

Full Length Research Paper

Influence of Agricultural Extension in Watermelon (*Citrullus lanatus*) Production in Kebbi State, Nigeria

*¹Salihu Abdullahi Abubakar, ²Bello Zaki Abubakar, ³Saadu Umar, and ³Yahaya Kaka

¹Department of Agricultural Technology, Umaru Ali Shinkafi Polytechnic, Kebbi State, Nigeria.

²Department of Agricultural Extension and Rural Development, Usmanu Danfodiyo University Sokoto, Sokoto State, Nigeria.

³Department of Agricultural Economics and Extension, Kebbi State University of Science and Technology, Aleiro, Kebbi State, Nigeria.

*Corresponding Author E-mail: salihusaadu2@gmail.com

Received 30 May 2020; Accepted 25 June, 2020

ABSTRACT: The study evaluates the impact of agricultural extension in watermelon (*Citrullus lanatus*) production in Kebbi State with the aim of examining the level of involvement of participants in watermelon production in their community and to identify the problems militating against watermelon farming in the study area. The results of the findings revealed that the majority of the sampled farmers were male (85%) and were within the age range of 21-40 years with most (57.5%) of them married and farming (72.5%) was their major occupation. The result also revealed that most of the sampled participants have above 20 years of farming experience with farm size of 1-6 hectares with at least primary school qualification. The results of the findings further revealed that out of 60.0% of the participants involved in watermelon production. 50.0% were strongly involved while the remaining 10.0% were partially involved in watermelon farming. The study further

revealed the mean difference of watermelon farming participant output before and after participation in the watermelon production to be 24.55 and the difference in the output was significant at a 1% level of probability (0.000) suggesting a positive impact on the participants. The study however, revealed that the problems militating against effective implementation of watermelon production in the study area were inadequate capital, high cost of inputs, bad road, high cost of hiring machines, low level of extension visits and poor storage facilities. The study therefore recommends that the Government should look for the assistance of watermelon farmers means, such as loans should be provided to the farmers and expansion of rural infrastructures such as; roads and markets.

Keywords: Agriculture, Extension, Watermelon, Farmers, Production, Kebbi

INTRODUCTION

Agriculture plays an important role in Nigerian economic development through the provision of food, raw materials for agro-allied industries, employment generation, foreign exchange and source of income. It is the most assured means of economic growth and development and a reliable key to industrialization; as it makes available the raw materials used in the industries and it is the main source of livelihood for the majority of the rural dwellers.

It was estimated that about 33% to the Gross Domestic Product (GDP) of the nation was derived from agriculture. The agricultural sector employs about one-third of the labour force and provides livelihood for the bulk of the populace as such the sector is regarded to as the backbone of Nigerians economy, despite being a leading producer of oil in the African region (Enoch *et al.*, 2018).

Watermelon (*Citrullus lanatus*) belongs to the family

Cucurbitaceae whose centre of origin has been traced to Kalahari and Sahara deserts in Africa (Ereketi and Asa, 2014). From there, watermelon spread to countries along the Mediterranean Sea and even beyond. According to FAO (2017) statistics, China is the world's leading producer of watermelon. The top twenty leading producers of watermelon produced a collective volume of approximately 92.7 million metric tonnes in 2017, of which China produced 75%. Turkey, Iran and Brazil commanded a production share (of the 20 leading producers) of 4.7%, 3.5% and 2.4% respectively in 2017. Nigeria produced more watermelons in 2017 (139,223 tons) than the leading fresh produce African exporter, Kenya, which produced 66,196 tons and South Africa that produced 77,993 tons (Shubin and Ernst, 2018).

Despite the increase in agricultural production around the world, Inam and Effiong (2017) observed that the progress has been uneven. This position, according to Inam and Effiong (2017) predicated on the fact that the United Nations Food and Agriculture Organization (FAO) has repeatedly warned that food production is on the decline given the fact that 270 million out of about 750 million Africans suffer some form of malnutrition associated with inadequate food supplies.

Nigeria is blessed with both physical and human resources, and fertile land to produce enough food for their entire population and even marketable surplus for exports, however, food has been imported to support the insufficient domestic production. If the rural farmers are provided with enough farm inputs like fertilizer, land, credit facilities and other incentives to boost their agricultural productivity including both crops and animals in profitable and sustainable way through the participatory extension approach by empowering the communities to collectively decide on how resources are allocated and managed for their livelihood activities and to participate in the design and execution of their sub-projects, this will improve the overall standard of living and thus, reduction in the overall food insecurity (Ominikari *et al.*, 2017).

The Federal Government of Nigeria attempted to reduce poverty and facilitate rural and agricultural development, therefore, introduced several rural and agricultural development programmes and projects decades ago till date. These programmes according to Enoch *et al.* (2018) includes National Accelerated Food Production Program (1972-1976), River Basin Development Authority (1975), Operation Feed the Nation (1976-1979), Green Revolution (1980-1984), Agricultural Development Programs (1985), National Directorate of Employment (1986-1993). However, some of the agricultural programs with elements of participatory extension approach include the National Special Program for Food Security (2003-date) and the three phases of the National Fadama Development Project, NFDP Phase I (1993-1999), NFDP Phase II (2000-2007), NFDP Phase III (2009-2013).

There is therefore, the need to evaluate the impact of such program on the rural farmers. More so, there is lack of documented evidence on any study on such conducted in Kebbi State which necessitate this study. The aim of this study is to examine the impact of agricultural extension in watermelon production in Kebbi State. This will be achieved through the following specific objectives; to describe the socio-economic characteristics of watermelon farmers. To examine the level of involvement of participants in watermelon production in their community. Others include; examining the impact of watermelon farmers on their participants' farm output. To identify the problems militating against effective watermelon farmers programme in the study area.

MATERIALS AND METHOD

Description of the study area

The study was conducted in all the local government area of Kebbi State. A two-stage sampling technique was adopted to select sample farmers. The first stage involved the selection of two districts that were involved in watermelon production. The second stage involved the selection of two farmers from the twenty villages were randomly selected to give a total of forty (40) watermelon farmers that were used for the study.

Data collection

Data were collected with the aid of structured questionnaires that were administered to the 40 watermelon farmers. Data were collected on the socio-economic characteristics of the participants, impact of watermelon production on participants' farm output, involvement of participants in watermelon production project in their community and problems militating against effective watermelon production in the study area

Data analysis

The data were analyzed using inferential statistics such as descriptive, frequency, percentage and mean score were used to satisfy objectives i, ii and iv, while objective iii were analyzed using paired sampled t-test.

RESULTS AND DISCUSSION

Socio-economic Characteristics of watermelon farmers' participants

Gender

Table 1 revealed that majority (80.0%) of the sampled watermelon farmers was male while 20.0% were females. This suggests that men were more accessible than women in the study area. The finding is similar to that of

Table 1: Socio-economic characteristics of watermelon farmers base on gender.

Variable	Frequency	Percentage
Gender		
Male	32	80.0
Female	8	20.0

Table 2: Socio-economic characteristics of watermelon farmers base on age.

Variable	Frequency	Percentage
20 years and below	4	8.0
21-30	16	42.0
31-40	9	22.5
41-50	4	8.0
Above 50	7	19.5

Table 3: Socio-economic Characteristics of watermelon farmers base on Marital Status.

Variable	Frequency	Percentage
Single	11	27.5
Married	20	52.5
Widowed	6	12.5
Divorced	3	7.5

Table 4: Socio-economic characteristics of watermelon farmers base on occupation

Variable	Frequency	Percentage
Farming	29	72.5
Trade	7	17.5
Civil service	3	7.5
Apprenticeship	1	2.5

Kuza *et al.* (2018) who found that 63.2% of their sampled farmers were males.

Age

Table 2 shows that 42.0% of the participants' falls within the age range of 21-30 years, 22.5% falls within the age range of 31-40 years and above 50 years while 8.0% were found to be below 21 years and 41-50 years. This implies that most of the watermelon farmers in the study area were energetic and in their active productive years. The study is similar to the findings of Etim (2017) in his study on watermelon farmers project and output performance of agricultural enterprise reported that (34%) of the sampled farmers were within the age range of 36-45 years.

Marital status

Table 3 revealed that majority (52.5%) of the watermelon farmers were married. 27.5% were single while, 12.5% and 7.5% each were widower and divorcee respectively.

This implies that most of the sampled participants in the study area were married. This suggests that the participants were responsible enough to be entrusted with the implementation of watermelon farmers' project. Marital status of a household determines the number of members of the family which in turn influences the decision of the household to participate in a project (Sulo *et al.*, 2012).

Occupation

Table 4 also shows that majority (72.5%) of the participants major occupation in the study area was farming and trade (27.5%). Other participants claimed to be civil servants (7.5%) and apprentice (2.5%). The main occupation of the participants will influence their level of participation (Kuza *et al.*, 2018).

Educational qualification

Table 5 below also revealed that 30.0% of the watermelon

Table 5: Socio-economic characteristics of watermelon farmers base on educational qualification

Variable	Frequency	Percentage
No formal education	12	30.0
Primary	9	22.5
Secondary	13	32.5
Tertiary	4	10.0
Adult Education	2	5.0

Table 6: Socio-economic Characteristics of watermelon farmers base on Farming Experience

Variable	Frequency	Percentage
5years and below	7	17.5
6-10years	11	27.5
11-15years	7	17.5
16-20years	2	5.0
Above 20years	13	32.5

Table 7: Socio-economic Characteristics of watermelon farmers base on Farm Size.

Variable	Frequency	Percentage
0.1-2	12	30.0
2.1-4	12	30.0
4.1-6	13	32.5
6.1-8	2	5.0
Above 8	1	2.5
Total	40	100.0

farmers had no formal education while 32.5% participants claimed to have attended secondary school with 25.5%, 10.0%, and 5.0% claimed to have attended primary, tertiary and adult education respectively. This implies that the participants sampled have some form of western education. This is vital as they would understand the importance of the watermelon farming to them. This finding is similar to that of Ehrim, (2017) who found majority of the watermelon farmers in his study area to have attended only primary school.

Farming experience

Table 6 also revealed that 32.5% of the watermelon farmers have at least 20 years farming experience, 27.5% has 6-10 years farming experience, 17.5% each has below 6 years and 11-15 years farming experience with the remaining 5.0% having 16-20 years farming experience. This implies that the participants are experience enough to identify some deficiency in their farming activities. The findings corroborates with the findings of Agwu (2004), Kolawole (2007) and Amaza (2011) who have all shown that farmers in their study

area have mean farming experience of 23, 18 and 25 years respectively.

Farm size

Table 7 shows that majority (92.5%) of the participants have farm size of between 0.1-6.0 hactres with only 7.5% of the participants having a farm size of above 6 hectares of farmland which suggests that the participants practiced subsistence agriculture. The findings is similar to that of (Kolawole, 2007; Mignouna *et al.*, 2011) who have shown that farmers in developing countries have an average farm size of 0.7 hectares indicating they are small scale farmers.

Participants' involvement in watermelon production

Table 8 presents the participants involvement in the design and implementation of watermelon production in the study area. The findings of the study revealed that 60.0% of the participants were involved in watermelon production while 40.0% of the participants were not involved in watermelon production.

Table 8: Participants involvement in the design and implementation of watermelon farming project.

Variable	Frequency	Percentage (%)
Involvement		
Involved	24	60.0
Not Involved	16	40.0
Total	40	100.0
Level of Involvement		
Strongly Involved	20	50.0
Partially Involved	4	10.0
Total	24	60.0

Table 9: Impact of watermelon farming project on participants farm output,

Variables	Mean	Std. Deviation	Mean Difference	t	df	Sig (2 tailed)
Annual farm output before participation in watermelon farming Project	44.50	39.18006	24.55	6.003	39	0.000
Annual farm output after Participation in watermelon farming Project	69.05	56.93854				

Table 10: Problems militating against effective implementation of watermelon farm project.

Problems	Frequency	Percentage
Inadequate capital	39	97.5
High cost of hiring machines	24	60.0
Bad road	33	82.0
Inadequate input support	19	47.5
Untimely distribution of inputs	6	15.0
High cost of modern farm inputs	20	82.5
Poor storage facilities	23	57.5
Does not address needs	18	45.0
Preference of extension agents to work with large farm	12	30.0
Low level of extension visits	31	77.5

The results of the study also revealed that out of the 60.0% of the participants involved in the design and implementation of the project, 50.0% were strongly involved while the remaining 10.0% were partially involved in watermelon production. The result of the study corroborates with that of Danjuma *et al.* (2016) on their study on socioeconomic impact of watermelon farming programme in Taraba State who revealed that 67.39% of the participants in their study area were involved in watermelon production, however, found that only 17.7% were strongly involved in watermelon production.

Impact of watermelon production on participants farm output

Table 9 presents the test of the output difference before and after participation in watermelon production among watermelon farmers in the study area. The results of the findings revealed that there is a mean difference of 24.55

in the output of the participants after their participation in watermelon production. The difference in the output was significant at 1% level of probability (0.000). This implies that participation in the project has therefore, significantly increased their farm output. The result of the study corroborates with that of Danjuma *et al.*(2016) on the socio-economic impact of watermelon farming in Taraba state who shows that the average annual farm output of the participant increased from 63.34 bags to 85.71 bags as a result of participation in watermelon production, suggesting a positive impact.

Problems militating against effectiveness in watermelon production

Table 10 presents the problems militating against effective implementation of the watermelon farm project in the study area. The results of the finding shows that the major problems faced by the farmers were inadequate

Table 11: Pair wise ranking of constraints faced by farmers in watermelon production.

Constraints no.	1	2	3	4	5	6	7	8	Score	Rank
Lack of improve variety of seeds	X	2	3	1	1	1	1	1	5	3 rd
Pests and Diseases		X	2	2	2	2	2	2	7	1 st
High perishability of the produce			X	3	3	3	3	3	6	2 nd
Inadequate storage facilities				X	4	4	4	4	4	4 th
Inadequate credit facilities					X	5	5	5	3	5 th
Inadequate extension services						X	6	6	2	6 th
Inadequate transportation facilities							X	7	1	7 th
Poor marketing information								X	0	8 th

Key:- X= Starting point

capital (97.5%), high cost of inputs (82.0%), bad road (82.0%), high cost of hiring machines (60.0%), low level of extension visits (77.5%) and poor storage facilities (57%) while 45.0% of the participants claimed their constraint was that some of the services does not address their needs. Other problems identified by the participants include preference of extension agents to work with large scale farmers and untimely distributions of inputs. The result of the study is similar to that of Ominikari *et al.* (2017) in their study on the assessment of the benefits of National Agricultural projects among participants through her activities in Bayelsa state revealed that despite the successes recorded in the fadama programme, the beneficiaries also encountered some problems such as lack of access to fadama project personnel when the need arise, lack of fund, non-regular training, poor communication channel, delay in being attended to by the delivery agency, no regular meeting to achieve effective participation, lack of farm land, poor infrastructure, distance to training centre, lack of farm input supply, lack of storage facilities and bad roads (Table 11).

Conclusion

Based on the results of the findings, the study therefore, concludes that the major occupation of the respondents in the study area was farming and they were strongly involved in watermelon in their community. The study also conclude that there is a significant difference in the mean output of the farmers before and after participation in watermelon production which suggests that government project has positive impact on participants

output. The study also conclude that the major problems militating against effectiveness implementation in watermelon production in the study area were inadequate capital, high cost of inputs, bad road, high cost of hiring, low level of extension visits and poor storage facilities.

Recommendations

Based on the findings, the research wish to recommends the following;

- (i) The Federal Government should assist watermelon production through the World Bank programme.
- (ii) More farmers should be encouraged by extension agents to participate in watermelon production.
- (iii) The project should develop proper measures towards ensuring that service providers execute projects according to specifications.
- (iv) Government should device a means of giving soft loans to the farmers. And such loans should be tailored to smallholder farmers with high potentials for diversification and quality improvement of productivity.
- (v) There should be expansion of rural infrastructures such as; roads and market.
- (vi) The African Development Bank (ADB) should ensure prompt disbursement of funds and inputs to further strengthen the existing positive attitude of the farmers towards watermelon production.
- (vii) Extension agents should focus both on small and large scale farmers as that will provide a uniform ground and a sense of belongings among the small scale farmers.

REFERENCES

- Agwu AE (2004). Factors Influencing Adoption of Improved Cowpea Production Techniques in Nigeria. *Journal of International Agriculture and Extension Education*. 2 (1): 81-88.
- Amaza PS (2011). Early Cowpea Adoption of Improved Varieties in Northern Nigeria. Report submitted to International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria
- Danjuma IA, Oruonye ED, Ahmed YM (2016). Socioeconomic impact of watermelon farmers project in Taraba State: A case study of Jalingo Local Government Area. *International Journal of Environmental & Agriculture Research*, 2(2) 35-41.
- Ehrim NC, Rhaji MAY, Oguoma NNO, Onyeagocha SUO (2016). Assessment of Poverty Profile of watermelon farmers Participants in Imo State, Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology* 15(4): 1-13
- Enoch TI, Jonathan IA, Terwase S (2018). The Economic Impact of watermelon farmers Project on Beneficiaries in Benue State: A Case Study of Makurdi Local Government Area. A Paper Presented at the 59th Annual Conference of Association of Nigerian Geographers, Department of Geography, University of Ibadan, 4th – 9th November, 2018.
- Etim AE (2017). Watermelon farmers project and output performance of agricultural enterprise: An Empirical Evaluation. *Archives of Business Research*, 5(8):160-169.
- Inam US, Effiong EA (2017). Watermelon farmers Project and Output Performance of Agricultural Enterprises: An Empirical Evaluation. *Archives of Business Research*, 5(8), 160-169.
- Kolawole O, Ojo SO (2007). Economic Efficiency of Small Scale Food Production in Nigeria: A Stochastic Frontier Approach. *Journal of Social Science*. 14(2):123-130.
- Kuza Y, Okwoche VA, Age AI (2018). Assessment of the Impact of Watermelon farmers Development Project on Beneficiaries in Nasarawa State, Nigeria. *Greener Journal of Agricultural Sciences*. 8 (9):197-202.
- National Fadama Development Project III (NFDP III), Akwalbom State Fadama Coordination Office, Uyo, Implementation Status Report (June 2009 – 2012) for 6th Joint World Bank/FGN Supervision Mission.
- Ominikari AG, Kuforiji OA, Eshiet A (2017). Assessment of the Benefits of National watermelon farmers Agricultural projects among participants through her Activities in Bayelsa state. *International Journal of Environment, Agriculture and Biotechnology* 2(4):2149-2155.
- Sulo T, Koech P, Chumo C, Chepng'eno W (2012). Socioeconomic Factors Affecting the Adoption of Improved Agricultural Technologies among Women in Marakwet County Kenya. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*. 3(4): 312-317.