COMPARATIVE ANALYSIS OF CO-OPERATIVE AND NON- COPERATIVE MAIZE FARMERS IN CHIKUN LOCAL GOVERNMENT AREA, KADUNA STATE
BY

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ABSTRACT
The desire of the Federal Government of Nigeria is to use farmers' cooperatives to achieve increased production of food, income and more equitable distribution of such income when compared with non- participants. This study therefore examined comparative analysis of co-operative and non –co-operative maize farmers in Chikun Local Government Area of Kaduna State. Primary data were obtained using structured questionnaires administered to 54 cooperators and 58 non-cooperators (20% of sampled respondents respectively). Descriptive statistics, Gross Margin and Z- test analysis were used for the analysis of data. The result showed that maize-based crop mixtures were more profitable for co-operative farmers with Gross margin of ₦34, 482 and ₦26, 818/ha respectively when both family and hired labour were costed. It was therefore recommended that in order to reduce cost of production, farm machineries, fertilizers and improved seed varieties need to be made available to farmers at affordable prices. However, the calculated z- test indicated that there was no significant difference between profit of co-operative farmers and non- cooperative farmers.

Keywords: comparative analysis, maize, cooperatives.

INTRODUCTION

Maize (*Zea mays* L) is unique in Nigerian food crop production. Although it is the second largest cereal crop produced after sorghum (guinea corn) in Nigeria, it is the most widely grown grain crop. According to National Agricultural Extension and Research Liaison Services (NAERLS) and Project Coordinating Unit (PCU) (2004), maize is cultivated under different crops in all the 5 agro-ecological zones in Nigeria; total land area estimated for maize production in the country by 2004 was 2,188,082 hectares – a figure less than that devoted for sorghum production. However, according to NAERLS / PCU (2004), because of its higher yield per hectare, more maize is produced than any other cereal crop in the country.

There are three major end users of maize grain-the rural dwellers, the urban populace and the industries. These three complement one another in meeting the maize demand by all sectors. There are three major uses of the cereal grain (a) as food (b) animal feeds (c) industrial uses. When used as food, maize is consumed in many forms, the simplest is as boiled or roasted whole grain. The other maize food form require primary processing into variety of food drinks such as pap ("ogi" "eko", "agidi" or "akamu") ., and it is used in making cakes, such as masa". However, the predominant use of maize in northern Nigeria is for making "tuwo". It is the main source of energy in livestock and poultry feeds. Furthermore, the growing plant can be cut and made into silage or hay for the feeding of cattle and other ruminants. In the Nigerian industrial sector maize grain is a major ingredient used by food processing industries to produce corn foods such as corn flakes, and baby foods such as Nestle Golden Morn and cereal. It is also a major ingredient in the production of beer by brewing industries in Nigeria today. Apart from the grain, the leaves, cobs, tassels and silk of maize all have commercial value.

Maize as a major crop produced in northern Nigeria is based mainly on intercropping (mixed cropping) system. According to Henriet *et al* (1997) mixed cropping system is of varying complexity involving mainly sorghum, millet, maize, cowpea and groundnut. These crops are grown on farms in mixtures. These complex systems are believed to be more stable than monocropping and more suitable in the long term (Edwards, 1993). Studies by Onwueme (1978) Edwards (1993) and Nweke *et al*(1999), clearly revealed the benefits that farmers who practice mixed cropping enjoy over other farmers such as high yield, lower costs of production, more uniform utilization of soil nutrients as well as control of pests / diseases.

To enjoy the comparative advantages of producing this cereal crop farmers form cooperative societies in the study area. According to Gidado (1994), co-operatives are significant in that by working together in an organized way, the economic position of the individual member and at the same time, all members of the cooperative group, is improved thereby contributing to the economic and social position of the country as a whole.

Further reasons why co-operative societies are needed today are:

(a)   To assist member increase their level of output and income   (b) Increase opportunity for capital formation,

(c)   Sale of agricultural production

(d)   Use of multipurpose cooperatives to enjoy government schemes and projects.

(e)   Economics of scale for use of large-scale mechanization

(f)   Group control over production and marketing;

(g)   Producers – farmers, pool resources together to enhance sale and efficient distribution,

(h)   Acquisition of large areas of land, better utilization of hired labour and supply of inputs, and

(i)   Easier access to extension services (Famoriyo, 1989).

Despite all these enumerated benefits from the system, the issue of profitability for maize crop production in Nigeria has become increasingly important during the last three decades both for subsistence and large-scale farming. This is necessary in order to ascertain whether or not enterprises embarked upon are justifiable. This study therefore seeks to answer the following research questions:

(i)   What are the different maize-based crop combinations by farmers in Chikun Local Government Area, Kaduna State?

(ii)   What are the cost, returns and profitability of cooperative and non-cooperative farmers engaged in maize-based cropping mixtures?

Hypothesis- There is no significant difference between the profits of cooperative and non-cooperative farmers.

METHODOLOGY

The study was conducted in Chikun Local Government Area of Kaduna State, Nigeria during 2004/2005 farming season. Kaduna State is located between latitude 1^0 and 12^0 N and extends from longitude 6^0 and 9^0 E and east of Greenwich meridian. Farming is the major occupation of the people of Kaduna State and it is characterized predominantly by mixed cropping, of such crops as maize, sorghum, millet, cowpea, rice, cassava, cocoyam, sugarcane, tomato, pepper, acha, millet and potato. Crop production is still manually done in small-scattered pieces of land with the use of implements such as hoes, cutlasses, knives and axes with very few medium and large-scale farmers that are engaged in tractor ploughing which is visible along access roads (Kaduna State Government, 2000).

Primary and secondary data were used for this study. A combination of purposive and simple random sampling techniques were used in selecting respondents. The data were obtained from 54 co-operative and 58 non-cooperative maize-based crop farmers using structured questionnaires. Maize-based farmers were chosen for this study because maize featured in virtually all crop mixtures in Chikun LGA.

Descriptive statistics: such as percentages, frequency distribution table, mean, standard deviation and coefficient of variation were used to group and summarize the data collected from the field. The coefficient of variations is expressed as:

$$Cov = \frac{SD \times 100}{X}$$

Where Cov = coefficient of variation, SD = standard deviation

X = Arithmetic mean.

Cov was used to determine variability in some parameters used in the study – parameters such as cost of inputs, income, gross margin etc.

The various crop combinations adopted generally by both co-operative and non-cooperative farmers were: Maize / Rice (M+R), Maize / Guinea corn/ Groundnut (M+GC+GN), Maize / Guinea corn / Groundnut/ Cowpea (M+GC+GN+C), Maize / Rice/ groundnut (M+R+GN), Soybeans/ Millet (SB+Mi), Maize / Millet / Rice/ Cowpea / soybeans/ Groundnut (M+Mi+R+C+SB+GN). The major reasons these farmers gave for preferring to grow crops in mixtures include: to maximize land use, obtain variety of crops, follow the traditional way of growing crops in the area, as security against crop failures and to maintain fertility of the soil.

The gross margin:- it is the difference between the gross farm income (GI) and the Total Variable Cost (TVC). It is a useful planning tool in situations where fixed capital is negligible portion of the farming enterprises as in the case of small scale subsistence agriculture (Olukosi and Erhabor, 1988).

$$GM = GI - TVC \dots\dots\dots\dots\dots(1)$$

Where GM = Gross Margin, GI = Gross Income, TVC = Total Variable costs.

The Gross farm Income –also called total returns, refers to the value of all output from the farm, i.e the physical quantity of each crop (sorghum cowpea, maize, etc) multiplied by their respective prices. Variable costs are costs that vary with the level of production they include expenditure on fertilizers, family labour, hired labour, seeds herbicides and pesticides.

Concurrent market prices of input and outputs were used to compute costs and incomes of farmers.

$$GM = \sum P_{yi} Y_i - \sum Px_j X_j \dots\dots\dots\dots\dots\dots(2)$$

Where GM = Gross margin

Yi = Enterprises product(s) where I = 1 , 2, 3 …….n product (s)

P_{yi} = unit price of the products

Xj = Quantity of the variable input, where j = 1 , 2, 3 ……..m

Variable Inputs

P_{xj} = price pre unit of variable inputs

$\sum$ = Summation (addition) sign

$\sum_{i=1}^{n} {}^{I=1} p_{yi} Y_i$ = Gross farm income

$\sum_{i-1}^{m} P_{xj} X_j$ = Total Variable Cost

RESULTS AND DISCUSSION

Maize – based crop combination by farmers

The various crop combination adopted by co-operative and non- cooperative farmers in the maize- based cropping systems is as shown on Table 1. The table indicates that cooperative farmers devoted only 9.6% (ie 16.50 hectares) of their total farm size (172.05 hectares) to sole maize crop and the remaining 90.4% to 2,3,4,5 and 6 crop combinations.

Non-cooperative farmers on the other hand devoted only 1.4% of their farm size (150.36 hectares) to sole maize and the remaining 98.6% to 2, 3, 4 and 5 crop combinations. Most co-operators engaged in 3, 4, and 5 crop combinations. Both co-operative and non-cooperative farmers and non-cooperative farmers devoted more land to 3 and 4 crop combinations than any other crop combination whereas, only co-operative farmers grew 6 crop combinations. Generally, co-operative farmers grew more maize –based crop combinations than their non-cooperative counterparts.

Table 1: Different Maize Based Crop Combination Adopted by Farmers in Relation to Farm Size and Number of Respondents.

	Cooperative Farmers			Non-Cooperative Farmers		
Crop Combinations	No. of Respondents	Area of land cultivated (ha)	% of Area of land cultivated	No. of Respondents	Area of land cultivated (ha)	% of Area of land cultivated
Sole Maize	4	16.50	9.6	2	2.06	1.4
2 crops (M+R)	6	30.55	17.7	11	35.8	23.8
3crops (M+GN+Mi)	10	32.40	18.8	18	40.5	26.9
4 crops(M+GN+R+Mi)	19	62.00	36.1	22	61.5	40.9
5 crops(M+Mi+R+C+SB)	14	25.10	14.6	5	10.5	7.0
6crops(M+Mi+R+GN+C +SB)	1	5.50	3.2	-	-	-
Total	54	172.05	100	58	150.36	100

Sources: computation from field survey, 2005
Where: M- Maize, R-Rice, Mi- Millet, GN- Guinea Corn, C-Cowpea, SB-Soybeans

Costs, Returns and Profitability of Co-operative and Non-cooperative farmers.

The estimated costs of inputs for co-operative and non-cooperative farmers are presented in Table 2. The analysis revealed that expenditures of cooperative farmers on all cost items were less than those of the non-operative farmers. Co-operative farmers spent less on inputs (₦24, 807/ha) than non-operative farmers (₦33, 460 / ha). While co-operative farmers spent the highest amount (₦10, 510) on fertilizer and lowest (₦2, 255) on pesticides, non-cooperative farmers spent the highest amount (₦12, 322) on fertilizer and lowest (₦3, 537) on herbicides. Labour cost accounted for about 25.7 of the total cost of production incurred by cooperative farmers and 27.1% by non-cooperative farmers respectively.

The overall variation in total variable cost (TVC) was lower for cooperative farmers than non-cooperative farmer. This was due to the cushioning effect of lower cost of production inputs by co-operative farmer compared to non-cooperative farmers. Some of these inputs particularly seeds and fertilizer were sourced through cooperatives societies (at reduced prices) which the cooperative farmers belonged to.

Gross Margin was used to measure profitability in this study. Gross margin was analyzed in two ways, depending on the way labour was costed. One method costed only hired labour. This was because family labour was not explicitly paid for. The second method costed all labour (family and hired). Since it is assumed that family labour was perfectly substitutable for hired labour and hence could command the same remuneration; based on this the gross margin was estimated for both cooperatives and non-cooperative.

Table 3 shows that cooperative farmers had higher profitability when both family and hired labour were costed (₦34, 482 / ha) than non-cooperative farmers (₦26,818 / ha). Even when hired labour

was costed gross margin was ₦37, 700 / ha for cooperative farmers. The higher profitability level of cooperative farmers could be due to their relative access to treated seeds as well as fertilizer which they obtained at cheaper rates through their cooperative societies for use, unlike most of their non-cooperative counterparts that relied more on untreated seeds and had to buy fertilizers from open markets.

Table 2: Estimated Level of Costs for Co-operative and Non-cooperative Farmers in Chikun LGA (₦ /ha).

Parameter	Cooperative Farmers				Non-Cooperative Farmers			
	Max.	Mean	SD	COV	Max.	Mean	SD	COV
Farm land (ha)	4.3	3.556	1.458	41.00	3.8	2.782	1.615	58.05
Seeds (₦)								
Fertilizer (₦)	9250	2647	2521	94.24	7005	4522	3538	78.24
FL (₦)	29502	10510	12495	118.89	30800	12332	9854	79.91
HL (₦)	7065	3218	3309	102.82	26400	4168	4566	109.55
Herbicides (₦)	8115	3165	2246	70.96	19600	4893	3464	70.80
Pesticides (₦)								
	8000	3012	2867	95.19	8000	3537	1576	44.56
	7000	2255	1731	67.75	21000	4008	4727	117.93
TVC (N)								
FL costed (₦)								
FL not costed (₦)	73710	24807	23175	93.42	304100	33460	62145	185.73
	81019	21589	22930	104.51	106521	29292	49110	167.66

Sources: computation from field survey, 2005

Max	=	Maximum	FL	= Family Labour	
SD	=	Standard Deviation	HL	= Hired Labour	
COV	=	Coefficient of Variation	TVC	= Total Variable Cost	

Table 3: Estimated Gross Margins for Cooperative and Non-Cooperative Farmers (₦/hectares)

	Cooperative	Non-Cooperative
Gross Farm Income	59,289	60,278
Total Variable Costs(1)	24,807	33,460
Total Variable Costs (2)	21,589	29,292
Gross Margin (1)	34,482	26,818
Gross Margin (2)	37,700	30,986

Z – Statistics:

(i)	Costing Family and hired labour	1.490
(ii)	Costing hired labour	1.441

Source: computation from field survey, 2005
(1)   Costing family and hired labour
(2)   Costing hired labour
Table Z- value = 1.960 @ 5% level.

The null hypothesis that there is no significant difference between the profit of cooperative and non-cooperative farmers was tested in each case using Z – statistic. In both cases, the calculated Z- values were less than the critical or table value (Table 3). As such, cooperative and Non-cooperative farmers that practice maize-based cropping system

CONCLUSION AND RECOMMENDATIONS

This study has further confirmed the ever growing trend of labour as the major item of cost in peasant production systems, and that under such situation, profitability is reduced. This was why there was no significant difference between the profit of cooperative and Non-cooperative maize-based crop farmers. Based on these findings, the following recommendations are made:

(i)   Inputs like farm machineries, fertilizers and improved seed varieties should be supplied to farmers at affordable rates and timely.

(ii)   Favorable pricing policy should be formulated to assist in raising farmers income and encourage increase in crop production.

(iii)   Non-cooperative farmers should be encouraged to join cooperative societies so that they too could enjoy the benefits therein.

REFERENCES

Edwards, R. (1993). Traditional Farming System and Research". In J.R.J., Rowland (ed) *Dry Land Farming in Africa*. The Macmillan and Company, Limited, London Basingstoke.

Famoriyo, S. (1989). The Role of Co-cooperative in Nigeria's Quest for Self-Reliance and Economic Recovery. In: MAMSER, Abuja, 1990, P.10

Gidado, L.A (1994). "The Role of cooperative in Nigeria". In participatory Irrigation Measurement in Nigeria by Pradlan, I and S. Abdulmumini (eds). Proceedings of a National Workshop Organized by International Irrigation Management Institute (IIMI), Kano and National Water Resources Institute (NWRI), Kaduna, held at NWRI, November 9-10th 1994.

Henriet, J; Van, E.K; Blade, G.A; Sigh, B.B (1997). "Quantitative Assessment of Traditional Cropping System in the Sudan Savannah of Northern Nigeria: Rapid Survey of Present Cropping System". *Samaru Journal of Agricultural Research*. 14:37-45.

Kaduna State Government (2000). Guide to Investment Opportunities in Kaduna State. Ministry of commerce, Industry and Tourism.

National Agricultural Extension and Research Liaison Service and Project Coordinating Unit (2004). *Field Situation Assessment of 2004 Wet Season Arid Production in Nigeria,* P.4.

Nweke, F.I. Ugwu, B.O.' Dixon, A.G.O' Asadu; C.I.A; and Ajobo, O. (1999). Cassava Production in Nigeria: A Function of Farmers' Access to Markets and Improved Production and Processing Technologies". A Collaborative Study of Cassava in Africa (COSCA), COSCA Working Paper No. 20, Pg. 23 – 52.

Olukosi, J. O and Erhabor, P.O (1988). Introduction to Farm Management Economics: Principles and Application. Agitab Publishers Ltd. P.77-78.

Onwueme, I.C (1978). *The Tropical Crops*. John Willey Publishers, Chestester, New York