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EVALUATION OF SMALL FARMER MANAGED IRRIGATION SCHEMES IN SOME FADAMA COMMUNITIES OF OYO STATE, NIGERIA

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Abstract: Small scale irrigation system offers a way of boosting crop production and yield for small scale irrigation farmers. This study was carried out to evaluate the necessary inputs for small scale irrigation scheme and its attendant fanatical benefits to the farmers in the State. An assessment of the land, irrigation water sources, irrigation gadget and crops were done by means of structured questionnaires within two Local Government Areas in Oyo State. Information collected included irrigation type, source of irrigation water, the distance of irrigation water from the farmland. The results showed that of about 40 hectares of irrigable farmland identified in Orire and Surulere Local Government Area about 13.3% had been developed. It was found out that 50% of small-scale farmers were using less than 0.405ha and practiced mixed cropping. Practiced, it was discovered that 60% of the benefits of the asset by the farmers were pumps; this is because of their practice of furrow irrigation which requires pumping. It was concluded that irrigation under the scheme gave profit that has brought economic prosperity to the farmer but insufficient water source has hindered the development of more expanse of land. Also, the inconsistency of the government in releasing of the fund has also not been of help.
Keywords: Small farmer; irrigation schemes; Fadama communities; Oyo State; Nigeria

1. INTRODUCTION

The observed global climatic changes prove convincingly that reliance on rain-fed agriculture may sooner than later be incapable of meeting the food requirements of the ever-increasing population. Hence, the needs to irrigate our farmlands during dry seasons and the use of our low-lying flood plains (Fadama) to boost crop production. In some countries, irrigated agriculture is new, world bank, co-operate bodies and the governments at large has made it a point of duty to get both small-scale and large scale farmers used to irrigated agriculture by giving loans to farmers and the supply of major inputs such as pumps, tube wells and some major equipment necessary for the stabilization of the farm irrigation (NFDP, 2007).According to Alatise (2004), the World Bank granted a loan of about 5million to the Nigeria government for the development of Fadama. This loan, according to the report culminated into the National Fadama Development Programme (NFDP) through which fund was distributed into some selected states for Fadama programme.In other words, the encouragement of farmers both small-scale and large-scale to improve crop production and has been as an important solution for both economical agricultural growths. This fact is supported by examples from Ghana, Uganda and parts of Ethiopia, where modest poverty reduction in the past decade is due to developing small-holder agriculture. Also, the green revolution in Asia makes the same case. Although, the target is for both large and small scale, in sub -Sahara Africa small scale farmers are the most rampant (Alatise, 2004).Although, there is no universally accepted definition of what constitutes a small-scale farm, small scale farm for this part of the country can be taken to be 20 hectares and below, be it public or private sector, individually owned or corporate. Small-scale irrigation system offers a way of boosting crop production and yields among small farmers.

In the mid-1980s, the International Fund for Agricultural Development (IFAO) in collaboration with food and Agricultural Organization (FAO) investment centre conducted a review of the present state of irrigation in sub-Sahara Africa with special emphasis on small scale water control scheme (FAO, 1986; Bambrah, 2001).Irrigation is the application of water to the soil to replenish moisture necessary for plant growth without adding to the groundwater table (Ojediran, 2016). Irrigation can be carried out in several ways from the traditional method of the use of watering-can to the new methods, sub-surface ways from the traditional method of the use of watering – can to the new methods, sub-surface and over-head irrigation. Irrigation can be used to attain low lying flood plains known as Fadama. "Fadama"an Hausa name for irrigable landsis flood plains and low lying areas underlined by shallow aquifers which have developed under natural hydrological and topographical conditions due to deposition of alluvial material by rivers during floods (FMWR, 2001). Their extensive groundwater potentialities serve to irrigate the effect of flooding and help to recharge the shallow aquifer. They constitute the most extensively cultivated areas, thereby attracting large settlements of pastoralist and their herd as well as settled agriculturists and fishermen. Fadama development implied the development of these flood plains for agricultural production purposes. The technologies adopted for Fadama development include water lifting from streams or rivers with the help of small or large pumps depending on the size of the land to be irrigated or the use of tube-well or wash-bores (Mijindadi *et al*. 1993).

2. IRRIGATION IN NIGERIA

Irrigation in Nigeria started as far back as 1930 in the Northern part of Nigeria. It was confined to the Hausa Fulani descents that lived in and around naturally inundated areas commonly referred to as 'Fadama'. They constructed barriers, sunk

wash, boreholes and shallow wells and developed local techniques of lifting water and transporting it to suit their traditional irrigation methods. More irrigation projects had been executed in many parts of the country since then. One of such is Old North Eastern State irrigation activity that commenced in 1956 when Lake Chad became a potential source of large-scale irrigation (Ogedengebe, 2002).Before then, in (1949) the first irrigation division was established by the Northern Department of Agriculture. Some of the projects undertaken by the Northern Department of Agriculture then were: the Yobe Irrigation schemes, the Ebeji River Scheme, the Wurno Irrigation Scheme, the Tungan Tudu Scheme, the Tungan kawo Food Protection Scheme, the Wuya and Edozhighi Rice Irrigation Scheme. Just of late, the southern part of the country started the planting of high valued crop along with river courses of swamps during the dry season. Of all the states in the south, the first severe efforts in irrigation development were made by the Jakande administration in Lagos in the early '80s and Oyo State Iseyin irrigation project which is still under construction (Ogedengbe, 2002).

Irrigated farming according to Ogedengbe (2002) has numerous advantages and some disadvantages compared to reliance on rain-fed agriculture because irrigation is allied firstly with the sample and regular supply of water and secondly with the nutrient brought by water. To evaluate small farmer managed irrigations scheme in some Oyo State selected Fadamacommunities this was achieved by identifying various small scale farmers in Surulere and Orire LGAs of Oyo State, to highlight the benefit of small scale irrigation scheme to the farmers, to assess yield of farmers in monetary terms during the course of the irrigation scheme and to make recommendations based on the findings. Irrigation has been carried out long before the colonial period but the method and mode of operation are too primitive to be of major significance. Before the year 2000, about 17% of all croplands are under irrigation, but these lands produce over one-third of the World's food. Like in Asia, 60% of third food production comes from irrigated agriculture. During the 1960s and 1970's the amount of cropland under irrigation expanded by 2% to 4% annually (FAO, 1998).A reliable and suitable irrigation water supply can result in a vast improvement in agricultural production and assure the economic vitality of the region. Irrigation in arid areas of the world provides two essential agricultural requirements which are a moisture supply for plant growth which also transport essential nutrients and flow of water to leach or dilute salts in the soil. Irrigation also benefits croplands through coding the soil and the atmosphere to create a more favourable environment for plant growth (FAO, 1996).

— **Sources of Irrigation water**

In designing an irrigation system for farmland, the source of water has to be considered first. There could be four sources of water for irrigation by small scale farmers which are:

» Rain harvesting, where run-off water is collected in a pond and later used for irrigation.
» Tube wells/wash bores, where water is pumped from aquifers to irrigate crops
» Open wells where water is either lifted using the shadoof or put into a shower bucket that is used in watering the crops, and
» Direct pumping from rivers and weirs to irrigate crops.

— **Common methods of irrigation**

There are several techniques of irrigation, ranging from the surface (using lined or unlined canals), sprinkler irrigation, drip irrigation, hose irrigation or simply lifting water manually from open well or river and applied directly to crops. By these techniques, water is distributed to crops in the furrows, basins or by sprinkling or dripping in small quantities, enough to wet the rooting zone of crops. The two most important methods of irrigation sued in the Fadama are the furrow and the basin. Water is pumped directly into the main canal from which it is distributed into the furrows and basins. The current practice of water distribution appears to be adequate except that the sizes of the water channels are determined by trial and error. The pumping rate depends on the cropping pattern and cropping intensity.

— **Irrigation method selection**

The method, frequency and duration of irrigation have a significant effect on crop yield and farm productivity. For example, the annual crop may not germinate when the surface is inundated causing a crust from form over the seedbed. After emergence, inadequate soil moisture can often reduce yields, particularly if the stress occurs during critical periods, even though the most important objectives of irrigation are to maintain the soil moisture. Reservoir, how this is accomplished is an important consideration (FAO, 1996). There are three broad classes of irrigation system; Pressurized distribution, Gravity flow distribution and Drainage flow distribution. The pressurized system includes sprinkler, trickle or drip and the array of a similar system in which water is conveyed to and distributed over the farmland through pressurized pipe networks. Gravity flow systems convey and distribute water at fluid level by a free surface, overland flow regimes such as furrow, border and basin irrigation. Irrigation by control of drainage system, sub-irrigation is not common but interesting conceptually. A relatively large volume of applied irrigation water percolates through the root zone and become a drainage and groundwater flow. Irrigation systems are often designed to maximize efficiencies and minimize labor and capital requirement. The most effective management practices are dependent on the type of irrigation system and its design. A large number of considerations must take into account in the selection of an irrigation system. These will vary from location to location, crop to crop, year to year, and farmer to farmer. In general, these considerations include the compatibility of

the system with other farm operations, economic feasibility, topographic and soil properties, soil characteristics, and social constraints (FAO, 1998).

3. IRRIGATION FACTORS

According to FAO, (1998) some factors that can affect irrigation are as follows:

— **Soil**

The soil's moisture-holding capacity, intake rate and depth are the principal criteria affecting the types of the system selected. Sand soil typically has high intake rates and low soil moisture storage capacities and may require an entirely different irrigation strategy than the deep clay soil with low infiltration rates but high moisture storage capacities. Sandy soil requires more frequent, smaller applications of water whereas clay soil can be irrigated less frequently and to a larger depth.

— **Water supply**

The quality and quantity of the source of water can have a significant impact on irrigation practices. Crop water demands are continuous during the growing season. The soil moisture reservoir transforms this continuous demand into a periodic one in which the irrigation system can service. A water supply with a relatively small discharge is best utilized in an irrigation system which incorporates frequent applications. The depth applied per irrigation would tend to be smaller under these systems than under system having a large discharge which is available less frequently. The quality of water affects decision similarly. Salinity is generally the most significant problems but other elements like boron or selenium can be important. A poor-quality water supply must be utilized more frequently are in large amount than one of good quality.

— **Crops**

Yields of many crops may be as much affected by low water is applied as the quantity delivered. Irrigation systems create different environmental condition such as humidity, temperature and soil aeration. They affect the pant differently by wetting different parts of the plant thereby introducing various undesirable consequences like leaf burn, fruit sporting, deformation, crown e.t.c. Rice, on the other hand, thrives under pounded conditions. Some crops have high economic value and allow the application of more capital-intensive practices. Deep-rooted crops are more amenable to low frequency, high application rate systems than shallow-rooted crops.

— **Topographical characteristics**

This is a major factor affecting irrigation particularly surface irrigation. Of general concern are the location and the elevation of water supply relatives to field boundaries, the areas and configuration of the fields, and access by roads utility line (gas, electricity, water) and migrating herds whether wild or domestic. Filed slope and its uniformity are two of the most important topographical factors.

— **Compatibility**

Irrigation system for a field or a farm must function alongside other farm operation such as land preparation, cultivation and harvesting. The use of large mechanized equipment requires longer and wider fields. The irrigation system must not interfere with this operation and may need to be portable or function primarily outside the crop boundaries. Smaller equipment o animal powered cultivating equipment is more suitable for small field and more permanent irrigation facilities.

— **Environmental aspects**

There is the need to create environmental consciousness among the farmers so that they may limit the activities that are likely to damage the environment. For instance, there could be a change in wetlands as a result of the introduction of agriculture and the effect of a saline phenomenon on the soil and water. There is the tendency of the shallow aquifer water to become saline due to leaching of chemicals from the soil surface. If the farmers for example, emphasize the use of compost and animal manure over fertilizer, they could make a positive contribution towards maintaining the quality of the environment. According to Ogedengbe (2002) Nigeria has about 98 million hectares of land out of which 73 million hectares are cultivable. Although 0.9 million of the cultivable area is under irrigation yet irrigated agriculture accounts for around 20-25% of the value of the nation's agricultural output. Of 1000, 3000 hectares now under formal irrigation in the whole country, 4,333 ha that is 6.33% are in the south.

Table 1: Features of Irrigated Agriculture in Nigeria. Source: Musa (2011)

Total land Area	98.3 million
Cultivable Area	73 million ha (74% of total land area)
Crop Coverage	25 million ha (34% of cultivable crop)
Cereal Crop Coverage	13 million ha (52% of crop area)
Rice Coverage	1 million ha (8% of cereal cover)
Irrigated Area	0.9 million ha (6% of cereal crop cover)
Area under modern irrigation	100,300ha (15% of irrigated area)
Area under informal irrigation	1000,000 ha (14% of irrigated area)
Tradition irrigation	755,000 ha (71% of irrigated area

— **Fadama Irrigation in Nigeria**

Several irrigation types have been reported in a variety of literature. However, the commonest among these strategies in Nigeria includes both traditional and modern irrigation technologies. Some of the traditional techniques adopted in many farm sites, especially in northern parts of Nigeria include; shadoof, pump, gravity or natural flow and calabash/bucket methods (FMWR, 2001). These are generally referred to as small scale irrigation enterprises covering small land area and with less sophisticated irrigation equipment. Under the traditional system, water sources for this system are mainly residual soil moisture, locally drug shallow wells, ponds and other depressions. There are virtually no government or any external organization's assistance and interference. The system is under local people in response to their wishes and felt needs (Mohammed, 2002). In another view, the Fadama irrigation concept emerges in one of the World Bank assisted programme with the launching of the National Fadama Development Programme in the early nineties. The Fadama concept is an age-old tradition in Hausa land, where Fadama land that is flooded on a seasonal basis and valley bottom, which allows for the growth of the variety of crops under small scale irrigation farming system (Mohammed, 2002).

— **Study area - Fadama irrigation in Oyo State**

Oyo state is located approximately within latitudes 7^0 and 9^0, 5' North of the equator and between longitudes 2^0.36' and 4^0, 35' of the Greenwich, it is bounded to the East by Osun State to the West by the Benin Republic, to the south by Ogun State and to the North by Kwara State. The climate is typical or tropical zones and it characterized by two distinct seasons: the rainy seasons lasting from March/April to October/November and the dry season accounting for the rest of the calendar year. The existing agriculture of Oyo State is rain-fed. The State forming has been strict during the rainy season and the only known attempts of irrigation were the only made by the federal government in Iseyin. The commencement of Fadama Development Project (Fadama 1) commenced in the country around the early 1990s under World Bank. The state was not among the first six states that benefited, but as that project moves to the second phase that is NFDP II Oyo state is stated as one of the 12 states listed for the second phase. The other states are Adamawa, Bauchi, Gombe, Imo, Kaduna, Kebbi, Niger, Taraba, Lagos, Ogun and FCT (NFDP, 2007).The project targets small scale farmers in the state and out of the 33 local governments in the state only 10 local governments benefit from the project, and this is due to their qualification of Fadama resourced area i.e. Availability if water, and irrigable land and also the acceptability of the programme by the farmers. The 10 local governments that benefited from the programme in Oyo state are; Akinyele local government Egbeda L.G, Ido L.G. Ona Ara L.G., Ibarapa North L.G., Iwajowa L.G., Olorunsogo L.G, Orire L.G, Surulere L.G, and Oyo-west L.G. Irrigation system is the process by which waster is been applied to the soil to replenish moisture necessary for plant growth without adding to the groundwater table (Ojediran, 2016).Irrigation can be carried out in several ways from the traditional method of the use of a watering can to the methods of surface, sub-surface and overhead irrigation.

— **Problem of irrigation**

Irrigated agriculture faces a number of difficult problems in the future. One of the major concerns is the generally poor efficiency with which water resources have been used for irrigation. A relatively safe estimate is that 40% or more of the water diverted for irrigation is wasted at the farm level through either deep percolation or surface run-off. These losses may not be lost when one views water view in a regional context since returns flow become part f the usable resources elsewhere. However, these lose often represent forgone opportunities for water because they delay the arrival of water at downstream diversions and because they almost universally produce poorer quality water. One of the more evident problems in the growth of alternative demands for water such as urban and industrial needs. Irrigation science in the future will undoubtedly face the problems of maximizing efficiency (FAO, 1996).

— **Irrigation benefits**

Socio-economic gains are prominent features of irrigation projects; generally, to an agriculturist, irrigation promotes maximum yields per hectare. Since water supply decision is largely made in the political arena rather than a market place, there is a great incentive for public support for their own financial gain. With irrigation is practiced on more areas of cultivated land with large output are the envisaged merits of irrigation farming (Mohammed, 2002). Dry season farming on Fadama land has the twin advantage of crop diversification such that if a crop fails or are damaged, other crops will ensure food security and economical returns as dry seasons crops allow the farmers improve household economic security and investment on one hand and money to buy food in case of crop failure on the other hand. Mohammed (2002) submitted that some of the benefits of irrigation are increases in the range of choice of crops and of livestock, thus providing flexibility in decision-making, focusing on more complete and efficient resources use. Others are lessening the danger of crop failure and the range of yield fluctuation, hence reducing uncertainties and increasing the capacity of the land for the input of other factors.

4. MATERIALS AND METHOD

— **Study Area**

This study was carried out in some Fadama communities in two local governments Area. The two local government areas are Surulere and Oriire local governments and they are both at the northern part of the State.

» **Surulere Local government Area**

Surulere local government encompasses Gambari, Gbede, Ajase, Iwofin and Arolu. It has its headquarter at Iresaadu and shares boundaries with Ifelodun and Orolulocal government of Oyo State, As Local government of Kwara State and Oriire, Ogbomosho North and Ogbomosho South local government of Oyo State as well.Surulere local government covers about 975km square land mass and of the population of about 126,692 people according to 1991 population census. It consists of about 260 communities amongst are Iresaadu, Oko, Iresaapa, Iregba, Orile-Igbon, Alayin, Ilajue, Baale-oba, Baaye-oje, Mayin, Iwofin and Iwaye. All these inhabitants are majorly Yoruba and their major occupation is farming.

» **Agriculture Practices in Surulere Local Government**

Intensive cultivation is found majority at Oko where permanent crops like cocoa, kola and citrus are cultivated also arable crops like yam, cassava, and maize e.t.c. are cultivated too. Their agricultural implementation had improved from crude implements of hoe and cutlasses to the use of factors still the use of cutlasses cannot be put to history.

» **Oriire local government area**

Orire local government covers about 1908.504km square land mass and of the population of 133,716 according to the 1991 population census. It shares boundaries with Ogbomosho, Atiba and Olorunsogo all in Oyo State. It encompasses Iluju, Adafila, Elekulu, Olokun, Kaola, Alawodi, Daodu-gbogun, Ikose and Ikoyi-ile amongst others. All the inhabitants are majorly Yoruba and they are known as good farmers.

» **Agriculture practices in Oriire Local government area**

An inhabitant of finding in Oriire Local government are predominantly farmers and arable crops are their major crop cultivated such as maize, yam, cassava and sometimes vegetable. Due to Oyo State water corporation dam very close to Ikose intensive Fadama farming is dominant here. Since both local government areas enjoy a tropical climate, high temperature is experience throughout the year. There are two climate seasons, the wet and the dry. The wet season normally starts around March and has two marked peaks in June/July and /September/October. This lasts for about seven and a half months during which the relative humidity falls between 60% and 80% during the dry season.

— **Sampling procedure**

Random sampling was used in the selection of respondents from the study area. A total of 50 respondents were chosen from the rural area of the local government. The villages are Iluju, Afejewe, Esineleoyo in Oriire Local Government Area and Ladokun, Ilajue, Onikeke, Iresaapa in surulere Local Government Area as indicated in the map provided in this study. A total of about 40 hectares of irrigable farmland were identified in the visited communities but 13.3% of it was developed at the time of visitation.

— **Method of data collection**

Direct visits to all locations where Fadama farming are being practiced in the two local government areas were undertaken. 50 respondents were given with 25 each for the two local government area (Oriire and Surulere). The questionnaire was administered by selected Fadama users in the community; this gave the members the opportunity to render information on the performance and the problems they face in their Fadama farming activities. It is important to stress the fact that most of the Fadama farmers are illiterate and the answers provided to the question by the farmers were put into written with our help. Information collected includes age, gender, educational status family size, crops planted, and time of commencement of Fadamaamong others.

— **Method of data analysis**

Both descriptive and inferential statistics were used in analyzing the results. The descriptive statistics tools employed include: table, frequency and percentage. The descriptive analysis was used to present the socio-economic characteristics of the farmers which include: age, gender, farming experience, farm size, family size, religion, crop grown at educational level as well as cropping system. Inferential statistic tool used was a regression to discuss the relationship between the dependent and independent variable. Simple linear regression function of the form Y=f(x) was used. Explicitly the linear regression function was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 + \beta_4 X_4 + ... + \mu$$

where: Y = irrigations scheme managed by small –scale Fadama farmers, X_1 = Size of land, X_2 = Cropping system, X_3 = Education level, X_4 = Gender, X_5 = Crop planted, X_6 = Family size, X_7 = Farming experience, X_8 = Age (years), X_9 = Religion, $\beta_0 - \beta_9$ = Coefficient of regression, μ= Error term.

— **Measurement of variable**

In this study, two variables were used: dependent and independent variables. Dependent variableswere he irrigations scheme managed by small scale Fadama farmers whereas the independent variables were: size of farmland, cropping system, educational status, crop planted, family size, gender, age, religion etc.

5. RESULTS AND DISCUSSION

— **Socio-economic characteristics of the farmers**

This section presents the results of socio-economic characteristics of the Fadama farmers in the study areas using table, frequency and percentage.

Table 2: Fadama communities in the LGAs

S/N	LGA	Fadama Communities	Number of farmers (respondents)
1	Oriire	Iluju	9
		Afejewe	8
		Esineleoyo	8
2	Surulere	Ladokun	9
		Onikeke	8
		Iresaapa	8
		Total	50

Table 3: Gender distribution

Gender	Frequency	Present
Male	24	48.0
Female	26	52.0
Total	50	100.0

Table 4: Age distribution

Age range (yrs)	Frequency	Percent
20-30	10	20.0
30-50	35	70.0
50 & above	5	10.0
Total	50	100.0

— **Gender**

The frequency distribution of Fadama farmers according to their gender is presented in table 3. From the table, 52% of the total farmers consulted are female. This due to the types of crops usually planted under the Fadama farming practices which are mostly leafy vegetables. The male counterparts claim that less profit is generated in this type of farming thereby leaving it to the females.

— **Age distribution**

The frequency distribution of Fadama farmer according to their age is presented in table 4. From the table, 20% of farmers are between 20-30 years and 70% falls under age 30-50 which is known to be productive.

— **Educational Status**

The frequency distribution of Fadama farmer according to their educational status is presented in Table 5. Table shows that only 10% of the farmers are informally educated and 90% are illiterate. This can be linked with the size of land under cultivating; well-educated farmer will cultivate more hectares of land due to his knowledge of soil composition, weather forecast, pest control method, storage and processing techniques.

— **Farming Experience**

The frequency distribution of Fadama farmer according to their farming experience is presented in Table 6. The table shows that only 20% of the farmers have less than 5 years of farming experience and about 40% have the farming experience above 16 years. The more experienced that farmers are the more adamant they are to new farming techniques.

Table 5: Educational status distribution

Educational Status	Frequency	Present
Informal	5	10.0
None	45	90.0
Total	50	100.0

Table 6: Farming experience distribution

Farming experience (yrs)	Frequency	Percent
Less than 5	10	20.0
5.10	15	30.0
11.15	5	10.0
16 & above	20	40.0
Total	50	100.0

Table 7: Size of farmland distribution

Size of farmland (hectare)	Frequency	Percent
Less than 0.405	8	16.0
0.405-0.809	25	50.0
1 and above	17	34.0
Total	50	100.0

— **Size of farmland**

The frequency distribution of Fadama farmer according to their size of farmland is presented in Table 7. This shows that 16% of the farmers cultivate less than 0.405ha and 50.0% cultivate between 0.405-809ha. The percent of size of land cultivate during raining season when irrigation is not required is relatively larger than that cultivated during Fadama farming. It is important to note that all the ranges of size of farmland cultivated by Fadama farmers visited are strictly small-scale farmland.

— **Types of crop planted**

The frequency distribution according to the type of crop planted by Fadama farmers is represented in table 8. The table shows that 50% of the respondents cultivates grains and vegetable which is most suitable for their type of irrigation method and also are one of the major food crops that are less available during dry season.

Table 8: Crop planted distribution

Crop planted	Frequency	Percent
Grain & vegetables	25	50.0
Grains & legumes	10	20.0
Grain & tubers	10	20.0
Grain & tree crops	5	10.0
Total	50	100.0

Table 9: Irrigation system distribution

Irrigation system	Frequency	Percent
Basin	8	16.0
Border	7	14.0
Furrow	35	70.0
Sprinkler	0	0.0
Total	50	100.0

Table 10: Asset benefited distribution

Asset benefited	Frequency	Percent
Cutlass & hoe	15	30.0
Pumps	30	60.0
Rice shellers	5	10.0
Total	50	100.00

— **Irrigation system practiced**

The frequency distribution according to irrigation system practiced is given in table 9. The table shows that 70% of the respondents uses furrow method to irrigate their farmland, non-practices sprinkler method of irrigation while remain 30% was shared between basin and border.

— **Asset benefited from the scheme**

The frequency distribution according to asset benefited by the Fadama farmers from the scheme is shown in Table 10. The table shows that 60% of the assets are pumps which are believed to serve a major purpose when the dry season is at peak and Fadama land experience dryness due to change in depth of the water table. During this period light digging can be done and water can be pumped back to the surface of the Fadama land.

— **Regression analysis**

Simple linear regression was used to explain the relationship between the effect of Fadama scheme on community and farmers socio-economic characteristics and the results were presented in table below. From Table 11 the coefficient of determination r^2 has a magnitude of 0.843, this implies that about 84.3% of the total variation exist between dependent (irrigation scheme) and independent variables can be explained as a result of linear association between them while the remaining 15.7% associate with the error.

Table 11: Coefficient of the determinant of the level of error

R square	Adjusted	R standard error
R square – coefficient of determinant 0.843	15.7%	

From Table 12 the following information was deduced: the coefficient associated with Age of respondent, family size, crop planted by farmer and size of land put into cultivation were positively related to the irrigation scheme and whereas the coefficient associated with Gender, Educational status, Religion, Years of farming experience cropping system were negatively related to the irrigations scheme. All the variables considered were satirically significant except the coefficient of regression with Gender and Educational Status. Among all the coefficient that are statistically significant are at 1% level of significant except associated with crop planted by the farmers which was significant at 5%. The coefficient associated with the year of farming experience has a magnitude of -0.2.235 which implied that the more years the farmer spends in farming the lesser the improvement of Fadama project. The coefficient associated with crop planted by the farmers has a magnitude of 0.05165 this implied that irrigation scheme will improve the irrigation pattern by 0.0516. And for the coefficient which are negatively related to the irrigation scheme: Gender – the higher the number female participant the lesser the improvement; Educational status – the more unlearned the farmers are the lesser the improvement; Religion – the greater the difference in religion the lesser the improvement; Farming experience – the more years the farmers sends in farming the lesser the improvement of Fadama project; Cropping system – the planting of variety rather than sticking to a type of crop has lessened the improvement of the project. Likewise, the remaining coefficient: Age, Family size, Crop planted and size of Age – with farmer within the age group of 30-50, Fadama project will improve; Family size – with small family size f around 4-6, Fadama project will be enhanced. The crop planted – the planting of grains and vegetables which are more adapted to eh land and tare non-selective of irrigation type has improved Fadama project. Size of land – cultivation with the land of around 0.405 – 0.809ha has improved Fadama project.

From Table 12, the coefficient associated time of commencement of Fadama, size of Fadama land. Cropping system under land with magnitude 0.26, 2980E-02 and 0.384 respectively are positively related to irrigation scheme, whereas the coefficient associate with crop planted, sources of irrigation water, distance of water source and Fadama required drainage with magnitude -8.904E-02, -0.690, -0.563 and -2.400 respectively are negatively related to irrigation scheme. All the variables considered were statistically significant except the coefficient of regression associated with size of Fadama land. The entire coefficient is statistically significant at 5% except Fadama required drainage that is significant at 1% and Distance of water source that is significant at 10%.

Table 12: Regression result on effect of Fadama project on community

Variables	Unstandardized coefficient	t value
Constant	-1.754	**-2.104
Gender	-0.132	***-1.544
Age	2.519	**6.467
Educational Status	-4.305E-02	***-0.819
Family size	1.230	**3.512
Religion	-1.737	**-3.695
Farming experience	-0.235	**3.002
Cropping system	-1.739	**-7.962
Crop planted	5.165E-02	2.377
Size of land	0.370	**3.407

Key *-Significant at 1%, **-Significant at 5%, ***-Non-significant

Table 13: Regression result on effect f irrigation on yield

Variables	Unstandardized coefficient	t value
Constant	12.554	*7.801
Start Fadama	0.261	**2.333
Size of Fadama land	2.980E-02	****0.183
Cropping syst. On Fad. Land	0.384	**2.341
Crop planted	-8.904-02	**-2.110
Source of Irrigation water	-0.690	**-2.518
Distance of water source	-0.563	***-1.939
Fadama require drainage	-2.400	*-6.784

Key: *-Significant at 1 %, **- Significant at 5%, ***-Significant at 10%, ****- Non-significant

The coefficients that are positively related implies that time of commencement of Fadama – due to farmers fresh involvement in the Fadama farming, farmers are willing to accept new innovations which have improved the Fadama the Fadama project. Size of Fadama land – the small land area has improved the project due to the ability of the farmers to handle the small expanse of land efficiently under irrigation scheme. Cropping system under Fadama land – mixed cropping, that is planting various crops at the same time has improved Fadamaproject. The coefficient that is negatively related shows that crop planted – a variation of crops planted in the communities visited has not contributed to the

improvement of Fadama project. If there is less variation in crops planted there will be a significant effect on the farm yield. A distance of water source – due to on-farm irrigation water source farmers is not taking necessary measures to control the amount of water needed by plant and draining of excess water off farmland. Source of irrigation water – the water source for an irrigation project. Drainage requirement – due to climate condition which is at high temperature, leading to quick evaporation of water from the land surface, reducing water available to the plant and thereby making drainage channel unnecessary and hence has affected the Fadama project negatively.

6. CONCLUSIONS

Fadama farming in Oriire and Surulere Local Government areas is strictly small scale and cultivation of vegetables and grain is most predominant. This project woke showed that of about 40 hectares of irrigable farm land identified; only about 13.3% were developed. Also, irrigation scheme has not gotten beyond the supply of water pumps and shower bucket unlike what we have in some Northern State where irrigation system has gotten to a level of sprinkler irrigation, which is believed to be more efficient. In addition, the inconsistency of the government in giving loans and other necessary amenities for the scheme has also contributed to snail speed of the rate of development of the irrigation scheme; this can be attributed to complex protocol and slow disbursement of giving fund. Moreover, due to its small-scale nature, the production of food in large quantities cannot be said to be enhanced maximally but rather of lower percentage. Cultivation of large expanses of Fadama land should be encouraged by providing more irrigation equipment to help when the dry season is at peak. This will cause the problem of scarcity of food during dry periods with the effect of improving the socio-economic status of the farmers. Good storage facilities should also be provided.

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