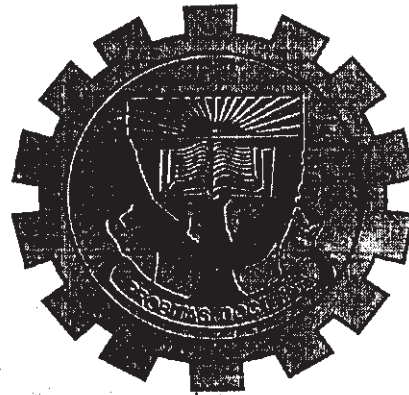


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CAPACITY UTILIZATION OF WET LAND (FADAMA) INFRASTRUCTURE IN KWARA STATE, NIGERIA

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ABSTRACT

A survey of the capacity utilization of Fadama infrastructure in Kwara State was carried out with the sole objective of finding their adequacy or otherwise. The increasing cost of modern irrigation development has caused a shift of attention by farmers to Fadama irrigation. The attraction here is the low cost of Fadama irrigation development and the less sophisticated technology, which are amenable to farmers' level of understanding and experience. To meet the increasing needs of the farmers for Fadama irrigation and encourage utilization, there is need to assess the level of availability of Fadama infrastructure in Kwara state. The survey was carried out by selecting at random, some locations in each of the four agricultural zones operated by Kwara State Agricultural Development Programme (KWADP). A structured questionnaire was administered to all the stakeholders for information on the availability and level of capacity utilization of the facilities. The results indicated 50 to 75 % level of utilization of the on - farm storage and processing infrastructure. Almost 100 % of the farmers investigated claimed between 5 and 100 % level of utilization of the physical infrastructure. There was no place within the zone covered where the available market stalled was utilized at or below 25 % and subsequently, there was as low as 25 % level of utilization. The investigation revealed that banking facilities were already available in all agricultural zones of the state. Suggestions were made on how the gaps between the present level of utilization and the expected demand could be positively adjusted.

INTRODUCTION

'Fadama' is Hausa word for wet swampy area. This includes the flood plain areas as well as waterlogged uplands in the rainy season. In Yoruba language, this wet swampy area is often referred to as 'Akuro' (a bottomland or topographical depressions, usually along the river courses) used for planting early maturing yams. It could also be called 'Abata', a clearly demarcated flood plain of large rivers or streams whose alluvial deposits are so fertile as to sustain the production of vegetables like okro, tomatoes and amaranthus during the dry season by simple capillary of residue moisture. The third equivalent of this is 'Ira', a water logged upland that does not support any crop (in view of its infertility and very shallow aquifers) except perhaps some varieties of upland rice and sugarcane during the rainy season. The feature of such area is that of hardpans at the subsurface rendering such areas agriculturally irrelevant.

From studies conducted under the World Bank National Fadama Project, ^[1] the total potential irrigation Fadama of the Northern and Middle-Belt parts of Nigeria is about 3.144 million hectares. The studies cited the Northern and the North-East of Nigeria as having over 57 % of its farmland as Fadama. The Food and Agricultural Organization (FAO) review on the irrigation subsection in Nigeria further confirmed that possibly 940,000 hectares of the Fadama land in this area is irrigable ^[2]. The very large area covered by the Fadama according to the reports is a source of conflict between the farmers and

herdsmen who have to compete for the use of the extensive Fadama area.

Unlike the intensive Fadama studies conducted for the North and Middle Belt areas of Nigeria, no similar studies exist for the south of the country. This however does not imply the absence of Fadama or wetland or topographical depressions along the river valley in the South and the Northern fringes of (especially) Kwara and Kogi States. The problem however may be the insignificance of an irrigation culture. On the other hand, it might be due to the pattern of use and the crop type favoured by the Southern farmers which are mostly different from the North. Irrigation vegetables tend to take prominence in the Northern Fadama, while the issue of yams, maize and other arable crops in the South seem not to have attracted such attention.

Fadama Operation in Kwara State

Kwara State has a modest potential for irrigation development. Apart from the fact that the state is well drained with surface water resources, there are also the shallow aquifers of flood plains of rivers and streams that can be exploited through low cost farmer owned and managed shallow tube wells and wash bores. Available evidences show that Kwara State has over 100,000 ha of Fadama land, which can be developed with wash bores, tube wells and about 30,000 ha by direct pumping of water.

The State has a population of about 1.60 million ^[3] and is divided into 16 Local Government Areas. Regardless of the low population of the State in relation to the entire country, the spatial distribution of

the population is very wide extending through some terrains which are usually impassable during the rainy season. For instance, a dominant food production area of Kaiama and Baruten Local Government Areas cannot be easily accessed during the rainy season; so also are many farming areas of Edu, Pategi, Asa and Ifelodun local government Areas. The low population density of the State is however an asset as it has encouraged many, private and public investment in large scale (irrigation) agriculture in the State. For instance, the Lower Niger River Basin Development Authority has provided small and large scale irrigation technology to many farmers.

Also, with a farm-family population of about 200,000^[4] who are directly involved in the production of major staples both on rain fed and irrigation farms, the state is purely agrarian. Any attempt to improve the conditions of living or to reduce poverty in the state will therefore involve some agrarian reform. The beginning point for this is an extensive study or assessment of these infrastructural facilities, which are needed to support and enhance the condition of agricultural production and productivity. The intervention by the Kwara Agricultural Development Project under its Fadama programme has however assisted to make Fadama farming a more sustainable and profitable area of farm business.

Objectives of the Study

The main objective of this study is to carry out survey of facility, agricultural machinery and infrastructure for the Fadama and irrigation farming operation in Kwara State, with a view to determining their capacity utilization. Specifically, it involved: the survey of the physical Fadama infrastructure such as shallow tube wells, washbores, water pumps, buildings, transport and marketing facilities; the assessment of the level of utilization and adequacy of these facilities; and determination of ways to empower the farmers to initiate own projects with little assistance from the government.

METHODOLOGY

This survey covered the whole of Kwara State of Nigeria. The State has a land area of about 32 5005 sq km and spans the rain forest zone in the southern fringes of Oyun, Offa, Irepodun, Isin, Ekiti and Oke-Ero Local Government Areas. This merges into the derived savannah and the Southern Guinea Savannah which accounts for about 90 % of the State's land mass. [4, 5]. The River Niger is the source of water for Fadama farmland of Edu and Patigi Local Government Areas of the state. Most other rivers, which are tributaries of the Niger to the interior of Kwara State, equally provide the alluvial

spread along their courses making Fadama farming a whole-State affair.

Direct visits to all locations where Fadama infrastructure exist in Kwara State was undertaken. The visits were guided through the zoning arrangement of the Kwara State Agricultural Development Project. The zoning arrangement has an effective coverage of the state. The state was divided into four zones as indicated in Table 1. Some locations in each of the four zones were visited for an on – the – spot assessment of the condition of the facilities, and other complementary infrastructure or supportive services in these locations. Figure 1 shows the distribution of the Local Government Areas in Kwara State to the identified KWADPs zones of A, B, C, and D. The choice of locations within each zone was done at random to give every location the opportunity of being selected. The area of high concentration of Fadama land was however given higher priority to allow for the proper assessment of the present condition and the requirements for further improvement.

The Infrastructure were classified into six distinct groups as follows: physical Fadama infrastructure, marketing infrastructure, agro-processing infrastructure, transportation and road network infrastructure, banking or financial infrastructure and other infrastructure^[6]. The survey of the physical Fadama infrastructure and their locations including shallow tubewells, washbores, water-pumps, buildings, road and other transport facilities including the pattern of their ownership in Kwara State was undertaken. The available social infrastructure including the main Fadama produce markets, existing facilities like water, electricity supply, e.t.c.; and agro-processing infrastructure related to Fadama produce including the ownership of such facilities and terms of use were assessed. The assessment of the level of utilization and adequacy of these facilities were appraised so as to make recommendations of what is to be done on how to keep the facilities functional and adequate to meet the needs of the farmers in Kwara State and on how to motivate the farmers to initiate own projects with simple assistance from the government.

Structured questionnaires were also administered to 336 Fadama users who were selected randomly among the Fadama Users Associations in the different zones of Agricultural Development Project in the State. This gave the members the opportunity to render all information on the performance and the problems they face in their Fadama farming activities. Since the study involved all related irrigation and water supply activities in Kwara State, visit was also paid to the Lower Niger River Basin and Rural Development Authority in Ilorin. Meetings were equally held with the relevant committee of the Authority. Subsequently, field visits

were organized to specific projects sites at Ajase, Oloru, and Oke-Oyi where private farmer's initiatives are being facilitated with the assistance of the Authority. Useful preliminary information on Fadama farming in Kwara State, the inventory of all Fadama

infrastructure which have been provided by the Agricultural Development Project, and the existence of the Fadama Users Association were collated through the Kwara State Agricultural Development Project Area Offices.

Table 1: Zoning of Kwara State Agricultural Development Projects in Local Government and their Area Headquarters

Zone	Area Headquarter	Local Government Areas
A	Kaima	Baruteen, Kaiama
B	Patigi	Edu, Patigi
C	Malete	Asa, Ilorin East, Ilorin West, Moro, Ilorin South
D	Igbaja	Ekiti, Ifelodun, Irepodun, Okcero, Offa, Oyun, Ishin

Source: KWADP (1999)^{1, 41}

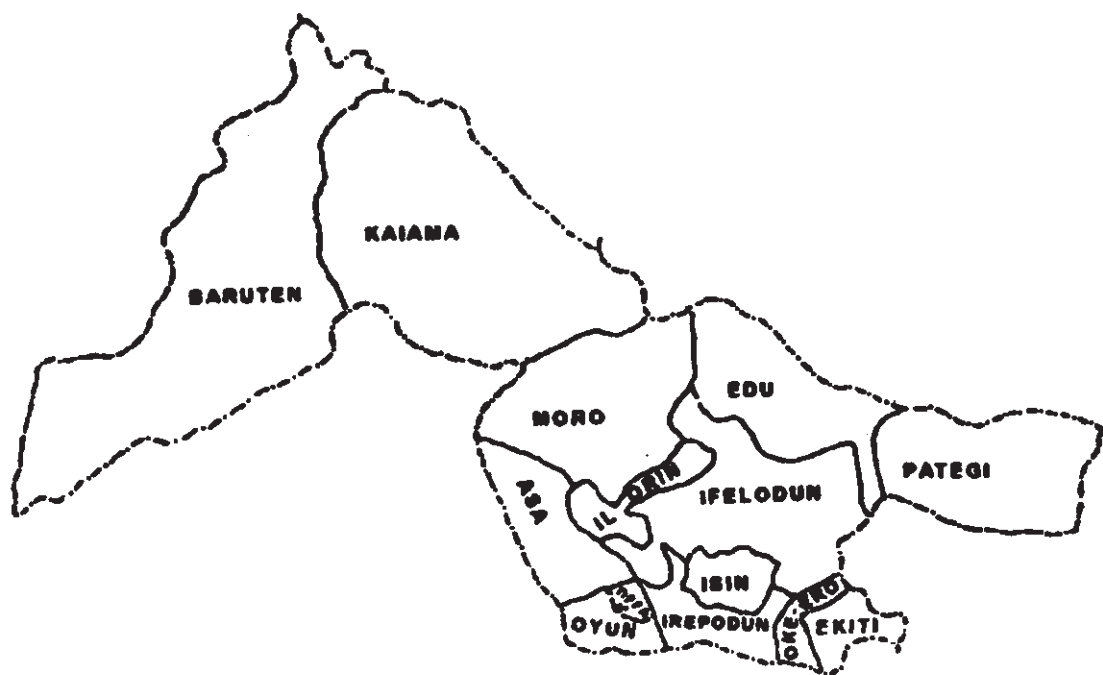


Figure 1: The distribution of the local Government Areas within the Surveyed Areas in the KWARDPs Zoning Arrangement (Zones A, B, C, and D)

RESULTS AND DISCUSSIONS

Table 2 is the summary of the major crops which farmers prefer to cultivate under the Fadama irrigation system in the State. From Table 2, over 70 % of the sampled Fadama farmers cultivate pure vegetables like amaranthus (24.3 %), okro (21.0 %), Tomatoes (17.3 %) and pepper (14.1 %). Contrary to the popularly held view of rice as a major crop to be considered under irrigation, only about 5 % of those interviewed showed any interest in rice. In fact about 11 % of the population prefer to grow maize and some other crops like sugarcane and garden eggs. Yams

which though were common in most Fadama (akuro) in the southern parts of the state do not feature here. This is perhaps because yams are grown under the very natural Fadama condition requiring no additional cost of tube wells and pumps. Perhaps, the traditional recognition of Fadama programme (Irrigation) with rice and wheat relates more to the sources of irrigation water, which are common in most parts of the state. Table 3 shows the sources of irrigation water and various water lifting mechanisms for Fadama Users in Kwara State.

Table 2: Major Crops Cultivated in the Fadama Areas of Kwara State

Crop	%
Efo Tete (<i>Ammaranthus Spp</i>)	24.3
Okro	21.1
Tomatoes	17.3
Pepper	14.1
Maize	10.5
Rice	4.7
Onion	0.7
Others	
(Ewedu (<i>Corchorus oilihorus</i>) Garden Eggs, Sugarcane)	7.3
Total	100.0 %

Table 3: Sources of Irrigation Water and Water Lifting Mechanism for Fadama Usage

A	Sources of water	%
	Irrigation Cannals	2.9
	Open well	0.5
	Pond/ Reservoir	5.6
	Rivers/ Spring / Stream	67.6
	Washbores / Tubewell	23.4
	Total	100.0
B	Water lifting Mechanisms	%
	Pump	81.6
	Shadoff	0.0
	Manual	16.9
	Others	1.5
	Total	100.0

Table 4. Physical Fadama Infrastructure and their Utilization

Level of utilization of physical infrastructure

In view of the non-perennial nature of the rivers and streams, Fadama farming based on that source appears quite transitory. The desire to invest on Fadama farming therefore becomes low and quite discouraging. This is the point of intervention by the Kwara State Agricultural Development Project with the provision of some Fadama infrastructure like tube

wells, washbores and diversion modules which are all technologies that are amenable to control by the farmers^[5]. Table 4 shows the physical Fadama infrastructure that have been provided by the Kwara Agricultural Development Project and the level of utilization of the available Fadama infrastructure. From Table 4, the use of water pump tops the list of the favoured infrastructural facilities by the Fadama

users. About 110 farmers claim a full 100 % level of utilization while additional 112 Fadama users utilize their pumps to between 50 – 75 % level. Only three (3) farmers claimed about 25 % level of utilization. Any intervention to succeed will therefore require greater consideration to the provision of water pumps, which have been accepted by the farmers as a necessary complement of Fadama farming. This situation can be explained by the prevalence of rivers, streams and springs (Table 3). More importantly the water pumps fall within the level of technology, which are amenable to farmers manipulation as they are relatively cheap.

The level of utilization of the tubewells and washbores is equally encouraging. A total of 73 Fadama users make not less than 50 % utilization of the tubewells and over 66 for washbores. With the

non-certain nature of the natural sources of water supply (from springs and rivers) these sources of the underground or subsurface water supply has continued to attract greater attention, patronage and high level of utilization by the Fadama users. There is apparently a low demand or level of utilization for dams and weir because they are very few and they require additional expenditure on canals or some form of sprinklers to make them functional. This type of technology does not even fall within a farmer managed irrigation system. The level of utilization of input shops and seed processing factories are also low because of their non-availability. This non-availability is equally explained by the fact that they are mostly provided by the government in an environment where farmers have alternative sources of getting their seeds or process their commodities.

Table 4. Physical Fadama Infrastructure and their Utilization

Types of Infrastructure	Available Number	Numbers of Fadama Users and their Level of Utilization (%)				
		100 %	75 %	50 %	25 %	< 25 %
Tubewell	135	2	15	50	11	12
Washbores	102	-	23	18	23	25
Diversion Modules	16	-	11	9	-	-
Input shop	50	-	4	3	-	-
Seed processing factory	29	6	-	2	-	2
Water pump	255	-	47	65	3	-
Others (Dam and weir)	44	-	-	-	-	5

Capacity Utilization of the Market Infrastructure

To facilitate the process of adjustment by farmers (or Fadama Users) to increase infrastructure the survey also confirmed the existence of markets in and around the areas of concentration of the Fadama users. Table 5 shows that a total of 326 Fadama Users attest to the existence of open markets in their areas. such markets have been provided by those communities, which are within the spatial arbitrage (usually between 1-5 km) of one another (Table 5). In most cases, the LGA and the communities provided some facilities like stalls, sheds etc. but not inclusive of those facilities required for highly perishable commodities like tomatoes, okro and even amaranthus. The common feature of most market in the surveyed area is open-spaced markets established by the relevant communities.

With the provision of stalls and crates by the Local Government or relevant agencies, the level of the utilization has been rising. Table 6 shows the level

of utilization of the facilities provided in the available markets. Information presented in Table 6 clearly indicated that Fadama users may use more than one type of marketing infrastructures. From Table 6, over 338 Stalls available were utilized by Fadama producers to 100 % level. The evidence further shows that there is no place where the available markets stalls are utilized below 25 %. Also 26 crates were used at a maximum level, 13 to about 50 % while about 26 are still below the 25 % level. This may show the lack of knowledge associated with the crates which is provided to enhance the conveyance of most perishable vegetables with minimum damage. In markets where quality of produce dictates the level of demand, this high use of this facility is promising in no distant future. This notwithstanding, and as shown in Table 6, open markets continue to be in high level use especially in those areas where stalls are yet to be provided.

Table 5. Distance of markets from the Area of Concentration of Fadama Users

Distance (km)	Fadama Users Respondents	Response in %
0 – 1	101	30
1 – 3	101	30
3 – 5	57	17
Above 5	50	15
Non Response	27	8
Total	326	100 %

Table 6. Marketing Infrastructure Capacity Utilization

Types of Infrastructure	Available Number	Number of Fadama Users indicating the Percentage Number of Facilities indicated by Fadama Users at different Percentage Level of Utilization				
		100 %	75 %	50 %	25 %	< 25 %
Stalls	845	338	330	135	42	-
Crates	65	26	-	13	-	26
Open Market	222	78	107	37	-	-

Market Evaluation and Frequency

In view of the fact that most areas are economically integrated though spatially separated, market days also vary between once weekly to once in 5 days. This practice allows for exchange of commodities among the affected communities. This approach equally helps to solve the storage problems, which are real with the kind of perishable crops as indicated in Table 5. Figure 2 presented the respondents response to the existence of market in the surveyed area. In those areas surveyed, there are over 845 stalls and 222 open markets which are of course not adequate enough for sales of perishable commodities like tomatoes (Table 6). Also there are only 65 crates of the modern infrastructure to transfer perishable commodities in the areas surveyed. To cope with the tempo of Fadama irrigation and encourage

higher participation, this area of need becomes germane and must be considered. The common feature of most market in the surveyed area is open-spaced markets established by the communities.

Table 7 shows that 43 % of the markets are held on weekly basis, 23 % on a 5 day rotation, 16 % are held daily and 11 % on a 3-day rotational basis. This marketing arrangement conforms to the nature of the crops produced under irrigation. Okros and tomatoes are usually harvested on either a 3 - day or 5 - day schedule. A bi-weekly or 5 - day market schedules create good opportunity for their sale even in the open markets. The availability of markets within the spatial arbitrage and roads or tracks of any mention provides an opportunity for selling off the items of produce.

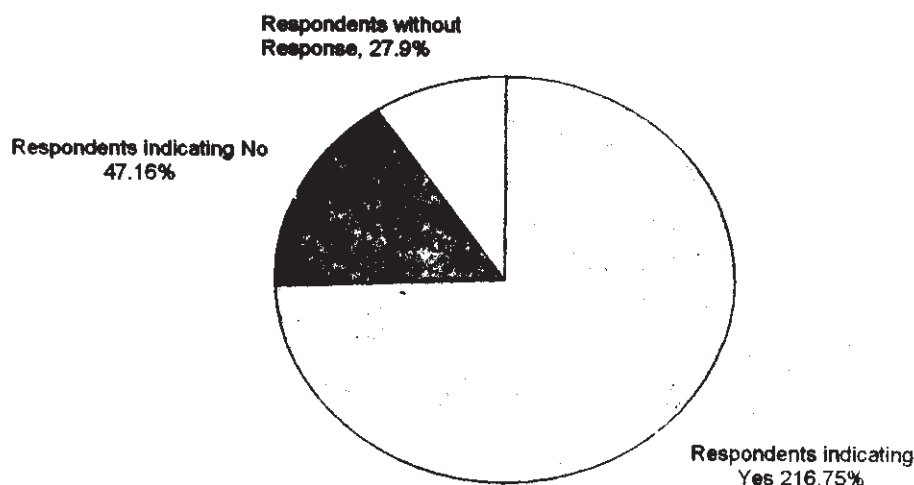


Fig. 2. The Distribution of the Respondents Response to the Existence of Market in the Surveyed Area.

Table 7: Market Evaluation and Frequency of Attendance by the Fadama Users

Types of Market Days	Frequency of Fadama Users	Response in %
Daily	53	16
Twice a Week	37	11
Weekly	144	43
Monthly	-	-
Others (5 Days)	77	23
No Markets	24	7
Total	335	100 %

Capacity Utilization of the Storage and Processing Infrastructure

Table 8 shows the number and the level of utilization of the agro-processing and storage infrastructure in the surveyed area. From Table 8 more than 130 Fadama users adopt the on - farm storage of their produce. Whereas these are adequate for grains and tubers, they have been found to be less effective for vegetables and other perishable commodities. The cold rooms are traditional type and tomatoes - processing facilities appear clearly unavailable when compared with the quantum of production. The perishable nature of vegetables that are commonly produced under irrigation has necessitated the provision of storage and processing infrastructure to make them retain their freshness. Table 8 shows that cold rooms and on - farm storage enjoy high patronage among the surveyed farmers, about 46 and 36 Fadama Users using cold room and on - farm storage, respectively claimed to utilize these infrastructure at 100 %. It was observed that 96 farmers make between 50 - 75 % levels of utilization of the on-farm storage with a high concentration of such farmers, 94, making

about 75 % level of utilization. This may be due to the fact that the on-farm storage can be easily improvised by the individual farmers as against confronting the attendant problem of possessing and maintaining processing facilities. Solar dryers are rare and where they are available are utilized to about 50 % level. Fish processing whose technology has long been known are not being utilized. Table 8 shows that about 30 farmers utilize this facility to about 50 % level. This may be due to the fact that the fishermen prefer to use their own traditional kilns, which their wives can easily operate and this provides a ready source of job for the women folk in the areas where fishing is the main occupation. The same reason may account for why tomatoes-processing facilities are not common. With the level of utilization of the available ones within 25 %, it shows that most tomatoes produced are sold raw. The implication of this is the very low price paid to the farmers at the farm-gate. If nothing is done, this practice can equally discourage the farmers who would have wished to earn more through the facilities, which are not available now.

Table 8: Capacity Utilization of the Agro - Processing and Storage Infrastructure

S/N	Types of Infrastructure	Available Number	Level of Utilization of Available infrastructures by Fadama Users (%)				
			100 %	75 %	50 %	25 %	< 25 %
1.	Go down	56	16	16	16	-	8
2.	Cold room	68	46	5	4	5	8
3.	On farm storage	132	36	94	2	-	-
4.	Solar dryer	4	-	-	4	-	-
5.	Tomato processing Equipment	9	-	-	-	4	5
6.	Fish Processing Equipment	30	-	-	30	-	-
7.	Silos	22	2	2	18	-	-
8.	None	15	-	-	-	-	-

Level of Utilization of Road Transport Infrastructure

Table 9 shows the types of access road linking the farms to the market outlets. From Table 9,

the roads with either good tars, bad tar or stable laterite are relatively few. This explains why most transportation of produces is done through bush paths (or tracks) by trekking with loads carried on the heads.

In some cases, bicycles and motorcycles are used. Animal transportation is rare in Kwara State and waterways are not of essence. Despite the existence of mainly laterite roads, about 40 Fadama users claimed to use vehicles like commercial buses and pick – up trucks or vans to convey their produce to the markets (Table 10).

Table 10 shows the other types and level of capacity utilization of the road transport infrastructure existing within the area of concentration of the Fadama Users. Bicycles and Motorcycles top the list of the facilities, which are used at 100 % level of utilization. This is in view of the inadequate motorcycles, roads or the inability of Fadama users to purchase and use vehicles. In most of the farming communities, commercial vehicles ply the roads about once in a week. This is inadequate for the evacuation of vegetables and other perishable crops produced on

Fadama farms. On the whole, it is clear that all the facilities have a fair level of utilization.

The Fadama Users can adequately be linked with some financial sources where they can borrow to meet their additional needs for bicycles and motorcycles. Hence, culverts, access roads can be a joint responsibility of the Local Government Areas (L.G.As), the state and Federal Government. This is because no such project will be regarded as feasible if they cannot be accessed. Also, the provision of commercial vehicles is clearly more amenable to private owners. Various credit facilities can be made available to enable prospective owners buy their vehicles. Generally, the Fadama Users in Kwara State have embraced fadama irrigation and are being encouraged by the quantum of infrastructure which have been provided for the purpose.

Table 9: Types of Access Road to the Farms and Distance from the Main Road

Types of Road	Range of Distance in km		
	1 – 5 km	5 – 10 km	> 10 km
Good tar	-	-	15
Bad tar	-	10	2
Good Laterite	2	10	16
Bad Laterite	30	20	8
Track	17	-	-
Foot path	62	-	-
Water ways	-	-	-

Table 10: Road Transport Infrastructure Capacity Utilization

Types of Infrastructure	Available Number	Level of Utilization of Available infrastructures by Fadama Users (%)				
		100 %	75 %	50 %	25 %	< 25 %
Go down	12	-	5	5	1	1
Vehicles	40	11	11	13	5	-
Culverts	50	11	15	18	6	-
Motorcycle	60	30	20	10	-	-
Bicycle	160	80	-	80	-	-
Others	14	-	-	-	-	-

Other Infrastructure Available

Cognizance was taken of the other infrastructure such as the existence of hand dug wells in all the farming communities for domestic uses. The activities of the Lower Niger River Basin in providing dams and weirs are quite restricted to their project areas like Oke - Oyi, Oloori, Ajasse, Tshonga and Erin-Ile. In most of these places the kind of technologies involved are too sophisticated and may not be readily qualified for consideration under a Farmer-Managed irrigation system as are being considered under this Fadama study. The Kwara State Ministry of Water Resources and Rural Development equally has its own 64 water schemes (surface and underground) spread all over the state. All these

sources are tailored towards domestic water supply and not irrigation.

Banking facilities are already available in all agricultural zones of the state. Quite a number of big commercial banks have branches in most of the communities under the rural banking scheme. Various communities have also established community banks to serve the local people that may not be served by the commercial banks either because of their low level of income or the sophistication in operation. The existence of this infrastructure will definitely assist in enhancing banking habits in the rural areas. The banks can equally become good outposts for credit assistance to the Fadama Users.

CONCLUSION

The Assessment of study of the Fadama infrastructure available in Kwara State was carried out to determine the conditions of the facilities and what can be done to improve the condition of living or reduce poverty of the farmers through improved production.

The finding from the survey showed a high level adoption of the various technologies for Fadama development introduced by the Kwara State ADP. This is demonstrated by a near 100% level of utilization of the washbores, tubewells, diversion modules and water pumps. The low level of utilization of the dams and weirs indicate that such technologies cannot readily conform with a farmer managed irrigation schemes of the Fadama type.

The utilization of the facilities has been found to be very encouraging. However, marketing and storage facilities need to be improved upon to accommodate the perishable commodities produced by farmers. In addition other facilities like roads, markets, transport, storage and processing facilities need to be provided to meet the requirement for increase in production with little intervention from the government since the Fadama farming readily lends itself to private farmer initiative and as such a veritable source of productivity growth in agriculture of Kwara State.

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