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COST, RETURNS AND PROFITABILITY OF MAIZE-BASED PRODUCTION AMONG MEMBERS OF COOPERATIVE RURAL FARMERS IN IBADAN-IBARAPA ZONE OF OYO-STATE, NIGERIA

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ABSTRACT

The study examined cost, returns and profitability of maize production among members of cooperative rural farmers in Ibadan-Ibarapa zone of Oyo State, Nigeria. A multi-stage sampling technique was utilized to select a sample size of one hundred and eight (108) respondents through a well structured questionnaire. Both descriptive and inferential statistics were absorbed to analyzed the data. The findings indicated that majority (88.9%) of the maize-based farmers were in their prime and bracket years of vitality and productivity. This result also implied that a significant portion (75.9%) of the respondents were married, with an average of five (5) persons per households. The findings further showed benefit-cost of 1.42, implied that for every ₦1.00 spent by the farmers on maize production, 42kobo was realized as profit, with benefit-cost ratio exceeded 1, this showed that the enterprise is profitable and economical. The study therefore, recommended that maize farm Input such as fertilizer, seeds among others should be made available to farmers timely at a subsidized rate by government at all levels. Timely and adequate training should be given to maize farmers to acquire modern production techniques in order to boost their production. Maize farmers should be educated on how to battle the challenges associated with their production. Both governments and non-governmental agencies should provide credit facilities for the farmers at low or no interest. Farmers should be encouraged to form more cooperative societies in order to pool their resources together to tackle the financial short fall facing them.

Keywords: Cooperative, Maize production, Maize farmers, Cost, Returns, Profitability

INTRODUCTION

According to Jain, Shelke and Meshram (2019), Maize (*Zea maize*) belongs to family (*Gramineae*). It is the third most important cereal food grain crop in the world followed by rice and wheat. The origin of maize is Mexico in Central America. Maize contributes about 20 per cent world's total cereal production. Maize is a major source of cooking oil (corn oil) and of maize gluten. Maize starch can be hydrolyzed and enzymatically treated to produce syrups, particularly high fructose, syrup, a sweetener; and also fermented and distilled to produce grain alcohol. Grain alcohol from maize is traditionally the source of bourbon whiskey (Anwarul *et, al.,* 2020). Sapkota (2018) Maize is sometimes used as the starch source for beer, it is also nutritive for adults of different ages. The green straw is suitable for making silage. Maize is also used as the fodder for livestock. The 100 grams of maize grains contains carbohydrate 71-72 kcal, sugars 2-3 grams, dietary fibers 9-10 grams, fats 4-45 grams and proteins 9-10 grams minerals 1-4 grams, its nutrients are very important for the smooth functioning of the body. It is a rich source of carbohydrates, besides this, it provides essential body building substances such as minerals and proteins. It is also a rich source of water (75.96 grams). Maize is consumed by the people in India in many forms, it can be consumed as a breads, in forms of pop corns or a pop grains. Maize is one of the important cereal crops in the world's agricultural economy both as food for men and feed for animals. Maize is called "*Queen of Cereals".* Because of its higher yielding potentials compared to other cereal crops. The crop is cultivated throughout the world in a varied range of soil and climatic conditions. Maize provides nutrients for humans and animals and serves as a basic raw material for the production of starch, oil, protein, alcohol beverages, food sweeteners and more recently, fuel (Abdulai & Abdulai, 2019). Maize is also a versatile crop, allowing it to grow across a range of agro-ecological zones. Every part of the maize plant has economic value: the grain leaves, stalk, tassel, and cob can all be used to produce a large demand for food, feed, fuel and industrial raw material; demand for maize is also hooking up. Maize is high yielding, easy to process, and costs less than other cereals (Grover and singh, 2017). Mahalakshmi (2019). Maize is an important cereal crop that came second as a staple food that is consumed by majority of Nigerian after rice. 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. IITA (2018) 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 by Small-holder maize farmers. Seed is the most essential input in any agricultural production system. (Langyintuo, 2020) identified maize seed as the most important, strategic and relatively inexpensive input that determines the crop yield. Jitendra *et., al.,* (2019) Maize (*Zea mays*) is the most widely distributed crop of the world being grown in tropical, subtropical and temperate regions under irrigated to semi-arid conditions. Being a versatile crop, it adapts easily to a wide range of production environments. In most African countries, maize is the third most important food crops after rice and wheat. The cultivation of maize has assumed critical importance due to its diversified use as food, feed and fodder. The cooperative has been touted as the appropriate vehicle for harnessing and polling the resources of millions of desperate producers

together to enjoy the benefit of large scale production (Ibe, 2022: Onuk *et., al.,* 2020). Despite the touted popularity of increased farm output by farmers membership of cooperative societies, there is still a perceived low farmers membership of cooperative societies particularly in the rural areas where most farming activities take place and the farmers' output and productivity arguably remain predominantly low thus making the business to be less attractive among the youths. Some of the major characteristics of the Nigeria farmers are poverty, small farm holding and their inability to increase their output and income above the subsistence level. These characteristics among others have been identified as one of the factors militating against food production in Nigeria. Umeh *et. al., (*2018) noted that the farm holdings of the average farmers in Nigeria are usually small, most often less than 2 hectares and are characterized by low productivity which leads to low income and low capital investment. Membership in agricultural cooperatives is expected to directly influence the members' welfare through improvements in production performance and market participation of maize farmers. Improvements in production performance can directly manifest through changes in productivity or crop yields which may result from enhanced access to new technologies and improved technical efficiency (Sundar and Kombai Raju, 2021). Langyintuo & Mekuria (2020) examined the effect of resource productivity of maize-based farmers on poverty reduction in South-West, Nigeria. Multi-stage sampling procedure was used to select 180 respondents and data were collected with the aid of a structured questionnaire. The stochastic frontier production function, poverty index and probit regression model were used to analyze data from the study. Results showed that age, farming experience, cooperative membership, credit, extension visits, farm distance, and land ownership were significant determinants of efficiency of maize-based farmers. The poverty incidence, poverty gap and poverty severity were 42%, 50% and 11.2% respectively. Results further showed that efficiency and other variables were significant determinants of poverty among respondents in the study area. Policies that facilitate increased production of maize, increased level of education, increased cooperative membership, and access to credit are essential to help reducing poverty among maize-based farmers and among the rural poor in general. Adams (2018) investigated maize yield response to fertilizer and profitability in Zambia. It was showed that, there is a significant relationship between maize yield (production) and fertilizer use (as a result of subsidy). They further established that, households that obtained fertilizer on time and used animal draft power or mechanical power in land preparation are more likely to find fertilizer use profitable (high maize production) than other groups of households located in the same district. Nigeria's average maize output decreased in 2017 from l.7 metric tonnes per hectare in 2016 to l.5 metric tonnes per hectare, falling short of the averages for Africa (2.17 metric tonnes per hectare) and the world (5.7 metric tonnes per hectare) (FAOSTAT, 2020). This could be as a result of Nigeria's primarily rainfed maize agriculture, where variable rainfall frequently causes drought. Climate variability has been cited as important factors in Nigeria's variable responsible for low crop yields (Ojo *et, al.* 2020). Wongnaa and Awunyo-Vitor (2017), most farmers prefer the cultivation of local maize varieties to hybrids given their better food processing and on-farm storage characteristics compared to hybrid varieties (Feder, *et, al., 2015*). Low input prices will encourage farmers to buy more. With high input utilization, maize production is bound to increase coupled with good maintenance this growth in production will increase the supply and subsequently the profit. High profits will provide sufficient income to meet basic needs of farmers, thus high standards of living. The present investigation focuses on cost, returns and profitability of maize production among members of cooperative rural farmers in Ibadan zone of Oyo State, Nigeria. *The s*pecific objectives are to describe socio-economic characteristics on maize production among members of the cooperative societies, examine the cost and returns of maize among the farmers, identify various sources of finance and problems facing the maize farmers in the study area.

MATERIALS AND METHODS

Area of the Study

The study area Ibadan-Ibarapa zone, Oyo state, Nigeria. Oyo State has 33 local government ares. It is located in the south-western part of the country. The Oyo State Agricultural Development Programme (OYSADEP) has four zones namely, Saki, Oyo, Ogbomoso and Ibadan - Ibarapa Zones. Oyo state covers approximately a land area of 28, 584 square kilometers and a population of 5,591,589 (Adesina and Zinnah, 2013). It lies between latitude 2°381and 4°351east of the Greenwich meridian. The major occupation in the state is agriculture and it is suited for the cultivation of export crops such as cocoa, cashew, palm tree. Arable crops, such as maize, yam, cassava, millet and rice are also cultivated. Other occupations include trading, hunting and civil service. The climate is tropical with distinct dry and wet seasons with relatively high humidity. The dry season lasts from November to March while the wet season starts April and ends in October. The annual mean rainfall is 300 mm. Average daily temperature ranges between 25ºC and 35ºC almost through-out the year. Both primary and secondary data were used. Primary data was collected through a well structured questionnaire with aid of interview conducted by the respondents. Secondary data was collected from internet sources, published journals, text books, dissertation and other relevant publications. The data collected were analyzed using both descriptivel and Inferential statistics. Descriptive statistics including frequency table, percentages and mean. Inferential statistics includes budgetary regression. The simple descriptive statistics was used to analyze the socio-economic of the farmers, identified sources of funds and problems facing the maize-based farmers in the study area. The budgetary regression was used to analysed the cost, return and profitability of the maize farmers. The study employed a multi-stage random sampling technique for the selection of the representative samples in the study area. The first stage involved random selection of one zone out of the four (4) OYSADEP zones. The selected zone is Ibadan-Ibarapa zone. From the selected zone, two Local Government Areas (LGAs) were purposively selected on the basis of highest area under maize crop production. i.e Akinyele and Oluyole local government areas (LGAs) from Ibadan-Ibarapa zone. The third stage involved a random selection of five villages from each LGAs making a total of 10 villages or rural communities. In the final stage, 12 maize-based farm holders were randomly selected to make a total of 120 maize-based farmers. The sample size in each Zone, LGAs and Villages were determined by probability proportional to size of farming households in each sampling unit respectively. Although a total of 120 questionnaires were administered on the respondents, 110 questionnaires were retrieved while only two (2) were not retrieved and ten (10) of the questionnaires were found unused, due to incomplete information and data, while one hundred and eight (108) questionnaires were utilized as sampled size for the study.

Analytical Technique

Budgetary technique: This was used to analyzed the cost, returns and profitability of smallholder maize farmers. It includes the use of gross margin analysis. Gross margin is taken as the difference between the total values of production and the total variable cost of production.

Where;

GM = Gross Margin
TR = Total Revenue
TVC = Total Variable Cost
TFC= Total Fixed Cost
TC = Total Cost
NFI = Net farm income
ROI = Returns on investment

Operating Ratio (OR) = TVC/TR (1)

Rate of Return on Investment (RRI) = NI/TC (2)

Rate of Return on Investment (RRI) = NI/TC x 100% (3)

Rate of Return on Variable Cost (RRVC) = TR – TVC /TC x 100% (4)

Benefit cost ratio = Benefit/Cost (5)

GM = TR - TVC
TC = TVC + TFC
NFI = TR - TC

Return on investment (ROI) = NFI/TR (6)

RESULTS AND DISCUSSION

Socio-economics Charactaristics of the Respondents

Table1, revealed that (21.3%) of the respondents were aged 30 years or below, (43.5.%) fell within the age bracket of 31—40, (18.5%) were in the range of 41-50 years, 11.1% of the respondents fell within the age of 51-60 while (5.6%) of the respondents were above 60 years old. This results indicated that the majority (83.3%) of the farmers were in their prime years of productivity, this concure with findings from FAO (2018) who asserted that majority (89.9%) of farmers aged between 35 and 55 year of age were youthful and energetic. Furthermore, table 1 also showed that (88.9%) of the respondents were males, while (11.1%) were females, the results signifying a prevalence of males within the surveyed respondents. The analysis of marital status revealed that (24.1%) of the respondents were single, (67.6%) were married, (6.4%) were divorced and (1.9%) were widowed. This suggested that a significant portion of the respondents were married, implied that they have family responsibilities that may exert pressure on them due to the necessity to care for their families. This results is similarly with Shittu *et, al., (*2025) who claimed that majority (85.7%) of farmers in the societies were married and have obligations to take care of their family members. Table also revealed that (20.4%) of the respondents had less than 3 members in their households, (33.3%) had 3-5 persons, (20.4%) had 6-8 individuals, and (25.9%) had 9 or more members, with an average of five (5) individuals per household. In terms of farming experience, (13.9%) had 5 years or less, (21.3%) had between 5 and 10 years farming experience, (25.9%) had 11 to 15 years and, (22.2%) had between 16 and 20 years while only (16.7%) had 20 years and beyond. This indicated that larger proportion of the respondents (86.1%) of the respondents had enough experience which could assist them to make their business productive efficiently and effectively, this findings is consistent with (Sadiq *et.,al.,* 2023) who claimed that having enough experience in any farming business will help to strengthen the farmers ability to avert farming risk. In terms of other occupations, (30.5%) of the respondents were artisans, (32.5%) of the respondents were civil servants, and (37.0%) were involved in trading, highlighting the diverse jobs engagement within the respondents, with trading being the most other occupation involved by the farmers apart from being a maize-based farmers, followed by civil service and artisans. Regarding educational attainment, (22.2%) of the respondents had completed primary education, (45.4%) had secondary education, (23.1%) had tertiary education, while (9.3%) had no formal education. This showed that majority of the respondents were educated, enabling them to read and write showing that they can adopt innovation easily, this support the findings of (Abu *et, al.,* 2019) who stated that literate farmers are different from laggards because they adopted innovation that is, new technology methods easily and quickly to improve their production. This findings is also consistent with the studies of (Adugna, 2019) who asserted that farmers with high level of education has tendency to improve the profitability of their business. The results show case the monthly income obtained from non-agricultural activities that (33.3%) earned less than ₦100,000, (16.7%) earned between ₦101,100 and ₦200,000, (23.1%) earned between ₦201,000 - ₦300,000, (14.9%) obtained between ₦301,000 and ₦400,000, and (12.0%) realized between ₦401,000 and above monthly, with an average income of ₦150,120.66k. This indicated that (66.7%) of the respondents realized more than ₦100,000 per month which showed a better high income among the farmers from other businesses. Moreover, Table 1 also showed the duration of cooperative that the majority (64.8.%) having been members for 1 to 9 years, (25.9%) for 10 to 14 years, and (9.3%) for 15 years and beyond. This findings indicated that majority of respondents spent much years in their societies. This results is in line with Sanskala *et, al.,* (2022) who asserted that majority farmers belong to one or more agricultural farming groups.

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

Variable	Value	Frequency	Percentage	Cumulative frequency	Average
Sex	Male	96	88.9	88.9	
	Female	12	11.1	100.0	
Age (years)	≥ 30	23	21.3	21.3	
	31-40	47	43.5	64.8	
	41-50	20	18.5	83.3	
	51-60	12	11.1	94.4	36 years
	61 & above	6	5.6	100.0	
Marital status	Single	26	24.1	24.1	
	Married	73	67.6	91.7	
	Divorced	7	6.4	98.1	
	Widowed	2	1.9	100.0	
Households size	≤ 3	22	20.4	20.4	
	3-5	36	33.3	53.7	

	6-8	22	20.4	74.1	
	9 & above	28	25.9	100.0	5 persons
Farming experience (years)	≤ 5	15	13.9	13.9	
	5-10	23	21.3	35.2	
	11-15	28	25.9	61.1	
	16-20	24	22.2	83.3	13 years
	21 & Above	18	16.7	100.0	
Other Occupations	Artisans	33	30.5	30.5	
	Civil servants	35	32.5	63.0	
	Trading	40	37.0	100.0	
Educational level (years)	Primary education	24	22.2	22.2	
	Secondary education	49	45.4	67.6	
	Tertiary education	25	23.1	90.7	
	No Formal education	10	9.3	100.0	
Non-farm Monthly income (₦)	< ₦100,000	36	33.3	33.3	
	₦100,000-₦200,000	18	16.7	50.0	
	₦200,001-₦300,000	25	23.1	73.1	
	₦300,001-₦400,000	16	14.9	88.0	
	₦400,001& Above	13	12.0	100.0	₦150,120.66k
Cooperative membership (years)	< 4	34	31.5	31.5	
	5-9	36	33.3	64.8	
	10-14	28	25.9	90.7	
	15 & above	10	9.3	100.0	7 years
Total		**108**	**100**		

Source: Field Survey, 2025

Cost, Returns and Profitability of Maize-based Production

Estimated production margin per annum for maize farmers revealed the calculated Rate of Return on investment (ROR), Profitability ratio (PR), Operating ratio (OP), Rate of returns on variable cost (RRVC) and Benefit-Cost ratio (B/C) were 41.88%, 0.30, 0.52, 157.39% and 1.42 respectively. The costs and returns analysis revealed variable cost (72.96%) and fixed cost (27.04%) of the total cost of maize production with labour cost (26.04%), Among the total cost of production, labour cost took the largest share (42.56%), followed by seeds (17.74%) of variable cost of production. This supports the findings of (Zongoma *et. al.,* 2015: Baruwa and Familusi 2018) who reported that labour constituted the single most important cost item on the average in crop farming. Closely followed is the cost of seeds (17.74%), land rent/ purchased (fixed costs) (14.19%) and transportation cost (7.13%).The RORI was estimated as (41.88%) in this study. This result is lower than the Zalkuwi et, al., (2012) which was 0.78 (78%). The higher RORI revealed in this finding could be attributed to access to capital, resource efficiency, contribution from people who gave out capital in form of cash to producers to enable easy production of maize and improved output. The findings further showed benefit-cost of 1.42, implying that for every ₦1.00 spent by the farmers on maize production, 42 kobo was realised as profit, this disclosed that the enterprise is profitable and economical since, benefit-cost ratio exceeded 1. The results was consistent with Sanusi and Dada (2016) who claimed that tomato business is viable and lucrative.

Table 2: Distribution of Cost, Sales Revenue and Profitability of Maize-based Farmers' Production

Variables	Value (₦)	Percentage %
Total Revenue	4,000,000	
Cost of Labour	1,200,000	42.56
Cost of Seeds (kg)	500,000	17.74
Transportation cost	201,000.34	7.13
Cost of Fertilizer (kg)	100,121.26	3.55
Cost of Pesticides and Herbicides (Litres)	56,012.24	1.98
Total Variable Cost	2,057,133.84	72.96
Cost of Land purchase/ rent	400,111	14.19
Depreciation of farm tools	200,123	7.10
General Administrative expenses	50,101.16	1.78
Loan interest	111,890	3.97
Total fixed cost	762,225.16	27.04
Total Cost (TC)	2,819,259.00	100
Net income (NI)	1,180,641.00	
Gross margin (GM)	1,942,865.16	

Profitability index (PI)	0.30
Operating index (OR)	0.52
Return per Capital invested (RPCI)	1.38
Rate of return on Variable Cost (RRVC)	157.39%
Return on investment (ROI)	41.88%
Benefit-Cost B/C	1.42

Source: Field Survey, 2025

Source of Funds or Finance Among Maize Farmers Production

A variety of funding sources were utilized by maize-based producers to initiate their cultivation endeavours. The findings indicated that a significant proportion, 55.6% of the respondents financed their maize farming through personal savings, while 32.8% secured funds from cooperative societies, 3.7% of the based-maize farmers sourced their finanance from banks, (1.8%) of the respondents sourced their finanance from family members and relatives. Additionally, only (6.5%) of the respondents sourced their capital through a combination of personal savings. This findings revealed that majority of the farmers predominantly relied on personal savings, with minimal aid from cooperative societies. This results is similarly with (Smale *et., al.,* 2020) who reported that majority of farmers financed their farming activities through personal savings.

Table 3: Distribution of Source of Funds of Cooperative Maize-based Farmers

Source of Funds to Maize Farmers	Frequency	(%)	Cummulative frequency
Personal Savings	60	55.6	55.6
Cooperative Societies	35	32.4	88.0
Banks	4	3.7	91.7
Family members and Relatives	2	1.8	93.5
Personal savings & Cooperative societies	7	6.5	100.0
Total	108	100.0	

Source: Field Survey, 2025

Problems Facing Maize Production in the Study Area

Table 4, Showed the constraints faced by cooperative maize farmers in maize production in the study area. The identified eleven (11) problems were analysed and ranked in order of importance in table 4 below. The identified constraints includes: high cost of farm inputs, lack of capital to purchase required farm inputs, lack of improved seeds, marketing challenges, inadequate storage facilities, lack of access to credit facilities, lack of access to road network, high cost of labours, pests and diseases infestation, inadequate extension services and inadequate processing facilities. The result revealed that (88.3%) of the respondents identified high cost of farm inputs was ranked 1st, (81.5%) lack of capital to purchase required farm inputs ranked 2nd, (71.4%) lack of improved seeds was also ranked 3rd, (68.5%) of the respondents claimed that marketing challenges is one of their problems in maize production which was ranked 4th, (64.8%) of the farmers reported that inadequate storage facilities to store their produce against better selling price as a constraint was ranked 5th and (60.2%) identified lack of access to credit facilities which would have helped in alleviating their poor nature as a constraint and ranked 6th. (59.3%) of the maize farm holders identified transportation problem i.e lack of access to road network and high cost of labours as impediment to maize production and ranked 7th. (55.6%) of the farmers disclosed that pests attack as well as diseases infestation and inadequate extension services as a challenge militating against maize production were ranked 9th position. while (50.0%) of the farmers identified inadequate processing facilities as the least and ranked 11th among the constraints militating against maize production in study area. High cost of farm inputs, emerged as the major challenge and most pressing concern confronting maize production followedby insufficient funds. In turns lead to low income and abandon of maize enterprise when capital is no more available for the farmers for continuity of maize production. Lack of improved seeds ranked 3rd with a substantial percentage value of (74.1%) could lead to decrease in farmers' output and profit margin. This agrees with the earlier findings of (Zalkuwi *et. al.,* 2020) who reported that increase in lack of improved seeds as one of the major challenges in the maize enterprises, in turn leads to reduction in profits which may quickly result into losses and abandoned of maize production by farmers.

Table 4: Distribution of Constrains Associated with Profitability of Cooperative Maize Producers

Problems Facing Maize Farmers' Production	Yes		No		Rank
	Frequency	(%)	Frequency	(%)	
High cost of farm inputs	90	83.3	18	16.7	1st
Lack of improved seeds	80	74.1	28	25.9	3rd
High cost of labour	64	59.3	44	40.7	7th
Inadequate fund	88	81.5	20	18.5	2nd
Inadequate extension services	60	55.6	48	44.4	9th
Lack of storage facilities	70	64.8	38	35.2	5th
Lack of road network	64	59.3	44	40.7	7th
Lack of credit facilities	65	60.2	43	39.8	6th
Diseases infestation and pests	60	55.6	48	44.4	9th
Inadequate processing facilities	54	50.0	54	50.0	11th
Marketing problem	74	68.5	34	31.5	4th

Source: Field Survey, 2025

CONCLUSION

Conclusively, the result indicates that majority of the respondents were males (88.9%), (68.7%) of maize farmers were educated and married (75.9%) while majority of them were in their active years, with average family size of 5 persons. The findings further showed benefit-cost of 1.42, implying that for every ₦1.00 spent by the farmers on maize production, 42 kobo was realized as profit, with benefit-cost ratio exceeded 1, the enterprise is profitable and viable. Variety of funding sources were utilized by maize-based producers to initiate their cultivation endeavours but majority of farmers were predominantly rely on their personal savings, with minimal aid from cooperative societies. Farmers needed to take necessary efforts by addressing the problems identified in the maize cultivation to ensure a higher net returns and higher productivity in the study area.

RECOMMENDATIONS

Therefore, the study recommended that maize farm Input such as fertilizer, seeds among others should be made available to farmers timely at a subsidized rate by government and non-government agencies. Timely and adequate training should be given to maize farmers to acquire modern production techniques in order to boost their production. Maize farmers should be educated on how to battle the challenges associated with their production. Both governments and non-governmental agencies should provide credit facilities for the farmers at low or no interest. Farmers should be encouraged to form more cooperative societies in order to pool their resources together to tackle the financial short fall facing them.

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