



## Harnessing Small Scale Irrigation Projects: A Strategy for Capacity Building Option for Enhanced Rural Economy in Nigeria

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### ABSTRACT

Irrigation farming can play a major role in improving agricultural productivity, reducing poverty and bring about sustainable development. The goals of irrigation projects were to provide increased agricultural productivity and improve the livelihoods of the people. Evidence of increased productivity through enhanced capacity building was reported by this study from Katsina state. A total of 203 farmers were surveyed including 113 irrigation farmers from Ajiwa and 90 irrigation farmers from Dan-Nakola irrigation projects. The findings indicate that irrigation farmers in the study area had the potentials to fight poverty and improve income level and livelihoods through small scale irrigation technologies. It is recommended that the social investment programmes of the Federal government of Nigeria and that of Katsina State government should provide an urgent economic intervention to improve farmers' potentials in irrigation farming in the areas and further provide more farm inputs that will enhance the available rural wage earning activities of the area.

### ARTICLE INFO

Article History  
Received: January, 2020  
Received in revised form: March, 2020  
Accepted: June, 2020  
Published online: August, 2020

### KEYWORDS

Small Scale, Irrigation. Capacity Building, Rural. Economy

### INTRODUCTION

The current move to the fight against poverty in Nigeria develops the background for this research. The primary objective of irrigation projects in Nigeria is to achieve the goal of development through the provision of available economic opportunities to the rural people. However, Seers (1977), Musa, (2004), Inuwa, (2007), Oluwasola, (2010) and Sheheli, (2012) opine that the concerns of the development process is multi-faceted and can be viewed to the following key questions: "What is happening to poverty? What is happening to unemployment in rural areas? and how best can poverty and unemployment be reduced or eradicated?" It is against this background that this research tries to

assess the economic opportunities of Ajiwa and Dan-Nakola irrigation projects with a view to provide an analytical framework for assessing the effects of capability building components of the two projects on incomes, poverty and unemployment of the irrigation beneficiaries.

The modern irrigation programmes in Nigeria were within a proper context in the country's overall development priorities and planning strategies. The history of modern irrigation in Nigeria right after the World War II is generally a short one and indeed by independence in 1960, Adekunle et al, (2005) and Iwuchuku, et al., (2017) observed that only eight irrigation schemes had been established across the northern states and majority were small scale.



Following improvement of capital and internal sensitization, Nigeria entered a dramatic phase in the history of modern irrigation from 1970s when both small and large scale irrigation projects began to be executed. The increase in oil revenue and twelve states structure and the spirit of economic reconstruction were factors that contributed to this new investment priority. Baba (1975) observed that Kano State had embarked on the multi-million naira Kano River project. The then Kaduna state and now Katsina State Government constructed the Ajiwa and Dan-Nakola Dams and the first pilot schemes commenced in the late 1970s (MOA, 2000).

The second National Development Plan (1970 –74), the third plan period (1975 –80) and the fourth plan period (1981 –85) were strategic policies pointing the huge investment proposals that have been made for various River Basins Development Authorities (RBDAs) during the periods. Despite the huge capital investment in irrigation, reports indicated that poverty in the rural areas where most people in Nigeria live still prevail. It is pertinent to ask the following

#### **Purpose of the Study**

1. Identify the socio-economic characteristics of the irrigation farmers.
2. assess the economic opportunities provided
3. Identify the enhanced capacity building measures of irrigation farmers in the project areas.

#### **Research Questions**

1. Are small scale irrigation development projects profitable?
2. Do irrigation projects have potentials for economic diversification opportunities?

3. What are the capacity enhancement measures put in place for irrigation farmers in the study area?

#### **METHODOLOGY**

The study was carried out in Ajiwa and Dan-Nakola irrigation projects located in Katsina state. The Ajiwa irrigation project is located in Batagarawa local government area while Dan-Nakola irrigation project is located in Daura local government area. The two projects were purposively selected for the study due to the high population of rural people whose livelihoods are largely dependent on the two projects. A stratified random sampling technique was used to select 203 irrigation farmers for the study. This figure comprised of 113 irrigation farmers from the Ajiwa irrigation project and 90 irrigation farmers from the Dan-Nakola irrigation project. The disparity in the number of respondents between the two projects was due to the population size of the participant farmers in the two projects and the figure represents a 15 percent of the total population constituting the sample frame.

The study was conducted in the months of October and November, 2018. To measure the capacity enhancement of the farmers, the study used a structured questionnaire to generate data which involved such information concerning technology transfer, rural wage earning opportunities, poverty reduction index and self participatory values designed into a 5 point Likert scale of four questions per factor as well as close and open ended questions. Other information generated includes the socio-economic characteristics of the farmers and aspects relating to food security of the households. Data collected were analyzed with descriptive statistics, gross margin and factor analysis.



## RESULTS AND DISCUSSION

The socio-economic characteristics of the farmers in **Table 1** show that majority of the farmers in both Ajiwa and Dan-Nakola irrigation projects were between the age ranges of 31-40 years. This shows that, the farmers in the two areas are within the agricultural productive age range of 35-55 years opined by Food and Agricultural Organization (FAO, 1999 and Lhing et al., 2013). The table further indicates that the formal literacy level of the farmers in the two project areas is low. The reason for the low western literacy level may be because people in the areas may have more

preference to issilamiyya education. However, the capacity building of the irrigation farmers through other trainings such as workshops, seminars, field trainings, agricultural shows and demonstrations among others for enhanced irrigation farming showed that 67.3% of irrigation farmers in Ajiwa had undergone some training for capacity building and 71.1% in Dan-Nakola. Majority of the respondents are full-time farmers (70% and 80% in Ajiwa and Dan-Nakola irrigation projects respectively). This implies that, majority of the farmers rely on agricultural production for their livelihoods.

**Table 1:** Socio-economic Characteristics of Irrigation Farmers

Variables	Ajiwa (Frequency)	%	Dan-Nakola (Frequency)	%
Age				
<20	12	10.6	6	7.0
21-30	20	17.8	18	20.0
31-40	46	40.7	37	41.0
41-50	17	15.0	19	21.0
>50	18	15.9	10	11.0
<b>Total</b>	<b>113</b>	<b>100</b>	<b>90</b>	<b>100</b>
Formal education and training				
No formal education	64	56.6	53	58.9
Primary education	39	34.4	24	26.7
Secondary education	10	9.0	13	14.4
Tertiary education	0	0	0	0
Other trainings	76	67.3	64	71.1
<b>Total</b>	<b>113</b>	<b>100</b>	<b>90</b>	<b>100</b>
Irrigation involvement				
Full-time	86	76.0	72	80.0
Part-time	27	24.0	18	20.0
<b>Total</b>	<b>113</b>	<b>100</b>	<b>90</b>	<b>100</b>
Farming experience				
<15years	38	33.6	49	54.4
16-25years	53	46.9	32	35.6
26-35years	19	16.8	8	8.9
>35years	3	2.7	1	1.1
<b>Total</b>	<b>113</b>	<b>100</b>	<b>90</b>	<b>100</b>

Findings on the socio-economic characteristics of the farmers show

disparity in the farming experiences of the farmers. About 47% of the farmers in Ajiwa

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irrigation project have farming experience of about 16-25 years while about 41% of the farmers in Dan-Nakola irrigation project have farming experience of less than or equal to 15 years. The work experience of less than 20 years may be considered low (Sharma, et al; 2003 and Koloche, 2016). This implies that with more experience in farming, farmers are less more likely to oppose the adoption of new technologies.

**Table 2** shows the gross margin of the irrigation farming per hectare in the study area. The findings show that farmers have great potentials to income earning opportunities from irrigated farming. The

average gross margin of irrigation farmers in Ajiwa was N66 913 and N64 448 for the farmers in Dan-Nakola irrigation projects respectively. The gross margin returns per Naira invested was N2.43 on the average. This implies that for every Naira invested in irrigation farming, a gain of N2.43k was made on the average. It means, looking at the variable costs of production, irrigation farming is profitable. According to Oluwasolam (2010), Lhing (2013) and Jamilu (2014) who reported that farmers participate more actively in a given project when they see prospects in what they invest.

**Table 2:** Costs and returns per hectare of irrigation farming in Ajiwa and Dan-Nakola irrigation projects

S/No	Items of costs and return	Total gross margin per ha	
		Ajiwa	Dan-Nakola
1.	Gross returns	142,563	139,698
2.	Cost of seeds	5,200	5,500
	Cost of fertilizer	25,000	28,500
	Cost of agro-chemicals	9,350	7,800
	Cost of labour	18,600	17,950
	Projects' dues	1,500	1,500
	Cost of transportation	16,000	14,000
		75,650	75,250
3	Total variable costs	66,913	64,448

**Table 3** shows result of the factor analysis. The higher values of the variables in **Table 3** explained the need for intervention efforts to improve the performance of the independent variables investigated for additional poverty

reduction measures and income generating activities. The items indicated the abilities of the farmers to demonstrate a sense of awareness to the importance of capacity enhancement measures.

**Table 3:** Factor analysis of four capacity enhancement measures in Ajiwa and Dan-Nakola irrigation projects

Factors	Eigen value	Percentage of variance
01	3.89435	31.7
02	3.44416	28.9
03	2.46876	20.6
04	2.34231	18.8



The four factors for capacity building measure were analyzed and presented in Table 3 and described as follows:

**Technology Transfer:** Factor one measures the available rural farm technologies and support services. This indicates whether the project technologies are capable of providing the kind of security measures against poverty, food security and increased economic activities in the areas. The factor is named technology transfer because the economic empowerment of the people in the areas can be guaranteed with sustainable and proven agricultural technologies brought for irrigated farming activities like cropping patterns, canals maintenance, processing and storage technologies. This finding agrees with that of Koloche (2016).

**Rural Wage Earning Opportunities:** Factor 2 was to determine the wage earning opportunities available for people in the areas through their own efforts that they engaged for diverse small scale or petty trades in making different forms of local foods, food preservation techniques, craft work, blacksmithing, commercial transportation, weaving and hoarding to fight poverty and improve income level. This effort can be appreciated and encouraged through capital development strategies and initiatives. The factor measures self-employment opportunities in the area which corroborates the findings reported by Oluwasola, (2010 Sheheli, 2012 and Lhing 2013).

**Poverty Reduction Index:** Factor 3 was about access to farming incentives, it is expected that when farmers get access to farm inputs and other support services like subsidies, credit facilities and information access, there will be greater performance in

irrigation farming and enlist the support and cooperation of the farmers. Therefore, poverty reduction initiatives introduced to farmers can determine the kind of support farmers can also give and initiate poverty reduction measures by themselves that have economic feasibility, compatibility and sustainability. This factor measures capacity building strategy for poverty reduction among irrigation farmers as supported by (Lhing, 2013 and Jamilu, 2014).

**Self-Participatory Values:** This factor captured self participatory values because of the need for a shift of paradigm to provide a new approach to community development projects. This study observed from the analysis, farmers still take decisions from the above and implementation stages are carried out by the project authorities. The study is of the opinion that the introduction of bottom-up approach to farmer participation in the projects will make farmers actualize their felt needs and priorities as opined by (Olukosi 2002 and Chikaire, 2017). This approach according to Musa (2004) and Jamilu, 2014 facilitates the adoption of new technologies introduced to farmers through effective technology transfer, creation of wage earning activities and reduces poverty among the people. This factor measure farmer capacity building for participation in self initiated and supported irrigation projects.

## CONCLUSION AND RECOMMENDATIONS

The socio-economic characteristics of the farmers and capacity enhancement measures jointly contributed to the development of the access to productive resources and poverty reduction strategies. However, there is the need to discover other factors for effective policy, planning and strategies for sustainable agricultural development. The study identified



potentials for developing many coping strategies to poverty and to improve the standard of living of the participating farmers. It was discovered that irrigation farming in the two areas is profitable but can be improved through incentives like loan schemes and subsidies. It is, therefore, recommended that the poverty eradication programme of the Federal government of Nigeria and that of Katsina State government should provide an urgent economic intervention to further empower people in the areas and provide necessary technical assistance in the form of commercial or economic incentives that will improve their local trades and available markets and rural wage earning activities. These could further explore other opportunities for which people in the area can engage to earn a living.

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submitted to Division of Agricultural Economics, Humboldt University. Berlin in fulfilment for Degree of Philosophy.