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Profitability of Small Scale Dry Season Tomato (*Lycopersicon esculentum* Mill.) Production in Adamawa State, Nigeria

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ABSTRACT

This study was designed to analyze the profitability of small scale dry season tomato production in Adamawa state. The Primary data were collected from 200 tomato farmers, using multi stage sampling techniques in four local government areas spread across the four Adamawa Agricultural Development Programme (ADPs) zones of the state. The data collected were for 2011/2012 cropping season with the aid of well structured questioners. Data collected were analyzed using descriptive statistics and budgetary analysis. The result indicates that majority of the respondents were male (85%) and married (76%) while most of them were in their active years, with family size of six people and above. Majority of the respondents (66.5%) have been in tomato production for 6 to 20 years and (71%) acquired their farm land through renting. Majority of farmers (63.6%) had no contact with extension workers while (80%) use their personal savings for production. Tomato production was found to be profitable with an estimated total cost of production and gross margin of ₦137,092.86 and ₦138,970.46 respectively. The study also identified the major constraints associated with tomato production to be attack by pest and disease, inadequate farm credit, poor storage and processing facilities while shortage/high cost of irrigation facilities been the least. The study therefore, recommends that immediate research to be conducted by research institutes to identify the course of high incident of pest and disease of tomato, input prices should be subsidized by public and private sectors and farmers should be educated on modern storage facilities to reduce excessive losses of tomato at storage.

Keywords: Production, Profit, Respondent, Sampling.

1 INTRODUCTION

Tomatoes are one of the most popular, versatile, and widely grown vegetable throughout the world and in nearly every home garden. They were first grown in Europe for ornamental purpose. Their Cultivation for food crop soon was established along with its dispersion throughout Europe and other areas. The crop has begun to be cultivated in North America in the early 1700s [6]. The area used for tomato production in tropical Africa is about 300,000ha with an estimated annual production of 2.3 million tonnes [17].

According to FAOSTAT [3], about 126 million tonnes of tomatoes were produced in the world in 2007. Similarly, FAO [4] reported that the global tomato production which can be roughly assimilated to global consumption amounted to 141 million tonnes in 2009. About a quarter of the global output is produced in China followed by United States and Turkey.

By nature tomato is highly perishable vegetables. This makes it difficult to cultivate at commercial level by many farmers in Nigeria. However, going by previous findings by some scholars reveals that tomato production is profitable. A study conducted by Ojo *et al.* [11] using Gross Margin analysis reveals that tomato production is profitable with net income of 85306.92 per ha. Babalola *et al.* [2] using gross Margin Analysis confirms that losses have a significant effect on the income of tomato farmer. Omonona *et al.* [14] also reported an enterprise economic efficiency of 1.17. Implying that for every N1 spend by the farmer on Cowpea production, 17 kobo was realized as profit. Zalkuwi *et al.* [18] revealed that tomato production is profitable in both short and medium term owing to the positive gross margin and net income per. ha of 90113.78 and 68296.26 respectively.

Unlike in other part of the country, less attention has been paid in finding the profitability of tomato in Adamawa State. It is in the view and prospect the crop holds for industrial and domestic home consumption in the state and Nigeria, that there is a clear need for the conduct of this study on profitability of dry season tomato production in Adamawa states. The study was meant to achieve the following objectives to:

- describe the socio-economic characteristics of tomato farmers in the study area,
- determine the cost and return of tomato production in the study area,
- identify the constraints to tomato production in the study area.

2 METHODOLOGY

2.1 Study Area

The study was conducted in Adamawa State. Adamawa State is located in the North Eastern part of Nigeria. The state lies between Latitudes 7° and 11°N of equator and between Longitude 11° and 14°E of the Greenwich Meridian. Adamawa State is made up of 21 local government areas divided into four zones by the Adamawa state Agricultural Development Programme (AD.ADP). The state covers a land area of 38,823.307km^2 with an estimated growing population of 3,178,950 comprising of 1,607,272 Males and 1,571,680 Female [10]. The mean Monthly temperature in the state ranges from 26.7C° in the south to 27.82C° in the north eastern part of the state. The Mean annual rainfall ranged from 700mm in the North West to 1600mm in the south east. The Mean annual rainfall is less than 1000mm in the central and North Western part of the state, while over 1000mm in the North eastern and southern parts [1].

The state has Fadama areas in Dwam, Loko, Mayo-Bani, Garkida Dasin Kumbo, Gerio, Tallum and Kiri, where irrigation activities take place for mainly growing of Cereals and Vegetables. The dominant soil groups in the state are luvisols, regosols, combisols, vartisols and lithosols derived from basemen complex, while few areas are on sandstones, shale's and alluvium [17].

The major economic activities of the inhabitant is agriculture (crop and livestock production) such as rice, maize, sorghum, millet, cowpea, groundnut, sweet potato, yam while Vegetables such as tomato are widely grown in the fadama areas of the state. The dominant ethnic groups in the state are Fulani, Bwatiye, Laka, Chamba, Bata, Higgi, Mbula, Kilba, Ga'anda, Kanakuru, Lounguda, Bura, Bille, Margi, Verre, Yungur, Fali, Gude.

2.2 Sources of Data and Sampling Procedure

Data for this study was collected from primary sources. The study used mainly primary data which were collected through administration of questionnaire to tomato farmers in the study area, with the help of well trained enumerators. The data collected were for 2011/2012 cropping season. Multi-stage sampling techniques were adopted for the selection of respondent for the study. In stage one, one local government area were purposively selected in each of the four ADADP zones, making a total of four LGAs. Stage two, three Villages were randomly selected from each of the four LGAs, namely, Digil, Vimtim, Hurda, Dadin kowa Hausawa, Baka, Domne, Opalo, Kokombe haying gada, Zangin, Dasin Hausa, Pariya and Farang-farang; making a total of 12 villages. Stage three, 200 tomato farmers were randomly selected in proportionate to the size of the villages.

2.3 Analytical Techniques

The analytical tools used to achieve the objectives of the study were descriptive statistics and gross margin analysis. The descriptive statistics such as frequency distribution, percentages was used in the analysis of socio-economic characteristics and problems associated with the respondents.

2.4 Gross Margin Analysis

This is the difference between the Gross Farm Income (GFI) and the total variable cost (TVC) [13, 9]. The technique was used to determine cost and return associated to tomato production. It is mathematically expressed as;

GM = GFI – TVC …… (1)

Where;

GM = Gross Margin (₦/Ha)
GFI = Gross Farm Income (₦)
TVC = Total Variable Costs (₦/Ha)

And

NFI = GM – FC …… (2)

Where;

NFI = Net Farm Income (₦/Ha)
TFC = Fixed Cost (₦/Ha)

Gross Ratio: is the total cost of production divided by the gross income. A less than 1 ratio is desirable for any farm business. The lower the ratio the higher the return per naira invested.

Operating Ratio: is the total variable cost divided by gross income. It shows the proportion of the gross income that goes to pay for the operating costs. The lower the ratio the higher the return on investment.

Return on capital investment: is the gross Margin divided by total variable cost.

3 RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of farmers

The distribution of respondents in Table 1 revealed that majority of them (85%) were males and 76% were married. The dominant of married men in tomato production could be due to traditional belief of the people in the area which prohibits women from going out freely to engage in economic activities. This agrees with the study by Ojo *et al.* [11] in Niger state which also found that tomato production is dominated by male. Majority (85%) of respondents fall within the age range of 30- 50years and 66% have been cultivating tomato for 6-20 years. This implies that the production is dominated with experienced adults who are in active years of their life. It is therefore, expected that farmers will achieve high level of productivity. The finding supports the findings of Maurice [7], who reported a positive and significant relationship between farming experience and technical efficiency. The table further reveals that majority 71% of respondents acquires their farm land through renting and 60% of them have farm sizes ranging between 0.5-2.0 hectares. This result shows that most of the respondents were small scale farmers possibly due to lack of Money (loan) to pay for rent and other production inputs. The table also reveals that majority 52.5% of respondents have no formal education which may hinder their acceptance of improved storage technology since education facilitates farmers' adoption of innovation [15]. This result agrees with the study by Olayemi [12]) who also reported high level of illiteracy in his study. The finding reveals that all the respondents use local methods to preserve tomato despite its perishability. This implies that there will be greater percentage of post harvest loses of tomato which may discourage farmers from increasing their production. The table further reveals that 80% of the respondents used their personal savings in tomato production. This shows that most of the farmers cannot have accesses to some improved farm inputs and ability to expand their production. This agrees with the findings of Isah [5] who also reported that lack of credit facilities affect production. Finally, the table reveals that, majority (63.5%) of the respondents had no contact with extension worker at all during their last year cropping season. The result shows that most of the farmers are likely to be technically less efficient to those in contact with extension agent. This result agrees with the findings of Moses [8] who also found that lack of extension services hinders farmers from adopting new innovations.

3.2 Profitability analysis

The profitability of tomato production was estimated using gross margin analysis, which is the difference between the gross farm income and the total variable cost [13, 9]. The result is presented in the Table 2. The table shows that the total variable cost per hectare was ₦ 104,609.54 with a total fixed cost of ₦32,483.32 and the total cost of production of ₦137,092.86. The average revenue generated by tomato farmers in the study area was ₦243,580 with a gross margin of ₦138,970.46. The table further reveals an estimated gross and operation ratios of 0.56 and 0.43 respectively while the return on naira invested was 1.33; thus indicate profitability of tomato production in the study area. This shows that despite the inadequacy of good storage and processing facilities to take care of large productivity, tomato production still remain a profitable venture in the study area.

Table 1: Socio-economic Characteristics of Respondents

Variables	Frequency	Percentage (%)
Sex		
Male	170	85
Female	30	15
Age		
≤ 20	10	5
21–40	107	53.5
≥41	83	41.5
Marital Status		
Single	28	14
Married	152	76
Divorced	11	5.5
Widow(er)	9	4.5
Education Qualification		
Primary	55	27.5
Secondary	27	13.5
Tertiary	13	6.5
No formal education	105	52.5
Land Acquisition		
Gift	20	10
Inheritance	38	19
Rent	142	71
Farm Size		
≤ 1.0	64	32
1.1–3.0	80	40
≥3.1	56	28
Farming Experience		
≤ 5	57	28.5
6–10	63	31.5
11–20	70	35
≥21	10	5.0
Method of Preservation		
Drying	160	80
Shade	40	20
Sources of Finance		
Personal Saving	160	80
Loan	14	7
Friends and Relative	26	13
Access to extension services		
Yes	73	36.5
No	127	63.5

Source: Field Survey, 2012.

Table 2: Average Cost and Return Per Hectare of Tomato Farmers

Variable	Value(₦/ ha)	Percentage (%) of Total Cost
A. Variable cost		
Seed	2,157.49	1.57
Family labour	16,437.38	11.98
Hired labour	16,870.05	12.31
Fertilizer	7,589.21	5.54
Agro-chemicals	7,248.87	5.29
Loading/Transportation	16,848.63	12.29
Fuel/ Tractor Hiring	11,982.42	8.74
Maintenance/ Spare Parts	2,438.06	1.78
Security/ Tax	3,984.52	2.91
Empty basket	18,383.05	13.41
Storage/Others	669.86	0.49
Total Variable Cost (TVC)	**104,609.54**	**76.31**
B. Fixed Cost		
Rent on Land	1,661.38	1.21
Depreciation of fixed assets	30,821.94	22.48
Total Fixed cost (TFC)	32,483.32	23.69
Total cost of production (TVC+TFC)	**137,092.86**	**100**
C. Returns		
Gross Revenue (GR)	243,580	
Gross Margin (GR–TVC)	138,970.46	
Net farm income (GM-TFC)	34,360.92	
Gross Ratio (TCP/GI)	0.56	
Operation Ratio(TVC/GI)	0.43	
Return on naira invested (GM/TVC)	1.33	

Source: Field Survey, 2012.

3.3 Constrains to tomato production

Table 3 shows that attack by pest and disease 16% were ranked first as the major problem faced by tomato farmers. Inadequate farm credit ranked second affecting about 14% of the respondents, while poor storage and processing facilities ranked third as it affect about 13% of the respondents. The table also reveals that shortage/high cost of inputs to be forth followed by Worms' infestation, shortage of land, clashes with pastoralist; high cost of transportation, poor output price and inadequate market. While high cost of fuel, shortage of labour and shortage/ high cost of irrigation been the least of problem in terms of importance.

Table 3: Distribution Based on Problems of Tomato Production

Problems	Frequency	Percentage (%)
Shortage of land	86	8.18
Shortage / high cost of inputs	101	9.61
Shortage of labour	29	2.76
Attack by Pests and disease	163	15.5
Worm infestation	96	9.13
Clashes with Pastoralist	73	6.95
Poor output Price	54	5.14
Poor storage and processing facilities	145	13.80
Inadequate market	35	3.33
Inadequate farm credit	148	14.08
High cost of transportation	71	6.76
High cost of fuel	30	2.85
Shortage / High cost of irrigation facilities	20	**1.90**
Total	**1051***	**100**

Source: Field survey, 2012.
***Multiple Responses**

4. CONCLUSION AND RECOMMENDATIONS

The study determined the profitability of dry season tomato production in Adamawa state. The result from the socio-economic characteristics of the respondents shows that majority (85%) were male, who are married (76%). About (66%) have been cultivating tomato for 6-20 years and 71% acquire their land by renting. Tomato production was found to be profitable with an estimated total cost of production and gross margin of ₦137,092.86 and ₦138,970.46 respectively. The study also identified the major constraints associated with tomato production to be attack by pest and disease, inadequate farm credit, poor storage and processing facilities while shortage/high cost of irrigation facilities been the least. The study therefore, recommends that immediate research to be conducted by research institutes to identify the course of high incident of pest and disease of tomato, input prices should be subsidized by public and private sectors and farmers should be educated on modern storage facilities to reduce excessive losses of tomato at storage.

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