Income Distribution In Small-Scale Irrigation Projects, A Case Study of Wurno Irrigation Project Sokoto State, Nigeria

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ABSTRACT

Farm income distribution among farmers at the Wurno irrigation project Sokoto State was studied Respondents were drawn from six villages that were selected randomly. From each of the six villages 20 respondents were selected randomly, to arrive at a sample size of 120 respondents. Structured questionnaire was used to collect data on both rain fed and irrigated crops for the 2006 rainy sesting and 2006/2007 irrigation season. However, 116 questionnaires were used for the analysis. Descriptive statistics, decile ratio test, the Lorenz curve and Gini concentration ratio were used for data analysis. Results of the study revealed that majority (98.28%) of the respondents were male, the against distribution shows that 32.76% were aged 31-40 years. Rice was mainly cultivated in the rainy session while onlon and garlic were cultivated during the dry season. For the dry season crops, an average farming and the season crops are received by 35.24% of the respondents representing 31.08%, of the aggregate income from dry season crops. The computed Gini coefficient of 0.5985 and 0,.6212 implies highly unequality distributed income for irrigated and rain fed crops respectively. It was recommentate that road network within the project area should be maintained regularly to improve transportation network, minimise post harvest losses and improve returns.

INTRODUCTION

Agricultural production in Nigeria can generally be described as rainfed. However, the erratic nature of rainfall in some parts of the country, especially the northern parts have constituted great constraints to increased food production among other factors (Falusi, 2000). Abdullahi (1985) reported Sokoto State as one of the northern states where water poses a limiting factor to agricultural production due to inadequate and erratic rainfall, with some parts of the state receiving less than 600mm of annual rainfall within a duration of five months or less. Baba and Adedibu (1998) noted that as a result of the erratic nature of rainfall in the area, large areas of land are left uncultivated, while only crops and crop varieties that are early maturing and/or drought tolerant are grown even if they are not the most productive in terms of yield and income. Irrigation was pointed out by Mua'zu and Abdulmumin (1991) as the only reasonable alternative of overcoming the constraint of inadequate water for improved food production, to meet the food demand of the increasing population. According to Baba and Adedibu (1998), the expected increased production from would, apart from making more products available, improve farmer's

d their living standards. Small and

Carruthers (1990) have also observed the irrigation is becoming crucial to food security, employment and income growth in poor countries.

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In recognition of the potential benefits of irrigation, small-scale irrigation projects were established in Sokoto State. One of such projects, the Wurno irrigation project was established by the then Northern Nigerian Government. The irrigation facility provided enables farmers to grow dry season crops as well as to make up for the shortfall in rainfall for growing rainy season crops. The objective of this is to bring about an increase in agricultural output and consequently an increase in farm income. A number of studies have indeed confirmed that irrigation has increased agricultural output and farm income in the Wurno area (Bana and Adedibu, 1998) and elst where in Sokoto State (Baba et al., 1997; Baba et al., 2001). However, little or no research work has been done to ascertain the distribution of income among different categories of farmers participating in irrigated agriculture in the State This study examines the distribution of income among farmers at the Wurno Irrigation Project.

METHODOLOGY

The Wurno Irrigation project is located in Wurno Local Government Area (between Longitude 5° 17′ 27″ – 5° 46′ 54″ E and Latitude 13° 8′ 10″–13° 24′ 0″ N) about 40km north—east of Sokoto town. Established by the then Northern Nigerian Government in 1958, the project covered an initial area of 600 hectares. In recognition of the benefits of the project, the Sokoto State Government in 1991 rehabilitated the project and expanded the project area to 1,200 hectared didd (http 2,800 plots of 0.4 hectare each. Not less than 3000 farmers participate in the project where rice is grown as the main crop during the rainy season and onion and garlic are grown as the main crops in the dry season.

Six villages namely Wurno, Yar Wurno, Lugu, Gidan Modi, Gidan Bango and Gidan Kamba were randomly selected for the study. From each of the selected villages, 20 farmers participating in the project were randomly selected to arrive at a sample size of 120 respondents.

Structured questionnaire were used to collect

data on crops cultivated, inputs used, cost of production as well as output and income realized for both rain fed and irrigated crops. Data collection covered the 2006 rainy season and the 2006/2007-irrigation season. Out of the 120 quastionnaires, 116 were used for analysis. Descriptive statistics, declie ratio test, the Lorenz curve and Gini concentration ratio were used for data analysis. Descriptive statistics used include means, frequencies and percentages. The declie ratio test was used to analyse the location of inequality in the various income distributions. The Lorenz curve was used to compare the cumulative shares of income ordered from the poor to the rich, with income shares that would

The Gini concentration ratio is defined as G = 1- ΣXY(1)

accrue to recipients under perfect equality.

Where G = Gini coefficient

X = percentage of farm income recipients

Y = cumulative percentage of aggregate farm income

The Gini concentration ratio is the most commonly used measure of income distribution and it summarizes the Lorenz curve. The value of the Gini Index varies from zero to unity. It approaches zero as income distribution tends to perfect equality and unity as it tends to extreme inequality.

RESULTS AND DISCUSSION Personal Characteristics of Respondents

Majority (98.28%) of the respondents were male while 1.72% were female. Also 97.41% were married and the remaining 2.59% were single. The age distribution shows that a high proportion (32.78%) of the respondents was aged between 31 and 40 years, 27.559% were aged between 41 and 50 years and 9.48% were aged between 20 to 30 years (Table 1). This implies that there were more of middle-aged farmers participating in the project activities compared to either young or old farmers,

With respect to education, result of the study shows that 58.62% attained Qur'anic education, 21.55% attained primary education and 6,89% each attained secondary and adult education (Table 2). This shows that the literacy level among farmers at the irrigation project was low. Low level of education could have nagative effect on farmers' ability to understand and use improved or new agricultural technologies for better output and income.

Analysis of family size (Table 3) shows that 37.07% of the respondents had family sizes of between 6 and 10 members, 33.62% had between 2 and 5 members while 2.59% of the respondents had family sizes of 21 members or more. Family size is an indicator of food requirements as well as family labour availability.

All the respondents were experienced project farmers with 38.79% having between 6 and 10 years of farming experience in the irrigation project. Up to 22.41% had between 1 and 5 years experience and 18.97% had 21 years or more of farming experience in the irrigation project (Table 4).

Crops Cultivated

Both rain fed and irrigated crops were cultivated at the Wurno Trigation Project. Majority (83,62%) of the respondents cultivated both rain fed and irrigated crops, 12% cultivated rain fed crops only and 7% cultivated Irrigated crops only. Rice was grown as the major rain fed crop by all the respondents who cultivated rain fed crops, while onion and garlic were grown as the main dry season crops. Although rice was grown in the rainy season, its cultivation was made possible by the availability of irrigation facilities that enabled application of water at the beginning of the rainy season when the rains were not well established, during drought and after the rainy season, before harvest.

Farm Income Distribution Among Farmers at the Wurno Irrigation Project.

The distribution *of farm income among respondents was determined separately for rainy season and dry season crops (Table 5). For the dry season crops, an average income of N62,523.78 was received by 35.24% of the respondents, representing 31.08% of the aggregate income from dry season crops. An average income of N 202,142.00 was received by 4.76% of the respondents, representing 13.58% and of the aggregate income from dry season crops.

For the rainy season crops, an average income of N37,626.10 was received by 37.61% of the respondents representing 42.11% of the aggregate income from rainy season crops. Up to N81,080.00 was received as income from rainy season crops by 4.60% of the respondents, representing 11.07% of the aggregate income from rainy season crops. For the rainy season, 0.9% of the respondents recorded a negative income (Table 5). Results of the study revealed that farm income from irrigated crops is distributed among various income levels with a greater proportion (35.24%) taking 31.08% of the farm income whereas just 4.76% of the respondents received up to 13.58% of the income. For the rain fed crop, the income was distributed among the first five income levels (Table 5) with 38.53% receiving only 14.8% of the aggregate income from rain fed crops while 4.6% of the respondents received up to 11.07% of the aggregate income The variation in the distribution between dry season and rainy season crops could be due to be fact that although crops grown in the dry ason are perishable, they command higher valle in the market than the rainy season crop.

The decile ratio test revealed that the 10% degroup (Table 6) for both irrigated and rain fecrops received the highest share of the aggregate income (22.74% and 20.56%) and first decile group received the least (2.57% and 1.23%) of income from irrigated and rainfed crops respectively

Gini coefficient and the Lorenz curves

The computed Gini coefficient of 0.5166 for income from Irrigated crops and 0.6233 for rain fed crops imply that farm Income from both irrigated and rain fed crops at the Wurno Irrigation Project were highly unequally distributed. According to Todaro (1981), Gini coefficient of some economic variables with highly unequally distribution of subjects or Items involved typically lie between 0.5 and 0.7 while

for economic variables with relatively equitable distribution, it is of the order of 0.2 to 0.35.

from the cultivation of rainy season crop, Analysis of the Gini coefficient and that of the Lorenz curves for irrigated and rainfed crops at the irrigation project revealed that farm income from both rainfed and irrigated crops were unequally distributed, with farm income inequality from rainfed crops being greater that farm income from irrigated crops.

RECOMMENDATIONS

Effort should be made to explore the possibility of narrowing down the income gap between the rich and poor farmers. This could be achieved by giving input subsidy to poor farmers as well as assisting them in the processing, storage are marketing of their produce with a view. It improving their incomes.

A method of regulating the area to be cultivated by poor and rich farmers could be introduced with a view to enhancing poor farmers' access to more land. This could be achieved by making the rich farmers to pay higher fees per unit are than the poor farmers.

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Table 1: Age distribution of respondents

Age (years)	Frequency	Percentage		
20-30	11	9.48		
31-40	38	32.76		
41-50	32	27.59		
51-60	21	18.10		
61 and above	14	12.07		
Total	116	100		

Source: Field Survey, 2007

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Table 2: Distribution of respondents according to educational Attainment.

Level of education	Frequency	Percentage		
Primary education	25	21.55		
Secondary education	8	6.89		
Tertiary education	7	6.03		
Adult education	8	6.89		
Qur'anic education	68	58.62		
Total	116	100		

Source: Field Survey, 2007

Table 3: Distribution of respondents according to family size

Family size	Frequency	Percentage		
Single	3	2.59		
2-5	39	33.62		
6-10	43	37.07		
11-15	20	17.24		
16-20	8	,6.89		
21 and above	3	2.59		
Total	116	100		

Source: Field survey, 2007

Table 4: Distribution of respondents according to farming Experience at the Wurno Irrigation Project

Years of experience	Frequency	Percentage		
1-5	26	22.41		
6-10	45	38.79		
11-15	17	14.66		
16-20	6	5.7		
21 and above	22	18.97		
Total	116	100		

Source: field survey, 2007

Table 5: Distribution of farm income for rain fed and irrigated crops among respondents at the illinois states.

Level of farm income (A)	Irrigated crop	16		Rainfed crops				
	Average income (#i)	% of respondents	% of apprepate	Average Income (N)	% of	% of appregate		
<0 N	0			-2,900	respondents	income		
1-25,000	13,513.33	0.57	1.00		0.9	•0.0\$		
25,001-50,000	36,791.15	24,76	1.60	12,915,46	30.53	14.0		
50,001-78,000	62,523.76		12.05	37,626.10	37.61	42.11		
78,001-100,000	.,	35,24	31.00	50,791.00	16.35	32.1		
	89,931.82	10.46	13.29	81,060.00	4.6			
100,001-123,000	112,603.33	11.43	10:16		4.0	11.07		
128,001-150,000	136,406.00	4.76	9.16					
150,001 and above	202,142.00	4.76				•		
Total			13.50					
Causes Bald &	•,	100	100		100	100		

Source: Field Survey, 2007.

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fairmers (x) % of fairmers	Cumulative	brigated crops		or impared and rainfed crops at the Wurning imparent project, hainfed crops					
		n of sociedate income	Cum, to of Aggregate income (v)	IXY	% of accredate	Cum. % aggregate	of	IXY	
Pirst 10 percent	0.1	4:1	2.57	0.0257	0.0026	1.21	income (y)		
Second 10 percent	0.1	8:2	4.5+	0.0711			0.0123		0.0011
Third 1C percent	0.1	8:3	6.11		0.0071	3.15	0.038		0.0036
ourth 10 percent	tt.	8.4		0.1342	0.0134	4.59	0.0097		0.0086
fifth 10 percent			7.70	0.212	0.0212	6.46	0.1543		0.015-
	0.1	4.5	4.45	0.3008	0.0301	0.66			
exth 10 percent	0,1	0.6	8.10	0.3902	0.039		0.2409		0 0241
eventh 10 percent	0.1	0.7	9.10			10,00	0.3497		0.0349
lighth so percent	0.1			0.49	0.049	12.94	0.4791		0.0479
		0.8	12,60	0.6108	0.0616	14,46	0.6237		0.0621
erth 14 percent	0.1	4.9	19.10	0.7726	UU//1	1//06			
enth 10 persons	0.1		22.74	1	2.1		0.7943		0.0794
otal .			100	•	0.1	20,64	1		0.1
ource: Field survey	2042.				0.4834	100			0.3767

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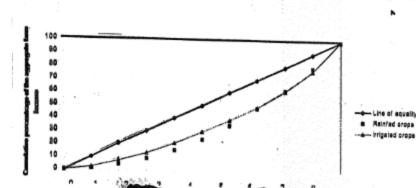


Fig. 1: Lorenz curves showing the distribution of ferm income among fermers in Wurno irrigation project