JOURNAL OF AGRICULTURAL ECONOMICS, EXTENSION & SCIENCE ISSN (Print) 2545-5179, ISSN (Online) 2714-5018
Official Journal of the College of Agricultural Economics, Extension & Science JAEES Vol. 7 No. 4 2021, Pages 71 - 89
www.jaees.org

FACTORS INFLUENCING OWNERSHIP OF FARM PLOTS AND INCOME UNDER THE DADIN KOWA IRRIGATION SCHEME IN NORTH EASTERN NIGERIA.

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Abstract

This study analyzed the factors influencing ownership of farm plots and income under the Dadin Kowa Irrigation Scheme in North Eastern Nigeria. The multi-stage stratified sampling technique in which 2 LGAs, 6 villages and 300 households were systematically selected in stages was applied; and primary data obtained with the aid of structured questionnaire. Analytical tools include both descriptive and inferential statistics. The results revealed that age and years of farming experience influenced the ownership of farm plots among the female farmers (P<0.01). Similarly, formal education, source of farm labour, total farm income among other variables were found to have significant effect on ownership of farm plots (P<0.05) among male farmers. Similarly, age, formal education, years of farming experience, cost of farm land, and occurrence of land dispute statistically and significantly affect acquisition of farm plot (P<0.01) among male farmers. Source of farm labour and method of land acquisition were, also, significant (P<0.05). Similarly, gender, formal education, source of farm labour, method of land acquisition, number of farm plots owned, and cost of farm land, influenced the total farm income of the female farmers (P<0.01), while age was statistically significant (P<0.05). Furthermore age, formal education, source of farm labour, method of land acquisition and number of farm plots owned were found to be statistically significant at (P<0.01) and found to influence male farmers' total farm income, while gender and cost of farmland statistically and significantly influence total farm income of male farmers (P<0.05). The major cause of conflicts was land encroachment (85.1%). The study concludes that age, level of formal education, gender, type of tenure, type of farm

labour, cost of farm land, and occurrence of land conflict affect the variability of farm plots owned and income of farmers under the Dadin Kowa Irrigation Scheme. Stakeholders should revisit the land tenure and acquisition structures in the area to improve the system. Enforcement of land-policies, establishment of land dispute courts and land management committees will, also, increase involvement in irrigation farming and income of land users.

Keywords: Variability, Analysis, Farm, Income, farmers.

1. Introduction

The significant contribution of agriculture to Nigeria's economy is well accepted and documented; accounting for average of 33% of the Gross Domestic Product (GDP) (FAO, 2014), and providing employment to about 65% adults' labor force, the food fiber need for large and increasing population of Nigeria (Izuchukwu, 2011) and the needed foreign exchange earnings for capital development project (Olatunji *et al.,* 2010). The agricultural sector is a catalyst for food provision, provision of employment, provision of raw materials for agro-allied industries, and generation of foreign earnings, among others (FMARD, 2000). It has been reported that, over the past years, value-added per capita in agriculture has risen by more than 1 percent annually. It is estimated that Nigeria has lost about USD 10 billion in annual export opportunity from export crops such as groundnut, palm oil, cocoa and cotton alone due to continuous decline in the production of those commodities. Similarly, food production increases have not kept pace with population growth, resulting in rising food imports and declining levels of national food security (FMARD, 2000; NBS, 2017 and 2019). Thus, its agreed among scholars that lack of food self-sufficiency connotes loss of sovereignty at all levels (Fraser and Rimas, 2010). Available statistics attest to the fact that Nigeria's population has quadrupled within the sixth decades of the nation's existence (45 million in 1963 to over 182 million in 2015 – UN, 2015). Therefore, demanding a more radical and sustainable approach to food security in all its ramifications. Friendly policies for transformation of land ownership and increasing farm income are very critical to the attainment of food security.

Land is a distinctive factor of production and is inclusive of all naturally occurring goods such as water, air, soil, minerals, flora and fauna that are used in the creation of products and its ownership structure defines land tenancy. According to Emeasoba (2012), land forms the

foundation of all human, social and economic activities that lie at the heart of social, political, or economic life of nations especially African nations. Land is recognized as a primary source of wealth, social status, and power, the basis for shelter, food, and economic activities and significantly provides employment opportunities in the rural areas. However, its increasingly becoming a scarce resource in both rural and urban areas (Emeasoba, 2012). The ownership and possession of land as an economic resource confers security on the owner and determines the level of involvement in agriculture in an agrarian society. Nigeria nationalized all lands in the country and by implication transferred the responsibility of its administration on committees constituted at state and local level Authorities. Land is the human habitat and a resource, which cannot be expanded, but keeps carrying an ever-increasing human population. It is an essential natural resource needed for the survival and success of humans as well as for the maintenance of the global ecosystems. Not every human user has equal access to land most of the time due to constant competition among land users.

This inequality in land access and continuous land contestations ownership, which exist among users may not only be a hindrance to agriculture, but also create tenuous relations among competing use groups which may lead to social conflicts and unrest among others (Kugbega and Aboagye, 2021). Inequality in land distribution has been found to have a strong inverse relationship with economic growth and poverty reduction. A large portion of land in developing countries is underutilized and/or even misused from a sustainability point of view. Lack of access to land or unfavourable terms of access may remain a fundamental cause of poverty, while unmet demands for it can be a source of political instability.

Land access is the process by which land users either singly or collectively gain rights and opportunities to occupy and utilize land on either a temporary or permanent basis (Jayne et al., 2003). Such an access enables family labour to be productive through farming, to generate a source of food and provide livelihood. In rural areas of the developing world, reduced access to natural resources such as land and water leads to poverty and intensified conflicts. It has been reported also, that conflicts over natural resources are not only unique to developing countries; they are present throughout the World (Emeasoba, 2012). To reduce competition over land resources and increase farm incomes, there is a need to regulate means of accessing them and promote efficient use for their sustainability. Several studies have been conducted on social-economics factors and how it affects farmers land ownership and income, the closest are the studies of Comelius *et al.* (2016). Ginting *et al.* (2020) analyzed

the factors affecting the income of farmers of corn (Zea mays) in the district of Tiga Binanga, Karo district; while Babatope and Abbyssinia (2019) examined land ownership and usage for agriculture: However, this study is of paramount importance in filling research gap and generating the needed data for gender main streaming in land administration for transforming the irrigation systems. The specific objectives were to analyze factors influencing ownership of farm plots and incomes of male and female farmers, identify the problems associated with land ownership and administration, and assess the state of awareness about the laws governing land tenancy, utilization and management in Dadin Kowa Irrigation Scheme (DKIS). The study hypothesized that none of the identified factors have any significant influence on farm plots and income of male and female farmers in DKIS.

2. Methodology

The areas covered 2 Local Government Areas of Gombe and Borno States. These include Yamaltu-Deba LGA (Gombe State) and Bayo LGA (Borno State) where the Dadin Kowa Irrigation Scheme (DKIS) activities have been designed to cover with irrigation services at the first stage of project.

Gombe State located in the north eastern part of Nigeria, is one of the country's 36 states; its capital is Gombe. The boundaries of the State roughly correspond to those of the Tangale-Waja Chiefdom and Gombe Emirate, a traditional State [National Human Development Report (NHDR), 2018]. The state has an area of 20,265 km² and a population of about 2,365,000 people [National Population Census (NPC), 2006]. Gombe has two distinct climates, the dry season (November–March) and the rainy season (April–October) with an average rainfall of 850mm (Hamidu *et al.,* 2014). Gombe has variety of agro-based products such as; sorghum, maize, millet, beans, groundnut, fishery, cotton, and gum Arabic. Mineral resources include gypsum, bentonite, limestone, and footer (NHDR, 2018).

Borno State is located in north-eastern part of Nigeria. Its capital is Maiduguri. The state was formed in 1976 from the split of the North-Eastern State. Until 1991 it contained what is now Yobe State. The state is predominantly agrarian state. The state is located in the North Eastern part of Nigeria and has about 69, 436 sq km and lies within the latitude 11°N and longitude 13.5°E. The 2006 census indicated that the state has 1,239,892 female. The climatic condition of the state is hot and dry for most part of the year in the north, while in the

south it is a bit milder. The annual rainfall ranges between 500-1,000 mm. The rainy season starts in June and terminates in September in the Northern part of the state. While the rainy season is between the months of May and October in the South with relative humidity of approximately 49% and evaporation of 203 mm year (NPC, 2006; Sabo, 2007). The Agro raw material found in Borno state includes; fishery, sorghum, maize, millet, beans, groundnut and cotton.

2.1 Sampling technique

The study used a multi-stage stratified sampling technique in which 2 LGAs, 6 villages and 300 households were systematically selected in stages. The first stage involved the selection of states, the second stage involved the selection of LGAs, the third stage involved the selection of wards, the fourth stage involved the selection of villages, and the fifth stage involved the selection of farmers.

2.2 Data collection method

Data were collected at the household's level using structured questionnaire. The questionnaires were pre-tested and administered by a team of trained enumerators. Interviews were held with the head of the household or other appropriate members of the household who are directly responsible for farming activities. The study captured key variables on land rights, types of land tenure, methods of land acquisition, gender and problems affecting land administration under the Dadin Kowa irrigation scheme.

2.3 Data analysis

A combination of analytical tools was employed in the analyses, including descriptive statistics (means, frequencies, percentages, minimum- maximum, bar-line chart, and coefficient of variation), measures of dispersion and inferential statistics (t/z tests). Also, employed in analyzing the data collected for this study include regression analysis to determine the drivers of farm plot ownership, farm income and other variables affecting land rights, methods of land acquisition, land tenure systems and gender variability among the land users in DKIS as used by Sani *et al.* (2001) and Adikwu *et al*. (2017), expressed as:

$$Y_1 = a_0 + b_1x_1 + b_2x_2 \ldots + b_nx_n + e \quad (1)$$

$$Y_2 = a_0 + b_1x_1 + b_2x_2 + \ldots + b_nx_n + e \quad (2)$$

Where:

Y = dependent variables (Y_1= No of Farm plots owned by land users; Y_2= Total Farm

Income)

a0 = intercept

b_i = regression coefficients of the independent variables.

X_1= Age (years) , X_2= level of education (Formal education = 1, none = 0), X_3= years of farming experience, X_4= Source of farm labor (family / hired labor), X_5= Total farm income (Naira), X_6= Method of land acquisition, X_7= Price of I ha of farm land in 2019 (Naira) , X_8= Cost of renting 1 ha of farmland in 2019 (Naira), X_9= Land dispute; Y_1= No of Farm plots owned by land users was analysed for both male and female.

Also, X_1= Age, X_2= Gender (male =1, female =2), X_3= level of education (Formal education = 1, none = 0) , X_4= Source of farm labor (family / hired labor), X_5= Method of land acquisition, X_6= No of plots owned, X_7= Price of 1 ha of farmland in 2019 (Naira) X8= Cost of renting 1 ha of farmland in 2019 (Naira), X_9= Land dispute (involved/not involved); Y_2 = Total Farm Income was analysed for male and female.

The criteria used in selecting best fit out of the two functional equations included in the regression model include: (i) highest R^2-value, (ii) highest number of significant variables, (iii) highest F-value and (iv) conformity to the a priori expectations of the regression coefficients as highlighted on table 1 (Adikwu *et al*., 2017).

Table 1: A Priori Expectations of Regression Coefficients for Key Varaibles

Variable	***Aprior* Expectation (+/ -)**
Age	+
Level of Education	+
Years of Farming Experience	+
Source of Farm Labor	+
Total Farm Income	+
Method of Land Acquisition	+
Price of 1 Hectare of Farmland	-
Cost of Renting 1 Hectare of Farmland	-
Land Dispute	-
Number of Farm Plots Owned	+

Source: Extracted from Adikwu *et al*. (2017)

3.0 Results and Discussion

3.1 Factors influencing ownership of farm plots

Land is a distinctive factor of production and is inclusive of all naturally occurring goods such as water, air, soil, minerals, flora and fauna that are used in the creation of products. Land ownership or tenancy spells out who owns what land in an agrarian community. Land is recognized as a primary source of wealth, social status, and power, the basis for shelter, food, and economic activities and significantly provides employment opportunities in the rural areas. Similarly, ownership and possession of land as an economic resource confers security on the owner and determines the level of involvement in agriculture in an agrarian society. Analysis of the factors influencing ownership of farm plots among the male and female landowners are presented in Tables 1 and 2.

Table 2 reveals that age and years of farming experience influenced the ownership of farm plots among the female gender ($P<0.001$). This results implies age increases the likelihood of farmland ownership among farmers. Aptly put, older farmers tend to own farmland than the younger farmers. Similarly, formal education, source of farm labour, total farm income, method of land acquisition, price of 1 ha farm land, cost of renting 1ha of land has significant effect on ownership of farm plots ($P<0.05$) respectively. This result implies that education increases the level of farmland ownership. This may be due to the fact that farmers without formal education may not be well informed and knowledgeable on the land tenure system and mode of land acquisition. Furthermore, source of farm labour increases the level of farmland ownership. This is also inline with the apriori expectation as farmers would not be eager to own more farmland if they can not be guaranteed of laborers would assist in farming activities. The result also showed that the total farm income was positive and significant which implies that farm income would increase the level of farmland ownership. This is because farmers will not be willing to own farmland if they do not get good returns from sales of farm produce. Relatively; method of land acquisition is positive and significant increases the level of farmland ownership. The result further revealed that price of 1 hectare of farm land increases the likelihood of farmland ownership. This implies that, if the prices of farm land is high, there would be a drop in the demand for land, hence decrease farmland ownership. Similarly, cost of renting 1 hectare of land increases the level of farmland ownership. This agrees with the findings of International Organization for Migration report in

2016 that social and cultural barriers are still the major factors hindering women from having owning lands and other property rights and assets in Nepal. The overall validity of the model is good as the adjusted coefficient of multiple determinations R^2 value (68 per cent) is higher to increase the variation explanation of response variables. The tests for the existence of linear relationship are captured by F- value (P<0.001) showing that, for the included variables there is evidences of relationship, that is, at least one explanatory variable is significant in the model. This implies that, the more female farmers are educated, experienced, the more likelihood of acquiring more farm plots for their irrigation activities. Agriculture is a land-dependent occupation which makes land a very important asset not only to farmers but to any economy seeking to achieve food self-sufficiency, any form of physical development, improving living standards of its citizens and the manufacture of goods and the establishment of institutions to support the basic needs of modern communities. Land is one basic resource, which is exploited for development by the application and management of capital, labour and technology. Therefore, its physical supply is limited even as the demand for its use increases daily

Table2: Factors influencing ownership of farm plots among female farmers in DKIS

Variable	Coef.	Std. Er.	t-value	P>|t|
Conts	4.138972	1.462212	2.83	0.007***
X1	.5866973	1.462212	2.83	0.002***
X2	.4910887	.2385266	2.06	0.046**
X3	1.256656	.202105	6.22	0.000***
X4	.4101909	.1735992	2.36	0.023**
X5	.3960328	.1676073	2.36	0.023**
X6	.2200173	.1021287	2.15	0.037**
X7	.212874.4	.106986.3	1.99	0.053**
X8	.2861716	.1307352	2.19	0.031**
X9	.3560971	.4033567	0.88	0.382ns
Prob > F	= 0.0000***			
R-squared	= 0.6683			
Adj R-squared	= 0.5989			

*** P<0.01; **P<0.05; ns- not significant

X1= Age X2= Formal education X3= years of farming experience

X4= Source of farm labour X5= Total farm income X6= Method of land acquisition

X7= Price of I ha of farm land in 2019 X8= Cost of renting 1 ha of farmland in 2019

X9= Land dispute

Table 3 shows the influence of some socio-economic factors on acquisition of farm plots among the male farmers in DKIS. The results reveal that, age formal education, years of farming experience, price of 1 ha of land, cost of renting 1 ha of farm and once affected by land dispute statistically and significantly affect acquisition of farm plot among male farmers (P<0.01) respectively. Consequently, source of farm labour and method of land acquisition were significant (P0.05). It has been stated that, land is the key factor for economic growth and development of every nation and the foundation for shelter in the urban areas as well as the source of livelihood in the rural areas. Therefore, it is an indisputable source of wealth and employment. Farming experience and formal education can lead to an increase in farmers quest for modern farm practices and technology, which eventually, will increase farm income and subsequently increase farm plot ownership. Similarly, the lees the price of 1 ha in the land market, the more likely tendency of acquiring more farm plots for irrigation farming in the area. The linear form of the specified regression model had the best fit based on the adjusted coefficient of determination (R^2), t – statistics and the signs of the regression coefficients. The results in Table2 show that, the independent variables included in the model accounted for 96% of the variability in the ownership of farm plots among the male land users in DKIS. The F – value was significant at 1% level of probability meaning that the model was well specified. Therefore, these factors should be considered when modernizing irrigation management. In Nigeria, land defines the social, political, economic and spiritual relations in the society. Its accessibility and availability on demand when and where needed is a critical factor to development of the agricultural sector. In Nigeria, it has been observed that the government's land administration technique currently in use (the Land Use Act of 1978) has not been able to meet the demand for agricultural land when and where needed for its population especially the low, the middle and even some high-income earners. Its implementation has not been very successful as it is frustrating, time consuming, cumbersome and highly bureaucratic. These have given rise to significant transaction costs in terms of fees, delays, and bribery (Mortimore, 1986; Antwi and Adams, 2003; Ikejiofor, 2009; Emeasoba, 2011).

Table 3: Factors influencing ownership of farm plots among male farmers in DKIS

Variable	Coef.	Std. Er.	t-Value	P>|t|
Conts	2.763784	.9834418	-2.81	0.006***
X1	.0679083	.0189495	3.58	0.000***
X2	.2704764	.0583266	4.64	0.000***
X3	0.863836	.3214356	2.69	0.008***
X4	.342141	.141048	2.43	0.017**
X5	.1228077	.0252791	2.71	0.008**
X6	.4628185	.2152518	2.15	0.033**
X7	1.168609	.0966537	12.09	0.000***
X8	.1543711	.0151394	10.20	0.000***
X9	.023222	.005596	4.15	0.000***
Prob > F	= 0.0000***			
R-squared	= 0.9613			
Adj R-squared	= 0.9595			

*** P<0.01; **P<0.05

X1= Age X2= Formal education X3= years of farming experience
X4= Source of farm labour X5= Total farm income X6= Method of land acquisition
X7= Price of I ha of farm land in 2019 X8= Cost of renting 1 ha of farmland in 2019
X9= Land dispute

3.2 Factors influencing total farm income

Analysis of the factors influencing total farm income among the males and female land users are presented in Tables 4 and 5. Farm income or returns not only indicate that consumers want more of a good; they are also the inducement to land users to produce this good. The farmers explain that income is very useful to them as it helps them meet the needs of their families on food, education, medication and purchase of gift items among others. Further opinion indicated that the greatest needs of small-scale farmer is capital for modernizing and expanding their farm operations. Further emphasizes is also placed income because farmer may have the land and some family labour but lack of capital to meet the increasing production costs such as fertilizer and seeds costs through inflation, and economic imbalances affect availability of inputs for production. This findings agree with the study of Ginting et al. (2020) who found that the problem of low income that farmers acquired are caused by several factors, among others, the number of land owned by farmers, the low economic value of the agricultural products themselves, the low level of education of farmers, inadequate access to

finance, lack of farmers skills, and lack of access to information furthermore, they stated that operating cost in small-scale farms could be reduced by the use of family labour, but that for proper cost allocation, the opportunity cost of family labour should be determined. They asserted that, other factors like labour, land and other inputs such as fertilizer and improved seeds, besides cost consideration, determine the size of the farm holdings.

Table 4 shows the factors influencing total farm income among the female farmers. Equality in all ramifications of life in gender issues has been advocated for in many articles and journals. Cornelius et al. (2016) in their study gender opined that the production of knowledge about African women can be used to transform social relations in the direction of gender equity and social justice. Furthermore, the results reveal that, gender, formal education, source of farm labour, method of land acquisition, number of farm plots owned, price of 1 ha farm land and cost of renting 1 ha farm land, influence the total farm income of the female farmers ($P<0.01$), while age is statistically significant ($P<0.05$). This finding agrees with Khoza *et al.* (2019) and Ayoola *et al.* (2006), who indicated that age, experience, method of land acquisition, cost of renting 1 ha farm among others greatly influence the income of farmers, increase their efficiency and standard of living. Consequently, the specified regression model had the best fit based on the adjusted coefficient of determination (R^2), t – statistics and the signs of the regression coefficients as shown in Table4. The independent variables included in the regression model accounted for 85% of the variability in the total farm income among the female land users in DKIS. Similarly, the F – value, which shows the joint effect of all the independent variables included in the regression model was significant at 1% level of probability, meaning that the model was well specified.

Table 4: Factors influencing total farm income among female farmers in DKIS

Variable	Coef.	Std. Er.	t-Value	P>|t|
Conts	3.486381	.6911982	5.04	0.000***
X1	1.079744	.4390413	2.46	0.018**
X2	.3063984	.0171712	17.84	0.000***
X3	.3767428	.0605906	6.22	0.000***
X4	.2843696	.1010225	2.81	0.007***
X5	.0198899	.0014363	13.85	0.000***
X6	.4735475	.1420927	3.33	0.000***
X7	.0723552	.0074339	9.73	0.000***
X8	.0345262	.0018878	18.29	0.000***
X9	.1622013	.1559032	1.04	0.304ns
Prob > F	= 0.0000***			
R-squared	= 0.8483			
Adj R-squared	= 0.8438			

*** P<0.01; **P<0.05; ns- not significant

X1= Age X2= Gender X3= Formal education X4= Source of farm labour X5= Method of land acquisition X6= No of plots owned X7= Price of 1 ha of farmland in 2019, X8= Cost of renting 1 ha of farmland in 2019 X9= Land dispute

Table 5 shows the factors influencing the total farm income among the male farmers in the study area. It reveals that age of the farmers, formal education, source of farm labour, method of land acquisition and number of farm plots owned significantly and statistically influence the total farm income (P<0.01) respectively. Other factors that consist of gender and price of 1 ha farm land were also significant (P<0.05). This finding corroborates that of Ayoola *et al.* (2006) who reported a similar trend in their study on land policies for growth and poverty reduction. The linear form of the specified regression model had the best fit based on the adjusted coefficient of determination ($R^{2)}$, t – statistics and the signs of the regression coefficients. The result shows that the independent variables included in the regression model accounted for 82% of the variability in the total farm income among the male land users in DKIS. The F – value was also significant at 1% level of probability meaning that the model was well specified. Transforming irrigation management system in Nigeria will, therefore, be sustainable if the identified factors are considered in planning and implementation of the project and consequently improve land administration in DKIS.

Table 5: Factors influencing total farm income among male farmers in DKIS

Variable	Coef.	Std. Er.	t-Value	P>|t|
Conts	1.128275	.1323958	8.52	0.000***
X1	.018335	.0011837	15.49	0.000***
X2	.631103	.323137	1.95	0.052*
X3	.0245671	.0051859	4.74	0.000***
X4	.0583989	.017693	3.30	0.001***
X5	.023222	.005596	4.15	0.000***
X6	.1543711	.0151394	10.20	0.000***
X7	.1151969	.0575723	2.00	0.047*
X8	.2280043	.0159765	14.27	0.000***
X9	.0059437	.0142982	0.42	0.678ns
Prob > F	= 0.0000***			
R-squared	= 0.8272			
Adj R-squared	= 0.8194			

*** P<0.01; *P<0.10 ns- not significant

X1= Age X2= Gender X3= Formal education X4= Source of farm labour
X5= Method of land acquisition X6= No of plots owned X7= Price of 1 ha of farmland
X8= Cost of renting 1 ha of farm land, X9= Land dispute

3.3 Problems Associated with Land Ownership and Administration

3.3.1 Main Victims of Land Conflict

The result in figure 1 affirmed that for both male and female land users, the poor masses within DKIS were most affected group of people by land conflict, followed by youths, non-indigenes, displaced persons and the returnees, in descending order. This result underscores the fact that these categories of land users (the poor men and women as well as the youths), are the most vulnerable in the society in terms of land use conflict or dispute.

The results further show that the percentage of male victims in land conflicts among the youths, poorer families, non-indigenes, displaced, disabled, returnees, and other groups are higher than the number of females in each case. This may have a serious consequence for irrigation activities and hence require the needed attention and intervention of the stakeholders to reduce the current trend to minimum and promote sustainability of land use among the land users and transformation of the irrigation management in its totality. This study conforms to the findings of Baumann *et al.* (2014) and Eklund *et al.* (2015) who opined that farmland conflicts may lead to death and outmigration from conflict areas causing agricultural production decline and land abandonment.

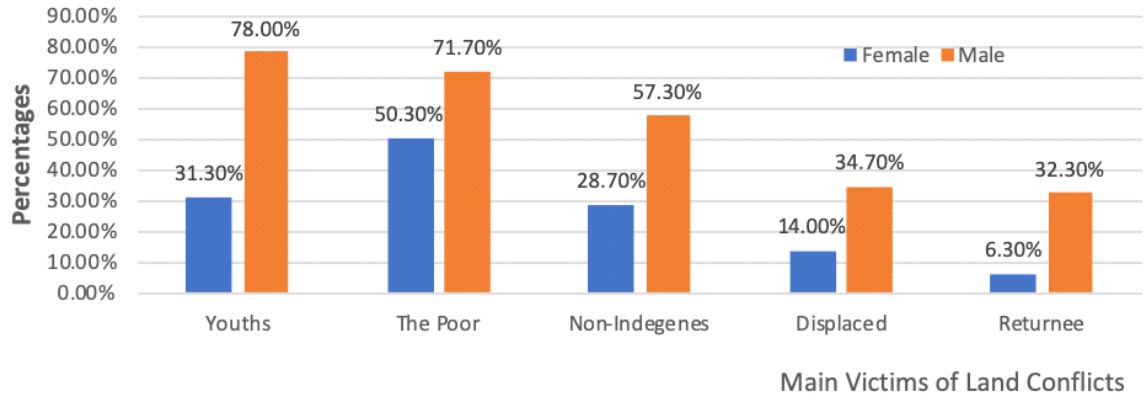

Fig 1: Victims of Land Conflicts by Gender

Source: Survey data 2020

3.3.2 Awareness of laws governing land tenancy, utilization and management

The land user's perception about the existing laws that governed land transfer, utilization and management as presented in Fig.2 indicated that most of the respondents were aware of the governing laws in this regard. About 91% males and 76% females hold claim of awareness of such laws. The enforcement of such laws by land administrators may have serious implication for improving irrigation management in DKIS. Therefore, the need for more extension and enlightenment activities cannot be over emphasized to ensure that necessary information about the laws governing land transfer and utilization are disseminated to the 9% male and 24% female that were unaware of the laws. Knowledge of existing and new laws governing land use, transfer, utilization and management is key to sustainable irrigation management. This finding agrees with the study of Anabaraonye (2017) who analyzed the effect of informal land transactions on land market in Owerri Urban Imo State and found that 88.2% of the aggregate mean of the sampled respondents said that they are aware that there exists the Land Use Act while 11.8% said that they are not aware. It was therefore concluded that majority of the land dealers in the area are aware that there exists the Land Use Act.

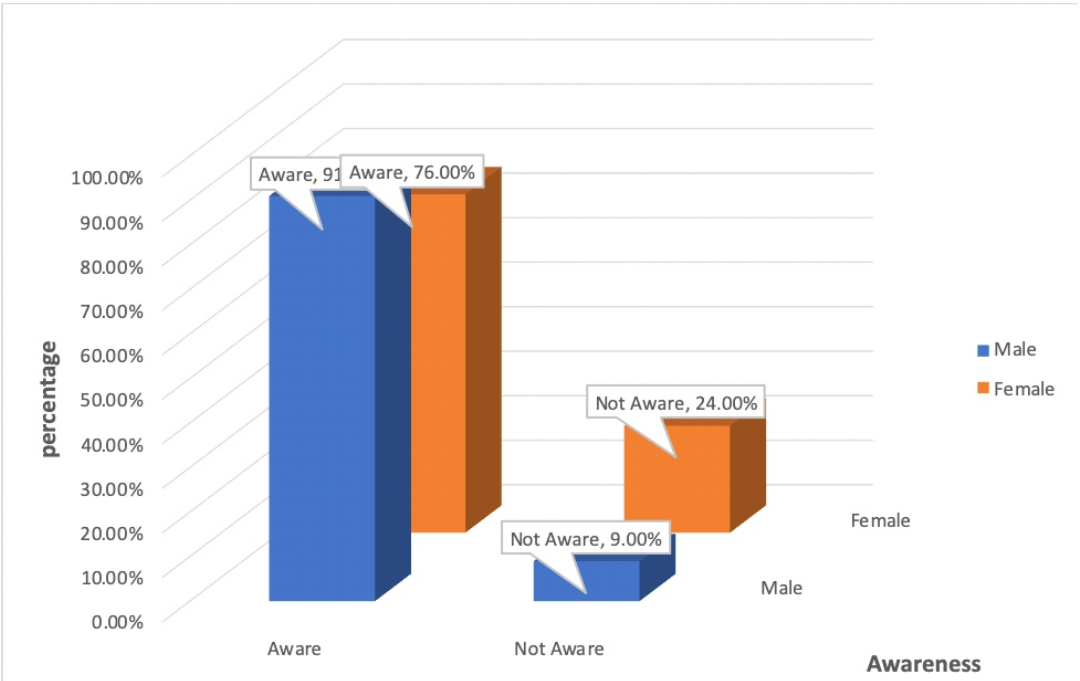

Fig. 2: Awareness of Laws Governing Transfer, Utilization and Management of Land

Source: Survey data 2020

3.3.3 Nature of land conflicts in DKIS

The nature of agricultural land conflicts (Table 4) shows that fraudulent eviction and charcoal production activities accounted for the least proportion of the issues, being 8.1% and 6.1% respectively. The major cause of land conflicts is land encroachment, as indicated by 85.1% of the respondents. Land is the ultimate resource, for without which life on earth cannot be sustained (UNECE, 1996). It is a basic element to every country since all activities of man takes place on it. Land tenure and property rights exist concurrently. According to Antwi and Adams (2003), Ikejiofor (2009) and Emeasoba (2011) well-defined property rights and institutions in land are prerequisite for proper land management. Thus, a proper understanding of the nature of these conflicts and institutional arrangement for addressing such conflicts will ensure sustainability of the transformation program in the management of irrigation system.

Table 4: Nature of land conflicts in DKIS

Nature of conflict	Frequency	Percentage (%)
Land encroachment	212	85.1
Fraudulent-eviction	20	8.1
Charcoal-production	15	6.1

Source: Survey data 2020

4.0 Conclusion and Recommendations

The study concluded that factors that included age, level of formal education, gender, type of tenure, type of farm labour, price of purchasing farmland, cost of renting farmland and occurrence of land conflict affect the number of farm plots owned and total farm income of male and female land users. Major problems affecting land use among the male and female land users are encroachment, unlawful eviction, and charcoal production. Level of awareness about laws governing land tenancy and management is generally high, but there is room for improvement especially among the female land users.

The study recommends the following:

1. Stakeholders should revisit the land tenure and acquisition structures in the area to improve the system.
2. Gender equality should be encouraged in all aspects of transforming irrigation management in Nigeria to harness the potentials of both the masculine and feminine gender for economic, social, agricultural growth and national development.
3. Stakeholders should ensure equity and justice in land management for irrigation purpose, in order to enhance the level of agricultural production and cushion the effects of food insecurity in the country.
4. Land dispute Courts and land management committees should be established, and land policies enforced to reduce land encroachment and promote effective transformation of irrigation management.

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ACKNOWLEDGEMENT

The Management and Staff of Upper Benue River Basin Development Authority and Dadin-Kowa Irrigation Scheme, TRIMING Project Management Unit (PMU) and members of the Research Panel of Experts (RPoE), the Water Users' Association, community members, and the World Bank are acknowledged and appreciated.