker, R. & Hamm, U. (2011). Factors influencing a conversion to organic farming in Nepalese tea farms. *Journal of Agriculture and Rural Development. Trop. Subtrop.* 2011, 112, 113–123.
- Loos, E., Peine, A. & Fernández-Ardèvol (2021). Older people as early adopters and their unexpected & innovative use of new technologies: Deviating from technology companies' scripts. In Q. Gao & J. Zhou (Eds.), *Human aspects of IT for the aged population*, HCII 2021, LNCS 12786, pp. 156–167. [https://doi.org/10.1007/978-3-030-78108-8\\_1](https://doi.org/10.1007/978-3-030-78108-8_1)
- Mishra, A. K., Kumar, A., Joshi, P. K. & D'Souza, A. (2016). Impact of contracts in high yielding varieties seeds production on profits and yield: The case of Nepal. *Food Policy*. 2016, (62), 110–121.



- Montes de Oca Munguia, O., Pannell, D. J. & Llewellyn, R. (2021). Understanding the Adoption of Innovations in Agriculture: A Review of Selected Conceptual Models. *Agronomy* 2021, 11, 139. [https:// doi.org/10.3390/agronomy11010139](https://doi.org/10.3390/agronomy11010139).
- National Population Commission. (2006). Population by State and Sex. <http://web.archive.org/web/20110519235026/http://www.population.gov.ng/files/nationsfinal.pdf>
- Oyedele, G. T., Wole-Alo, F. I., Owolabi, K. E., & Okunlola, J. O. (2018). Small–Scale Farmers Perception on Organic Farming Status in Ondo State, Nigeria, *American Journal of Agriculture and Forestry* 6(6), 186-190.
- Oyesola, O. B. & Obabire, I. E. (2010). Farmers’ Perceptions of Organic Farming in Selected Local Government Areas of Ekiti State, Nigeria, *Journal of Organic Systems*, 6(1),20-31.
- Wikipedia (2009). In Wikipedia. [https://en.wikipedia.org/index.php?tite=bogoro\\_lga](https://en.wikipedia.org/index.php?tite=bogoro_lga).
- Willer, H. & Lernoud, J. (2017). *Organic Agriculture Worldwide*. 18<sup>th</sup> edition. BiBL and IFOAM-Organics International, Frick and Bonn, pp.143-148.
- Wu, F. (2022). Adoption and income effects of new agricultural technology on family farms in China. *PLoS ONE* 17(4): e0267101. <https://doi.org/10.1371/journal.pone.0267101>.