ANALYSIS OF INCOME INEQUALITY IN NIGERIAN AGRICULTURAL ECONOMY: A CASE STUDY OF EKITI STATE.

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<u>ABSTRACT</u>

This study analyses the impact of income inequality on agricultural production among sample of farm households in rural and urban areas of Ekiti-state, Nigeria. The study used primary and secondary data. Descriptive analysis, Gini coefficient and Regression analysis were used to analyzed the data. The results showed the socio-economic characteristics of farm households in both rural and urban areas. The results also indicated that income inequality is higher in urban than in the rural areas and that income level, farm size and household size are the factors that contribute to inequality in both rural and urban areas. The study however recommends that production technology should be improved, infrastructural facilities should be provided, access to credit and land should be made easier and that large family size should be discouraged to facilitate a more equitable distribution of income and increase agricultural production.

INTRODUCTION

Agriculture is by far the widest spread form of human activity and it is more basic than any other industry (World Bank 2008). Even, in the machine age, agriculture of one kind or another provides a livelihood for more than three quarters of the human race and creates employment for millions of people all over the world and over seventy percent (70%) of Nigeria population engage in one form of agriculture or the other according to 1991 census (Anyanwu, et al, 1999). In addition, agriculture yields fiber and raw materials for the factories on which a large portion of the remaining people depends. From the crops the farmer grows, he gets his food and also that of his family and the surplus is sold for cash, with which he buys other necessities of life. In other words, apart from the provision of food for the growing population of the world, agriculture serves as the major source of income for the local farmers and rural dwellers in the developing countries of the world including Nigeria (Anyanwu et, al, 1999). However, despite the numerous economic importance of agriculture, the sector is presently in distress and Nigeria, once a food exporter, became a food importing nation (Bill Leonard, 2000). The World Bank also reported that before independence in 1960, agriculture was the foundation of the human economy in Nigeria and Nigeria was self sufficient in terms of food since about eighty percent (80%) of our

land is cultivable. Agricultural and rural sectors have suffered from neglect and underinvestment over the past two decades, while seventy-five percent (75%) of the world's poor live in rural areas and a mere four percent (4%) of official development assistance goes to agriculture in developing countries including Nigeria (World bank, 2008).   As a result, efforts have been made over the years to reduce rural poverty but unfortunately, because of the linkage between income and poverty and its effect on agricultural production, most of these efforts were abortive (Awoyemi, 2007). However, reducing income inequality has become a major public challenge among agricultural developing agencies and poverty reduction experts (Babatunde, 2008). Income inequality as defined by the IMA journal of management mathematics (2008) is the extent of disparity between high and low incomes; i.e. the ratio of a high household income to a low household income after adjustment for household size and consumption.

The ultimate goal of agricultural plans and production in national development is to raise the standard of living (Olayide and Olayemi, 1998). However, standard of living is related to many other factors and its measurement involves attention to a considerable number of variables. One of the important yardsticks for measuring standard of living is the average distribution of income (Olayide, et, al, 1998). Babatunde (2008) reported that

when economic growth increases, the incidence of poverty also increases and this has a decline effect on general agriculture production. High level of income inequality exists in developing countries (Addison and Cornia, 2001; Kanbur and Lustig, 1999) and this can be better buttressed by the widening dimension of poverty and general economic problem in countries (Oyekale, et, al, 2006). Awoyemi, (2007) reported that the increasing income inequality and poverty continue to be the most challenging economic problem facing most developing countries, particularly Nigeria. It is also widely believed that majority of the people in sub-Saharan Africa live in the rural areas and this rural communities are majorly agrarian with majority of them owing just a small piece of land on which they grow crops hardly sufficient to feed themselves let alone to sell in other to generate income. The rural farmers therefore live on small and meager income as compared to urban dwellers who earn more than rural dwellers due to their higher literacy level and education. Meludu (2005) reported that nearly all the agricultural activities are done in all the rural areas as a source of income; however, the income generated from overall agricultural production is highest in these areas leading to a high income inequality between rural and urban areas. Since a high level of income inequality exists between Nigeria rural and urban areas (Oyekale,et, al, 2006), and that income inequality and poverty are closely related as proved from the

various studies of Aboyade (1983), Adams (1999), UNU/WIDER (2000), Addison and Cornia (2001), and Kolenikov and Shorrocks(2003). Therefore, understanding income inequality and it's consequences on agricultural production especially on how to improve the status of the chronically poverty trapped individual farmers and farming communities is the major concern and focus of this study. As a result of this, the following research questions are raised: What are the identified income sources in rural and urban areas of agricultural sector? What is the level of inequality in income distribution in rural and urban Nigerian agricultural sector? What are the factors that contribute to income inequality in agricultural sector? What are the impacts of this disparity in income distribution on agricultural production?

This study examines income inequality and its general effect on agricultural production in rural and urban area of Ekiti state, Nigeria. The specific objectives of this study are to: Provide a descriptive analysis for the composition of household's income from different sources, evaluate and compare the overall income inequality in rural and urban areas of Ekiti state, Nigeria, examine the factors responsible for income inequality in the agricultural sector, evaluate the effect of this income inequality on agriculture.

METHODOLOGY

The study area that was used is Ekiti state. The state is one of the six states constituting the southwestern region of Nigeria. Ekiti state is made up of 16 local government areas and according to the 2006 population census; the state has a population of 2,384,212 (with 1,212,609 males and 1,171,603 females) and a land area of 5,435sq km (EKSG, 2006). The state is situated entirely within the tropics. It is located between longitude 4° 5′ and 5° 45′ east of the Greenwich meridian and latitude 7° 15′ and 8° 5′ north of the equator. The state is found to the south of Kwara and Kogi states, east of Osun state and bounded by Ondo state in the east and in the south (EKSG, 2006).

The state is mainly an upland zone, rising about 250 meters above the sea level. It lies within the areas underlain by metamorphic rocks of the basement complex. It has a general undulating land surface with a characteristic landscape that consists of old plains broken by step-sided out dome racks that may occur singularly or in group of ridges. The state enjoys tropical climate with two distinct seasons. These are the raining season (April-October) and the dry season (November- March). Temperature ranges between 21°C and 28°C with high humidity. Tropical forest exists in the south, while savannah occupies the northern peripheries (EKSG, 2006).

Ekiti-state is one of the predominantly agrarian areas and agriculture is the major and primary occupation of the dwellers in the state. The men are predominantly farmers while the women engage majorly in trading activities and for the educated indigenes who are employed formally, farming remains the major secondary occupation.

Data for this research work were collected from two different sources. Firstly, the primary data were collected from the selected research areas with the use of a well structured questionnaire from the rural and urban households. The secondary data were however collected from publications such as state and local government annual report on agricultural production, household economic and financial survey data from state and local government agencies of the research zone.

Sampling technique:

This research work was conducted using a comprehensive household income and expenditure survey of farm households in Ekiti state. A multi- stage random sampling technique was used for data collection. Eight [8] local government areas were selected for the purpose of this research work. Each of the selected local government was sub-divided into two categories namely the rural and the urban areas under which the

respective communities will be classified. The communities were classified into the sub-groups earlier mentioned based on a population line; i.e. communities with population less than five thousand (5,000) were classified under rural, while communities with population more than the above stated population line were classified under urban areas.

In each local government, two communities were sampled and categorized under urban while another two communities were sampled and categorized under rural making a total of four [4] selected communities in each local government and a sum total of thirty-two [32] communities for the eight local government areas to be sampled. Five [5] farm households were sampled in each of the selected communities (be it rural or urban) making a sum total of twenty [20] households per local government area and one hundred and sixty [160] farm households across the eight local government areas.

A well structured questionnaire that covers information on household expenditure and income including details on participation of individual household member in different income generating activities was used in collecting data. Income and expenditure data from the various sources will be collected for each household through which the overall household income and expenditure was calculated.

Income was however broadly classified into two major categories which are as follows:

i)   Agricultural income – This include: crop income, livestock income, earnings from supplying agricultural labour to other farms etc.

ii)   Non agricultural income – This include income from both formal and informal employment, income from self employed and/or owned business that are not agricultural based, income received from relatives and friends not presently living with the household etc.

These two categories of household income were used in determining the actual income that contributes majorly to disparity in income distribution. Also, household expenditure data was sub-divided into two major categories in other to determine the overall percentage of household income expended on agriculture. Therefore, the two sub-divisions will be as follows:

i)   Agricultural expenditure – This include expenditure on food, agricultural inputs and machineries (e.g. Agrochemicals, farm implements, storage facilities etc.

ii)   Non agricultural expenditure – This include household expenditure on other necessities of life such as health, communication, housing, transportation, education, etc.

Analytical technique:

The analytical techniques that were used include descriptive statistics such as the frequency distribution table and percentages to show the pattern of income distribution. A double log regression function was employed to show the various factors that contribute to inequality in income distribution and to show the effect of this income inequality on agricultural production.

Gini-coefficient used was for the estimation and comparism of the degree of income inequality between rural and urban areas. By calculation, the Gini-coefficient is computed as follows:

$$G_y = \frac{2}{n^2\mu}\left[\frac{\sum n + 1}{2}\right]Yi$$

Where: n = number of observations, μ = mean of the distribution, Yi = income of the ith household, G_y = Gini income.

The Gini-coefficient is a measure of statistical dispersion most prominently used as a measure to show the degree of income distribution or inequality of wealth distribution between different households in a population.

According to the IMA journal of management mathematics (2008), Gini-coefficient is defined as a ratio with values between zero and one (0-1). A low Gini-coefficient indicates more equal income or wealth distribution, while a high Gini-coefficient indicates more unequal distribution. Zero (0) corresponds to perfect equality while one (1) corresponds to perfect inequality.

The Gini-coefficient is a precise way of measuring the position of the Lorenz curve. It is worked out by measuring the ratio of the area between the Lorenz curve and the 45 degree line to the whole area below the 45 degree line. If the Lorenz curve is the 45 degree line, then the value of the Gini-coefficient would be zero. In general, the closer the Lorenz curve is to the line of perfect equality, the less the inequality and the smaller the Gini-coefficient.

Below is the graphical representation of the Gini coefficient where the area of the whole triangle is defined as 1.
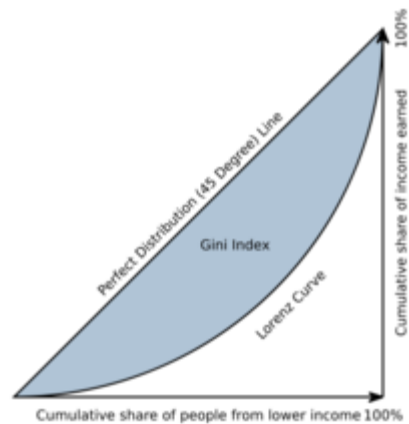
Figure 1:

Regression analysis was used to determine and show the various factors responsible for income inequality in the rural and urban areas. Y(g) is the household income inequality which is dependent on the explanatory variables X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}. i.e. how much income inequality is accounted for by each of the explanatory variables and how much is unexplained as measured by the error term μ. The regression model was specified as: $Y(g) = f(Xi, \mu)$ ……………………… (1)

Where: $Y(g)$ = Household income inequality; $X1$ = Age of household head; $X2$ = Educational level; $X3$ = Household size; $X4$ = Farm size; $X5$ = Number of agric. Enterprise; $X6$ = Government employment (Dummy;

13

Yes=1, No=0); X7 = Full time farmer (Dummy; Yes=1, No=0); X8 = Total Income; X9 = House hold dependents; X10 = House hold total expenditure; μ = The error term

RESULT AND DISCUSSION

SOCIO-ECONOMIC CHARACTERISTICS OF FARM HOUSEHOLDS IN RURAL AND URBAN NIGERIA:

Table 1 reveals that with the minimum age group of between 41-50, 40.3% of the total respondents in rural areas fall within the age range of 61-70 years indicating that older people are the one that practice agriculture in areas while in the urban, only 19.4% of the respondents are within range 61-70 years, 30.6% fall within age range 51-60, while 31.9% of the total respondents in the urban areas fall within 31-40 years of age signifying that younger people practice agriculture in the urban areas compared to what obtains in the rural areas.

Table 1: Age distribution of respondents in rural and urban areas.

Age group	Rural Frequency	Rural Percentage (%)	Urban Frequency	Urban Percentage (%)
≤20	–	–	10	13.9
41-50	6	8.3	23	31.9
51-60	26	6.1	22	30.6
61-70	29	60.3	14	19.4
≥71	11	15.3	3	4.2
Total	72	100	72	100

Source: Field survey data, 2009.

It was also revealed that 70.8% of the total respondents in the rural areas have no formal education and only 6.9%, 12.5% and 9.7% have adult, primary and secondary education respectively, while 51.4% of the total respondents in urban areas have tertiary education and only 11.1% of the urban respondents have no formal education.

Table 2: Educational level of respondents in rural and urban areas.

Educational level	Rural Frequency	Rural Percentage (%)S	Urban Frequency	Urban Percentage (%)
No formal education	51	70.8	8	11.1
Adult education	5	6.9	3	4.2
Primary	9	12.5	9	12.5
Secondary	7	9.7	15	20.8
Tertiary	–	–	37	51.4
Total	72	100	72	100

Source: Field survey data, 2009.

With a minimum household size of between 5 - 8 constituting 12.5% of the rural household sampled, 75% of the rural household has a size of between 9 -12. But in the urban areas however, 69.4% of the total number of household sampled has a population of ≤ 4 as shown in table 3 below.

Table 3: Household size in rural and urban areas.

Household Size	Rural Frequency	Rural Percentage (%)	Urban Frequency	Urban Percentage (%)
≤ 4	–	–	9	12.5
5 – 8	9	12.5	50	69.4
9 -12	54	75.0	13	18.1
13 – 16	9	12.5	–	–
≥17	–	–	–	–
Total	72	100	72	100

Source: Field survey data, 2009.

The major occupation of the respondents in both rural and urban areas is mainly agriculture as revealed by the field survey data. Since the scope of this study is limited to farm household only. However, 73.6% of the total respondents in rural areas have no other employment or business apart from agriculture, 13.9% have a non-governmental employment and 12.5% have personal business apart from agriculture while none of the respondents are government employed. But

17

in the urban areas, it was revealed that 59.7% of the total respondents are government employed while only 13.9% have

no other business apart from agriculture as shown in table 4.

Table 4: other household employment in rural and urban areas.

Other employment	Rural Frequency	Rural Percentage (%)	Urban Frequency	Urban Percentage (%)
Govt. employment	-	-	43	59.7
Non-govt employment	10	13.9	11	15.3
Personal business	9	12.5	8	11.1
None	53	73.6	10	13.9
Total	72	100	72	100

Source: field survey data, 2009.

From the entire rural household sampled, 52.8% of the total respondents have less than one hectare (1ha) of farm land,

31.9% has between 2 – 5 hectares. Among the urban household, only 11.1% have less than 1hectare, 36.1% have

between 1 – 2 hectares, 34.7% have between 2 – 5 hectares while 18.1% have between 5 – 10 hectares as shown in the

table 5.

Table 5: rural and urban household farm size.

Farm size	Rural Frequency	Rural Percentage (%)	Urban Frequency	Urban Percentage (%)
< 1 hectare	38	52.8%	8	11.1
1 – 2 hectares	23	31.9%	26	36.2
2 – 5 hectares	11	15.3%	25	34.7
5 – 10 hectares	-	-	13	18.1
> 10	-	-	-	-
Total	72	100	72	100

Source: Field survey data, 2009.

Composition of household income:

Table 6 shows how much different income source contributes to total household income. The descriptive analysis provides background information on the amount and source of income earned by an average farm household, which will later form the basis of inequality analysis.

The results indicate that 77.8% of the number of the respondents in rural areas receive only between N10,000 – 20,000 a month and 75% of the total respondents receive less than N10,000 from non-agricultural sources, while in the urban areas, 47.2% of the total respondents receive between N21,000 – 50,000 a month and 27.8% receive between N51,000 – 100,000 a month while some that operate on a relatively larger scale constituting 4.2% of the respondents in the urban areas receive over N100,000 a month. However, on the aggregate, over 70% of the rural farm household income comes from agriculture, while about 54% of the urban farm household income comes from agriculture while over 40% comes from non-agricultural sources.

Table 6: Rural and urban household agricultural income.

Agric. Income	Rural Frequency	Rural Percentage (%)	Urban Frequency	Urban Percentage (%)
<10,000	9	12.5	-	-
10 – 20,000	56	77.8	15	20.8
21 – 50,000	7	9.7	34	47.2
51 – 100,000	-	-	20	27.8

>100,000	-	-	3	4.2
Total	72	100	72	100

Source: field survey data, 2009.

Table 7: Rural and urban household non-agricultural income.

Non-agric. Income	Rural Frequency	Rural Percentage (%)	Rural Frequency	Rural Percentage (%)
<10,000	54	75.0	9	12.5
10 – 20,000	18	25.0	26	36.1
21 – 50,000	-	-	22	30.6
51 – 100,000	-	-	15	20.8
>100,000	-	-	-	-
Total	72	100	72	100

Source: Field survey data, 2009.

Income inequality in rural and urban Nigeria:

As shown in table 8, the Gini decomposition method of income inequality revealed that income inequality is highest among urban farm households, a Gini coefficient of 0.41 and 0.33 are obtained for agricultural and non-agricultural income respectively.

Table 8: Agricultural and non-agricultural income inequality among farm households in rural and urban Nigeria

Income source	Income inequality Rural	Income inequality Urban
Agricultural income	0.41	0.69
Non-agricultural income	0.33	0.67

Source: Field survey data, 2009.

This result suggests that income inequality is higher in urban than rural areas of Nigeria, in agreement with the findings of Oluwatayo (2008) and Babatunde (2008). But in contrary to what was reported by Oyekale et, al (2006) that income inequality is higher in rural than in urban Nigeria.

A lower Gini coefficient of 0.41 and 0.33 obtained for rural farm households compared to that of urban areas indicates that a greater portion of the respondents in the study area are in the low income groups with about 90.3% of them earning less than N20.000 a month. However, the value of inequality obtained among rural farm households is low because of the homogenous nature of the study area and that majority of the respondents engage in the same occupation both as primary and secondary occupation, and with this there will be not much variation in their income.

Factors responsible for income inequality in rural and urban areas:

The regression indicated the various sources that contributed to inequality in income distribution in rural and urban areas. In table 9, the linear regression result was chosen for having the highest R^2 value and number of significant variables. This show that age of household head, number of household dependents and total income are the major factor responsible for income inequality in the rural areas.

Table 9: Factors responsible for income inequality in rural areas.

	CONSTANT	VARIABLES										
		X_1	X_2	X_3	X_4	X_5	X_7	X_8	X_9	X_{10}	R^2	F
LINEAR	0.024	0.123	0.890	0.015	0.051	0.835	0.448	0.000	0.147	0.423	0.698	15.925
	(2.312)	(1.562)**	(0.138)	(-2.512)	(-1.987)	(-0.210)	(-0.764)	(10.92)*	(1.47)**	(-0.800)		
SEMI LOG	0.000	0.159	0.724	0.027	0.223	0.415	0.732	0.000	0.284	0.500	0.602	10.427
	(-19.701)	(-19.701)	(1.424)**	(-2.264)	(-1.231)	(0.108)	(-0.343)	(-0.343)*	(1.081)	(-0.678)		
DOUBLE	0.014	0.231	0.994	0.051	0.038	0.543	0.616	0.000	0.312	0.253	0.649	19.766
LOG	(2.535)	(1.210)	(0.007)	(-1.988)	(-2.114)	(-0.611)	(-0.504)	(10.845)	(-1.921)	(-0.842)*		

Note: t-values are the values in parenthesis.*= significant variable at 5% **= significant variable at 10%

However, in the urban areas, the double log regression result shows that household size, farm size, household total income and expenditure are the significant variables that affect inequality in income distribution. The result indicated that these variables are significant at five percent, meaning that a 5% increase in income for example will result in about a 5% increment in income inequality.

Table 10: Factors responsible for income inequality in urban areas.

	CONSTANT	VARIABLES									R^2	F
		X_1	X_2	X_3	X_4	X_5	X_7	X_8	X_9	X_{10}		
LINEAR	0.466	0.437	0.270	0.930	0.989	0.553	0.849	0.184	0.894	0.000	0.649	12.555
	(-0.774)	(0.783)	(1.114)	(0.088)	(-0.014)	(-0.596)	(-0.191)	(1.35)**	(-0.133)	(4.170)*		
SEMI	0.000	0.814	0.086	0.556	0.674	0.704	0.544	0.000	0.473	0.015	0.756	21.027
LOG	(-20.339	0.237	1.716	-0.592	0.423	0.381	0.610	4.558)*	0.722	2.491)*		
DOUBLE	0.014	0.231	0.994	0.051	0.038	0.543	0.660	0.000	0.519	0.063	0.550	10.994
LOG	(2.535)	(1.210)	(0.007)	(-1.988)*	(-2.114)*	(-0.611)	(-0.504)	(10.84)*	(1.314)	(3.921)*		

Note: t-values are the values in parenthesis *= significant variable at 5% **= significant variable at 10%

The double log pooled regression result for both rural and urban areas shows that age of household head, educational level, total household income and expenditure are the factors that are shown to be responsible for inequality in income distribution in both rural and urban areas on the aggregate. Household expenditure is significant at ten percent meaning that a 10% increment in household expenditure brings about a 10% increment

in income inequality while other significant variables like household income are significant at 5% level of significance as shown in table 11.

Table 11: Regression result of pooled data.

	CONSTANT	VARIABLES										
		X_1	X_2	X_3	X_4	X_5	X_7	X_8	X_9	X_{10}	R^2	F
LINEAR	0.883	0.011	0.207	0.333	0.343	0.660	0.770	0.00	0.742	0.016	0.617	22.718
	(-0.147)	(-2.581)*	(1.270)	(0.972)	(-0.953)	(-0.442)	(-0.293)	(11.88)*	(0.411)	(0.478)		
SEMI	0.00	0.112	0.102	0.594	0.056	0.222	0.985	0.00	0.521	0.162	0.730	45.047
LOG	(-28.783)	(-1.61)**	(1.66)**	(0.534)	(-1.925)	(-1.227)	(0.018)	(15.30)*	(-0.906)	(0.38)**		
DOUBLE	0.00	0.003	0.119	0.317	0.026	0.380	0.754	0.00	0.906	0.113	0.720	42.738
LOG	(-16.819)	(-3.069)*	(1.56)*	(1.003)	(-2.257)	(-0.882)	(0.313)	(14.86)*	(-0.119)	(0.37)**		

Note: t-values are the values in parenthesis *= significant variable at 5% **= significant variable at 10%

Effect of income inequality on agriculture:

Table 12: Effect of income inequality on agriculture.

	Rural				Urban			
	CONSTANT	VARIABLES			CONSTANT	VARIABLES		
		Agric production	R^2	F		Agric income	R^2	F
LINEAR	0.00	0.00	0.632	120.353	0.600	0.00	0.534	80.324
	(9.459)	(10.971)*			(-0.431)	(7.962)*		
SEMI LOG	0.00	0.00	0.532	79.479	0.00	0.00	0.712	173.247
	(-93.476)	(8.915)*			(-90.71)	(13.16)*		
DOUBLE LOG	0.00	0.00	0.611	109.479	0.00	0.00	0.623	115.589
	(-20.251)	(10.488)*			(-18.69)	(10.75)*		

Note: t-values are the values in parenthesis *= significant variable at 5% **= significant variable at 10%

The result in table 12 shows that in both rural and urban areas, agricultural income which is used as a measure

of household level of agricultural production has a significant relationship with the income inequality level at

1%. An increase in the level of income inequality by 1% signifies that there will be more gaps between the high and the low income households and this widening gap limits the production level of the low income households.

CONCLUSION AND RECOMMENDATIONS

Income inequality has been seen as one of the major factors militating against agricultural production both in rural and urban areas of Nigeria. It was revealed in this study that household size, farm size, and household income are the factors that contribute to income inequalities in the rural and the urban areas. The findings of this study however shows that the average income of rural household in the study area is less than N20,000 a month while that of the urban household is a little above N50,000 from both agricultural and non-agricultural sources. However, the analysis revealed that income inequality is lower in rural areas compared to the urban areas with values of 0.41 and 0.33 as against 0.69 and 0.67 for non-agricultural income in rural and urban areas respectively.

Resulting from the findings of this study, the following recommendations were made to improve income distribution among farm households, increase income generating ability of households and consequently bust agricultural production in rural and urban Nigeria.

Firstly, since agriculture is the major source of income for both rural and urban farm households accounting for about 70% of the rural household income and more than half of the urban household income, there is the need to upgrade technologies for agricultural production in order to further improve equity in the distribution of income.

Secondly, socio-economic infrastructural facilities (like portable water, health services, electricity, good roads, etc.) should be provided to facilitate effective production and marketing of agricultural produce. Moreover, access to credit and land should be made easier in order to help farmers produce at the optimum level; and lastly, large family size should be discouraged and that government efforts should be directed towards educating the farmers on the available production technology towards optimizing production.

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