



IRRIGATED TOMATO FARMING; A TOOL FOR ENTREPRENEURSHIP DEVELOPMENT. A CASE STUDY OF SAKI AREA OF OYO STATE

¹Salau M. A., ²Adesina A., ²Ayandele A. A. and ³Fasasi S. K.

¹Department of Agricultural Extension and Management, The Oke - Ogun Polytechnic, Saki.

²Department of Agricultural Technology, The Oke – Ogun Polytechnic, Saki. Oyo State.

³Department of Mathematics and Statistics, The Oke – Ogun Polytechnic, Saki. Oyo State.

salaudebayo@gmail.com

07059718696

Abstract

Self - empowerment is the Key to alternative sustainable way in unstable economic situation Nigerian found themselves. This study investigates irrigated Tomato production as a tool for Entrepreneurship development in Saki area of Oyo State. A multi-stage random sampling procedure was used to select and elicit information from sixty (60) Irrigated Tomato farmers from three Local Government Areas that made up Saki area; through the use of standard structured questionnaires. The data were analyzed using descriptive statistics while a Gross margin analysis was used to determine the profitability of Irrigated Tomatoes farming. Findings showed majority (99%) of the respondents were male, married (75%) with 58.3% of the respondents' age fall between 31-50 years. It also revealed that majority of the respondents carried out land preparation, nursery management and hardening as part of management practices. While factors such as; lack of capital (53.3%), water source (71.7%), diseases (50%) and lack of storage and processing facilities were major constraints facing Tomato farming. It was further revealed that a profit of N170, 000 was realized in 2023 season per acre on irrigated Tomato farm which implied that Irrigated Tomato farming is a profitable venture. It is hereby recommended that, Irrigated Tomato farmers should form cooperative to improve their production while, Government, the NGO should partner irrigated tomato farmers to acquire basic equipment to encourage the interested youth and teeming Nigeria population to adopt Tomato Farming with irrigation as a means of entrepreneurship and sustainability.

Keywords: *Entrepreneurship, Tomato production, Value chain, Irrigation, horticultural crop, Saki area*

Introduction

Tomato (*Solanum lycopersicon spp.*) is one of the most important vegetables worldwide. World tomato production is a major horticultural crop with an estimated global production of over 120 million metric tons (F.A.O. 2007) of fresh fruit from an estimated 3.9 million hectares. As it is a relatively short duration crop and gives a high yield, it is economically attractive and the area under cultivation is increasing daily. Tomato belongs to the *Solanaceae* family. This family also includes other well-known species, such as potato, tobacco, peppers and eggplant.

The importance of entrepreneurship is to build innovative culture and initiative spirit in individual (Akpomi, 2009). This is in order to improve the ability to contribute significantly to economic development through self-employment SMART Agricultural production (Afolabi *et al*, 2017). And to make Nigeria teeming population more self-reliant and gainfully employed. Nigerian needs skills especially in area of Agriculture where the country is blessed with vast abundant fertile land.

Tomato is produced in temperate, subtropical and tropical areas around the world (Blanca *et al.*, 2012) and it is the second horticultural crop produced in terms of yield in the world (FAO, 2016). Statistics showed United States, China, India, Turkey and Nigeria as the countries with the largest production area (FAO, 2016, USDA, 2016). Despite Nigeria being categorized among the leading producer of world Fresh tomato production that has reached 186 million tons in the world in 2020, the country still import tomato to meet its demand with annual imports value of USD170 million (Edeh 2017 and Okojie 2017). Base on the finding from the research literatures, there are several research reports on tomato production (AVRDC. 2006, Aditi *et al*, 2011 and AETS, 2018), tomato breeding (Cheema *et al*, 2004 and Prayal *et al*, 2019) and tomato marketing (Adejebi *et al*, 2011, Hanins *et al*, 2012 and Aremu *et al*,



2016) but there is paucity of literatures on nexus between tomato production and entrepreneurship empowerment. Thus, this research study would be a novel ideal to bridge the gap by depicting the valuable contribution irrigated tomato production in empowering teeming population in the country.

The main objective of this study is to investigate the economic analyses of Irrigated Tomato production, a case study of Saki area of Oyo State.

1. To examine the socio-economic characteristics of the respondents
2. To identify the constraints of tomato production in the study area.
3. To examine the profitability of tomato production in the study area.

Research Methodology

Study Area

The study area is Saki Area of Oyo State, Nigeria. It covers an area of approximately 12,310sq km. it is bounded by Ogun, Kwara, Osun and Benin respectively in the West, East, South and North respectively. The area within the tropical and it’s made of three local government areas: Saki West, Saki East, and Atisbo local government area. The 2006 NPC put the population of the area at 278,002, 110,223 and 119,792 for Saki West, Saki East and Atisbo Local Government areas respectively. The area experiences two climate seasons; the dry and the rainy seasons.

The climate of the area favours the growth of variety of food and cash crops. The food crops grown in the area (either as sole crop or mixed crops) includes yam, maize, cassava, cowpea, sorghum, soybeans, okra, pepper, melon and rice while cash crops include cashew and oil palm. Saki area is recognized as the food basket of Oyo state.

Sampling Techniques

A multistage sampling techniques was used in this study, the first stage involved the purposive selection of all the three (3) local governments areas which are; Saki-west. Saki-East and Atisbo that made up Saki area and due to prevalent of irrigated tomato production in the areas. The second stage involved the random selection of 20 respondents from each local government area making a total number of 60 Irrigated tomato farmers interviewed through the use of standard structure questionnaires.

Analytical Techniques

The analytical techniques employed include descriptive statistics such as frequency and percentage used to analyze the socio-economic characteristics of the respondents, while the gross margin analyses was used to determine the profitability of irrigated tomato production in the study area. The gross margin analysis adopted is of the model state below;

$$GM = \sum P_1 Q_1 - \sum K_1 X_1 \dots\dots\dots (1)$$

$$NFI = TR - TC \dots\dots\dots (2)$$

- Where
- GM = Gross Margin (N/ha)
 - P₁ = unit price of output (N/Kg)
 - Q₁ = Quantity of output (Kg/ha)
 - K₁ = unit cost of variable input (N/ha)
 - X₁ = Quantity of variable input (Kg/ha)
 - P₁ Q₁ = Total revenue (N/ha)
 - K_j X_j = Total cost associated variable input (N)
 - GM = TR – TVC
 - TR = Output (Q*) Price (P)
 - Net Farm Income
 - NFI = TR – TC --- (3)
 - TC = TVC + FC



$$\text{Return on investment} = \text{NFI/TC}$$

The mean values of tomato farmers was used to compute the cost of the various inputs such as land, seed, equipment and labour employed, fertilizer, used in production process. All equipment used was depreciated using straight line method of depreciation in order to guide against over valuation of the cost incurred in each production year.

Multiple regression Technique

A multiple regression technique was used to ascertain factors determine net returns of irrigated tomato farmers. The model implicit form as adopted by Sheu and Muhammed (2017) is stated as follow;

$$Y = f(X_1 + X_2 + X_3 + X_4 + X_5 + e)$$

- Where; X_1 = Acquisition cost
 X_2 = Transportation cost
 X_3 = Labour cost
 X_4 = farming experience
 X_5 = Social organization

Results and Discussion

Socio-economic characteristics of the Respondents

The result in Table 1 showed that 58.3% of the respondents' age fell between 40 -50 years. These implied that the respondents were active ready take risk and adopt new innovative techniques while majority of the respondents 99% were male. The findings revealed that majority 75% of the respondents were married while 20% were single. Also, 56.6% of the respondents have Household size between of 1-5 persons while 38.33% have 6-10 persons in there households. It was revealed that 48.33% of the respondents farm at medium scale while 30% farm at small scale. Also 45% of the respondents have 6 - 10 years of experience while 35% of respondents have 1-5 years of experience. Fifty – seven percent of the respondents' sources of finance were through self-capital while 25% raise capital through co-operative.

The finding indicated majority 75% of respondents occupation was crop farming while 10% were civil servant. More so, 53.3% belong to association while 58% of the respondents attended tertiary institution and 30% of the respondents attended primary school.

Table 1: Distribution of Respondents based on their socio-economic characteristics

Variables	Frequency	Percentage	Cumulative Percentage
Age			
20-30	11	18.3	18.3
31-40	18	30	48.3
41-50	17	28.3	76.6
51-60	11	18.3	94.9
>60	03	5	100
Farm size			
1-2	27	45	45
3-4	20	33.3	78.3
>4	13	21.7	100
Gender			
Male	59	99	99
Female	01	1	100
Marital status			
Single	12	20	20



Married	45	75	95
Widow	03	5	100
Household size			
1-5	34	56.7	56.7
6-10	23	38.7	95.4
11-15	03	5	100
Level of education			
No formal education	5	8.3	8.3
Primary	18	30	38.3
Tertiary	35	58	96.3
Quranic	02	3.3	100
Scale of production			
Small scale	18	30	30
Medium scale	29	48.3	78.3
Large scale	13	21.7	100
Years of experience			
1-5	21	35	35
6-10	27	45	80
11-20	10	16.7	96.7
21-30	02	3.40	100
Source of finance			
Self-capital	34	56.7	56.7
Co-operative	15	25	81.7
Loan from relative	05	8.3	90
Loan from bank	06	10	100
Major occupation			
Crop farming	45	75	75
Civil servant	06	10	85
Trading	03	05	90
Self employed	04	6.7	96.7
Student	02	3.3	100

Source: Field survey, 2023.

Respondents farm characteristics

The findings in table 2 revealed that majority 86.7% of the respondents practice sole cropping while 13.3% of the respondents practices mixed cropping. Also 91.7% of the respondents planted 1-3 seeds per stand while 8.3% of the respondents planted 4-6 per stand.

The table above indicated 80% of the respondents agreed to 3month of period of tomato harvesting while 20% agreed to 2month to harvest tomato on the field. It was further revealed that 83.3% of the respondents' practices handpicking during the harvesting while 16.7% of the respondents used harvester during harvesting process. Fifty percent of the respondents' adopted farm gate selling of their products, 43.3% of the respondents used Cold storage for storing tomato while 6.7% of the respondents used refrigeration for tomato preservation. Furthermore, it was also revealed that 13.3% of the respondents belong to social organization while 86.7% of the respondents do not belong to any form of social organization.

Table 2: Distribution of respondents based on farm characteristics

Variables	Frequency	Percentage	Cumulative %
-----------	-----------	------------	--------------



Mode of cropping			
Sole	52	86.7	86.7
mixed	8	13.3	100
Period of harvesting			
2 Month	12	20	20
3 Month	48	80	100
Method of harvesting			
Hand picking	50	20	83.3
Use of harvester	10	80	100
Methods of preservation			
Farm Gate selling	30	83.3	50
Cold storage	26	16.7	93.3
Refrigeration	04	6.7	100
Social organization			
Yes	08	13.3	13.3
No	52	86.7	100

Source: Field survey, 2023

Constraints in tomato production in the study area

Table 3 showed that majority of the respondents (53.3%) identifies lack of capital as a major problem while 46.7% disagreed. (71.7%) majority of the respondents identify source water as a challenge while (23.3%) disagreed. It's also revealed that some of the respondents are facing the problems of poor consumer price 45%. Also 50% of the respondents are facing the challenges of diseases. Finally 38.3% of the respondents are as well facing the problems of cattle encroachment.

Table 3: Distribution of respondents' constraints facing tomato farmers

Constraints	Agreed	disagreed	undecided
Lack of capital	32(53.3)	28(46.7)	-
Poor management	17(28.3)	38(63.3)	5(8.3)
Lack of technical know-how	27(45)	29(48.3)	4(6.7)
Poor consumer price	27(45)	31(51.7)	2(3.3)
Water source	43(71.7)	14(23.3)	3(5)
Diseases	30(50)	25(41.7)	5(8.3)
Storage facilities	38(63.3)	17(28.3)	5(8.3)
Cattle encroachment	23(38.3)	31(51.7)	6(10)
Perishability	40(66.7)	20(33.3)	-

Source: field survey, 2023. () figures in bracket represent percentages

Profitability of Tomato Production

The finding revealed that, within the average period of three months (April to June), the respondents average total cost of tomato production per acre in the area in 2023 season was ₦136,000 while average total revenue was ₦294,236. Thus, the total profit which is the differences between the total revenue and total cost incurred during the production is ₦170, 000.00 which implied that, tomato production is a profitable agricultural venture. This



corroborates the findings of Micheal and Kolawole (2020). The rate of investment is 116% which connotes that for every naira expended N116 is realized when into irrigated tomato production.

Table 4: Average Cost and Return on Irrigated Tomato Production per Ha in 2023 season.

Variable	Amount (₦ : K)
(A) Variable cost	
i. Ploughing	15,000.00
ii. Planting	21,000.00
iii. Fuel and watering	25,000.00
iv. Manure	10,000.00
v. Weeding	5,000.00
vi. Stalking	10,000.00
vii. Pesticides/Insecticide	6,600.00
viii. Harvest	20,000.00
ix. Basket/Sorting	12,000.00
Total Variable Cost (TVC)	124,000.00
(B) B. Fixed Cost	
Cost of Rent Farm Land	2,000.00
iii. Labour	10,000.00
(C) Total Fixed Cost (TFC)	12,000.00
Total Cost (TVC + TFC)	136,000.00
(D) Returns	
Sales (7.4 baskets/acre X ₦ 35,000)	259,000
Household Consumption/ Gifts	35,236
Total Revenue (TR)	294,236
Gross margin	170,000
Net farm income (NFI)	158,236
Return on investment (ROI)(NFI/TC)	116.35

Source: Field survey, 2023`

Result of Regression Analyses

The result of regression analyses revealed a co-efficient of multiple determination (R^2) of 0.848. This connotes that the estimated variable 84.8% of the variation in net returns of irrigated tomato farmers.

Table 5: Result of Regression Analyses

Variable	Co-efficient	T- ratio
Constant (X_1)	7.340	8.443
Acquisition cost (X_2)	-0.289	3.321***
Transportation cost (X_3)	0.421	3.074**
Labour cost(X_4)	-0.756	5.003***
Farming experience (X_5)	2.788	6.448***
Social organisation (X_6)	0.103	-0.082***

$R^2 = 0.848$ Adjusted R^2 . F – Statistics = 645.2. *** Significant at 1% ** Significant at 5%.



The result in table 5 revealed variables such as acquisition cost (X_1) and labour cost (X_4) were negative and statistically significant at 1% level of probability. These indicated increases in values of these variables reduce the net returns of the marketers. Also, factors such as transport fare, farming experience, social organisation were positive and significant at 5% and 1% level respectively. These connotes that they have positive effect on the irrigated tomato yields and on the net return of the tomato farmers.

Recommendations

Based on the findings of this Study, it is hereby recommended that;

1. The tomato farmers should engage in cooperative association in other to have access to loan from finance house to procure inputs, improve their productivity through value chain.
2. Government at all level and Non- Governmental Organization (NGO) should partner with the Irrigated Tomato farmers to attract youths and job seekers as a tool for entrepreneurship empowerment.

References

- Adenegan, K. O. and Adeoye, I. B. (2011). Price Analysis of Tomato in Rural and Urban Retail Markets of Oyo State, Nigeria. *International Journal of Agricultural Economics and Rural Development*. 8(2): 61-69.
- Adejobi, A.O., Babatunde, R.O., & Idowu, E.O. (2011). Weight and measurement issues in retail marketing of fresh tomatoes: evidence from Osun State. *Journal of Agricultural Science*, 6 (4), 20-26. Nigeria. Asian Research Publishing network (NARPN)
- Aditi, G., Kawatra, A. & Sehgal, S. (2011). Physical-chemical properties and nutritional evaluation of newly developed tomato genotypes. *African Journal of Food Science and Technology*, 2 (7), 167-172.
- Aditi, G., Kawatra, A. & Sehgal, S. (2011). Physical-chemical properties and nutritional evaluation of newly developed tomato genotypes. *African Journal of Food Science and Technology*, 2 (7), 167-172.
- AETS Consortium. (2018). Support to the implementation of the Nigerian Component of the West Africa Competitiveness Programme. (EU). Draft Final Report. Annex 10: Tomato Sector Study.
- Aminu, A. and Shehu, A.M. (2017). Tomato Value Chain in Kano River Irrigation Project, Nigeria. *Journal of Agricultural Economics, Environment and Social Sciences*. 6(2). 56-65.
- Aminu, A. and Shehu, A. M. (2007) Tomato Chain Analysis in Kano River Irrigation Project, Nigeria. Department of Agricultural Economics and Extension, Bayero University, Kano.
- Aremu, F.J, Adeyemo, R and Olugbire, O.O (2016). Economic analysis of fresh tomato marketing in the wet season under Tropical conditions. *Journal of Sustainable Development*, 13(1), 65-72.
- Asian Vegetable Research Development Centre (AVRDC) (2006). *Vegetables Matter*, AVRDC The World Vegetable Centre, Shanhua, Taiwan.
- Blanea *et al*, (2012). The vegetable and potato sector Nigeria; An overview of the present status. Wageningen, Wageningen Economic Research, Report 2019-119. 68.
- Cheema D. S. and Dhaliwal M. S. (2004). Hybrid tomato breeding. Food products press, an imprint of the Harworth press incooperation. 1-4.
- Edeh, Harisson. (2017). FG announces new tomato policy to protect over \$180m market. In: *Businessday Online*, August 1, 2020. <http://www.businessdayonline.com/exclusives/article/fg-announces-new-tomato-policy-protect-180m-market/>



- F.A.O. (2007). Data on harvested area, production volume and yields of tomato worldwide (data from 2016, accessed August 1, 2020.). <http://www.fao.org/faostat/en/#home>.
- FAOSTAT (2018). Data on harvested area, production volume and yields of tomato worldwide (data from 2016, accessed August 1, 2020.). <http://www.fao.org/faostat/en/#home>.
- Food and Agricultural Organization of the United Nations, FAO. (2010). FAOSTAT. Retrieved from: <http://faostat.fao.org/>.
- Gebhardt and Thomas, (2002). Agriculture Sector Performance Review Report. 1-40. Retrieved from; www.kano.gov.ng.
- Haruna, U., Sani, M.H., Danwanka, H.A., & Adejo, E. (2012). Economic Analysis of Fresh Tomato Marketers in Bauchi Metropolis of Bauchi State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*, 8 (30), 1-8.
- Melo, D. I., Javanica M. and Avenaria M. (2018). Absence of HS Code for greenhouses shows tomato policy weakness. In: Business day Online, August 1, 2020. <http://www.businessdayonline.com/companies/agriculture/article/absence-hs-codegreenhouses->
- Micheal A. and Kolawole A. A. (2020). Analysis of Tomato Production in some Selected Local Government Areas of Kano State, Nigeria. *Symposium on Agri-Tech Economics for Sustainable Futures*.
- Olanite, Rdiwannulahi. (2017). Benefiting from the Nigerian Tomato Sector Reforms. A case for investing in tomato processing factories in Nigeria. <http://www.kusamotu.com/wp-content/uploads/2017/08/TOMATO-PART-1-by-Ridwanulahi-Olanite-Esq.pdf>
- Okojie, Josephine. (2018). Absence of HS Code for greenhouses shows tomato policy weakness. Businessday Online, August 1, 2020. <http://www.businessdayonline.com/companies/Agriculture/article/absence-hscodegreenhouses->
- Payal S., Seema T. and Radhika N. (2019). Recent advances in breeding of tomato. A review. A review. *International Journal of microbiology and applied science* 8(3): 1275 – 1283.
- Shehu A. S. and Mohammed A. S. (2017). Economic analysis of tomato marketing in Ilorin metropolis, Kwara State, Nigeria. *Journal of Agricultural Sciences*. 62(2), 179-191.
- Tahir, A.D., Ghide, A.A. Ibrahim, U.S., Mohammed, A.G. and Abba, I.Y.(2021). Economic analysis of small-scale tomato production in jere local government area of Borno State, Nigeria. *FUOYE Journal of Agriculture and Human Ecology* 5(2): 21 – 28.
- Troke, J.K. (1981). *Agribusiness management international student edition*, library of congress cataloguing in publication: Mc. Graw-hill, inc. 6-7.
- Ugonna, C. U., Jolaoso, M. A. and Onwualu, A. P. (2015). Tomato Value Chain in Nigeria: Issues, Challenges and Strategies. *Journal of Scientific Research & Reports*, 7(7), 501-515.
- USDA. (2016). Tomato Value Chain in Nigeria: Issues, Challenges and Strategies. *Journal of Scientific Research & Reports*, 7(7), 501-515.
- Van der Waal, J.W.H. (2015) 'Horticulture Sector Study for Nigeria'. Taste Symposium on Agri-Tech Economics for Sustainable Futures -2020.