



Original Research Paper

**EFFECT OF SOCIO-ECONOMIC FACTORS ON VEGETABLE PRODUCTION OF
SMALLHOLDER FARMERS IN SELECTED LOCAL GOVERNMENT AREAS OF
KADUNA STATE, NIGERIA**

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ABSTRACT

The study examined the socio-economic factors influencing vegetable production of smallholder farmers in selected Local Government Areas of Kaduna State, Nigeria. A combination of purposive and random sampling techniques was used in selecting respondents in the study area. The first stage involved a purposive selection of two Local Government Areas, considering the preponderance of vegetable production. The second stage involved a random selection of two villages from each Local Government Area viz; Unguwar-Fatika, Samaru, Tudun Wada, and Bomo. Finally, one hundred vegetable farmers were randomly selected using balloting. Data were elicited through a structured questionnaire and personal interview schedule. Descriptive statistics were employed to describe the socioeconomic characteristics of smallholder vegetable farmers. Results revealed that the mean age of the farmers was 36 years inferring an active working age bracket. These farmers also have one form of education or the other while the mean for household size stood at 5 persons contributing to family labour. The majority (57 %) of farmers sourced their capital through personal savings indicating the need for alternative funding. Logit regression model analysis was used to estimate the socioeconomic variables influencing vegetable production of smallholder farmers. Results revealed that age, marital status, and credit were positive and

statistically significant at 1 % while year of experience was significant at 5 % level of probability infers that these variables are the major determinants of vegetable production in the studied area. The high cost of fertilizer was the foremost constraint in the production of vegetables. It was concluded that despite the exigencies in the studied area vegetable production was profitable though operated on a small scale. It was, therefore, recommended that key stakeholders in the vegetable industry comprising the government and non-governmental organizations should assist farmers in subsidizing inputs to increase their production capacity.

Keywords: vegetable production, social-economic factors, small holder farmers, food security

INTRODUCTION

Vegetable production is of great economic importance in the agricultural sector. Its value chain can provide income and reduce poverty and unemployment. Vegetables have been part of the human diet right from time; some are perennials but mostly annuals and biennials, usually harvested within a year of sowing or planting (Schreinemacher *et al.*, 2018). Vegetables are of great nutritional value in Nigeria and other sub-Saharan Africa and are majorly comprised of minerals, vitamins, proteins, carbohydrates, and dietary fibres. They form an important component in the human diet (Aju and Popoola, 2010). Vegetables, in no small measure, offer people with limited access to meat and fish sources of protein and some vital micro-nutrients needed for healthy living. They are crop plants with immature succulent roots, bulbs, stems, blossoms, leaves seeds, or fruit that are eaten (Musa and Ogbadoyi, 2012). Vegetables such as tomato, potato, beetroot, carrot, cabbage, onion, sweet potato, and hot pepper are mostly grown in Nigeria, particularly in Kaduna State. Tomatoes, peppers, and onions are important vegetables in the global economy due to their high consumption (Schreinemachers *et al.*, 2018).

Tomato is one of the foremost, essential vegetables in Nigeria, virtually consumed by every tribe, and grown all over Nigeria (Abur, 2014). Tomato is a highly nutritious food ingredient used in the preparation of many foods. (Shehu and Mohammed, 2017). Vegetable crops mostly tomato crops, for example, not only contribute to the share of agriculture in the national economy but possess a great potential and comparative advantage to compete in a liberalized economy. According to Katanga (2018), Nigeria's annual tomato imports are valued at US\$170 million. Despite this importance, vegetables are still mainly produced in Kaduna State by resource-poor small farmers with small farm holdings and they are responsible for the vegetables consumed in the nation.

One of the problems of the production of vegetables in Nigeria is stagnant production technology among the Nigerian farming community, the majority of whom are small-scale producers. Therefore, the extent to which inputs supply and productivity relate to a shortfall in food demand and supply in Nigeria and a source of concern. Furthermore, the impact of factors such as the policy environment, and the availability of markets for the disposal of farm outputs is not often considered even though such factors make farmers work harder and thus, produce higher outputs.

It is pertinent to note that the productivity of smallholder farmers and their contribution to the economy, food security, and poverty reduction depend on the services provided by well-functioning ecosystems, including soil fertility, freshwater delivery, pollination, and pest control. Smallholder farming practices, in turn, affect the condition of ecosystems. These impacts are not always negative, but poverty and immediate needs can drive smallholders to put pressure on ecosystems and this is worrisome. Therefore, this study became imperative since an effective ecosystem can increase vegetable output.

Therefore, the study examined the socio-economic characteristics influencing vegetable production of smallholder farmers in selected Local Government Areas of Kaduna State, Nigeria.

Finally, the results of the study will be useful to policymakers as a guide in designing appropriate policies needed to improve the efficiency of vegetable production.

MATERIALS AND METHODS

Study area

Kaduna State is located between Latitude 9° 03¹ and 11° 32¹ North of the Equator and Longitudes 6° 05¹ and 8° 38¹ East of the Greenwich Meridian (Kaduna State Agricultural Development Agency KADA, 2007; Kaduna State Government, KSG, 2015). It shares common boundaries with Kano and Katsina to the north, Bauchi and Plateau State to the North East, Federal Capital Territory Abuja, and Nasarawa State to the South, Niger and Zamfara State to the South West (Alabi and Abdulazeez, 2018; Yakubu, 2015).

It has a total land mass of 46,053 square kilometers (KSG, 2015) with a population of 6,113,503 people as of 2006. The projected population of the State is put at 9,476,053 people in 2020 at a growth rate of 3.18 % per annum. The wet season lasts from April through mid-October with a peak in August, while the dry season extends from mid-October of one calendar year to April of the next (Abaje and Giwa, 2010). The annual average rainfall in the state is about 1323 mm. The

spatial and temporal distribution of the rain varies, decreasing from an average of about 1733 mm in Kafanchan-Kagoro areas in the South of the study area to about 1203 mm in the central part (Kaduna) and about 1032 mm in Zaria, Ikara, and Makarfi LGAs in the north.

The highest average air temperature normally occurs in April (28.9°C) and the lowest in December (22.9°C) through January (23.1°C). The mean atmospheric relative humidity ranges between 70-90 % and 25-30 % for the rainy and dry seasons respectively. Kaduna State consists of four Agricultural zones viz; Birnin-Gwari, Lere, Maigana, and Samaru-Kataf. The state consists of 23 local government areas; Birni-Gwari, Chikun, Igabi, Ikara, Jaba, Jema'a, Kachia, Kudan, Kajuru, Kaura, Kauru, Kubua, Kaduna North, Kaduna South, Lere, Markafi, Giwa, Kagarko, Sabon-Gari, Sanga, Soba, Zangon-kataf, and Zaria.

Kaduna State has different ethnic groups including Hausa, Fulani, Gbagyi, Karama, Bajju, Kataf, Kadara Jaba, and so on including other ethnic groups from various parts of the country. The major religions are Islam and Christianity, followed by Traditional African Religion as a minority. In addition to vegetables, maize, cowpea, sorghum, soybeans, potato, ginger, groundnut, and other crops are grown, while other farmer rear animals including goats, sheep, cows, pigs, vegetable, duck, and their likes. The predominant occupations in the area are farming, complimented by other livelihood (off-farm) activities such as trade, collection, and gathering of firewood, fruit, and vegetables. The majority of the farmers are small-scale farmers who cultivate vegetables alongside other crops alongside other crops for household consumption, while part of their produce including cash crop harvested is sold for income generation.

A multistage sampling technique was used to select farmers for this study. In the first stage, a purposive selection of two Local Government Areas, due to the preponderance of vegetable production. In the second stage, a random selection of two villages from each Local Government Area which are Unguwar-Fatika, Samaru, Tudun Wada, and Bomo. Finally, one hundred vegetable farmers were randomly selected using balloting.

Descriptive statistics was used to describe the socio-economic characteristics involved in the production of vegetables in the study area. Arithmetic means, frequency distribution, and percentages were used in cross-tabulation. Multiple Regression analysis was used to examine the

socio-economic variables that affect vegetable production. The Linear function was selected based on the magnitude of the coefficient of determination (R^2), a prior expectation, and the statistical significance of the estimated regression coefficients. The multiple regression analysis is estimated in linear functional form as;

Y= Output

X₁= Access to credit (Access=1, no access=2)

$X_2 = \text{Age (number of years)}$

X_3 = Years of Experience (number of years)

X_4 = Marital Status (Married 1, Single 0)

X₅= Educational Level (number of years in school)

X_6 = Household Size (number of persons)

X₇ = Farm Size (ha)

a= constant

$b_1 - b_7$ = Régression coefficients

e= error term.

RESULTS AND DISCUSSION

Socioeconomic characteristics of vegetable farmers

The socioeconomic characteristics of the vegetable farmers greatly influenced their behaviour. Some of these characteristics are age, marital status, household size, educational background, access to credit, farm size, and years of experience.

The distribution of the farmers according to age showed that about 41 % of the farmers were within the active age of 20-30 years while 32 % of them were 31-40 years of age with a mean age of 36.07 years. This implies that these farmers were within the active working age bracket. These farmers were particularly young people who could afford to venture into the vegetable business which is

known to be characterized by risks such as disease, drought, and theft and they are mature enough to take credit decisions that can sustain their vegetable production. This finding agrees with the findings of Sekumade and Toluwase (2014).

Findings of the marital status of the farmers showed that the majority (62.0 %) of the farmers were married while only 29.9 % were single, indicating that married households were more involved in vegetable farming than unmarried households. This study supports the findings of (Amos, 2007; Maikasuwa and Jabo, 2011) that married farmers were more involved in vegetable production than unmarried farmers.

The result of the analysis on household size showed that about 60 % of the farmers had household size of 1-5 persons, while the least was 6-10 persons per household (35 %) with a mean household size of 5 persons. A higher number of members of the household contributed to family labour. This supports most of the studies that confirmed large house size among the farming households where they see family size as a workforce that supplies the most needed labour requirement for production activities in the study area (Emaikwu *et al.*, 2011).

It can be deduced that the majority (37 %) of the farmers had primary education, while those who had only secondary and tertiary education were 10 % and 5 % respectively and 29 % had adult education, and 19 % of no formal education. This indicates that about 52 % of vegetable farmers were literate. The educational level of farm owners is very important in the management of vegetable birds and it is known to affect their farming activities, since the majority of the farmers are educated, it will improve the productivity and efficiency of tomato production in the study area. This agrees with the finding of (Ezeh *et al*, 2012) which states that the level of education attained by a farmer increases his farm, productivity and enhances his capacity to understand and evaluate new production technologies.

The findings in Table 1 revealed that 54 % of the farmers had 1-5 years of experience, 30 % had 6- 10 years, 8 % had 11- 15 years, and 8 % of the farmers had more than 20 years of experience. The mean years of experience was found to be 7 years. This suggests that the majority of the vegetable farmers in the study were new entrants into the business. It is generally expected that productivity increases with years of experience (IFPRI, 2008). Farmers master the techniques of production and avoid previous mistakes. Experienced vegetable farmers are likely to make better

decisions to enhance productivity and income because it is expected that experience in vegetable production usually determines the effectiveness of farmers' decisions concerning input combinations or resource allocation. Years of farming experience affect the productivity and technical efficiency of vegetable production. The longer the years of farming experience, the more knowledge acquired the more efficient the farmer becomes.

The result of the distribution of farmers showed that 63 % were non-members of cooperative societies, while only about 37 % of the farmers were members of cooperative societies. This implies that the benefit of cooperative membership was not fully accessed by the farmers. Cooperative membership avails co-operators the benefit of pooling resources together. Members also benefit from enhanced delivery of agricultural extension services, especially to farm financial institutions, and government and private institutions.

The distribution of farmers according to their source of credit is presented in Table 1, it shows that 57.0 % sourced for credits through personal savings that possibly might have been accumulated over time and from the sale of their products, and this is closely followed by friend and family as asserted 31.0 %, while 12.0 % sourced from commercial banks. Access to credit is one of the major determinants of outputs and effective productivity of farmers.

The regression model shows that the R^2 was found to be 0.469 which implies that socio-economic factors affecting the vegetable production in the study area were explained by variation in the independent variables and also implies the survey has a positive impact on vegetable production having about 47 % significance in the study area. The result of the socio-economic factors influencing vegetable production in the study area showed that the positive values of the coefficient imply that increasing the independent variables by one unit will increase the vegetable

Table 1: Socio-economic characteristics of the respondents (n= 100)

Variables	Frequency	Percentage	Mean	Std. Dev	Min	Max
Age			36.07	11.03	23	65
0 < 30	41	41				
31 - 40	32	32				
41 - 50	16	16				
51 - 60	7	7				
> 60	4	4				
Marital status						
Single	29	29				
Married	62	62				
Divorced	3	3				
Widow	4	4				
Separated	2	2				
Education level						
Adult education	29	29				
Primary education	37	37				
Secondary education	10	10				
Tertiary education	5	5				
Quranic education	19	19				
Household size			4.95	3.31	1	15
1 - 5	60	60				
6 - 10	35	35				
11 - 15	5	5				
Years of Experience						
1 - 5	54	54				
6 - 10	30	30				
11 - 15	8	8				
16 - 20	6	6				
21 - 25	2	2				
Membership of cooperative						
Member	37	37				
Non-member	63	63				
Source of Capital						
Personal saving	57	57				
Friends and family	31	31				
Commercial banks	12	12				

Source: Computed from field survey data, 2021

production level by the value of the coefficient while negative values of the coefficient imply that increasing the independent variable by one unit will reduce the vegetable production level by the value of the coefficient. It revealed that of the three variables included in the regression model farm size and labour were significant at a 1 % level of probability. Marital status and source of land were significant at a 5 % level of probability. Only cooperative was significant at a 10 % level of probability. Labour and farm size had negative coefficients, and marital status and source of land had positive coefficients.

The coefficient of marital status was positive and statistically significant at the 5 % level of probability. The positive coefficient indicates a direct linkage between marital status and vegetable production. It is expected to be positive given that marriage offers the vegetable farmers labour constraints to be minimized so that they will have the opportunity to produce more with less labour and this affects their standard of living. The coefficient for labour was negative and statistically significant at the 1 % level of probability. This implies that labour has an indirect linkage with vegetable production by the farmers; this implies that the cost of labour reduces the production level of the vegetable farmers.

The coefficient of the year of membership of the cooperative was positive and statistically significant at the 10 % level of probability. The positive coefficient implies that there is a direct linkage between the year of membership of the cooperative and vegetable production. It is expected to be positive given that cooperatives offer vegetable farmers financial constraints to be minimized so that they will have the opportunity to improve their standard of living. Social capital and entrepreneurial skills will be increased as they become a member of the cooperatives. The coefficient for the source of land was found to be positive and statistically significant at the 5 % level of probability. The positive coefficient depicts a direct linkage between the source of land and vegetable production. The possible reason could be as an individual owns land; it reduces the cost of production which possibly could increase their productivity.

The coefficient for Farm size was negative and statistically significant at the 1 % level of probability. The negative coefficient depicts an indirect linkage between farm size and vegetable production. This implies that farmers' output could only be increased if the farmland is fertile and all the management practices put in place and not necessarily large farm size. Farmers sometimes count more on their farm size than educational attainment to increase their productivity which consequently leads to higher return on investment. (Tables 1 and 2)

Note: ***, **, and * imply significance at 0.01, 0.05, and 0.1 levels, and Ns implies no significance. Values in parentheses are the respective t – t-ratios

Constraints in vegetable production in the study

About 76 % of the farmers ranked the incidence of pests and disease attacks as the major constraint in vegetable production. Vegetable requires prompt application of agrochemicals such as insecticides and herbicides to check the menace of pests and disease infestation that may occur as a result of overgrowth of weeds. About 33 % ranked poor seed quality as the last constraint. Poor seed quality lowered domestic vegetable output, distribution, and marketing by various stakeholders and government agencies. About 45 % of the farmers ranked shortage and high cost of farming, fertilizer, and other inputs as constraints (Table 3).

Table 2: Socio-economic factors influencing vegetable production in the study area

Variable	Coefficient	Std. Error	T-value
Constant	-4.59E-06	0.00	-3.034
Age	0.006067	0.00156	1.112
Marital status	0.0045717**	0.00583	0.225
Labour	-0.0347087***	0.00584	0.234
Household size	7.84E-09	0.00	-0.478
Education	-0.2088	0.0977	-1.22
Source of capital	0.000141	0.0001	-1.123
member of cooperative	2.83E-07*	0.00	-2.324
Farm size	-0.0402925***	0.0098	5.465
Source of land	0.1233935**	0.05254	0.244
Cropping pattern	-0.01951	0.01894	-1.306
Number of observation	100		
R ²	.469		
Adjusted R square	.403		
Prob> f	7.064		

Source: computed from field survey data, 2021

This is one of the problems confronting vegetable production in the study area. Farmers in the study area are poor and cannot afford to buy some of the farming inputs. This implies the fact that inputs are too expensive for an ordinary farmer in the study area considering the farmer's financial status.

Table 3: Constraints of vegetable production (n=100)

Constraint	Frequency	Percentage	Rank
Incidence of pests and diseases	76	76	1 st
Shortage and high cost of fertilizer	76	76	1 st
Unpredictable sales and perishability	57	57	4 th
Lack of storage facilities	54	54	5 th
Environmental problem	45	45	6 th
Shortage and high cost of labour	45	45	6 th
Poor seed quality	33	33	8 th
Difficulty in accessing	27	27	9 th
Difficulty in acquiring farmland	27	27	9 th

Source: field survey, 2021

CONCLUSION

The study establishes that vegetable farmers in the study area though on a small scale has the potential to increase food security while factors such as age, marital status, farming experience, and credit respectively are determinant of vegetable production of the farmers in the face of constraints such as pest and disease attack, high cost of farming inputs, unpredictable sales/marketing, lack of storage facilities.

RECOMMENDATIONS

The study recommends the provision of competent extension agents to visit and enlighten vegetable farmers on the technicality of production processes and how they can improve using advanced technology. This will not only enhance the skills of the farmers but also ensure food security. Key stakeholders in the vegetable industry comprising the government and non-governmental organizations could assist farmers in increasing their use of improved seeds by supporting them with production capital with which they can purchase the inputs and also provide machinery to reduce the cost of labour by subsidizing the vegetables of the working hour for those farmers that cannot purchase the machines. This is because the use of these inputs in vegetable production enhances the outputs which translate to higher returns. Farmers should be encouraged to form an association to enable them to benefit from such associations' training, information on innovations, and access to credits.

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