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COMPETITIVENESS OF TOMATO PRODUCTION IN KOKONA LOCAL GOVERNMENT AREA OF NASARAWA STATE, NIGERIA

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ABSTRACT

The study determined the competiveness of Tomato production in Kokona Local Government Area of Nasarawa State, Nigeria. Primary data were collected using a structured questionnaire administered to 60 respondents selected through a simple random sampling technique. Descriptive statistics and Policy Analysis Matrix (PAM) were used for data analysis. The results show that majority (71.7%) of the farmers males with an average of about 8 persons in the household.. The result of the Policy Analysis Matrix (PAM) shows that Tomato production with subsidized inputs is more profitable compared to its production with input purchased directly from the open market. However, the Domestic Resource Cost (DRC) was less than unity, (0.0864) suggesting that tomato production system can be sustainable without government intervention. Major constraints in Tomato production include; lack of basic equipment and infrastructure, inadequate extension service and poor access to credit facilities. Therefore to increase the profit and ensure high return on investment, it is recommended that the state government key into the Fadama III additional Financing project in order to enhance Tomato production.

Key Words: Tomato, Competitiveness, PAM, Constraints, Nasarawa State, Nigeria

Introduction

Tomato (*Solanum lycopersycum L*) is one of the most important vegetables worldwide. It is a relatively short duration crop, high yielding, and economically attractive. Tomatoe contribute to a healthy, well-balanced diet (Naika *et al.*, 2013), as they are rich in minerals, vitamins, essential amino acids, sugars, dietary fibres, vitamin B and C, iron and phosphorus. The consumption of Tomatoes and Tomato-based foods can be linked to reduced incidence of a variety of cancers in general, including pancreatic, lung, stomach, colorectal, oral, bladder, breast and cervical cancers (Giovannucci, 2014).It is the most frequently consumed vegetable in many countries, becoming the main supplier of several plant nutrients and providing an important nutritional value to the human diet (Willcox *et al.*, 2011).

The trend in Tomato production in Nigeria from the year 2000 to 2013 indicated that the highest yield was recorded in the year 2013 and the lowest in 2006. Total yield in 2013 was 1,860,600 metric tonnes valued at $687,610,000. Most Tomatoes produced are destined for domestic market and yet they are scarce during off season (FAO, 2014).Nigeria ranked as the 16th largest tomato producing nation. The production of Tomatoes in Nigeria in 2012 was about 1.8 million metric tonnes, which accounts for about 68.4% of West Africa, 10.8% of Africa's total output and 1.28% of world output (FAO, 2012).

Unfortunately, the country experiences deficiency in critical inputs, lack of improved technology, low yield and productivity, high post-harvest losses and lack of processing and marketing infrastructure for tomato production. Denton and Swarup (2010), observed that Tomato production in Nigeria takes place majorly in the Northern States especially during the dry season, while its production is scarce during the rainy season because of high disease incidence associated with growing Tomatoes and preference of Tomato producers for grain food crops during the rainy season.

Having a population of over 170 million people, an estimated national population growth rate of 5.7% per annum, in the past five years, Nigeria has a large market for processed tomato products (FAOSTAT, 2014). Apart from the Nigerian market, the advantage of the trade liberalization in the West African market could be used to enhance the sales of processed Tomato products in this region. At present, a significant percentage of processed Tomato products used in Nigeria are imported, resulting in unnecessary pressure on foreign exchange reserve.

Tomato production can serve as a source of income for most rural and peri-urban producers in Nigeria and other developing countries. Tomato production is very important in the farming system of most states in northern Nigeria and its production has enhanced the income and standard of living of rural dwellers

(Muhammad and Ibrahim, 2011). However, in Nasarawa state, despite the availability of seasonally flooded low lying areas commonly called *Fadama* lands, Tomato production is not as important and intensive compared to other states like Kaduna, Kano and Bauchi raising questions as to why? This study therefore attempts to answer this question by examining the competitiveness or otherwise of Tomato production with the aim of determining the appropriate policy recommendation that will enhance and sustain Tomato production in Nasarawa state.

Competitiveness can be defined as the capacity to gain profit and maintain the market share which is determined by the performance of a business (Porter, 1990). Competitiveness implies the ability of a group of like firms to compete with another group in another sector or the same sector in another country or region (Gourichon, 2013). It enables firms to decide whether or not they will undertake a new course of action.

Previous studies conducted on Tomato in Nigeria, by Tijani*et al*. (2010) and Seyoum*et al* (2010), emphasized more on marketing than the competitiveness aspect of Tomato production. Also relevant studies on competitiveness such as Akramov *et al* (2012), Ogbe *et al* (2011), and Emam *et al* (2011), Musa and Ibrahim (2018) used Policy Analysis Matrix (PAM) framework to analyze competitiveness, efficiency, comparative advantage and policy effects on different agricultural crops and livestock such as Rice, Maize, Cassava, Date Palm, Poultry and Piggery in different countries as well as Nigeria but none was conducted on Tomato production in Nigeria. Determining the competitiveness of Tomato production in Nasarawa State is imperative because it will give an idea on the comparative advantage of the state in terms of Tomato production.

Objectives of the Study are to:

i. describe the socio-economic characteristics of Tomato farmers in the study area;
ii. analyze the competitiveness of Tomato production among farmers in the study area; and
iii. identify the constraints faced by Tomato farmers in the study area.

Methodology

The study was carried out in Kokona Local Government Area of Nasarawa State Nigeria, Kokona Local Government Area is made up of 6 districts and it has its headquarters located in Garaku. It has an area of 1,844 km² and a population of 141638 at the 2018. It is located between latitude $8^0 51'$ N and longitude 5^0 05′E. The mean annual rainfall ranges from; 14.2mm to 229.4mm with the highest in August and lowest in April. The mean annual temperature of the area in a year ranges from19.3^0C to 23.8^0C. The annual mean humidity varies from 32% to 86 %.(Nasarawa Metrological Agency, 2013).The economic activity in the area is largely agrarian where majority of the people live as subsistence farmers and cultivate crops such as yam, sesame, rice, cassava, sorghum, millet, cowpea, groundnut among others.

Six communities (Angwan Doka, Kokona, Bukoko, Sabo Ruwa, Agwada Afo and Amba) noted for intensive production of vegetables were purposively selected for the study. A simple random sampling procedure was employed to select ten (10) Tomato farmers from each of the six (6) communities giving a sample size of sixty (60) respondents for the study. Primary data was collected for the study with the aid of a structured questionnaire.

Analytical Techniques

Descriptive statistics such as mean, percentages and frequency distribution were used to. In order to assess the competitiveness of Tomato production in the study area, Policy Analysis Matrix (PAM) was used. PAM measures the competitiveness and the comparative advantage of existing systems and also the impact of policy on these systems. PAM is a computational framework developed by Monke and Pearson (1989) for measuring input use efficiency in production, comparative advantage, and the degree of government interventions.

The basic format of the PAM as shown in table 1 is a two-way accounting identities. The PAM table consists of private and social profitability in the first and second rows and divergences in the third row. The private profits are evaluated at market prices while the social profits are evaluated at social or efficiency prices. If there are no market distortions, it is expected that both profits will be the same. If, however, there are market failures or distortions then the two would diverge. Their divergence acts as a signal for policy intervention.

In a PAM framework, inputs are disaggregated into tradable and non-tradable. For this study, the tradable inputs include fertilizers and tomato seed while the non-tradable inputs include land, labor, capital, tractor, plough and other fixed farm tools and implements.

Table 1: The Framework of the Policy Analysis Matrix

	Revenue	Cost		Profit
		Tradable	Non Tradable	
Private Price	A	B	C	D
Social Price	E	F	G	H
Divergence	I	J	K	L

A: Revenues in private prices (market prevailing prices, also called accounting prices).
B: Costs of tradable inputs (such as fertilizers, tomato seeds, plastic mulch, etc.) in private prices.
C: Costs of domestic factors (such as labor, capital, etc.) in private prices.
D: Private Profits D=A-(B+C).
E: Revenues in social prices (economic efficiency prices or shadow prices).
F: Costs of tradable inputs (such as fertilizers, tomato seeds, plastic mulch, etc.) in social prices.
G: Costs of domestic factors such as (labor, capital, etc.) in social prices.
H: Social profits (H = E-F-G).
I: Output Transfers (I = A-E)
J: Input Transfers (J=B-F)
K: Factor Transfers (K=C-G)
L: Net Transfers (L=D-H or L=I-J-K)
For all inputs and outputs except pesticides, fuel and electricity, prices obtained from the commerce and industry ministry was used as social prices while the actual market prices was being regarded as private prices. For pesticide and fuel, the social price was determined by tax on pesticides deducted from the market (private price). As for electricity, the tax intricacy may not be easily determined thus the same price was used for both private and social prices assuming no distortion.

Results and Discussion

Socio economic Characteristics of respondents

The result on gender distribution in Table 2 shows that majority (71.7%) of the respondents were male, and this could be attributed to the fact that men have more access to land. Rahman *et a.l* (2013) noted that the low participation of women in farming may be attributed to gender inequality in terms of land holdings. The result further shows that the mean age of the farmers was 40 years, which implies that they are in the active farming age group. In terms of household size, majority of the respondents (43.3%) have up to four persons in their households.Majority of the farmers (73.3%) had formal education with about 15 years of experience in farming which may be a plus to the farmers in the study area given that experience of a farmer has a way of influencing his/her ability to make effective farm management decisions with respect to input combination or resource allocation. Extension service provision was very poor as majorities (73.3%) of the respondents were never visited by an extension agent in the previous season.

Table 2: Socio-economics Characteristics of Farmers.

Variable	Frequency	Percentage (%)	Mean
Gender			
Male	43	71.7	
Female	17	28.3	
Total	**60**		
Age			
20-30	8	13.3	
31-40	23	38.3	
41-50	21	35.0	
51-60	8	13.3	
Total	**60**	**100.0**	40.375
Household size			
1-4	26	43.3	
13	1	1.0	
5-8	25	41.7	
9-12	6	10.0	
13-16	2	3.3	
Total	**60**	**100.0**	8.375
Educational qualification			
No formal education	16	26.7	
Primary education	13	21.7	
Secondary education	20	33.3	
Tertiary education	11	18.3	
Total	**60**	**100.0**	
Farming experience			
1-10 years	23	38.3	
11-20 years	16	26.7	
21-30 years	16	26.7	
31-40 years	5	8.3	
Total	**60**	**100.0**	**20.5**
Extension Visit			
Yes	16	26.7	
No	44	73.3	
Total	**60**	**100.0**	

Competiveness of Tomato production

The result of the Policy Analysis Matrix technique used to evaluate the competitiveness of tomato production shows that Tomato farmers that purchased inputs from the open market incurred a higher production cost (₦119,604) and had a private profit of ₦103,032. This implies that Tomato production is profitable and competitive. This was further confirmed by the value of the Private Cost Ratio (PCR) (0.161) which if less than 1 indicates competitiveness. For the production of one hectare with subsidized inputs from government, the total production cost was ₦54,733 and a positive social profit of₦330,019 was obtained and it means that Tomato production in the study area has a comparative advantage. This is further corroborated by the Domestic Resource Cost (DRC) (0.0864) which is less than unity and this means that the Tomato production system can be sustainable without government intervention. These findings are in line with previous studies by Adeoye and Oni (2014) as well as Musa and Ibrahim (2018) on Plantain processing and date palm production respectively.

Table 3: Policy Analysis Matrix for Tomato Production System (in Naira)

Respondents	Revenue	Cost		Profit
		Tradable cost	Non-tradable cost	
Private prices	A	B	C	D
	222,636	99,884	19,720	103,032
Social prices	E	F	G	H
	384,752	23,528	31,205	330,019
Divergence	I	J	K	L
	(-162,116)	(76,356)	(-11,485)	(-226,987)

The Effective Protective Coefficient (EPC) value was less than unity (Table 4) implying that the value added to the prevailing market prices in the study area were lower compared to the reference national price. Furthermore, it implies that Tomato marketers had a net disincentive and are over charged in the marketing system by about 67%. The Nominal Protective Coefficient (NPC) was also less than 1 implying that market failures will reduce the market price of Tomatoes. This can also be interpreted to mean that the prevailing production system of Tomato production is able to finance domestic input supply without subsidy from government. The values for diversions show price distortions. The negative value of divergence in profitability shows that policy interventions may reduce profitability in the long run. On the other hand, the positive divergence for tradable inputs means that market prices for private tradable inputs such as are larger than the social tradable input cost implying that subsidy provided is not favoring the agricultural production system.

Table 4: Policy Analysis Matrix Indicator

Indicators	NPC	EPC	DRC	PCR
Values	0.570	0.330	0.086	0.161

Constraints faced by farmers in Tomato production

The result presented in the Table 4 shows the constraints faced by farmers in the production of Tomatoes. Majority (81.6%) farmers pointed out that they lack some basic equipment and infrastructure such as pumping machines, tube wells and wash bores that will encourage Tomatoe production in the study area. The next most critical constraint was inadequate extension support service as pointed out by 75.0% of the respondents. The implication of this is that Tomato farmers in the area of study may be operating withoutdated production technology hence find tomato production unattractive. Similarly, majority of the respondents also indicated that the lack of support from government was not encouraging. They added that the Fadama III project meant to support them was not well implemented by government in the state as emphasis was on other preferred crops.. Furthermore, poor access to credit facilities was also identified by 71.6% of respondents. The implication is that the lack of access to credit by farmers would weaken their ability to expand their production or adopt new technologies. Finally, poor marketing and processing system was also identified as another critical challenge to Tomato production in the study area, causing farmers to sell at giveaway prices at harvest time to reduce losses.

Table 5: Constraints Mitigating Tomato Production in the Study Area

Constraints	Frequency	Percentage
Inadequate capital	28	46.7
Poor farm input	29	48.3
Inadequate government support	45	75.0
Low income	27	45.0
Inadequate equipment and infrastructure	49	81.6
Poor access to credit facilities	43	71.6
Lack of collateral security	7	11.6
Poor marketingand processing system	42	70.0
Shortage of inputs	11	18.3
Inadequate extension support	45	75.0
Poor road network	8	13.3
Inadequate rainfall	12	20.0

Source: Field survey, 2017
*Multiple responses allowed

Conclusion/Recommendations

Tomato production in Nasarawa state is profitable and competitive without government support. Furthermore, significant opportunities abound for enhancing Tomato production and income generation in Nasarawa state. It is also imperative that the state government key into the Fadama III additional Financing project in order to enhance Tomato production.

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