MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

A Stem-Based Analysis of Farmer's Attitude Concerning Organic Farming in Nigeria (A Case Study of Borno State)

Muhammad Isah Muhammad[1]

Email: abbasisah084@gmail.com

Babakura Abba Mohammed[2]

Isa Ahmed[3]

Aliyu Muhammad Bello[4]

[1]Department of Agricultural & Bio-Environmental Engineering, Ramat Polytechnic Maiduguri, Borno State

[2]Desert Research Monitoring and Control, Yobe State University Damaturu

[3]Department of Statistics, Ramat Polytechnic Maiduguri, Borno State

[4]University of Maiduguri, Borno State

Abstract
Organic farming is gaining acceptance all over the world due to associated benefits of quality food, enhanced soil health, environment protection, conservation of natural resources and taking care of human health. However, concern is whether farmers will change their farming systems which they have been practicing from long and shift to organic farming. The attitude and perceptions of farmers on organic farming systems have an impact on their behavioral tendencies. Consequently, the attitude is being shaped by various factors which stand as driving and restraining forces for the desired change. Boost to organic farming is important for sustainable agriculture. Various factors like profitability, cost, consumers demand, impact on health, availability of fertile soil, community co-operation, government initiatives and support affect the adoption of organic farming practices. This research paper aims to analyse the factors which influence the inclination and adoption of organic farming by small and marginal farmers in India using STEM-based approach and ANOVA. 483 farmers comprising of fruit, cereal and vegetable growers have been taken for the survey and structured questionnaire has been used. The result may help the government/policy makers to take such decisions which will increase organic farming and long-term benefits in terms of good health and economic growth.
Keywords: Organic farming, sustainable, small and marginal farmers, agriculture.

Introduction

Increased awareness to health and sustainable environment has resulted in transition of conventional farming practices to organic farming which benefitted in triple bottom line- people,

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

planet and profit to the farmers. This gradual shift to organic farming aiming at food security has helped in addressing the issues of reducing carbon foot-prints, providing gainful employment and raising the standard of living of small and marginal farmers and changed the landscape of modern Nigeria agriculture.

Agriculture sector has been specified as priority in Nigeria; agrarian economy. Government has announced many schemes for providing direct benefit to the farmers which will further result in benefits to the consumers and help us in attaining sustainable development goals. One such method is organic farming for the benefit of both agriculture and health sectors. The benefits of organic farming are known to everyone. The tech-savvy large farmers who want more profit, those who are engaged in agri-business or the small farmers, organic farming has given profits to every farmer. For the business minded large farmers, organic label on the Agri-produce help them to get more profit and for the small and marginal farmers cost-effectiveness is the major influencing factor for keeping them engaged in organic farming practices. Increase in market size for organic produce has resulted in shifting of farmers to organic farm practices and other climate resilient methods.

Meaning of Organic Agriculture

Organic agriculture is defined as "a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved" (IFOAM). The International Federation for Organic Agriculture Movement's (IFOAM) definition of Organic agriculture is based on: the principle of health; the principle of ecology; the principle of fairness and the principle of care. Organic farming is one of the sustainable agricultural systems and relies less on expensive imports such as chemical fertilizers and pesticides (Ramesh et al., 2005)

The farmers' concern for the environment protection, soil health and human health was also determining factor for motivating them towards organic cultivation. The farmers in the study area were noted to have favorable attitude towards organic farming and also felt that organic farming was the right approach for protecting the quality of soil which was being deteriorated due to continuous and uncontrolled use of pesticides (Janjhua et al., 2018). Commitment towards organic farming was influenced by a sense of strong moral obligation to the environment and growing consumer demand for high quality and healthy food products (McCarthy et al., 2007). It was noted that majority of farmers wanted to reduce chemical application and the expenses for agricultural chemicals provided other things were being available to replace (Siriwattananon et al., 2014). In one of the studies the results showed that the perceived usefulness and environmental concern positively and significantly affect intention to adopt rice organic farming (Ashari et al., 2016). The study by Midmore et al. (2001) observed that on the attitudinal statements that explored

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

the factors motivating for organic farming highest importance was given for the environmental benefits of organic farming. The organic farmers reported more satisfaction with their lives, a greater concern for living ethically, and a stronger perception of community (Sullivan et al., 1996).

In a research study the respondents of both farming systems had common perception on some attributes of organic farming that it makes the soil more fertile, is tolerant to shortage of rain fall, stores more moisture, is good habitat for soil macro-organisms and its straw is preferred by animals as compared to that of conventional farming system (Berhane et al., 2015). The studies have reported that in the majority of cases, organic systems have emerged to be more profitable than non-organic systems. There are wide variations among yields and production costs, but either higher market price and premiums, or lower production costs, or the combination of these two generally result in higher relative profit in organic agriculture in developed countries (Nemes, 2009).

Some farmers were, however, interested in converting to organic farming in the near future in Madhya Pradesh due to the low cost of production, and in Tamil Nadu and Uttarakhand due to the price premium and health benefits (Paneerselvam et al., 2012). Organic agriculture has been proved to be beneficial in the long attributing to increase in steady yield and profitability (Ramanjaneyulu et al., 2013

Many studies have reported positive/favourable attitude of farmers towards organic farming (Alzaidi et al., 2013; Mohan and Helen, 2014; Dipeolu et al., 2006, Tratnik and Zutinic, 2009; Singh and George, 2012). Many farmers have been found to be positive for organic farming but were concerned about its viability (Eyinade and Akharume, 2018). Although majority of the farmers had favorable perception towards organic farming in the study but most farmers were yet to adopt the organic system of farming (Oyedele et al., 2018).

Despite of the realization of the environmental, health, social, economic or personal benefits associated with organic agriculture the adoption of organic agriculture is restricted due to many challenges. The research studies in this context have identified various factors that impede the farmers from converting to organic agriculture. The perceived problems by the farmers emerged to be the lack of financial and technical capacity of the smallholder farmers; problem on the marketing and product labelling of organic food products and the quality of the organically produced agricultural products (Landicho et al., 2014).

Many studies reported high cost of inputs as their main constraint followed by lack of knowledge about resistant varieties, non-availability of inputs like vermi-compost, bio-fertilizer, bio-pesticides etc., lack of scientific information regarding organic farming, lack of proper training about organic farming and non-availability of appropriate literature related to organic farming as the barriers for adoption (Patel, 2017). Despite of possessing knowledge of organic farming some farmers had revealed their failure to practice it because of affordability.

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

A statistically significant affiliation between farmers' perception of organic agriculture and the following factors i.e., age, education, labor, income, and extension workers' visit were found. The farmers' level of education, extension media contact and agricultural training received has positive and significant relationship towards organic agricultural practices (Rana et al., 2017). The findings of the study pointed that conversion to organic farming is indeed affected by attitudes of the farmer, perceived social pressure and ability to convert (Lapple and Kelly, 2010). The farmer's attitude toward organic farming was significantly affected by the farmer's experience, income, and their knowledge of organic farming (Shams et al., 2017).

Results

A mixture of organic farmers, partial organic farmers and inorganic farmers have been randomly selected for this analysis. Data was gathered from 483 farmers using a structured questionnaire on five-point Likert scale. STEM, Regression and ANOVA analysis was employed to comprehend the behaviour of farmers concerning the organic farming.

The STEM Model (comprising of Social, Technological, Economic, and Managerial) for this analysis wraps the following for understanding the main drivers and trials which affect farmers' attitudes towards organic farming in Borno state state:

Social Factors

Beliefs of the farmers and the communal, their understanding towards organic farming, trends of consumers to buy organic products over the non-organic ones, awareness level and institutional exertions for promoting the organic farming are included in the social factors.

Technological Factors

Accessibility of fertile, irrigated land, manure, biofertilizers and biopesticides, organic certification influences the recognition of organic farming. Consumers' assertion for organic products and availability of market/e-market is also considered.

Economic Factors

Genuine cost experienced in acceptance of organic farming, viability of organic produce, availability of financial support, subsidies, and incentives from the government, impact on productivity, production and incomes in the long run are the economic factors in consideration.

Managerial Factors

The process and compliance for organic certification, worries concerning supply chain and logistics management for the organic produce, and the support for organic farming and marketing play significant role for considering the organic farming adoption.

A sample of 483 farmers has been taken and the results of the survey under each parameter are enlightened below to identify the farmers' attitude regarding organic farming:

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI) in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

Social Factor	% Of Farmers Agreeing	Technological Factor	% Of Farmers Agreeing	Economic Factor	% Of Farmers Agreeing	Managerial Factor	% Of Farmers Agreeing
Aware of organic farming	95%	Have access to organic inputs	58%	High initial cost of organic transition	80%	Find organic certification process complex	70%
Believe organic farming is healthier	70%	Use biofertilizers and biopesticides	49%	Organic farming is more profitable	52%	Member of an organic farming cooperative	35%
Influenced by peer/community adoption	55%	Aware of organic certification process	35%	Receive government subsidies for organic farming	35%	Lack of training in organic farm management	63%
Believe organic farming is time-consuming	60%	Use digital platforms for organic markets	25%	Face difficulty in selling organic produce	55%	Willing to shift to organic if given financial support	82%

It is well-defined from the above assembled data that even though the level of awareness concerning organic farming is high their acceptance rate is quite low. Farmers are eager to adopt organic farming but majority of them still find the certification procedure as tough. As there is high initial cost involved in the process of organic evolution, they are looking for some financial backing. Profitability and access to market are of the great concern for the farmers.

Correlation Matrix

Factor (%)	Social (%)	Technological (%)	Economic (%)	Managerial (%)
Social	1.000	0.86 (Strong)	0.93 (Strong)	-0.01 (No correlation)
Technological	0.86 (Strong)	1.000	0.64 (Moderate)	-0.47 (Negative)
Economic	0.93 (Strong)	0.64 (Moderate)	1.000	0.23 (Weak)
Managerial	-0.01(No correlation)	-0.47 (Negative)	0.23 (Weak)	1.000

Consequently, it is clear from the above analysis that there occurs a high degree of positive correlation amid social and economic factors (.93) and also among technological and social factors (.86). On the other hand, negative correlation is existing among managerial and technological

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

factors (-0.47). Socially aware farmers with access to organic inputs and biofertilizers seem interested to reap the economic benefits. Farmers who find difficulty in organic certification are not interested in the organic transition and training does not affect their decision.

Regression Equation

Desire to Shift = −28.84 + (7.63 × Social) + (−5.61 × Technological) + (−3.76×Economic)

Thus, we can say that increase in social awareness may result in greater tendency to shift to organic farming and lack of access to organic inputs, financial constraints have negative impact on the farmers' willingness to shift to organic farming.

STEM Analysis:

A sample of 483 Farmers consisting of Fruits, Vegetables, and Cereal Growers and its analysis is given below:

Mean % by Category

Category	Social (%)	Technological (%)	Economic (%)	Managerial (%)
Cereals	70.15	49.62	59.88	45.99
Fruits	73.82	55.62	65.09	52.03
Vegetables	76.55	57.87	67.73	52.99

Vegetable growers:

Diagonally all factors vegetable growers are showing uppermost agreement with more than 76% farmers knowing and identifying the benefits of organic farming. More than 52 % vegetable growers are using biofertilizers and use digital platforms. They believe in organic profitability and subsidies and have moderate concerns about organic certification and training.

Cereal growers

The apparent difficulty among cereal growers has caused in lower rate of acceptance of organic farming. They are most affected by technological and managerial worries. They also are looking for backing from the government.

Fruit growers

Profit-oriented fruit growers believe greater financial benefits of organic farming as nearly 65% of fruit growers agree with the economic factor.

ANOVA (at 5% significance level)

Hypothesis: There is no significant difference between the three groups farmers' attitude concerning organic farming.

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

ANOVA table

Source	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F-Statistic	p-value
Category (Fruits, Vegetables, Cereals)	13427.5	2	6713.75	56.32	6.66e-18
Factor (Social, Technological, Economic, Managerial)	162342.8	3	54114.3	454.19	3.15e-126
Interaction (Category× Factor)	214.1	6	35.68	0.25	0.9367
Residual (Error)	57503.2	471	122.1	-	-
Total	233487.6	482	-	-	-

Explanation of ANOVA Results

The above analysis goals to examine whether there is any significant influence on attitudes of farmers of different category (Fruits, Vegetables, Cereals) and STEM factors (Social, Technological, Economic, Managerial) significantly impact attitudes concerning organic farming. Group of farmers is statistically significant at p = 6.66e-18. It means that there is a significant difference in attitudes concerning organic farming among fruit, vegetable, and cereal growers. Vegetable growers show the highest agreement across all factors, while cereal growers are less influenced.

STEM factors are statistically significant at p = 3.15e-126. Farmer's decision to adopt organic farming is influenced by social, technological, economic, and managerial factors differently. Of them social and economic factors (awareness, profitability) are strongly affecting their decision while technological and managerial factors have low impact.

Interaction between category and factor is not statistically significant at p = 0.9367. this entails that no significant variation in factor effects across different categories institute. The manner and the degree to which social, technological, economic, and managerial factors influence attitudes does not differ significantly across categories (Fruits, Vegetables, Cereals). Farmers view the factors similar manner irrespective of the category while taking decisions on organic farming.

Conclusion:

The inclination of the consumers towards organic produce is increasing rapidly and in future the demand for organic products is likely to increase. Sooner or later the farmers will have to adopt organic farming, since the studies have reported the positive and favorable attitude of

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

farmers towards organic agriculture. The need of the hour is to understand thoroughly the problems faced by farmers in adopting organic farming and formulate the action plans accordingly. Availability and cost of labour in case of natural and organic farming determines the size of land to be used for organic farming; which also results in partial adoption in many cases. Availability of manure and/ or livestock holding is another determining factor which may affect the adoption decision. Level of education, age, family income, non-farm income and training also influence the farmers' decision to a large extent. Proximity to the premium organic market play a significant role in deciding whether to go for organic farming or not. Concern for health and climate are related parameters often considered in connection with the decision for adoption of organic farming.

References:

Landicho, L.D., Paelmo, R.F., Cabahug, R.D., Visco, R.G., Abadillos, M.G., 2014. Prospects and challenges in promoting organic agriculture in the upland communities in the Philippines: Implications to Food Security and Nutrition. *International Proceedings for Chemical Biological and Environmental Engineering* 67, 60–65.

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, 186–190

Eyinade, G.A., Akharume, C.I., 2018. Farmers' attitude towards organic farming practices: *A concept of sustainable organic farming development in South Africa.* Anthropologist 32, 102–106

Alzaidi, A.A., Baig, M.B., Elhag, E.A., 2013. An investigation into farmers' attitude towards organic farming in Riyadh region- Kingdom of Saudi Arabia. *Bulgarian Journal of Agricultural Science* 19, 426–431

Mohan, D.J., Helen, S., 2014. Attitude of farmers towards organic vegetable cultivation. Agriculture Update 9, 364–367

Dipeolu, A.O., Bello, K.A., Akinbode, S.O., 2006. Comparative economic analysis of organic and inorganic vegetable production in Ogun State, Nigeria. In: Proceedings of the 2nd National Conference on Organic Agriculture, University of Ibadan, Ibadan, Nigeria 27–29 November, 2006, 24

Tratnik, M., Zutinic, D., 2009. Organic vegetable growing– Attitude of the Croatian farmers. International Society for Horticultural Science. http:// www.actahort.org

Singh, S., George, R., 2012. Organic farming: Awareness and beliefs of farmers in Uttarakhand, India. *Journal of Human Ecology* 37, 139–149

Nemes, N., 2009. Comparative analysis of organic and non-organic farming systems: a critical assessment of farm profitability, FAO Rome

MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Volume 2 Number 1, June, 2024
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v2i1.88

Berhane, M., Zenebe, A., Fitiwy, I., 2015**.** Farmer's perception of productivity and profitability of organic and conventional production: Tigray, Northern Ethiopia. *Journal of Agricultural Science and Food Technology 1, 88–93*

Midmore, P., Padel, S., McCalman, H., Isherwood, J., Fowler, S., Lampkin, N., 2001. Attitudes towards conversion to organic production systems: a study of farmers in England, *Published by Institute of Rural Studies, The University of Wales*

Sullivan, S., Mccann, E., Young, R.D., Erickson, D., 1996. Farmers' attitudes about farming and the environment: a survey of conventional and organic farmers. *Journal of Agricultural and Environmental Ethics 9, 123-143.*

Ashari, J.S., Mohammed Zainal, A., Terano, R., 2016. Rice farmers' perception and attitude toward organic farming adoption. Agro Economic Journal 34, 35–46

Siriwattananon, L., Kawabe, K., Mihara, M., 2014. Assessment on local awareness of organic farming practices in Kampong Cham of Cambodia**.** *International Journal of Environmental and Rural Development, 5–1.*

McCarthy, M., O' Reilly, S., O'Sullivan, A., Guerin, P., 2007. An investigation into the determinants of commitment to organic farming in Ireland. IFMA 16- Theme 4, Environment *– A Global Resource.*

Janjhua, Y., Chaudhary, R., Deopa, V., Kumar, K., 2018. A study on perceived problems and farmers' attitude towards organic farming. *International Journal of Farm Sciences 8, 1–4*.

Ramanjaneyulu, A.V., Sarkar, N.C., Thakur, A.K., Maiti, R.K., 2013. Organic Farming- A Perspective. *International Journal of Bio-resource and Stress Management 4, i-ii.*

Paneerselvam, P., Halberg, N., Vaarst, M., Hermansen, J.E., 2012. Indian farmers' experience with and perceptions of organic farming. Renewable Agriculture and Food Systems 27, 157–169.

Landicho, L.D., Paelmo, R.F., Cabahug, R.D., Visco, R.G., Abadillos, M.G., 2014. Prospects and challenges in promoting organic agriculture in the upland communities in the Philippines: Implications to Food Security and Nutrition. *International Proceedings for Chemical Biological and Environmental Engineering 67, 60–65.*

Patel, C.D., 2017. Awareness and attitude of organic farming followers of South Gujarat, M.Sc Thesis, Extension Education Dept., N. M. College of Agriculture, Navsari Agricultural University, Navsari.

Ramesh, P., Singh, M., Rao, A.S., 2005. Organic farming its relevance to the Indian context. Current Science 88, 561–568

Rana, S., Md. Hasan, H., Alam, M.S., Islam, M.S., 2017. Farmer attitude towards organic vegetable cultivation in Rangunia Upazila, Chittagong, Bangladesh. *Journal of Biosciences Agricultural Research 14, 1151–1156.*

Shams, A., Hooshmandan, Z., Fard, M., 2017. Factors affecting wheat farmers' attitudes toward organic farming. Polish Journal of Environmental Studies 26, 2207–2214