ABSTRACT

This study was carried out to estimate costs and returns associated with maize production in Lere local government area of Kaduna state. Data were collected from a sample of 100 maize farmers selected through multi-stage sampling procedure using questionnaire and data collected were analyzed using simple descriptive statistics and net farm income analysis. The result showed that 82% were in their working age of between 21-50 years, majority of the farmers 53% were married, 91% had formal education, in terms of farming experience, majority (68%) of the respondent had farming experience that is above one year. The result revealed that maize farming is profitable investment in the study area with a total return of N 194,545.00 and net farm income of N 81,275.00 per hectare with a benefit cost ratio of 1.72 and a return on capital invested of 0.42. All the farmers identified maize as an important source of food to households in the study area. However maize farming is facing several constraints such as lack of capital (73%), high cost of
farm inputs (69%), lack of credit facilities (67%), inadequate storage facilities (53%), inadequate processing facilities (50%), incidence of pests and diseases infestation (46%), poor road network (40%) and poor extension services (33%). Therefore, it is recommended that credit facilities should be provided so that farmers can have fund to purchase farm inputs such as fertilizer, pesticides and insecticides and be able to employ adequate labour, storage and processing facilities such as silo and shelling machine should be made available to farmers at subsidized and affordable price as a form of government intervention, adequate workshops and seminars especially on training farmers on methods of weed and pests control should be organized by extension agents and farmers should be encouraged to form themselves into cooperative groups so that they can pool their resources together in getting adequate funds to finance maize production activities.

Keywords: Costs; returns; constraints; maize production; Lere; Kaduna; Nigeria.

1. INTRODUCTION

Maize is an important cereal crop that came second as a staple food that is consumed by majority of Nigerian after rice. Maize is one of the most important cereal crops in the world. Maize is a crop with high yielding crop potential and can be used as source of food to human, source of feed to livestock’s and as a raw material to many agro-based industries. According to the report of IITA [1], maize is used as animal feed and as raw material for brewing beer and for producing starch. Maize is also an important source of carbohydrate, protein, iron, vitamin B, and minerals. It is one of the most important crops in Nigeria owing to its ability to grow in all the ecological zones of the country. Fertilizer, herbicides, pesticides, seed, labour, farm tools such as hoe and cutlass and water supply are important variables that are employed by farmers in the production of maize in the study area. Seed is the most essential input in any agricultural production system. Langyintuo [2], identified seed as the most important, strategic and relatively inexpensive input that determines the crop yield as extracted from the study of Sapkota et al. [3]. The use of improved and hybrid maize seed to increase the productivity and profitability of maize is therefore of great importance to maize farmers in the study area. Resources such as fertilizer, herbicides, and pesticides are scarce in the study area or when available the poor maize farmer may not have the sufficient fund to purchase the required quantities. Maize cultivation in the study area is mainly rain fed system which means water supply is basically rain dependent.

Many studies have been conducted concerning costs and returns associated with maize production. Zalkuwi et al. [4], in their study reported total variable cost of N25, 954.18, depreciation on fixed cost of N859.01, total cost (TC) of N26, 813.19 and total revenue, gross margin and farm income were N57, 052.97, N31, 098.79 and N30, 239.78 per hectare respectively, with a return on naira invested of 1.13. Zongoma et al. [5], reported that maize production is profitable in Biu local government area of Borno state, Nigeria with gross margin of N28, 1741.00 per hectare and a total variable cost of N12, 001.20 per hectare. Adams [6], revealed that the total variable cost of N30,500, depreciation on fixed cost of N900.50, total cost (TC) of N38,500 and total revenue, gross margin and farm income were N60,500, N30, 100 and N25,500 obtained per hectare of maize cultivated in Kano state of Nigeria with a return on naira invested of 2.20. Despite the good returns obtained from maize farming, it is still faced with problems such as lack of access to credit by the farmers, lack of farm inputs, poor storage facility, inadequate fund, pests attack, disease infestation, weeds completion and lack of mechanized farming system among others. Adams [6], identified inadequate credit, lack of fund, unavailability of irrigation facilities, climate change, pests and diseases infestation, land tenure problem and inadequate processing facilities as the constraints militating against maize production in Kano state, Nigeria. Zalkuwi et al. [4], in their study also identified inadequate credit, lack of improved seed, lack of irrigation facilities, landform, problem of pest and diseases, problem of land tenure system and inadequate extension services as the constraints that hampering maize farming in Ganye local government area of Adamawa state, Nigeria. Zongoma et al. [5], on their part reported lack of finance, pest and diseases, high cost of inputs, lack of hired labour, transportation problem and lack of family labour as the problems confronting maize farmers in their study. This study therefore aimed at estimating the costs and returns
associated with maize production as well as the constraints militating against maize production in Lere local government area of Kaduna state, Nigeria.

2. METHODOLOGY

2.1 Study Area

The study was conducted in Lere local government area of Kaduna state. The headquarter of the local government area is located in Saminaka. The local government area was created in the year 1991 out of the former Saminaka local government area created in 1976. The local government is located between latitude 9°N and 12°N and longitude 6°E and 9°E of prime meridian. The total land area is about 21,158 km² and a population of 331,161 as at the 2006 census [7]. It shares boundary with Kano state in the northern part, while in the area towards eastern part it is bounded by Bauchi and Plateau states. In addition to the above mentioned, other important area around Lere local government include the ancient city of Zaria to the north. It is bordered by the commercial town of Kafanchan down south. The study area has many villages among which are Lere, Saminaka, Kayarda, Ungwan-Bawa, Yarkasuwa, Garu, Gure, Dokandanbala and Lazuru among many others. The climate in Lere local government can be divided into three seasons, this start with the hot and sunny season which begins from February to early May, followed by the raining season from March to October and then harmathan season, which usually last for about three months. Crops commonly grow in the area include, yam, millet, beans, soya beans, tomatoes, onion, sugar cane, rice, groundnut, cucumber, cabbage and potatoes.

2.2 Method of Data Collection

Primary data was used for this study. The primary data was sourced through administering of a well-structured questionnaire and oral interview to the maize farmers. The questionnaire that contained both open-ended and multiple choice questions relates to maize farmers socio-economic characteristics, maize output and maize inputs were administered to the farmers by the researchers through physical contact.

2.3 Sampling Procedure

Multi-stage, purposive and random sampling techniques were adopted to select the respondents for the study. In the first stage Lere local government area was selected from the state purposively due to high concentration of maize farmers in the area. In the second stage five villages were also purposively selected which includes; Saminaka, Lere, Ungwa-Bawa, Yarkasuwa and Kayarda. Based on the population and concentration of the maize producers in these places, 24 respondents each were selected from Saminaka and Lere while 20 respondents each were selected from Kayarda and Ungwa-Bawa and 12 respondents from Yarkasuwa which gave a total of one hundred (100) respondents that were used for the study.

2.4 Analytical Technique

The following tools of analysis were employed to achieve the stated objectives of the study.

i. Simple descriptive statistics

ii. Net farm income analysis

2.4.1 Simple descriptive statistics

This involves the use of descriptive statistics such as table, percentage, mean and frequency distribution to describe the socio-economic characteristics of the maize farmers.

2.4.2 Net farm income analysis

Net farm income analysis was used to estimate costs and returns associated with maize production in the study area. It is expressed as follows:-

\[
GM = TR - TVC \\
NFI = GM - TFC
\]

Where: GM=Gross Margin (Naira/ha)
TVC=Total Variable Cost (Naira/ha)
TR= Total Return (Naira/ha)
NFI = Net Farm Income (Naira/ha)
TFC = Total Fixed Costs (Naira/ha)

2.4.3 Profitability ratios

The gross, operating cost, return per capital invested, benefit cost and expense structure ratios were employed to analyze the performance and economic worth of the maize farmers in the study area.

The Gross Ratio (GR) is given as Total Cost (TC) divided by Total Return (TR). That is GR=TC ÷ TR. This shows the proportion of the TR that...
goes into the total farm costs during the production period.

Operating Cost Ratio (OCR) is given as Total Variable Cost (TVC) divided by Total Return (TR). That is OR = TVC / TR. The ratio indicates the proportion of the TR that goes to pay for the operating cost. It is directly related to the farm variable input usage.

Return Per Capital Invested (RPCI) is given as Net Farm Income (NFI) divided by Total Return (TR). That is RPC I = NFI / TR. This indicates the amount of money return to the investor for every Naira invested on a business.

Benefit Cost Ratio (BCR): This is estimated by dividing the Total Return (TR) by Total Cost (TC). The ratio indicates the profitability of the business based on amount of capital invested.

Expense Structure Ratio (ESR): This is obtained by dividing The Total Fixed Income (TFC) by the Total Variable Cost (TVC). The ratio showed the proportion of total cost of production that is made up of fixed cost component.

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of Respondents in the Study Area

3.1.1 Distribution of the respondents based on gender

The result of the distribution of the respondents based on gender is presented in Table 1. The result revealed that majority of the respondents (77%) is male while (23%) are female. This implies that male dominated maize production in the study area. This result is in line with the finding of [8], which reported that majority of maize farmers in Niger state of Nigeria are male (67%).

3.1.2 Distribution of the respondents based on age group

The result of the age group of the farmers is shown in Table 2. The table shows that many of the respondents (38%) are within the age range of between 21-30 years, 27% of the respondents are within the age range of 31-40 years, 17% of the respondents are between the range of 41-50 years, 10% of the respondents are below 21 years, while few (8%) of the respondents are 50 years and above, the result shows that most of the respondents are in their youthful age which makes them active in maize production. The finding in this present study was in agreement with the work of [9], they reported that majority of maize farmers in their study were young and active with 90.17% of the maize farmers have an age range of between 21-50 years.

3.1.3 Distribution of the respondents based on marital status

The result of the marital status of the respondents is presented in Table 3. The result shows that 53% of them are married, 33% of the respondents are single, 8% of them are widow, while 6% of the respondents are divorcee. This implies that majority of the respondents are married people. This shows that the maize farmers may be more stable in their location of production. The result was in conformity with finding of [10], who observed that 89% of maize farmers in Oyo state, Nigeria were married people.

Table 1. Distribution of the respondents based on gender

| Gender   | Frequency | Percentage (%) |
|----------|-----------|----------------|
| Male     | 77        | 77.00          |
| Female   | 23        | 23.00          |
| Total    | 100       | 100.00         |

Table 2. Distribution of the respondents based on age range

| Age class (year) | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| Below 21         | 10        | 10.00          |
| 21 – 30          | 38        | 38.00          |
| 31 – 40          | 27        | 27.00          |
| 41 – 50          | 17        | 17.00          |
| Above 50         | 8         | 08.00          |
| Total            | 100       | 100.00         |
Table 3. Distribution of the respondents based on marital status

| Marital status | Frequency | Percentage (%) |
|----------------|-----------|----------------|
| Single         | 33        | 33.00          |
| Married        | 53        | 53.00          |
| Divorced       | 6         | 06.00          |
| Widow          | 8         | 08.00          |
| Total          | 100       | 100.00         |

Table 4. Distribution of the respondent based on household size

| Household size (person) | Frequency | Percentage (%) |
|-------------------------|-----------|----------------|
| 1 - 5                   | 38        | 38.00          |
| 6 - 10                  | 36        | 36.00          |
| 11 - 15                 | 16        | 16.00          |
| 16 above                | 10        | 10.00          |
| Total                   | 100       | 100.00         |

Table 5. Distribution of the respondents by their educational qualification

| Education background    | Frequency | Percentage (%) |
|-------------------------|-----------|----------------|
| Non - formal education  | 9         | 09.00          |
| Primary education       | 25        | 25.00          |
| Secondary education     | 37        | 37.00          |
| Tertiary education      | 29        | 29.00          |
| Total                   | 100       | 100.00         |

3.1.4 Distribution of the respondents based on household size

Household size of the farmers is shown in Table 4 which shows that good number of the respondents (38%) have household size ranging from 1-5 members, 36% of them have household size ranging from 6-10 members, 16% of them have household size that is between 11 – 15 people and 10% of the maize farmers have family members that comprises of 16 people and above. This implies that majority of the farmers have over five household members which signifies that labour can be easily sourced from the family members.

3.1.5 Distribution of the respondent based on educational qualification

Table 5 shows the result of the educational background of the respondents. The result reveals that 37% of the farmers had secondary education, 29% of them had tertiary education, 25% had primary education and only 9% had non-formal education. This shows that about 91% of the farmers are educated and possess the ability to read and write. This will enable them to understand new techniques and improvements that may be developed by researchers in maize farming. Zongoma et al. [5], reported that 62% of maize farmers in their study were educated.

3.1.6 Distribution of the respondents based on source of capital

The result of the distribution of farmers based on their source of start-up capital is presented in Table 6. The table shows that 62% of them acquire their capital from personal saving, 18% of them sourced their capital from family members, 12% of the farmers sourced their capital from money lender, while 8% of them sourced their capital through bank. This implies that most of the farmers sourced capital through personal saving which implies that they will have ability to manage their finances well if given credit loan.

3.1.7 Distribution of the respondents based on farm size

Table 7 presents the result of size of farm owned by the respondents. The result revealed that 32% of the respondents have farm size of less than one hectare of land, 31% of them have farm size of one hectare, 17% of them have three hectares, 14% of them have two hectares, while...
only 6% of the farmers have four hectares and above. The result shows that most of the respondents are small - scale maize farmers. This result consolidates the work of [11], they reported that maize farmers in Soba local government area of Kaduna state were small-scale producer with a mean farm size of 1.22 hectares.

3.1.8 Distribution of the respondents based on their years of experience

The result in Table 8 shows that most of the respondents (36%) have 1-5 years farming experience in maize production, 32% of the respondents have less than one years in maize farming experience, 13% of them have between 11-15 years of experience in maize farming, 11% of them have between 6 – 10 years of experience in maize farming while only 8% of the farmers have experience in maize farming that is above 15 years and above.

3.2 Importance of Maize Production

The importance of maize in the study area was investigated and the result presented in Table 9. The result revealed that 100% of the respondents agreed that maize serves as source of food to man. This was followed by 76% who agreed that maize is an important ingredient for livestock feed, 75% said they generate income from maize farming, 65% of them reported that they sell their maize to agro – allied industries Table 6. Distribution of the respondents based on source of capital

| Source of capital     | Frequency | Percentage (%) |
|-----------------------|-----------|----------------|
| Personal saving       | 62        | 62.00          |
| Loan from family      | 18        | 18.00          |
| Credit from bank      | 8         | 08.00          |
| Money lender          | 12        | 12.00          |
| Total                 | 100       | 100.00         |

Table 7. Distribution of the respondents based on farm size

| Farm size              | Frequency | Percentage (%) |
|------------------------|-----------|----------------|
| Less than one hectare  | 32        | 32.00          |
| One hectare            | 31        | 31.00          |
| Two hectares           | 14        | 14.00          |
| Three hectares         | 17        | 17.00          |
| Four hectares and above| 6         | 06.00          |
| Total                  | 100       | 100.00         |

Table 8. Distribution of the respondents based on their years of experience

| Year of experience (year) | Frequency | Percentage (%) |
|---------------------------|-----------|----------------|
| Less than 1               | 32        | 32.00          |
| 1 – 5                     | 36        | 36.00          |
| 6 – 10                    | 11        | 11.00          |
| 11 – 15                   | 13        | 13.00          |
| 15 and above              | 8         | 08.00          |
| Total                     | 100       | 100.00         |

Table 9. Importance of maize production

| Variable                                | Frequency | Percentage (%) |
|-----------------------------------------|-----------|----------------|
| Source of food                           | 100       | 100.00         |
| Source of income to farmers              | 75        | 75.00          |
| Generation of employment                 | 40        | 40.00          |
| Source of raw materials to industries    | 65        | 65.00          |
| As ingredient of livestock feed          | 76        | 76.00          |
| Profit generation to marketers           | 30        | 30.00          |
within their area or to their agents, 40% of the farmers reported that maize cultivation serves as source of employment generation to them while 30% of them reported that they sell their maize to marketers who in turn generates income in form of profit from the sales of the maize. IITA [1], reported that maize is important as animal feed and as well as raw material for brewing beer and for producing starch. Adams [6], also identified some importance of maize in Kano state to include provision of food for man and animals, provision of employment, raw material for livestock feed and increases income and savings of the farmers.

3.3 Costs and Returns Associated with Maize Production

Net farm income analysis in Table 10 presents costs and returns associated with production of maize in the study area and were determined on a per hectare basis. The costs (variable and fixed) include all the expenses encountered in the maize production process. These include cost of variable inputs namely, labour, seed, agro-chemical, fertilizer and transportation while the fixed cost includes land rent, cutlasses, hoes and wheelbarrow which were depreciated. On the other hand, return was computed by considering the money realized by selling the maize grains. The total variable cost (TVC/ha) was estimated at N 109,770.00 which represented 96.91% of the total farming cost, while the depreciation cost on fixed items (TFC/ha) was N 3,500.00 which represent 3.09% of the total cost of maize production, the total return per hectare was computed at N 194,545.00 using the farmers maize yield which stood at an average of 1898 Kg/ha and were observed to vary from one farmer to another and from one location to the other on the average. The gross margin and net farm income were N 84,775.00 and N 81,275.00. This implies that maize production is profitable in the study area. The present result is in agreement with the findings of [6,5,4], they reported that maize production is a profitable investment in their various studies. Adams [6] and Zalkuwi et al. [4], reported net farm income of N 25,500.00 and N 30,239.78 per hectare of maize cultivated in their study area, respectively.

3.4 Profitability Ratios

In order to have a clearer picture of the performance of any enterprise, it is necessary to examine other measures of financial analysis such as, returns to the various factors of production inputs and other financial ratios. So this study therefore considered some profitability ratios namely, gross, operating cost, return per capital invested, benefit cost, expense structure ratios which have been computed in Table 11.

Gross ratio generally helps in measuring the overall financial success or otherwise of a farm. The gross ratio (GR) from the table is obtained by dividing the total farm costs (TC) by the total return (TR) and this was computed to be 0.58. The ratio reveals that the total farm costs was about 58% of the total return. Therefore, as a rule, a less than one ratio is always desirable for any investment. This means that the lower the ratio, the higher the return per Naira invested. This showed that it is safe to invest on maize farming in the study area. Ettah et al. [12], obtained gross ratio of 0.47 which was lower to the value obtained in the present study.

Table 11 also captured the operating cost ratio (OCR) for the respondents in the study area and it was calculated by dividing the total variable cost (TVC) by the total return (TR) and from the analysis it was found to be 0.56 (56%). This established the proportion of the total return that goes to service the operating expense of the respondents and this is directly related to the farm variable input usage. As a rule, an operating ratio of one means that the gross income just defray the expenses incurred on the variable inputs used on the farm. The result revealed that only 56% of the total return was used to offset the variable costs. The value of operating cost ratio obtained in this study was higher than the 0.32 reported by [12] in their study.

The return per capital invested in this study was computed to be 0.42. This shows that for every one naira invested on maize production a return of 42 kobo is obtained which an indication that the investment is a worth one. Adams [6] and Zalkuwi et al. [4], obtained higher return per capital invested on maize farming in their works.

The benefit cost ratio was computed to be 1.72. The higher the benefit cost ratio the better for the investment because a benefit cost ratio of 1 means that the business is neither making profit or making loss but just break even while benefit cost ratio of greater than 1 means that the
business is making profit and less than 1 means the business is making loss. The result from this present study showed that maize farming is profitable in the study area. The benefit cost ratio of 1.72 obtained in this study is higher than 1.12 and 0.9 obtained for maize seed production for large scale farmers and small scale farmers in Palpa district of Nepal by [3].

The expense structure ratio was computed to be 0.03. This shows that only 3% of the total cost of maize production is made up of fixed cost components. This makes maize farming a worthwhile investment in the study area since increase in the production with variable costs will increase the total return leaving fixed cost unchanged.

Table 10. Average costs and return per hectare of maize production in the study area

| Variable | Quantity/Ha | Unit price (Naira) | Value in Naira/Ha | % of Total cost |
|----------|-------------|-------------------|------------------|----------------|
| **Variable Costs** | | | | |
| Seed (Kg) | 25 | 100 | 2500 | 2.21 |
| Fertilizer (Kg) | 452 | 110 | 49720 | 43.90 |
| Agrochemicals (Litre) | 14 | 1400 | 19600 | 17.30 |
| Labour (Manday) | 28 | 1200 | 33600 | 29.66 |
| Transportation | - | - | 4350 | 3.84 |
| **(A) Total Variable Cost** | - | - | 109770 | 96.91 |
| **Fixed Costs** | | | | |
| Depreciation of land(Ha) | 1 | - | 2000 | 1.77 |
| Depreciation of tools | - | - | 1500 | 1.32 |
| **(B) Total Fixed Cost** | - | - | 3500 | 3.09 |
| **(C) Total Cost ( A+B)** | - | - | 113270 | 100 |

| Variable | Unit price (Naira) | Value in Naira/Ha | % of Total cost |
|----------|-------------------|------------------|----------------|
| **Returns** | | | |
| Maize yield (Kg) | 1898 | 102.50 | 194545 |
| **(D) Total Return** | - | - | 194545 |
| **(E) Gross Margin ( D – A)** | - | - | 84775 |
| **(F) Net Farm Income ( E – B)** | - | - | 81275 |

Table 11. Profitability ratio estimates for maize production in the study area

| Profitability ratio | Estimated value |
|---------------------|-----------------|
| Gross ratio (GR) | 0.58 |
| Operating cost ratio (OCR) | 0.56 |
| Return per capital invested ratio (RCIR) | 0.42 |
| Benefit cost ratio (BCR) | 1.72 |
| Expense structure ratio (ESR) | 0.03 |

Table 12. Constraints associated with maize production in the study area

| Constraints | Frequency | Percentage | Ranking |
|-------------|-----------|------------|---------|
| Lack of capital | 73 | 73.00 | 1<sup>st</sup> |
| High cost of farm inputs | 69 | 69.00 | 2<sup>nd</sup> |
| Lack of credit facilities | 67 | 67.00 | 3<sup>rd</sup> |
| Inadequate storage facilities | 53 | 53.00 | 4<sup>th</sup> |
| Inadequate processing facilities | 50 | 50.00 | 5<sup>th</sup> |
| Pests and diseases infestation | 46 | 46.00 | 6<sup>th</sup> |
| Poor road network | 40 | 40.00 | 7<sup>th</sup> |
| Poor extension services | 33 | 33.00 | 8<sup>th</sup> |
3.5 Constraints Associated with Maize Production in the Study Area

Table 12 presents the constraints faced by farmers in producing maize in the study area. The table revealed that 73% of the respondents identified lack of capital to purchase required farm inputs and hired labour which ranked as the first constraint hindering their level of maize production, 69% of the respondents identified high cost of farm inputs as an impediment to maize production, 67% identified lack of access to credit facilities which would have helped in alleviating their poor nature as a constraint, 53% reported that inadequate storage facilities to store their produce against better selling price as a constraint, 50% reported inadequate processing facilities as a problem, 46% of the farmers reported about the pests attack as well as diseases infestation as a challenge militating against maize production and 40% of the farmers recognized that poor road network affect their production because it contributes to increase in production cost while 33% of the farmers claimed not to have adequate extension services. Most of the constraints observed in this study were similar to those reported by [6], who identified inadequate credit, lack of fund, pests and diseases infestation, and inadequate processing facilities as the constraints militating against maize production in Kano state, Nigeria. Similarly, Zalkuwi et al. [4], in their study also identified inadequate credit, lack of improved seed, problem of pest and diseases and inadequate extension services as the constraints hampering maize farming in Ganye local government area of Adamawa state, Nigeria, while [5], on their part reported lack of finance, pest and diseases, high cost of inputs and transportation problem as the problems confronting maize farmers in their study.

4. CONCLUSION

The study in conclusion revealed that maize farming in Lere local government area of Kaduna State, Nigeria is dominated by male who are in their active age and the business is a viable and profitable investment with a total return of ₦194,545.00 and net farm income of ₦81,275.00 obtained per hectare of maize cultivated and a return on capital invested of 0.42 implying that for every naira invested, the farmers makes 42 kobo (₦ 0.42). All the farmers identified maize as an important source of food to households in the study area However the business is faced with constraints such as lack of capital, high cost of farm inputs, lack of credit facilities, inadequate storage and processing facilities, incidence of pests and diseases infestation, poor road network and poor extension services, but despite of these constraints, the maize farmers is still able to made profit. Therefore, it is recommended that credit facilities should be provided so that farmers can have fund to purchase farm inputs such as fertilizer, pesticides and insecticides and be able to engaged adequate labour, storage and processing facilities such as silo and shelling machine should be made available to farmers at subsidized and affordable price as a form of government intervention, adequate workshops and seminars especially on training farmers on methods of weed and pests control should be organized by extension agents and farmers should be encouraged to form themselves into cooperative groups so that they can pool their resources together in getting adequate funds to finance maize production activities.

CONSENT

As per international standard or university standard, participant’s written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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