

Socio-Demographic Variables of Crop Farmers and Irrigation Practice along River Galma, Zaria Kaduna State

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Abstract

Increase in food production through irrigation system will cut down poverty rate, generate employment opportunities, boost the economy of the farmers and increase the Gross Domestic Product of Nigeria. This study was carried out with a view to determine the influence of Socio-Demographic Variables of Crop Farmers on Irrigation Practice along River Galma, Zaria Kaduna State. The population of the study was 130 crop farmers that practiced irrigation for their crop farming. A sample size of 65 respondents was used for the study. The instrument consisted of two sections, section one, sought information on the socio-demographic information of the respondents, the socio-demographic variables was further sub-divide into section A, B, C, D. section A elucidated information on , section B elicited information on marriage status, Section C provided information on Household size, while section D elicited information on educational attainment. Section 2 elicited information on the types of irrigation practiced by the Galma farmers, the instrument was built on four- point rating scale of Very High Influence 4 points, High Influence, 3 points, Moderate Influence 2 points, and Low Influence. Face validation of the instrument was done by three experts, their comments alteration and suggestions were in-cooperated into the final draft of the instrument. The instrument was trial tested on 30 Galma crop farmers who were not part of the sample size but were of the parent population. Using Cronbach alpha reliability statistics, a reliability coefficient of eighty-seven (87) was realized, this indicated that the instrument was fair for the study. Primary data was obtained from field survey through the administration of questionnaire containing structured questions and oral interview was used for those who cannot read nor write. The questionnaire was distributed and a total of sixty-five (65) copies of questionnaire were used to seek information from the crop farmers, from Galma I and Galma II on irrigation practice. A total of fifty-nine (59) questionnaire were filled and returned without void, giving a 91% percentage return rate. Mean and Standard Deviation was used to answer the research questions while Analysis of Variance (ANOVA) was used to test all the null hypotheses at 0.05 level of significance, it was recommended among others that Kaduna State Government should provide credit facilities in order to improve crop farmer agricultural productivity which would help in ensuring food security for the nation at large.

Keywords: Agriculture, Irrigation farming, Galma, Fadama, Gyellesu

Introduction

Crop' and vegetables farming is done in both wet and dry season with each season requiring different resources. crops production contributes minerals, vitamins, and fiber to the diet of the populace. Mineral are naturally occurring inorganic substances with a definite

chemical composition and an ordered atomic arrangement. Among the plants, vegetables are the excellent sources of minerals, and also are very important and essential ingredients for normal metabolic activities of body tissue (Alvarez, 2002). In Nigeria, intensive farming activities comprises staple food crops take place mostly during rainy season while vegetables farming such as cabbage, maize, cucumber, okoro, among others is commercial focused in all season but rely serious on constant and adequate supply of irrigation water. The urgency of increasing food production becomes patently obvious as one of the base inputs required for achieving this is water. when adequate supply and control of water are ensured. It is very easy to grow crops and vegetables all-round the year. In-order to achieve optimum production of farm produce, adequate use of available natural resources or the development of new natural resources becomes necessary. This study is based on determining if the socio-demographic variables of crop farmers could predict irrigation practices along river Galma, Zaria Kaduna state

Irrigation is the process of applying water to soil, primarily to meet the water needs of growing plants. Water from rivers, reservoirs, lakes, or aquifers is pumped or flows by gravity through pipes, canals, ditches or even natural streams. A crisscross network of earthen walls formed in a field of crops that would be flooded by the river. When the floods came, the water would be trapped in the basins formed by the walls. Since the crops needed water to grow, the Galma farmers invented a system of canals that they dug to irrigate their crops. (Crump, 2019).

There is variation in rainfall pattern across the Nigeria, and geographically some areas experience much rainfall, where as some areas experience less. Agriculture and rainfall cannot be separated, rainfall influences agricultural production in different ways, such as the types of crops grown, when to and overall output of the yield (Ayle, 2011). Plants require water to maintain turgor and supply nutrients; water deficiency therefore leads to loss of turgidity and wilting of the plant. Under such extreme condition growth of plants is inhibited therefore areas of short and uncertain water supply crops are grown under irrigation (Briggs, 2009).

Irrigation is the artificial application of water to soil for the purpose of crop production. Irrigation water is supplied to supplement the water available from rainfall and contribution to soil moisture from ground. In many areas the moisture requirement of crops and irrigation is essential to raise crops necessary to meet the need of food and fiber (Miceal, 2019). According to Ayele (2011), there are different types of irrigation which includes surface irrigation (above the ground) which is the method generally adopted in most countries, flood and border irrigation; others are sprinkler's irrigation and drip irrigation.



Figure 1: <https://www.regionalh2o.org> › outdoor-water-conservation

The three methods of irrigation are:

1. Surface.
2. Sprinkler.
3. Drip/trickle.

This study focused on surface, sprinkler and drip irrigation which is the most water-efficient way to irrigate many different plantings. These are ideal methods to water in clay soils because the water is applied slowly, allowing the soil to absorb the water and avoid runoff. Irrigation is an age-old act, as old as civilization. Irrigation has been practiced in some parts of the world for several thousand years, for instance, rice has been grown under irrigation in India and far east for five thousand years (Zewdie,2007). The Nile Delta in Egypt was under irrigation for about four thousand years (Ayele, 2011). The plain of Euphrates and Tigris in Iraq were under irrigation for 4000 years (Zewdie, Moto and Seimelis, 2007).

The first modern irrigation project in Africa was believed to be the Gezira irrigation scheme which started in 1912 in Egypt (Sokoto Rima Bulletin, 1923). In Nigeria the first formal irrigation was developed in 1925 in the Sokoto province but it was until 1963 with the Advent of the Food and Agricultural Organization (FAO) of United Nations studies that the establishment of the institutional framework of River Basin Development Authorities (RBDAS) was first initiated. Soribo (1993) explains that in early 1970, The Federal Government of Nigeria established eleven River Basin Development Authorities (RBDAS) which were charged with water resource control and development in the areas of operations. The arrangements of dams were constructed to encourage irrigation farming especially in the northern part of Nigeria.

Musa (2013) asserts that irrigation farming in northern Nigeria has regularly improved the nation's Gross National Product (GDP) through increased productivity enhancement of farmer's welfare and income level. Furthermore, Orunye (2011) noted that standard of living is artificially improved, leading to jobs and employment creation to the inhabitants that settled in the area where the irrigation is being practiced and has also

contributed to agricultural development as well as improvement in socioeconomic activities thereby increasing the income level of farmers in this area and its rural environment.,

Many studies have been conducted in different aspect of irrigation for instance, Sanda (1992) wrote on managing irrigation project in Nigeria also Iguisi (1997) studied the sources and nature of sediments delivery into the Kubbani reservoir of Ahmadu Bello University dam. His primary concern was the net accumulation of sediments in the reservoir. Hence irrigation practices become necessary. Therefore, the contribution of the irrigation scheme to farming community in Gyellesu, Zaria area of Kaduna State is the focus of this work. In view of this, the study will provide information on determining the socio-demographic variables of crop farmers as a predictor to irrigation practice along river Galma, Zaria Kaduna State

Socio-demographic variables included in this study include but not limited to ages, marital status, size of household, educational attainment. this Demographical information ensure certain generalizations about groups to identify the capacity to practice method of irrigation. some household life-cycle variables influence the availability of the household labor force, that in turn may impact the diversification of irrigation activities and cropping, and the use of intensive (inputs) and/or extensive agriculture (deforestation);marital status roles are well defined in function to the practices of irrigation for the production of agriculture produce. Household access to skills in irrigation on crop production, migration out and/or in plays an important role on the different dynamics on irrigation practices along Galma River in Gyellesu Community

This study explained that age comes with the much-needed experience Ndiema (2002), and would point to the fact that such older farmers adopt best practices. Ndiema (2002) viewed that older farmers were found to be more likely to establish own irrigation practices for crop production, as they were more likely to adopt proper and more rewarding practice than by young farmers. it may not be out of place to notice that age could also predict the various irrigation practice. Household size may significantly influence adoption of irrigation practice. several studies have indicated that farmers with large household sizes tend to take up more labour intensive technologies compared to those with small household sizes Kirui, (2014) Hassan, and Nhemachena, (2008) The significant role played by household size in irrigation practices is well demonstrated by Akhter, and Olaf, (2016) , who found the number of adaptive strategies being practiced by farmers in Pakistan to be positively associated with household size, level of education, being male, land size, access to extension services, credit, as well as marital status and wealth

Marital status was never found to influence irrigation practice by smallholder farmers, whether individually or jointly with the other five socio-demographic factors. Although some studies have indicated that married farmers are more stable, made joint decisions regarding their farming business, and shared resources, hence; influenced technology adoption in agriculture Akhter, and Olaf, (2016), (Akinbami, Aluko, & Momodu, 2012) A number of other studies (Atibioke, Ogunlade, Abiodum, Ogundeke,

Omodara, & Ade, 2012, Pooja, & Rekha (2017), do not seem to indicate that marital status plays any significant role in technology adoption.

Generally, education is perceived to play an important role in influencing a person's decision to practice a new technology. In this respect, the farmer's level of education would be understood to increase his/her ability to obtain; process and use information related to the practice of irrigation by crop farmer in Gyellesu Community

Respondents' level of education was found never to influence climate change adaptation by smallholder farmers whether individually or jointly with the other five socio-demographic factors. This contradicts findings from several studies: Hassan, and Nhemachena, (2008) and Amuge, and Osewe, (2017), even found the number of adaptive practices adopted by farmers to be positively associated with education, among others, Hence the need to determine the influence of socio-demographic variables of crop farmers on the irrigation practices along river Galma, Zaria kaduna State

Purpose of the Study

The major purpose of the study was aimed to determine the influence of socio-demographic variables of crop farmers on the irrigation practices along river Galma, Zaria Kaduna State, specifically the study sought to answer the following question and test the following hypotheses:

Research Questions

The study seeks to find answers to the following questions.

1. Does the age of crop farmers influence the irrigation practices along river Galma, Zaria Kaduna State?
2. Does the Marital Status of crop farmers influence the irrigation practice along river Galma, Zaria Kaduna State?
3. Does the size of household of crop farmers influence the irrigation practice along river Galma, Zaria Kaduna State?
4. Does the Educational Attainment of crop farmers influence the irrigation practice along river Galma, Zaria Kaduna State?

Research Hypotheses

1. Age of crop farmers does not significantly influence the irrigation practice along river Galma, Zaria Kaduna State
2. Marital Status of crop farmers does not significantly influence the irrigation practices along river Galma, Zaria Kaduna State
3. Size of household of crop farmers does not significantly influence the irrigation practice along river Galma, Zaria Kaduna State
4. Educational Attainment of crop farmers does not significantly influence the irrigation practices along river Galma, Zaria Kaduna State

Methodology

Zaria is located in Kaduna State of Nigeria, and lies between latitude 11°04'N and 11°15'N of the equator and 7°30'E of the Greenwich Meridian as shown below. It is bounded by Funtua Local Government Area (L.G.A) of Katisna State in the North, to the South by Kachia Local Government Area (L.G.A.) Kaduna State, in the Southwestern part by the southern limit of Igabi L.G.A. to the west is Birnin Gwari L.G.A while to the east and southeastern part is Ikara and Lere L.G As of Kaduna State respectively. The climate of the study area is described as a tropical humid characterized by two distinct seasons the dry season and wet season. The vegetation of the Galma River basin is of the northern Nigeria guinea Savannah. The river Galma basin is underline by the crystalline rock of the basement complex.

The drainage system of Zaria focuses on the River Galma which it a major tributary of the river Kaduna and part of all input watersheds that divides Sokoto and Chad basin. The soil type is highly leached ferruginous tropical soil.

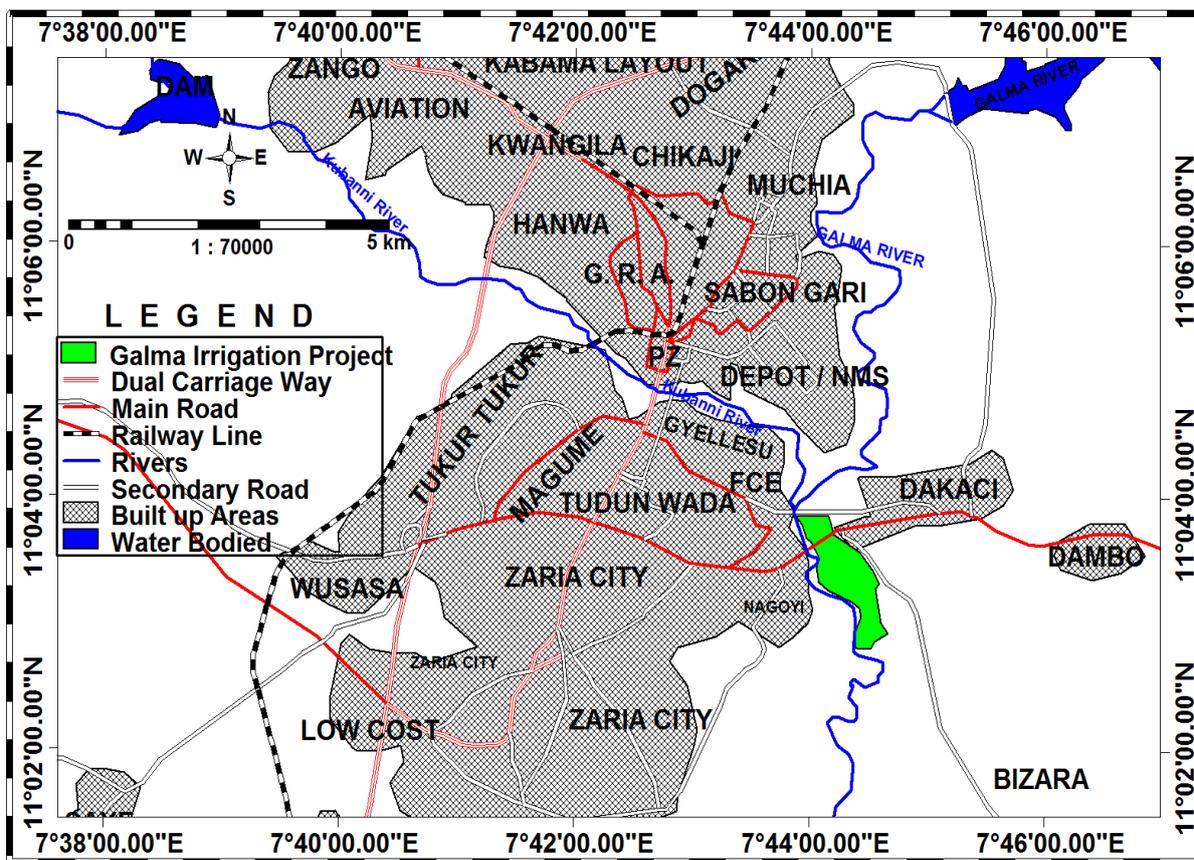


Fig. 1: Zaria LGA Showing Galma Irrigation Project as a Study Area.
Source : Department of Geography, Federal College of Education, Zaria.

Material

The material used for this research work involves data collected from field survey, questionnaire and other secondary sources. A reconnaissance survey of the area was conducted to get acquainted with the study area. This among other things helped in collecting vital information and getting on the spot assessment of the areas. Population of the study was 130 crop farmers that practiced irrigation for their crop farming. A sample size of 65 respondents was used for the study. Using 50 % of the population and simple random sampling technique, a sample size of the study was realized. A total of sixty-five (65) copies of questionnaire were used to seek information from the farmers, from Galma I and Galma II irrigation practice, and a structured interview was collected from River Galma irrigation office. The technique used in sampling of the farmers in the field survey was random sampling technique because of the individual availability at the moment of distribution of the questionnaire. The instrument consisted of two sections, section one, sought information on the socio-demographic information of the respondents, the socio-demographic variables was further sub-divide into section A, B, C, D. section A elucidated information on age which ranged between (15-34, 35-54, 55 and above) section B elicited information on marriage status (single, married, divorced) Section C provided information on Householding which ranged from (0-4, 5-10, 11 and above) while section D elicited information on educational attainment with the following (Quran, Primary, secondary education, tertiary institution) while section 2 elicited information on the types of irrigation practiced by the Galma farmers, the instrument was built on four- point rating scale of strongly agree 4 points, Agree, 3 points, Disagree 2 points, and Strongly Disagree 1,

The instrument was presented for face validation by three lecturers, one from the Department of Agricultural Education, and two from the Department of Geography all from the Federal College of Education, Zaria. The comment – alteration and suggestions of the experts were in-cooperated into the final draft of the instrument. The instrument was trial tested on 30 Galma crop farmers who were not part of the sample size but were of the parent population. Using Cronbach alpha reliability statistics, a reliability coefficient of .87 was realized, this indicated that the instrument was fair for the study. Primary data was obtained from field survey through the administration of questionnaire containing structured questions and oral interview was used for those who cannot read nor write. The questionnaire was distributed to various respondents in the study area through the simple random sampling method.

The researcher with three research assistants distributed the questionnaire to the respondents after a brief and careful explanation on how to respond to the items. A total of sixty-five (65) copies of questionnaire were used to seek information from the farmers, from Galma I and Galma II on irrigation practice. interpretation of the items was also done to assist some farmers in respond to the items. Primary data was obtained from field survey through the administration of questionnaire containing structured questions. Oral interview was used for those who cannot read nor write. The questionnaire was distributed to various

respondents in the study area. A total of fifty-nine (59) questionnaire were filled and returned without void, giving a 91% percentage return rate. Mean and Standard Deviation was used to answer the research questions while Analysis of Variance (ANOVA) will be used to test all the null hypotheses at 0.05 level of significance.

Result

Research Question 1: Does the age of crop farmers influence the irrigation practice along river Galma, Zaria Kaduna State?

Table 1: mean summary of age of crop farmers on the influence of irrigation practice along river Galma, Zaria Kaduna State

Age range of the farmers	N	\bar{X}	SD
15-34	21	3.52	.602
35-54	30	2.17	.379
55and above	8	2.38	.518
Total	59		

Table 1, result revealed that the age range between 15-34 years had mean of 3.52, and the age range of 35-54 years had a mean of 2.17, while the age range of 55 years and above had a mean of 2.38. This implies that farmers within the age range of 15-34 were influenced by the irrigation practice prevalent along the Galma River in Zaria

Research Question 2: Does the marital status of crop farmers influence the irrigation practice along river Galma, Zaria Kaduna State?

Table 2: mean summary of marital status of crop farmers on the influence of irrigation practices along river Galma, Zaria Kaduna State

Marital Status	n	\bar{X}	SD
Single	10	2.10	.316
Married	34	3.74	.448
divorced	15	2.27	.458
Total	59		

Table 2, result revealed that the crop farmers who are singles had mean of 2.74, and the crop farmers who are married had a mean of 3.74 while the crop farmers who are divorced had a mean of 2.27. This implies that crop farmers who are married were influenced by the irrigation practice prevalent along the Galma River in Zaria

Research Question3: Does the household size of crop farmers influence the irrigation practice along river Galma, Zaria Kaduna State?

Table 3: mean summary of household size of crop farmers on the influence of irrigation practices along river Galma, Zaria Kaduna State

Household size	n	\bar{X}	SD
1-4	15	2.33	.488
5-10	21	2.71	.717
11 and above	23	3.74	.449
Total	59		

Table 3, result revealed that the crop farmers with a household size of 1-4 had mean of 2.33, and the crop farmers with a household size of 5-10 had a mean of 2.71 while the crop farmers with a household size of 11 and above had a mean of 3.74. This implies that crop farmers with the households size of 11 and above were influenced by the irrigation practice prevalent along the Galma River in Zaria

Research Question 4: Does the educational Attainment of crop farmers predict the irrigation practice along river Galma, Zaria Kaduna State?

Table 4: mean summary of educational qualification of crop farmers on the influence of irrigation practices along River Galma, Zaria Kaduna State

Educational qualification	n	\bar{X}	SD
Quran	26	3.31	.471
Primary	18	3.56	.511
Secondary	13	3.23	.439
Tertiary	2	3.50	.707
Total	59		

Table 4, result revealed that the crop farmers with Quran qualification had a mean of 3.31, the crop farmers with primary education had a mean of 3.56, the crop farmer of secondary education had a mean of 3.32 while the crop farmers with tertiary education had a mean of 3.50. The result implies that crop farmers with the primary education were influenced by the irrigation practice prevalent along the Galma River in Zaria

Research Hypothesis 1: Age of crop farmers does not significantly influence the irrigation practice along river Galma, Zaria Kaduna State

Table 5: Summary of ANOVA showing influence of age of crop farmers on the irrigation practice along River Galma, Zaria Kaduna State

	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	23.602	2	11.801	49.763	.000	Sig.
Within Groups	13.280	56	.237			

Total	36.881	58
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The summary of data analysis presented on table 5 shown F value as 49.763. This was compared with its significant value of .000 at 0.05 level of alpha. since the significant value of .000 is less than the acceptable level of 0.05, the null hypothesis which stated that age of crop farmers does not significantly influence the irrigation practice along river Galma, Zaria Kaduna State is rejected. Hence, the result showed that age of crop farmers significantly influences the irrigation practice. There was the need to conduct the post hoc test to determine the direction of the significance.

Table 6: Post-Hoc of Scheffe test on significant influence of age of crop farmers and he irrigation practice along river Galma, Zaria Kaduna State

(I) age	(J) age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
15-34	35-54	1.357*	.139	.000	1.01	1.71
	55and above	1.149*	.202	.000	.64	1.66
35-54	15-34	-1.357*	.139	.000	-1.71	-1.01
	55and above	-.208	.194	.564	-.70	.28
55and above	15-34	-1.149*	.202	.000	-1.66	-.64
	35-54	.208	.194	.564	-.28	.70

The mean difference is significant at 0.05 level. From the post hoc test in Table 6, it is observed that the significant difference lies between the ages of 15- 34 and 55 and above as shown with significant values attached with asterisks This means that crop farmers with this age bracket are predominantly influenced by the irrigation practice.

Research Hypothesis 2: Marital Status of crop farmers does not significantly influence the irrigation practices along river Galma, Zaria Kaduna State

Table 7: Summary of ANOVA showing influence of marital status of crop farmers on the irrigation practice along river Galma, Zaria Kaduna State

	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	34.125	2	17.063	91.428	.000	Significant
Within Groups	10.451	56	.187			
Total	44.576	58				

The summary of data analysis presented on table 7 shown F value as 91.428. This was compared with its significant value of .000 at 0.05 level of alpha. since the significant value of .000 is less than the acceptable level of 0.05, the null hypothesis which stated that marital status of crop farmers does not significantly influence the irrigation practices along river Galma, Zaria Kaduna State is rejected. Hence, the result showed that marital status of

crop farmers significantly influences the irrigation practice. There was the need to conduct the post hoc test to determine the direction of the significance.

Table 8: Post-Hoc of Scheffe test on significant influence of marital status of crop farmers and the irrigation practice along river Galma, Zaria Kaduna State

(I) marital status	(J) marital status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
Single	married	-1.635*	.155	.060	-2.03
	divorced	-.167	.176	.642	-.61
Married	single	1.635*	.155	.000	1.24
	divorced	1.469*	.134	.000	1.13
Divorced	single	.167	.176	.642	-.28
	married	-1.469*	.134	.030	-1.81

The mean difference is significant at 0.05 level. From the post hoc test in Table 8, it is observed that the significant difference lies between the marital status of married and divorced farmers as shown with significant values attached with asterisks This means that crop farmers with married and divorced status are predominantly influenced by the irrigation practice.

Research Hypothesis 3: Household size of crop farmers does not significantly influence the irrigation practice along river Galma, Zaria Kaduna State

Table 9: Summary of ANOVA showing influence of household size of crop farmers on the irrigation practice along river Galma, Zaria Kaduna State

	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	20.929	2	10.465	32.45	.036	significant
Within Groups	18.054	56	.322			
Total	38.983	58				

The summary of data analysis presented on table 7 shown F value as 32.45. This was compared with its significant value of .000 at 0.05 level of alpha. since the significant value of .000 is less than the acceptable level of 0.05, the null hypothesis which stated that household size of crop farmers does not significantly influence the irrigation practice along river Galma, Zaria Kaduna State is rejected. Hence, the result showed that household size of crop farmers significantly influences the irrigation practice. There was the need to conduct the post hoc test to determine the direction of the significance.

Table 10: Post-Hoc of Scheffe test on significant influence of household size of crop farmers and the irrigation practice along river Galma, Zaria Kaduna State

(I) household size	(J) household size	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
0-4	5-10	-.381	.192	.149	-.86	.10
	11 and above	-1.406*	.188	.000	-1.88	-.93
5-10	0-4	.381	.192	.149	-.10	.86
	11 and above	-1.025*	.171	.000	-1.46	-.59
11 and above	0-4	1.406*	.188	.000	.93	1.88
	5-10	1.025*	.171	.000	.59	1.46

*. The mean difference is significant at the 0.05 level.

The mean difference is significant at 0.05 level. From the post hoc test in Table 10, it is observed that the significant difference lies with the crop farmers with household size of 11 and above as shown with significant values attached with asterisks This means that crop farmers with house hold size of 11 and above are predominantly influenced by the irrigation practice.

Research Hypothesis 4: Educational attainment of crop farmers does not significantly influence the irrigation practices along river Galma, Zaria Kaduna State

Table 11: Summary of ANOVA showing influence of Educational Attainment of crop farmers on the irrigation practice along river Galma, Zaria Kaduna State

	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	.009	1	.009	.011	.915	
Within Groups	45.618	57	.800			
Total	45.627	58				

The summary of data analysis presented on Table 11 shown F value as .011. This was compared with its significant value of .915 at 0.05 level of alpha. Since the significant value of .915 is greater than the acceptable level of 0.05, the null hypothesis which stated that educational attainment of crop farmers does not significantly influence the irrigation practices along river Galma, Zaria Kaduna State is retained. Hence, the result showed that educational attainment of crop farmers does not significantly influences the irrigation practice.

Findings of the Study

Research Questions

1. Crop farmers within the age range of 15-34 were influenced by the irrigation practice prevalent along the Galma River in Zaria
2. Crop farmers who are married were influenced by the irrigation practice prevalent along the Galma River in Zaria
3. Crop farmers with the household size of 11 and above were influenced by the irrigation practice prevalent along the Galma River in Zaria
4. Crop farmers with the primary education were influenced by the irrigation practice prevalent along the Galma River in Zaria

Research Hypotheses

1. That age of crop farmers significantly influences the irrigation practice
2. Marital status of crop farmers significantly influences the irrigation practice.
3. Household size of crop farmers significantly influences the irrigation practice.
4. Educational attainment of crop farmers does not significantly influence the irrigation practice.

Discussion of Findings

Age of the crop farmers and the irrigation practice prevalent along the Galma River in Zaria,

The result from the research question one shows that farmers within the age range of 15-34 were influenced by the irrigation practice prevalent along the Galma River in Zaria, while the corresponding hypothesis indicated that age of crop farmers significantly influences the irrigation practice. The inference of these results is that most of the respondents fits-in to the young and middle-aged category. This is a benefit since they are presumed to be physically skillful and more mentally vigilant in learning new technologies compared to the older farmers. This also agreed with Ayandiji and Adeniyi (2011) who reported that age bracket of 30-40 years is an indicator of good supply of agile workforce in farming This result may be the expected as this age bracket are still young and can

effectively carry out the task required by farmers. the result is in line with the findings of country (Salisu, 2001) which indicated that the new entrants in the agriculture are the major ones practicing irrigation farming. In some cases, it becomes visible that at a certain number of years of farming, the farming experiences have positive effects on the adoption of new technologies whereas in some cases it becomes negative. This negative effect may be due to the aging or unwillingness of the older farmers to adjust from old and well-known practices to the modern and improved practices.

Married status of the crop farmers and the irrigation practice prevalent along the Galma River in Zaria

The result from the research question two shows that crop farmers who are married were influenced by the irrigation practice prevalent along the Galma River in Zaria, while the corresponding hypothesis indicated that married crop farmers significantly influences the irrigation practice. The result of the marital status established that most of the farmers were married This could have an implication on irrigation practices; married farmers are presumed to enjoy family labour for farming activities. the result is in line with the findings of Akhter, and Olaf (2016) Akinbami, Aluko, Momodu, (2012) which asserted that married farmers are more stable, made joint decisions regarding their farming business, and shared resources, hence; influenced technology adoption in agriculture

The household size of crop farmers and the irrigation practice prevalent along the Galma River in Zaria

The result from the research question three shows that crop farmers with the household size of 11 and above were influenced by the irrigation practice prevalent along the Galma River in Zaria, while the corresponding hypothesis indicated that household size of crop farmers significantly influences the irrigation practice. This result is envisaged that large size of the household could serve as a means of affordable labour on the farm. the finding is in line with the assertion of Muthui, (2015) that one of the predominant factors that control the level of output and efficiency of the farmers are the composition and number of the family members. Therefore, the finding of the present study is in line as found out by (Yakubu, 2015) that the relatively number of family size of the farmer is a clear edge, since it may probably allow the farmers to utilize family labor, thereby minimize labour cost needed for production

Educational qualification of the crop farmers and the irrigation practice prevalent along the Galma River in Zaria

The result from the research question four shows that crop farmers with the primary education were influenced by the irrigation practice prevalent along the Galma River in Zaria, while the corresponding hypothesis indicated that whatever type or level of educational attainment of crop farmers does not significantly influence the irrigation practice. The result on educational qualification of the crop farmers and the irrigation

practice could be explained from the fact that the farmers gained much information from the mass media. This result is in line with the findings of Tegegne, (2017) who stated that respondents' level of education was found never to influence climate change adaptation by smallholder farmers whether individually or jointly with the other five socio-demographic factors. This is summed up that education is perceived not to play an important role in influencing the farmer's decision to adopt a new technology. The finding of the study is in line with the works of Akinsanmi and Doppler, (2015) who asserted that reasonably educational level may not motivate the adoption of new innovation which may improve farm productivity and earnings as the farmers depended a lot on peers for them to adopt new technologies relating to climate change

The interview conducted with Mal. Sani Umar of Gyllesu on the 2nd Of May 2021 revealed that capital is very important especially for purchasing of farm implements, fertilizer and other things required by the farmers for irrigation farming. However, the farmers interviewed revealed that they make use of their personal savings in purchasing whatever they need as most attempt they have made for government to come to their aid has remain abortive and because of insufficient fund most of them have not been able to farm as much as they want.

Conclusion

No doubt, irrigation farming has contributed to the agricultural productivity in the study area. However. There are problems associated with it such as flooding and poor channelization of irrigation water which seriously affects the crops productivity. The flooding of the farmland is a phenomenon associated with the Galma River, it occurs every year and it has negative impact on crop productivity and is as a result of high rainfall during the rainy season especially in the month of July and August. Also, poor channelization is as a result of poor management of the channels and also due to the flood water that destroyed the irrigation channels. Irrigation farming has been beneficial even though there are some ups and downs but to some extent the benefits derived by the farmers is higher because their livelihood is tied to it.

Recommendations

1. Government should introduced more of this irrigation scheme to boost agricultural production in the area.
2. Kaduna State Government should refurbish the canals distributing the water to the farmlands this with the view to assist the crop farmer to have water through-out the year for their planting
3. Kaduna State Government should provide credit facilities to the farmers in order to improve their agricultural productivity which would help in ensuring food security for the nation at large



4. The channels which have been destroyed or washed away by flood should be reconstructed by the ministry of Agriculture so as to allow proper flow of water into the farm land.
5. Formation of cooperatives society should be encouraged among crop farmers, so as to facilitate easy sharing of ideas on the irrigation practice in along Galma river.
6. Government should provide credit facilities for crop farmers to hire labour force when there is small household size.

References

- Akhter, A. & Olaf, E. (2016) Assessing farmer use of climate change adaptation practices and impacts on food security and poverty in *Pakistan*. *Science Direct. Elsevier, Amsterdam*.
- Akinbami, C.A.O., Aluko, M.A.O & Momodu, A.S. (2012) Technology adoption and women entrepreneurial behaviour: Case of agri-allied businesses in rural south western Nigerian communities. *International Journal of Science and Technology*, 1, 509-523.
- Akinsanmi A, & Doppler, W. (2005). Socio - economic and food security of farming in south east Nigeria. *Conference on International Agricultural Research for Development held at Stuttgart - Holien, October 11-13*. p. 12.
- Amuge, M. L. & Osewe, D.O. (2017) Socio-Economic Factors influencing adoption of feed based dairy technologies among smallholder farmers in Ekerenyo sub-county, Kenya. *Asian Journal of Agricultural Extension, Economics & Sociology*, 16, 1-8. <https://doi.org/10.9734/AJAEES/2017/32357>
- Ayele , G. K. (2011) . The impact of selected small-scale irrigation scheme on household income and the likelihood of poverty in the lakeTana Basin of Ethiopia. *A project paper presented to the faculty of graduate school of Cornell University*.
- Atibioke, O.A., Ogunlade, I., Abiodun, A.A., Ogundele, B. A., Omodara, M.A. & Ade, A.R. (2012) Effects of farmers' demographic factors on adoption of grain storage technologies developed by Nigerian stored Products Research Institute (NSPRI): A case study of selected villages in Ilorin West LGA of Kwara State. *Research on Humanities at Social Sciences*, 2, 56-65.
- FAO (1973).Irrigation drainage and salinity, food and agricultural organizations of the United Nation. London, UK. *Hutchinson and Co. Ltd*.
- Hassan, R. & Nhemachena, C. (2008) Determinants of African farmers' strategies for adapting to climate change: Multinomial choice analysis. *African Journal of Agricultural Research and Extension*, 2, 83-104.



- Kirui, J.W. (2014) Assessment of the influence of climate change on smallholder dairy productivity in Kosirai, Kenya and Namayumba in Uganda. *University of Nairobi, Kenya*
- Musa, S.B. (2013) Irrigation margin of financial transfer in Nigeria. A Case Study of Financial Sustainability for operation, Maintenance and Management *FAO my room Italy*.
- Muthui, M.M. (2015) Socio-economic and administrative factors influencing adoption of irrigation technology in Tharaka Nithi County. *University of Nairobi, Nairobi, Kenya*
- Ndiema, A.C. (2002) Factors affecting the adoption of selected wheat (*Triticum aestivum*) production technologies by farmers in Njoro and Rongai Divisions of Nakuru District, Kenya. Egerton *University, Njoro, Kenya*
- Orunye, E.D. (2011). An assessment of Fadama dry season forming through small chat irrigation system in Jalingo LGA. Taraba State. *International Research Journal of Agricultural Science and Soil Science*, 1 (1) 014-019
- Pooja, J. & Rekha, D. (2017) Impact of demographic factors: Technology adoption in agriculture. *SCMS Journal of Indian Management*, 93-102
- Salisu S. A. (2001) Individual pump ownership and associated service providers in Fadama irrigation in Northern Nigeria in Hilmy S, Charles L (eds) *Private irrigation in Sub-Saharan Africa. Regional seminar on private sector participation and Irrigation Expansion in Sub-Saharan Africa 22-26 October, Accra, Ghana pp.211 -220*
- Sanda, A.O. (1992). *Managing Irrigation project in Nigeria*. Ibadan: Spectrum books Ltd.
- Tegegne, F.S. (2017) Factors Affecting adoption of dairy technologies and their impact on farm household income and asset holdings: The case of Tehuledere District, South Wollo Zone, Amhara Region, *Ethiopia. Hawassa University, Hawassa, Ethiopia*
- Yakubu, O.M. (2015). Impact of Agricultural Services and Training Centre (ASTC) Project on tomato farmer's livelihood in Plateau State, Nigeria. A PhD Thesis in the Department of Agricultural Economics and Rural Sociology, Faculty of Agriculture, Ahmadu Bello University, Zaria, Kaduna State Nigeria.
- Zewdie, M.J. Moti, S. D. & Ascimelis, G. (2007). Assessment of Wenko. Washa irrigation scheme in Awassa Zura proceeding of research project completion workshop; 2007 Feb 1-2 Addisababa, Ethiopia