

Economics of Organic and Non-Organic Vegetable Production among Small Holder Farmers in Cross River State

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ABSTRACT

This study was conceptualized to analyze the cost and returns of organic and Non- organic farming among small holder fluted pumpkin farmers in Cross River State. A multistage sampling technique was employed in the selection of location and respondents. The data were collected from 240 organic and non-organic small holder fluted pumpkin farmers. The primary instrument used for data collected was structured questionnaire. Data obtained was analyzed by **Enterprise budgeting method**, Anova and descriptive statistics. Results indicated that the profit realized by organic fluted pumpkin farmers in Cross River State was N 108,060, while the profit of Non-organic was N145,480. The results of socio-economic characteristics of fluted pumpkin producers showed that majority (65.42%) were in Age bracket of 31-50 years. Majority (65.75%) of the respondents were female, (70.83%) were married, majority (97.92%) were literate, average farm size was 0.8 hectare, (82.50%) of household size were in the range of (6-9) and average years of experience of 9 years. The study therefore suggests that farmers should be trained as often as possible.

Keywords: Vegetable, Organic, Non- Organic, Small Holder, Farmers, Production

INTRODUCTION

In Nigeria the level of use of organic technology among the small scale vegetable farmers are still very low and at early stage Ubokudom & Idiong (2016). To improve or create a new technology in agriculture, extension workers must play a vital role to disseminate the technology to farmers (Ayoola, 2012;). The decision of farmers to use organic technology is based on the discussion and characteristics of the technology itself with the conditions and circumstances. The diffusion as well depends on individual decision to use the technology or not and also the uncertain benefits of the new invention with the costs of adoption (Chomba,2016). A good knowledge of the factors affecting the choice of adoption is vital for growth and economic study for generating and dissemination of organic technologies.

Traditionally, economic analysis of technology use described adoption behavioral trait as personal characteristics and endowments, information gap, uncertainty, risk, challenges of institution and infrastructure (Chomba,2016). Social work and learning has been included as class of factors determining use of technology. Most studies classified these factors into various categories. Therefore, Ndungu, *et al.*, (2013) classified the determinant of agricultural technology use into three groups as social, economic and institutional factor. Chomba, (2016) clearly specified the factors that affect technologies adoption as social, physical and economic class. Namara, *et al* (2013) as cited by Chomba. (2016) grouped the factors into farm structure, farmer characteristics, institutional characteristics and managerial structure. Organic farming practices are the only profitable lead to farmers in attaining a high production and sustainability in agriculture due to some uncertainties facing agricultural yield. Some of these challenges are population growth, environment degradation, climate change among others. The only way out in getting the desired food for the teaming population and overcoming unpredicted hazards that can affect the farm land, such as erosion, earthquake, leaching and infertile soil situation, is just by converting properly to organic practices

(Matsane & Onyeka, 2014). The challenge is to develop government policies that support conventional farmers converting to organic technology and other sustainable systems. The modern times have transformed the initially supply-driven organic movement through increasing environmental awareness in the general population. In developing nations, most farmers practice traditional methods that are close to organic but not certified organic and the latest scientific improvement in organic agriculture (IFOMA,2016). The yield of fluted pumpkin with the use of organic technology is very high and the output level is very encouraging and higher than the conventional practices (OLowa & Olowa, 2016). Organic practices keep the leaves and seed pod fresh and greenish in colour rather than looking yellowish (Ndubueze-Ogaraku, 2017). The output level of fluted pumpkin in the use of organic practices is very encouraging to the farmer and also in meeting the need of the growing population on the aspect of food consumption. The broad objective of this study was to analyze the economics of organic and non-organic vegetable production among small holder farmers in Cross River State. The specific objectives were to identify socio-economic characteristics of fluted pumpkin producers and estimate the costs and returns of organic and non-organic production.

MATERIALS AND METHODS

The Study Area

Cross River State

Cross River State is a coastal state in south-south Nigeria. It occupies 20,156 square kilometers. It shares boundaries with Benue State to the North, Ebonyi and Abia State to the west, to the east by Cameroon Republic and to the south by Akwa-Ibom and the Atlantic Ocean. Its capital is Calabar. The estimated population of about 2.89 million people (NPC, 2006) with a unique and rich cultural heritage. Ejagham and Efik are the major languages of this state, but the Igbo tribe and language are also present in its western land borders. The state belongs to tropical rainfall belt where rainfall is usually seasonal and at times very heavy. Humid tropical climate of about 1300, 3000mm rainfall and 30°C mean annual temperature prevail over the state. The vegetation ranges from mangrove swamps, through rainforest, to derived savannah, and Montane parkland. The mineral resource potentials of the state are diverse so also the rocks. About forty percent of the estimated population constitute the active population that is engaged in various economic activities; ranging from subsistence agriculture to urban commerce and transport business. The common crops grown in the state are yam, maize, tree crops.

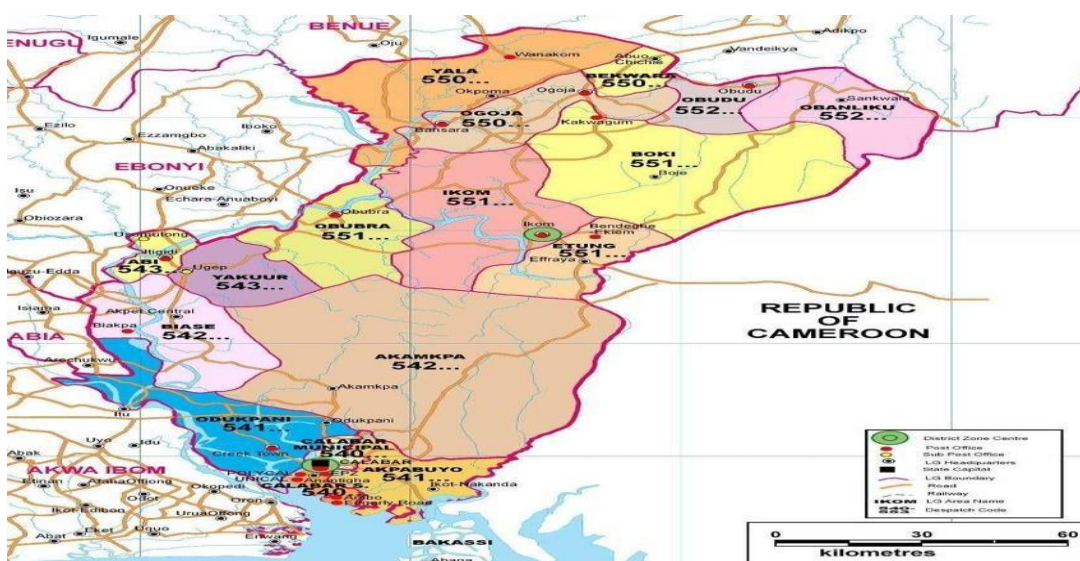


Figure 2.1: Political Map of Cross River State. Researchgate.net, (2021)

Population of the Study

The population of the study constituted all the smallholder organic fluted pumpkin farmers and non- organic (conventional) farmers in Cross River State.

Sampling Technique and Sample Size

A multistage random sampling technique was adopted in the selection of agricultural zones, local government areas, communities and respondents.

In the **First stage**, fifty percent (50%) of the agricultural zones, that is, 2 zones in the State were randomly selected. These were Ogoja and Ikom zone.

In the **second stage**, three LGAs were randomly selected from each of the two agricultural zones, giving a total of six LGAs that were selected. For Ogoja zone (Ogoja, Obudu and Yala) were selected, for Ikom zone (Abia, Ikom, and Boki).

In the **third stage**, four communities were randomly selected from each of the six (6) LGAs. This gave a total of 24 communities.

In the fourth stage, 10 farmers were randomly selected from each of the 24 communities giving a total of 240 respondents that were selected for the study. Furthermore, 80 respondents were used as sample for the control group (non-organic fluted pumpkin farmers) while 160 respondents were used for the experimental group (organic fluted pumpkin farmers).

Method of Data Collection

Primary and secondary data were used for the study. The primary data was obtained from questionnaire administered to the cucumber farmers.

Table 1. Distribution of agricultural zones and local government areas in Cross River State, Nigeria.

| States | Agricultural zones | Local Government Areas |
|-------------------|--------------------|---|
| Cross River State | Ogoja | Ogoja, Obudu, Obanliku, Kekwarra and yala |
| | Ikom | Abia, Obubra, Yakurr, Ikom and Boki |

Table 2: Distribution of organic and non-organic fluted pumpkin farmers

| Selected State | Selected Zones | Number of selected LGAs | Number of selected communities | Number of selected farmers |
|----------------|----------------|-------------------------|--------------------------------|----------------------------|
| Cross River | 1(2) | 2(3) | 6(4) | 10(24) |
| Total | (2) | (6) | (24) | (240) |

N.B: Figures in parenthesis = Number selected

Method of Data Collection

Data for this study were derived from primary sources which include the use of structured questionnaire, personal interviews, observations and informal discussion. Structured questionnaire was used for literate

farmers and interview schedules for the illiterate farmers. All the copies of the questionnaires were administered to the farmers. The questionnaire for fluted pumpkin farmers was divided into the following sections:

Section A: Socio-economic characteristics of fluted pumpkin farmers.

Section B: Costs and Returns of organic and non-organic fluted pumpkin farmers.

Validity

The instrument was subjected to both validity and reliability test. Test retest method was used for the reliability test.

Reliability

Reliability is usually expressed numerically as a correlation coefficient. The Cronbach's Alpha correlation technique was used to ascertain the reliability of the instrument.

Data Analysis

Objectives i, was realized using descriptive statistics such as frequency distribution table, mean. Objective ii were realized using enterprise budget with cost function and profit function.

Mathematical Expression/Model Specification

MODEL 1

Cost Function

Cost function is specified as:

$$Tc = \sum X_i P_i + Fc$$

Where Tc = Total cost X_i . P_i expenditure on ith

Input..., Fc =fixed costs.

MODEL 2

Profit FunctionS

Profit function is specified as:

$$\pi = TR - TC$$

$$\pi = Q \cdot P_q - (\sum X_i P_i - FC)$$

Where

p = Net profit

TR = Total Revenue

TC = Total cost

Q = Quantity of output

P_q = Unit Price of Output.

MODEL 3

Enterprise Budget Analysis Model

$$NP = (TR - TVC) - TFC$$

Where;

NP = Net Income or Net Returns in Naira (N)

TR = Total Revenue in Naira (N)

TVC = Total Variable Cost in Naira (N)

TR - TVC = Gross Margin in Naira (N)

TFC = Total Fixed Cost in organic and non-organic fluted pumpkin

RESULTS AND DISCUSSION

Costs and Returns of Organic Fluted Pumpkin Production

Table 1: Distribution of the Socio-economic Characteristics of the Respondents

(n= 240).

| Variable | Frequency | Percentage (%) | Mean/mode |
|--------------------------|-----------|----------------|-----------|
| Age (years) | | | |
| 20 and below | 14 | 5.83 | |
| 21 – 30 | 38 | 15.83 | |
| 31 – 40 | 157 | 65.42 | 37 years |
| 41 – 50 | 24 | 10.00 | |
| 51 and above | 7 | 2.92 | |
| Sex | | | |
| Male | 87 | 36.25 | |
| Female | 153 | 63.75 | Female |
| Marital status | | | |
| Single | 34 | 14.17 | |
| Married | 170 | 70.83 | Married |
| Widow/widower | 20 | 8.33 | |
| Divorced | 16 | 6.67 | |
| Educational level | | | |

| | | | |
|----------------------------|----------|-------------|-------------|
| No formal education | 5 | 2.08 | |
| Primary | 15 | 6.25 | Tertiary |
| Secondary | 185 | 77.08 | |
| Tertiary | 35 | 14.58 | |
| Farm size | | | |
| 0.5 and below | 38 | 15.83 | |
| 0.6 – 1.0 | 202 | 84.17 | 0.8 hectare |
| Above 1.0 | 0 | 0 | |
| Household size | | | |
| Less than 2 | 12 | 5.00 | |
| 6– 9 | 198 | 82.50 | |
| 10 and above | 30 | 12.50 | |
| Years of Experience | | | |
| 0-9 | 206 | 85.83 | |
| 10–15 | 26 | 10.83 | |
| 16 – 21 | 5 | 2.08 | 9 years |
| Above 21 | 3 | 1.25 | |

Type of Technology

| | | |
|-----------|-----|-------|
| Organic | 160 | 66.67 |
| Inorganic | 80 | 33.33 |

Age

The results of age distribution showed that majority (65.42%) of the respondents were within the age bracket of 31-50 years, see (Table 1). This result agrees with the findings of (Ugbajah, *et al.*, 2015) that reported the dominance of the age bracket of 31-50 years of vegetable farmers in Onitsha Southeast zone, Nigeria. They stated that age is regarded as an important variable because it influences people's attitude, skill and aspiration. The average age of fluted pumpkin farmers in the study area was 37years. The farmers are still young and are capable of impacting positively on fluted pumpkin production.

Sex

The result showed that majority (65.75%) of the respondents were female and fairly good proportion (36.25%) are males (Table 1). Vegetable production is not tedious this could be the reason women are more in vegetable farming. This result agrees with the findings of Ndubueze-Ogaraku, (2017) who reported that women dominated the farming population in crop production.

Marital Status

Majority (70.83%) of the respondents were married, fair proportion (14.17%) were single see (Table 1). This implied that married farmers can settle down and coordinate their business. Married farmers inorganic fluted pumpkin production have the benefit of family labor than the unmarried. This result is in line with the report Obianuju & Asa (2015) who reported that good number of small scale farmers are married and have better performance and efficiency in fluted pumpkin production.

Educational level.

The results showed that majority (97.91%) of respondents were literate see (Table 1). A good proportion (77.08%) of the literate small scale fluted farmers had completed secondary education, (6.25%) had primary education and (14.58%) had tertiary education, while (2.08%) had no formal education. This implied that small scale fluted pumpkin farmers would not have difficulties in the training and embracing modern agricultural technologies and innovations. This finding is in line with (Ugbajah, *et al.*, 2015) who reported also that 90% of the vegetable farmers had some formal education which indicates good understanding and adoption of improved agricultural skills and technologies.

Farm size in hectare.

Majority (84.17%) of the respondents were medium size operators of (0.6-1.0) hectare. The average farm size of operation was 0.8 hectare in the study area see (Table 1). Fair proportion (15.83%) were small size operators between (0.5 and below) hectare. This finding agrees with Olowa & Olowa (2016) who reported that farm sizes are fragmented and small-scaled in Nigeria having less than 2 hectares.

Household size

Majority (82.50%) had a household size of 6 – 9 persons, (5.00%) had the household size range of 2-5 while (12.50%) had the household size range of 10 and above. The average household size was 7 persons in the study area (Table 1). This shows that most fluted pumpkin farmers have relatively large household sizes. Household are similar in so many areas: both are big, populous countries; both have a large Muslim and a large Christian population; both have a history of a military government; both are oil producers and both are perceived as problematic concerning good and bad governance (Ndubuisi, K.E, 2023). This result agrees with the findings of Ndubueze-Ogaraku, (2017) who reported that average household size of small scale vegetable farmers was within 6-10 persons.

Farming experience.

Majority (85.83%) of the respondents were within the years of farming experience of 0-9 years. Result showed that 10.83% of the respondents were within the years of farming experience of 10-15 years, 2.08% were within the range of 16-21 years of experience, while only 1.25% were above 21 years of farming experience. It indicates that fluted pumpkin farmers have the strength of maximizing their output and profits at minimum cost. It agrees with the findings of Olowa & Olowa (2016) who reported that farming experience of about 10 years provide necessary skills for high productivity and efficiency.

Type of technology.

Majority of the respondents (66.67%) were organic fluted pumpkin farmers, while (33.33%) were inorganic (conventional) fluted pumpkin farmers. The result implies that organic producers dominated the study area. The result disagrees with the findings of (Nduagu, *et.al.*, 2013) who reported that conventional farming is dominant was Kiambu country.

Cost analysis and Returns in the use of organic farming technology among fluted pumpkin (per hectare) in Cross Rivers State

| S/N | Items life span | Quantity | Unit Price (N) | Total Cost |
|-----|----------------------|--------------|----------------|------------|
| | Variable cost | | | |
| i. | Planting materials | 180 pods /ha | 470.00 | 84,600 |

| | | | | | |
|-------|--------------------------------|---------|--------------------|----------------|----------------|
| ii. | Organic material | – | 6 (50kg bags) | 5,000 | 30,000 |
| iii. | Hired labour | – | 30mandays | 300 | 30,000 |
| | Irrigation | – | 2 | – | 60,000 |
| | Transportation cost | – | Lump sum | – | 14,000 |
| i. | Communication cost | – | – | – | 7,000 |
| | Total variable cost | | | | 225,600 |
| | Fixed cost depreciation | | | | |
| iii. | Land(rent) | – | 3plots (1 hectare) | 11,000 | 33,000 |
| iv. | Wheel barrow | 2 years | 2 | 10,000 | 20,000 |
| v. | Irrigation equipment | 2 years | 4 | 20,000 | 80,000 |
| vi. | Machete/Cutlass | 2 years | 10 | 1,200 | 12,000 |
| vii. | Hoe | 6 years | 5 | 500 | 2500 |
| viii. | Shovel | 4 years | 4 | 1,500 | 6,000 |
| ix. | Basket | – | 5 | 500 | 2,500 |
| | Watering can | | 2 | 1500 | 3000 |
| | Bicycle | | 1 | 15,000 | 15,000 |
| | Motorcycle | | 1 | 200,000 | 200,000 |
| | Total fixed cost | | | | 379,500 |
| | Revenue | | | | |
| | Pod (kg) | | 216pods(kg) | 510 | 110,160 |
| | Leaves (bunches)KG | | 201 bunches(kg) | 3000 per bunch | 603,000 |
| | Total Revenue | | | | 713,160 |
| | Total production cost | | | | 605,100 |
| | Gross Margin | | | | 487,560 |
| | Profit | | | | 108,060 |

Source: field survey 2018

The results cost analysis and returns in the use of organic farming technology among fluted pumpkin (per hectare) in Cross River State.

The result of the cost analysis and Returns in the use of organic farming technology among small scale fluted pumpkin farmers in Cross Rivers state (Table 6.) were analyzed as follows: The estimation showed that the average total variable cost per hectare was N225,600; the total fixed cost was N379,500 per hectare, the total cost was N605,100. The gross margin per hectare was N487, 560. The Returns from pods were N110,160 and Returns from leaves (bunches) were N603,000, the total revenue were N713,160. The return from investment/ profit were N108,060. It showed that organic production of fluted pumpkin in Rivers state was profitable and seen as a good business venture. This result agreed with the report of Olowa & Olowa (2016); Ayoola (2014) who reported fluted pumpkin production as being profitable with greater economic efficiency.

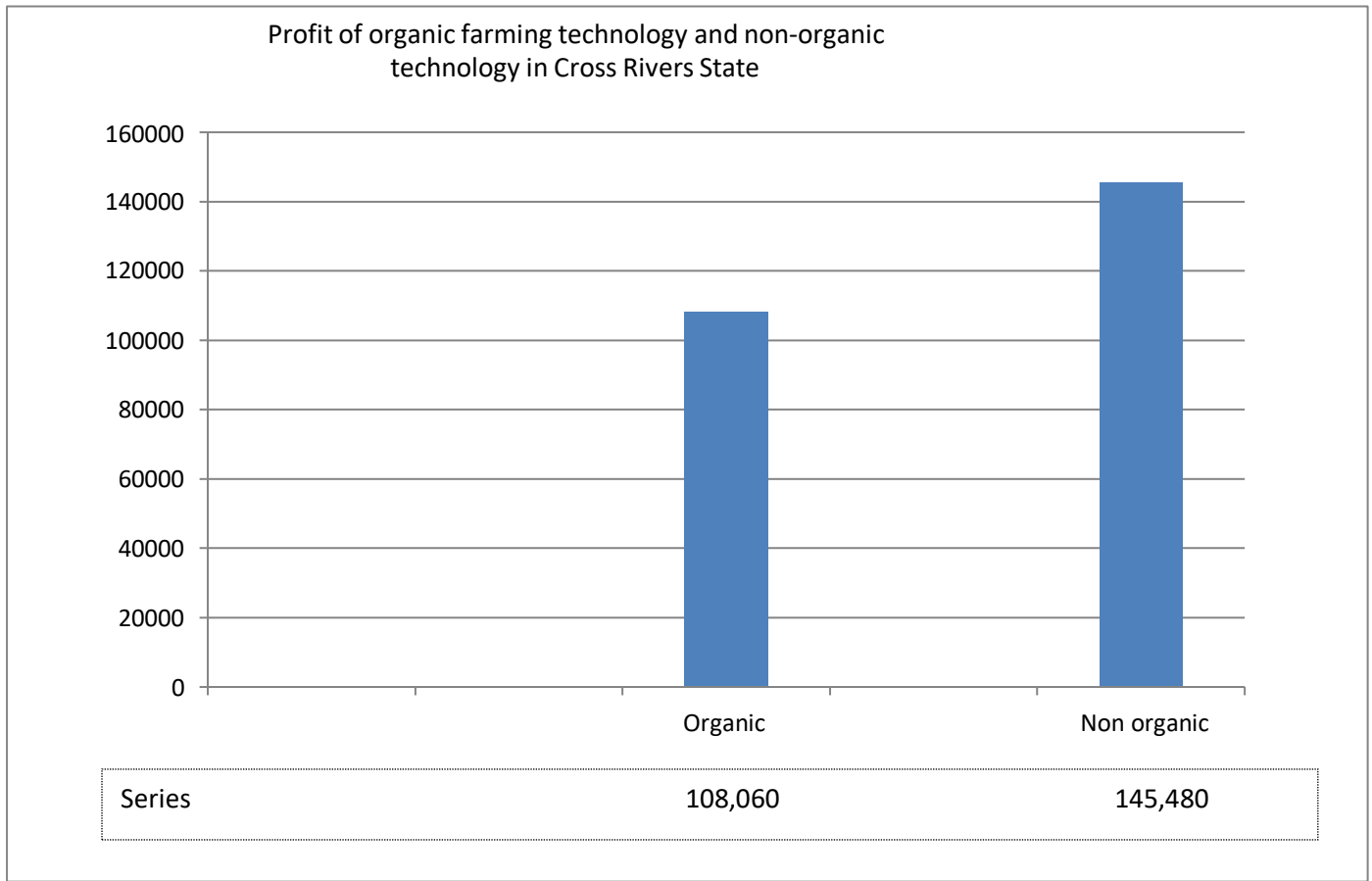


Figure 3.1

Difference between the profit of organic farming technology and non-organic technology (conventional system) of fluted pumpkin production in Cross -Rivers state.

The results showed that the mean profit in Rivers state in organic fluted pumpkin production were N 108,060, while the mean profit of non-organic (conventional system) was N145,480 with the mean difference of N 37,420. The result showed that non-organic technology of fluted pumpkin production is more profitable in Cross-Rivers state.

Non-organic producers had profit above organic producers with N37,420. The bar chart shows the picture of the profitability.

Difference between the profit of organic farming technology and non-organic technology (conventional system) of fluted pumpkin production in three states

| One-sample Statistics | | | | |
|-----------------------|--------|-------------|-----------------|-----------------|
| Technology | N | Mean | Std. Deviation | Std. Error Mean |
| Organic | 120 | 206894.4587 | 235987.7541 | 69874.6532 |
| Non-organic | 120 | 107589.6589 | 854621.7512 | 69862.7584 |
| One-Sample Test | | | | |
| Technology | T | Df | Sig. (2-tailed) | Mean difference |
| Organic | 19.335 | 239 | 0.000 | 206894.4587 |
| Non-organic | 29.127 | 479 | 0.000 | 107589.6589 |

CONCLUSION

The results of socio-economics characteristics of fluted pumpkin producers showed that majority (65.42%) were in Age bracket of 31-50 years. Majority (65.75%) of the respondents were female, (70.83%) were married, majority (97.92%) were literate, average farm size was 0.8 hectare, (82.50%) of household size were in the range of (6-9) and average years of experience of 9 years.

The findings of costs and returns of organic fluted pumpkin in Cross Rivers State was N 108,060, while that of non-organic (conventional system) was N 145,480. A mean difference of N 37, 420 was computed. The result of One Sample test indicated a significant difference between the means in favour of organic fluted pumpkin production, implying that organic fluted pumpkin production was more profitable than non-organic in Cross Rivers State.

RECOMMENDATION

1. Government and social organizations should create more awareness about technologies and health benefits of organic fluted pumpkin to improve the farmers output, sales and profit.
2. Financial institutions should be available to give financial assistance to fluted pumpkin farmers

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