Effect of Farmers – Herdsmen Crisis on Yam Production in Southern Agricultural Zone of Nasarawa State, Nigeria

A. A. Girei[1*], L. S. Ugwuanyi[1] and H. M. Turai[1]

[1]*Department of Agricultural Economics and Extension, Nasarawa State University, Keffi, Nigeria.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The study analyzed effect of crisis on yam production in Southern Agricultural Zone, Nasarawa State, Nigeria. The specific objectives were to; determine the effect of socio-economic variables on yam production, determine the factors affecting yam production, and to compare the gross margin of yam production before and after crisis in the study area. A multi-stage sampling procedure was adopted for this study and a total of sixty (60) respondents were sampled for this study. Data were collected through the use of structured questionnaires and analyzed using descriptive statistics which involves use frequency, percentages and the gross margin analysis. The study revealed that before the conflict the total variable cost was 233,288.4 while after the conflict, the total variable cost was 172310. The study conclude that price of fertilizer was doubled after conflict thereby reducing production. The result shows that 17.6% of the respondent's stopped producing yam because of the fear of conflict. And also, there was a reduction in food production between the period of the conflicts and peaceful disposition. The study therefore recommend that government should develop

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Corresponding author: E-mail: agirejo@gmail.com;

policies and strategies to curtail future occurrence of crisis among farmers and herdsmen, and focus more on giving incentives to farmers and subsidy on farm inputs such as fertilizer, improved varieties, chemicals among others to boost food crop production, farmers income level and to ensure maximum security on lives and properties of prospective citizens and farmers.

1. INTRODUCTION

Yams (*Dioscorea species*) are annual root tuber-bearing plants with more than 600 species out of which six are socially and economically important in terms of food cash and medicine [1]. Some of the yam species are water yam (Dioscorea alata), white yam (*Dioscorea rotundata*), yellow yam (*Dioscorea cayanensis*), chinese yam (*Dioscorea esculanta*) and three-leaf yams (Ike and Inoni, 2006; Zaknayiba and Tanko, 2013). Conflict between farmer and nomadic cattle herder have been a common feature of economic livelihood in West Africa [2] in the period before the beginning of 20th Century, the problem was mainly restricted to the savanna belt of West Africa. Cattle rearing were mainly prevalent in the Guinea. Sudan and Sahel Savanna belt where crop production was carried out only during the short rainy season on a small scale. This gave the Cattle herder access to a vast area of grass land. As time went on, and with introduction of irrigated farming in the Savanna belt of Nigeria, and the increased withering of pasture during the dry season, less pasture was available to cattle herders. This gave rise to an increased pressure on natural resources and a stiff competition for available resources between farmers and herders [3,4]. Tonah [2] stated that since 1970s and 1980s, the accompanying migration of a huge number of pastoralist into the fringes of the humid forest zone of west Africa, there has been a massive increase of the incidence of farmers-herders conflict are wide spread in Nigeria, in obi local government of Nasarawa State. People were displaced and rendered homeless in the host community in the hostility between cattle herdsmen and farmers in the host community between two communities for many reason. Many farmers have lost their lives and herds, while others have experienced dwindling productivity in their farms. Several studies [5], stressed that low soil fertility, lack of improved yam varieties, poor road networks, high cost of labour and lack of finance to carry out necessary farming activities were the constraints to productivity. Yams like many other crops in Nigeria are labour intensive. The high cost of labour has been among the major constraints to yam production. It has constrained smallholder yam farmers from enhancing productivity [5]. The labour cost of yam production from mounding to staking, especially in the forest areas account for approximately 40% cultivation costs. In addition about 50%of the expenditure goes to the planting process [1]. In order to cut labour cost, most family members practically do all the production and marketing activities themselves. Ike and Inoni [6] and Okeocyhene et al., [7] confirmed that over 65% of smallholder farmers used family labour in Delta state; Nigeria. The conflicts are a threat to peace and national stability. It also has implication for tribal co-existence in Nigeria being a multi-ethnic and multi-tribal nation. One major constraint highlighted for its contribution to declining yam productivity and marketing in the research area is crisis due to disputes between two communities and competition for limited resources between cattle herdsmen and crop farmers. The result of the study would be useful for a further understanding of farmers-herders conflicts in the southern agricultural zone of Nasarawa state and other local governments in Nasarawa state, Nigeria. It would also give an insight into the way forward in such conflict situations. The objectives of the study are to; (1) determine the socioeconomic characteristics of the farmers, (2) compare the gross margin of yam production before and after the crisis or conflict, and (3) determine the factors affecting yam production. There is no significance difference between the factors affecting yam production and gross margin of yam production before and after the crisis.

2. MATERIALS AND METHODS

This study was carried out in Southern Agricultural Zone of Nasarawa State, Nigeria. The State lies between latitude 07^045^0N and 09^0 25E of the equator and longitude 09^037E of the Greenwich meridian. It shares boundary with Kaduna State in the North, Plateau State in the East, Taraba and Benue State in the South, while Kogi and Abuja in the West (Binbo and

Marcus, 2005). Nasarawa State has altitude of 181.5m above sea level and comprises of thirteen Local Government Areas viz; Akwanga, Wamba, Nasarawa Eggon, Awe, Obi, Keana, Lafia, Doma, Kokona, Keffi, Toto, Nasarawa, and Karu. The study area which is Southern Agricultural Zone of Nasarawa State Comprises of five local government areas which are Lafia, Keana, Awe, Doma, and Obi. The zone is characterized by long period of rainy season (March – October). The study area has a tropical climate with two main season's namely wet and dry season. The soil structure of the area is sandy loam which is suitable for farming. The major crops produced in this area includes yam, sesame (Beniseed) groundnut, melon, cassava, cowpea, maize, rice, sweet potato, guinea corn, and some fruit such as paw-paw, cashew, orange and guava, farmers in the study area also keep livestock like cattle, poultry, goats and sheep.

2.1 Sampling Procedure and Sample Size

A multi-stage sampling procedure was adopted for this study. First, three (3) Local Government Areas (LGAs) in the zone were randomly selected out of the five (5) Local Government Areas. Secondly, four (4) farming community (villages) were then randomly selected from each of the three (3) selected Local Government Areas to give a total of twelve (12) villages. In the third stage, five (5) farmers were also randomly selected from each of the twelve (12) villages to give a total of sixty (60) respondents which formed the sample size for this study.

2.2 Data Collection

The primary data was collected through the use of structured questionnaire and oral interview. Information that was collected from the respondents covers all the objectives.

2.3 Data Analysis

A simple descriptive statistics involving frequency counts, percentage and mean score was used to analyze the socio-economic variables on yam production and factors affecting yam production, while gross margin analysis was used to analyze the gross margin of yam production before and after crisis in the study area.
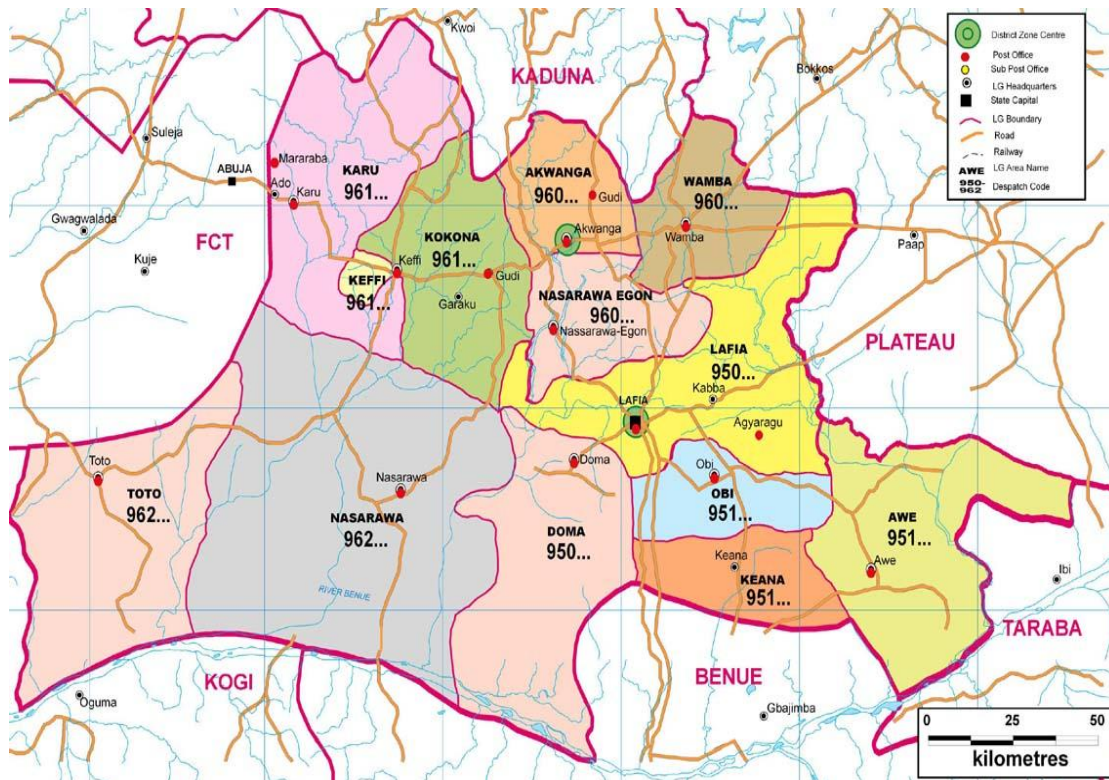

Fig. 1. Map of Nasarawa State showing the Southern Agricultural Zone

Arithmetic mean will be computed according the following formulae;

$$\bar{X} = \sum \frac{x_i}{N}$$
$$= \frac{X_1 + X_2 + X_3 \ldots\ldots\ldots\ldots\ldots\ldots X_n}{N} \quad (1)$$

Where,

$\bar{X}$ - Mean
$\sum X_i$ = summation of the sample
N = Total number of observations
Σ = Summation
X_i = Individual observation
N = Total number of observation

Percentage is mathematically expressed as:

$$Percentage\ (\%) = \frac{X}{N} \times 100 \quad (2)$$

Where,

% = Percentage
X = Individual observation
N = Total observation

The gross margin analysis is specified as:

GM = TR – TVC

Where,

GM = Gross margin
TR = Total revenue generated from crops
TVC = Total variable cost.

3. RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics

Age: The results from table 1a, revealed that 41.7% of the respondents were between the ages of 31-40 years followed by 36.7% who were between the ages 20-30 years. These indicate that most of the respondents were still strong and energetic to participate in agricultural activities. This is in consonance with the findings of Ogumbameru (2001), who asserted that young and middle aged people were the most active in agricultural production activities for increased productivity.

Gender: The results also revealed that majority (90.0%) of the respondents in the study area were men, while only 10.0% were women. This indicates that yam production in the study area were more among the male gender than the female. This might be attributed to fact that household heads are responsible for major production decisions, hence agreeing with (Johnson, Dingkuhn and Jones 1998).

Marital Status: Also, results from the findings indicated that majority 87.1% of the respondents were married whereas 11.7% were single, 3.3% were divorced and another 3.3% were widowed. The high number of married respondents could increase the release of family labour, thus making more hands available for productive activities on respondent's yam farms. This is in line with Akimbile (2007), who indicated that married people accounts for majority of farmers' working population.

Educational Level: The result in Table 1b, revealed that majority (38.3%) of the respondents have obtained secondary school qualification, 21.7% have primary education, 23.3% having tertiary education and then 1.7% having adult education. This indicates that majority of the respondent in the study area are educated enough to understand how to use their inputs efficiently. Muneer (2008) reports that educated farmers are more innovative and knowledgeable. The high number of literate people among the farming population indicates that majority of them are in a better position to adopt new technologies exposed to them. Education has always been known to play a positive role in the adoption of improved technologies among farmers (Negash, 2007).

Family Size: The result presented in Table 1b also revealed that most or 45.0% of the respondents were found to have family size of 5-10 persons per household, 30.0% has less than 5 persons, and 25.0% has above 10 persons per household.

Farming Experience: The result in Table 1b also revealed that most or 35.0% of the respondents were found have a farming experience of 20years and above, 26.7% has 5-10 years farming experience, 21.7% has 16-20years farming experience, 15.0% has 11-15 years farming experience.

3.2 Yam Production Before and After Conflict

Table 2 shows the gross margin of yam production before and after the conflict. It was

observed that before the conflict, the total variable cost was 233,288.4 while after the conflict in Table 2, the total variable cost was 172310.The drop in production of yam was because during the conflict the yam farmers loss their produce, houses/facilities were destroyed and they also lose some of their family members in the cost of the conflict which indirectly reduced the numbers of laborers' in the affected area thereby affecting production.

that there was a reduction in food production between the period of the conflicts and peaceful disposition. This agreed with Messers et al., (2001) who reported difference in the level of production between the period of war and peaceful disposition and their contribution to regional agricultural production level.

Table 1A. Socio-economic variables on age, gender and marital status

Characteristics	Frequency	Percentage
Age (years)		
21-30	22	36.7
31-40	25	41.7
41-50	10	16.7
51-60	3	5.0
Total	60	100.0
Gender		
Male	54	90.0
Female	6	10.0
Total	60	100
Marital status		
Single	7	11.7
Married	49	81.7
Divorced	2	3.3
Widowed	2	3.3
Total	60	100.0

Source: Field survey, 2018

Comparing the results of the production levels before and after the conflicts. It can be concluded

Table 1B. Socio-economic variables on educational status, family size and years of farming experience

Characteristics	Frequency	Percentage
Educational Status		
Primary	13	21.7
Secondary	23	38.3
Adult education	1	1.7
Tertiary	14	23.3
Total	60	100.0
Family size		
Less than 5	18	30.0
5-10	27	45.0
Above 10	15	25.0
Total	60	100.0
Years of farming experience		
Less than 5	1	1.7
5-10	16	26.7
11-15	9	15.0
16-20	13	21.7
Above 20	21	35.0
Total	60	100

Source: Field survey, 2018

Table 2a. Gross margin before conflict

Cost and return item	Mean value before conflict	%	Mean value after conflict	%
(a) Variable Cost (VC)				
Fertilizer	4,350.0	1.86	5258.33	3.05
Labour	15,266.7	6.54	6866.7	3.98
Cost of yam	212,266.7	90.9	158,641.7	92.06
Herbicide	1405.0	0.6	1543.3	0.89
Total Variable Cost (TVC)	233,288.4		172,310	
(b) Fixed Cost (FC)				
Land	13,850.7		17,4408	
Implement	3,281.8		4,565.6	
Total Fixed Cost (TFC)	17,132.5		22,006.4	
(c)Total Cost (TC)= TVC+TFC	250,420.9		194,316.4	
(d) Total Revenue (TR)	1,431,933.3		664,101.7	
Net Farm Income (NFI)= TR-TC	1,181,512		469785.3	
Gross Margin= TR-TVC	1,198,644.9		491791.7	
Return per Naira invested	5.13		2.85	

Source: Field survey; 2017

Table 2b. Gross margin after conflict

Cost and return item	Mean value	Percentage of variable cost
(a) Variable Cost (VC)		
Fertilizer	5258.33	3.05
Labour	6866.7	3.98
Cost of yam	158,641.7	92.06
Herbicide	1543.3	0.89
Total Variable Cost (TVC)	172,310	
(b) Fixed Cost (FC)		
Land	17,440.8	
Implement	4,565.6	
Total Fixed Cost (TFC)	22,006.4	
(c)Total Cost (TC)= TVC+TFC	194,316.4	
(d) Total Revenue (TR)	664,101.7	
Net Farm Income (NFI)= TR-TC	469785.3	
Gross Margin= TR-TVC	491791.7	
Return per Naira invested	2.85	

Source: Field survey, 2017

3.3 Factors Affecting Yam Production

Table 3 shows the factors affecting yam production in the study area after the conflicts. It was also observed that poor extension services which constitute 32.4% really affected yam production in the study area. The results revealed that 14.7% of the respondents were unable to access inputs such as fertilizer, yam seeds, labourers and capital among others. The results also revealed that 35.3% of the respondent's production declined due to increase in price of inputs such as fertilizer which constitute a major constraint of production. These findings is in consonance with the works by Zaknayiba and Tanko [8]; Ike and Inoni [6]; Maikasuwa and Ala [9], who find that lack of access to farm inputs, high cost of inputs, high incidence of pests and diseases have negatively affected yam production. It was observed that before the conflict the price of fertilizer was ₦3,500/bag(50 kg) (Government price) and after the conflict due to lack of government intervention in the study area, the fertilizer passed through middle men and on getting to the farmers the price changes to ₦7,500/bag(50 kg), Thereby making the fertilizer not affordable and available for majority of the farmers leading to reduction in quantity of fertilizer used which will definitely reduce yield because a farmer who cultivate 3 hectare (ha) of yam is expected to reduce to 1ha or 2ha. In conclusion the price of fertilizer was doubled after conflict thereby reducing production. The result shows that 17.6% of the respondent's stopped producing yam because of the fear of conflict.

Table 3. Constraints to yam production

Factors	Frequency	Percentage
Poor extension service	55	32.4
In accessibility of input	25	14.7
Increase in price of input	60	35.3
Fear of conflict	30	17.6
Total	170	100

Source: Field survey, 2017

4. CONCLUSION AND RECOMMENDA-TION

4.1 Conclusion

The result reveals that majority 41.7% of the respondents were between the ages of 31-40 years followed by 36.7% who were between the ages 20-30 years. These indicate that most of the respondents were still strong and energetic to participate in agricultural activities. It also shows that 17.6% of the respondent's stopped producing yam because of the fear of conflict. And also, there was a reduction in food production between the period of the conflicts and peaceful disposition. In conclusion the price of fertilizer was doubled after conflict thereby reducing production. The study therefore recommend that government should develop policies and strategies to curtail future occurrence of crisis among farmers and herdsmen. A focus should be given more on incentives to farmers and subsidy on farm inputs

such as fertilizer, improved varieties, chemicals among others since the respondents were still very young and active. They can engage in agriculture to boost crop production, farmers income level and to ensure maximum security on lives and properties of prospective citizens and farmers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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