FACTORS AFFECTING IRISH POTATO FARMERS' PARTICIPATION IN HUNKUYI IRRIGATION PROJECT IN KUDAN LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA.

Danjuma IBRAHIM, *Jamila Baba ABUBAKAR and Yusuf HABIBU

Department of Vocational and Technical Education, Ahmadu Bello University, Zaria, Nigeria
*Corresponding Author: jamilababaabubakar1987@gmail.com; 08069675543

Abstract

The study investigated the factors affecting Irish Potato farmers' participation in the Hunkuyi irrigation project in Kudan local government area, Kaduna state, Nigeria. Two research questions were raised, and one hypothesis was formulated to guide the study work. A descriptive survey design was employed using 8,650 farmers. An interview schedule was designed and used for data collection. The proportionate random sampling technique was used to select 200 farmers from Hunkuyi participating in Irish potato farming. A Logit regression analysis was used to test the null hypothesis. The null hypothesis of the Hunkuyi irrigation project has no significant impact on Irish potato farmers' livelihood. The results show that the socioeconomic and institutional factors do not influence farmers' participation in the project, as the P value is less than the P calculated. Therefore, the null hypothesis is rejected. The main constraints facing Irish potato farmers in the study area were the high cost of seed (100%). Inadequate knowledge of improved varieties of Irish potato seed (96%), Pest and diseases (92%), poor access to credit facilities (79%) and information on improved technology (79%) were among the major constraints to Irish potato farming in the project area. The study recommended that a sustainable strategy for irrigated agriculture development in Kudan LGA and Kaduna State as a whole should be sustained. Irish potato farmers should have access to extension agents for proper training on the adoption of new technology in Irish potato farming.

Keywords: Hunkuyi irrigation project, Irish potato, Farmers

Introduction

Agricultural production in Nigeria is primarily rain-fed, so it depends on erratic and often insufficient rainfall. As a result, there are frequent failures of agricultural production. Irrigation has the potential to stabilise agricultural production and mitigate the negative impacts of insufficient rainfall. Irish potato is one of the crops in Nigeria with high market demand, but produced in small quantities.

Irrigation farming has been considered essential in sustaining the economic growth of Nigeria. Irrigation refers to the application of controlled amounts of water to plants at required intervals. It contributes graciously to the economic growth of Nigeria. Irrigation equally plays a significant role in enhancing the country's economy by allowing the production of a different array of crops which cannot be grown under rain-fed conditions, allowing producers to take advantage of a wider range of national and international markets. Irrigation has increased the amount of land under cultivation and the yields on existing cropland. It has also allowed double cropping and has decreased the uncertainty of water supplied by rainfall (Gomo, 2019).

Irrigation originated as a method for improving natural production by increasing the productivity of available land, thereby expanding total agricultural production. Availability and access to irrigation were considered essential for crop production, asset creation and expansion of development frontiers (Cosmos *et al*, 2018). Irrigated agriculture facilitates the intensification of cropping practices and inputs used, thus paving the way for the "modernisation" of the agricultural sector. Irrigated agriculture is one of the critical components of world food production, which has contributed significantly to maintaining world food security and to the reduction of rural poverty (Gomo, 2019). The growing world populations with consumption patterns are estimated to require a doubling of food production in the developing countries by 2050. Eighty per cent of this

increase would need to come from crop yields that require greater crop intensity, coupled with the agricultural land for arable production (Bello, 2020). Efficient irrigation in this direction helps small farmers improve their livelihoods by allowing for a more efficient use of inputs, such as water and fertiliser, and by enhancing the yields and quality of the crops farmers grow.

Irrigated agriculture rapidly expanded between the 1980s to date, with the establishment of River Basin Development Authorities (RBDAs). According to Bijani and Hayati (2019), irrigation is the motor of development in the basin, notably in the valley, due not only to improved technology, but also to the wider variety of produce grown (rice, onions, tomatoes, potatoes, sweet potatoes and maize). In Nigeria and in many other parts of the world, irrigated agriculture takes place during the dry season after the rainy season has come to an end. During this period, other water sources such as ponds, seasonal rivers and water wells, which in one way or another serve people, dry up. Worldwide, irrigated agriculture accounts for about four-fifths of global water withdrawals. The share of irrigated land ranges widely, from 4 per cent of the total area cropped in Africa to 42 per cent in South Asia.

Factors affecting irrigation farmers' participation include the adoption of improved technologies, household-specific factors and institutional factors, among others. Given the importance of the Irish potato in food security and poverty alleviation, the low productivity remains a major challenge in its production. This indicates that technological advancements that are generated through research institutes have not been widely accepted. By the Irish potato farmers

One of the major factors that leads to the limited production of Irish potatoes in Nigeria is its soil requirements and the environment, which restricts its production to specific areas of the country with favourable soil and climatic conditions. The crop is produced under both irrigated and rain-fed conditions and is produced in large quantities in Hunkuyi, Kudan local government area of Kaduna state and high altitude of Plateau State, as well as some other parts of Nigeria that have the required climatic and soil conditions (Hussain & Hanjra, 2014). Irish potato has a higher economic value than any tuber crop produced in the country and produces more yield per unit area than most tuber crops (Dube, 2015).

Research Questions

i. What are the socio-economic and institutional factors influencing Irish potato farmers' participation in Hunkuyi irrigation project?

ii. What are the constraints to Irish Potato production in the study area?

Hypotheses

i. Socioeconomic and institutional factors have no significant influence on Irish potato farmers' participation in Hunkuyi irrigation project.

Methodology

Two research questions were raised; also, one null hypotheses were formulated and tested at a $p \geq 0.05$ level of significance. The study adopted a descriptive survey design, which involved the collection of data from respondents using a structured questionnaire that was administered by the researcher. This study used primary data that were collected through the use of a questionnaire and oral interview, in which the instrument was administered by enumerators under the supervision of the researcher. The data collected focused on the respondents' socio-economic characteristics and examined the impact of the Hunkuyi Irrigation scheme. Split half method was used to collect data, and the data collected was analysed using Cronbach's alpha. A reliability coefficient of 0.83 was obtained. The population of the study comprised all the 8,650 irrigation farmers in Kudan Local Government Area of Kaduna State, out of which 1800 farmers are engaged in Irish potato production under the irrigation scheme, which constitutes the project participants. A multi-stage sampling technique was used to select the respondents, and a sample size of 200 Irish potato farmers was selected in the study area.

Results and Discussion

Table 1: Distribution of socio-economic characteristics of Irish Potato farmers

Socio-economics Characteristics		
Sex	**Frequency**	**Percent**
Female	50	25
Male	150	75
Age		
≥ 18 - 30 Years	64	32.0
31 - 40 Years	52	26.0
41 - 50 Years	54	27.0
51 - 59 Years	12	6.0
>60 Years and Above	18	9.0
Average age (Mean)		39.91
Marital Status		
Married	150	75.0
Single	30	15.0
Widowed	12	6
Divorced	8	4
Average number of wife/ves		2.02
Household size		
1 - 7 People	48	24.0
8 - 15 People	94	47.0
16 - 22 People	46	23.0
23 - 29 People	8	4.0
> 30 People and Above	4	2.0
Average (Mean)		12.0
Education Level		
Non-Formal	78	39.0
Primary	64	32.0
Secondary	52	26.0
Tertiary	6	3.0
Total	200	100.0
Farming experience		
1 - 7 Years	6	3.0
8 - 15 Years	132	66.0
16 - 22 Years	48	24.0
23 - 29 Years	10	5.0
>30 Years	4	2.0
Average (Mean)	18.0	
Membership of cooperative		
No	62	31.0
Yes	138	69.0
Credit Access		
No	198	99.0
Yes	2	1.0
Potato-Income		
₦200,000 and less	22	11.0
₦ 200,001 - ₦ 400,000	148	74.0
₦ 400,001 - ₦ 600,000	16	8.0
₦ 600,001 - ₦ 800,000	4	2.0
>₦ 800,001	10	5.0
Average (Mean)		#382,561.91

About 75% of these farmers are males, while 25% are females, with a strong reliance on irrigation farming as a source of income. The result of the bio data analysis indicates a low level of education among the farmers, with 39% having no formal education, 32% with primary education 26% with secondary education and 3% tertiary education. Most of the farmers are within the middle ages, with 32% between the ages of 18 – 30years, 26% between 31– 40 years and 27% between 41 -50 years. The low level of education of the majority of the farmers makes them lack basic knowledge of crop water requirement, irrigation scheduling and skills in

maintaining and operating irrigation systems. These affect the productivity of the systems, as the crops are either over- or under-irrigated, leading to wastage of the little available water and irrigation farmland.

The result indicated that the majority of the respondents are married, with 75% showing they are married, 15% showing they are single, 6% are widowed, and 4% are divorced. Considering the household size, the majority of the respondents showed that they have 8-15 people, with 47%, other respondents said they have 16-22 people, with 23% some with 1-7 people as their household (24%). With regards to farming experience, the majority of the respondents indicated that they have 8-15 years (66%) and 16-22 years (24%) of farming experience. Few respondents showed that they have 1-7 years (3%), 23-29 years (5%) and above 30 years (2%) as their years of experience. The majority of the respondents showed that they are members cooperative (69%), while others are not into any cooperative society (31%). The majority of the respondents stated that they do not have access to credit (99%). Most of the respondents showed that their income is ₦ 200,001 - ₦ 400,000 (74%), some said their income is N200,000 and Less (11%).

Table 2: Constraints to Irish Potato Production

Constraints to Irish Potato Production	Frequency	Percent	Rank
Poor Seed Variety	100	100.0	1st
Inadequate variety Knowledge	96	96.0	2nd
Expensive Seed	92	92.0	3rd
Poor Access to Credit	79	79.5	4th
Low Information Improve technology	79	79.5	4th
Much Fertilizer	56	56.0	6th
Sensitive Diseases	47	47.0	7th
Sensitive Water Stress	38	38.0	8th
Low-Yielding Seed	29	29.0	9th
Inadequate Storage Facilities	25	25.0	9th
Attack By Insects	24	24.0	11th
Small-Size Seed	23	23.0	12th
Late Maturing Variety	22	22.0	13th

The main constraints facing Irish potato farmers in the study area were poor seed (100%). Inadequate knowledge of improved varieties of Irish potato seed (96%), high cost of seed (92%), poor access to credit facilities (79%), and information on improved technology (79%) were among the major constraints to Irish potato farming in the study area.

4.2.1 Hypothesis Testing 1

Hypothesis One: Socioeconomic and institutional factors do not significantly influence Irish potato farmers' participation in Hunkuyi irrigation project.

Table 3: Socio-economics and Institutional Factors Influencing Participation in Hunkuyi Irrigation Scheme

Socio-economics and Institutional factors	Odds Ratio	Std. Err.	Z	P>|z|
Sex	2.822912	6.28536	0.47	0.641
Age	0.9882793	0.025973	0.45	0.654
Household size	0.9948712	0.042923	0.12	0.905
Years in formal education	0.9285038	0.036113	1.91	0.056**
Years in cooperative	1.246905	0.06774	4.06	0.000***
Income from primary	0.9999908	2.84E-06	3.22	0.001***
Credit access	-0.0005797	0.008304	-0.52	0.603
Output	1.001358	0.000269	5.05	0.000***
Value of asset before	-0.9999988	9.58E-07	-1.24	0.215
Value of asset after	1.000001	1.15E-06	0.68	0.499
_cons	-0.2094731	0.514854	-0.64	0.525
Number of observations				200
LR chi2(10)				86.43
Prob > chi2				0.0000***
Log likelihood				-95.41
Pseudo R2				0.3117

NB * Significant at 10% ** Significant at 5% while *** significant at 1%

Conclusion

From the study, it can be concluded that socioeconomic and institutional factors significantly determine the participation of farmers in a given project. Also, the participation of irrigated Irish potato farmers in the Hunkuyi irrigation project agreed with the earlier claims that provision of efficient extension services can significantly lead to frequent participation in the projects, hence, in output, income generated from Irish potato farming and farmers' livelihood.

Recommendations

Based on the findings from this study, the following recommendations are forwarded.

i. Sustainable strategy for irrigated agriculture development in Kudan LGA and Kaduna State as a whole.
ii. Ensuring better management of soil moisture in the irrigation farming areas through efficient extension services.
iii. Massive orientation of the female farmers should be undertaken by extension workers through agricultural forums in order to encourage them to participate more in Irish potato farming.
iv. Irish potato farmers should have access to extension agents for proper training on the adoption of new technology in Irish potato farming, easy access to improved seed varieties and credit facilities to boost their level of production.
v. State and Local Government authorities should provide motivational packages such as agricultural inputs like good quality seed, agrochemicals rehabilitation of irrigation canals to encourage the farmers to participate in Irish potato farming, which will improve their income and enhance their livelihood.

References

Bello, A. (2020). Herdsmen and farmers conflicts in north-eastern Nigeria: Causes, repercussion and resolutions. *Academic Journal of Interdisciplinary Studies, 2*(5), 129–139.

Bijani, M., & Hayati, D. (2019). Water conflict in agricultural systems in Iran: A human ecological analysis. *Journal of Ecology and Environmental Sciences, 2*(2), 27–40.

Dube, K. (2015). *Rural irrigation schemes: A socio-economic perspective, Zimbabwe*. LAP Lambert Academic Publishing.

Federal Government of Nigeria. (2015). *Draft national irrigation and drainage policy and strategy for Nigeria*. Federal Ministry of Water Resources.

Gomo, T. (2019). Assessing the performance of smallholder irrigation in South Africa and opportunities for deriving best management practices. *Journal of Irrigation and Drainage Systems, 1*(7), 285–303.

Hussain, I., & Hanjra, M. A. (2014). Irrigation and poverty alleviation: Review of the empirical evidence. *Wiley InterScience, 53*(4), 1–15.

International Fund for Agricultural Development. (2018). *Rural poverty in Nigeria*. http://www.ruralpovertyportal.org/web/guest/country/home/tags/nigeria

World Bank. (2016). *Nigeria: Transforming irrigation management in Nigeria project*. World Bank Group. http://documents.worldbank.org/curated/en