

INFLUENCE OF FARMERS' DEMOGRAPHIC CHARACTERISTICS ON KNOWLEDGE GAP OF RECOMMENDED FADAMA TECHNOLOGIES IN ILARO AGRICULTURAL ZONE OF OGUN STATE.

Agwu A. E and Edun O. A.

Department of Agricultural Extension, University of Nigeria, Nsukka, Nigeria.

ABSTRACT

The study determined the influence of farmers' demographic characteristics on the knowledge gap of recommended fadama practices in Ilaro agricultural zone of Ogun State through interviewing 83 fadama farmers. Statistical analysis was accomplished by the use of frequency and percentage distributions, multiple regression and mean statistics. Findings revealed that majority (68.7%) of the respondents were males who were married, primarily engaged in farming, members of at least one farmers' co-operative organization who participated in dry season farming annually and operated at subsistence level, cultivating less than one hectare of land. Majority (66.3%) of the respondents earned more than ₦10, 000 annually from dry season farming. About 49% of the respondents had between 11 – 20 years of dry season farming experience, majority (94%) of them used hired labour to carry out their fadama farming activities. The findings also revealed that majority (63.9%) of the respondents had high knowledge level of the recommended fadama practices. The results further showed that out of all the demographic characteristics measured, only years spent in school (formal education), numbers of farmers' co-operative organizations belonged to and gender were found to have negative influence on knowledge gap of farmers. The study therefore recommended that there should be active participation of female farmers in dry season farming as well as encouraging farmers to form and join more farmers' co-operative organizations in order to enjoy the benefits of group dynamics.

Keywords: Fadama, knowledge gap, constraints, demographic characteristics

INTRODUCTION

The major challenge facing agricultural development in sub-Saharan Africa (including Nigeria) has been the problems related to population growth, particularly, the increasing area under agricultural use. This has led to expansion of farmlands and reduction of the period under fallow in traditional shifting cultivation system.

Rain fed agriculture is the most common practice in Nigeria as more than three quarters of the country's agricultural area is rain fed and subsistence in nature (Country Profile, 2002). However, rain fed agriculture can no longer cope with food demand through out the year as a result of the growing population coupled with climate change which made rain fed agriculture unreliable as well as unpredictable and therefore has to be supplemented by irrigation for effective agricultural production to be realized (World Bank, 1991). In South-Western Nigeria for instance, experience and meteorological data showed that the length of dry season is ever increasing from two months per year in 1950's and 1960's to almost five months in the 1990's (Oluwatosin, 2001). FAO (1992) reported that to increase productivity, the use of fertilizers and

improved irrigation is viewed as key factors. Efforts are now being geared towards opening up of more hydromorphic land (valley) to complement the rain fed farming (Oluwatosin, 2001), since Nigeria has enormous potentials for higher yields through development of irrigation (Country Profile, 2002).

It has been noted that the rapid spread of small scale irrigation will be a key source of agricultural growth and poverty alleviation for small farmers who are otherwise dependent on low and erratic rainfall (World Bank, 1991 cited in Tyem, 1995). In line with this, the National Fadama Development Project (NFDP) was initiated for small-scale irrigation development, to increase the productivity of the farming system during the dry and wet season (F.M.A.N.R., 1997; Agu, 2002). Fadamas are flood plains and shallow aquifers found along Nigeria's river systems. The fadama irrigation concept came up in the early nineties as one of the World Bank assisted programme (OGADEP, 1997; Yahaya, 2002). The rationale for sponsorship of the National Fadama Development Project (NFDP) (I) loan along with National Agricultural Technology Support Project (NATSP) loan by International Bank for Rural Development (IBRD) is to ensure that

appropriate tillage and crop management practices are incorporated in the irrigated farming project (Imo ADP, 1998). The programme development objective is to sustainably increase the incomes of fadama users (World Bank, 2003). The broad objectives of NFDP as contained in the Imo ADP Internal Implementation Completion Report, 1998 included the following:

- 1 to assist the beneficiary states to consolidate pilot fadama development programmes by financing the provision of shallow tube wells in fadama lands;
- 2 simplifying drilling technologies for shallow tube wells / wash bores;
- 3 construction of fadama infrastructure;
- 4 organization of fadama farmers for irrigation management, cost recovery and better access to credit, market and other services;
- 5 provision of vehicles, pumps and other equipment; and
- 6 use of surface water by pumping and diversion system.

In line with the above objectives, several achievements were recorded under the National Fadama Facility (NFF) in Ogun State. According to OGADEP report (2002), these included the rehabilitation of 4km access roads, procurement of 215 petrol pumps for distribution to fadama groups/individuals who own tube wells; completion and handover of 163 wash bores and 50 tube wells to the beneficiary groups, formation of 105 Fadama Users Association (FUA) of which 10 were duly registered by cooperatives; deposition of ₦ 797, 735.00 (seven hundred and ninety seven thousand seven hundred and thirty five naira) by FUAs for 73 irrigation pumps, 34 wash bores and 3 tube wells, sixty groups were trained on the operation and maintenance of irrigation pumps; and forty groups were trained on the safe use of pesticides and other pest control practices.

However, the OGADEP diagnostic survey on fadama development in Ogun State (1997) reported that only few pumps were identified with the fadama farmers. The report also stated that many of the fadama farmers manually watered their crops using watering cans through personal efforts and hired labour. Furthermore, some fadama technologies were alien to some of the fadama farmers. Another area of knowledge gap identified in the survey is in land preparation where some of the fadama farmers did not know how to prepare basin (OGADEP, 1997). This situation could be traceable to the findings of IITA (1992), which revealed that many new agricultural technologies are available, but not getting to farmers and other potential users.

However, from 1996 to 1999 increase in yield for most of the fadama crops in Ogun State was attributed mainly to adoption of improved seeds,

fertilizers and agro-chemicals (OGADEP, 2002). In line with this, most studies focus on farmers' adoption of recommended technologies and its effects on agricultural productivity with very limited number of studies focusing on farmers' knowledge of recommendations vis-à-vis factors influencing knowledge behaviours. Therefore, there is justification for ascertaining the knowledge of fadama farmers on appropriate technologies rather than seeking to know the adoption level. Since there can be no adoption if farmers lack proper knowledge of recommended technologies. This study therefore, sought to determine the influence of fadama farmers' demographic characteristics on the knowledge gap of recommended fadama technologies in Ilaro Agricultural zone of Ogun State.

Objectives of the Study

Specifically, the study sought to:

1. describe the demographic characteristics of the farmers and production systems prevalent in the fadama areas of the zone;
2. ascertain fadama farmers' knowledge and knowledge gap of recommended technologies;
3. determine the relationship between farmers' demographic characteristics and knowledge gap of recommended fadama technologies.

METHODOLOGY

The study was carried out in Ilaro Agricultural zone of Ogun State. Ilaro agricultural zone is one of the four agricultural zones of Ogun State. According to the Ministry of Bureau for Land and Survey, Ogun State (1997) the zone has a total landmass of 4,090.20 square kilometers and supports a population of 793,396 people. It is made up of four extension blocks, namely: Imeko, Ado-Odo, Oke-Odan and Sawonjo (OGADEP, 2002). This study covered all the blocks because of the abundance of natural fadama land as well as reliable surface and underground water potentials of the area. The population for the study consisted of all the farmers that participated in Fadama I programme in Ilaro agricultural zone of Ogun State. Simple random sampling technique was used to select 25 farmers from each of the four blocks in the zone. This gave a total of 100 respondents for the study. However, 83 completely filled copies of the interview schedule were used for analysis.

Measurement of Variables

In order to achieve objective 1, the interview schedule elicited information on demographic characteristics of the respondents, prevalent production systems and their level of extension contact. To achieve objective 2, farmers' knowledge

of the recommended practices was determined using two-point score for each of the twelve recommended fadama practices. These points were called impact points and these impact points referred to the important agricultural practices or the production recommendations that the extension agents emphasized to the farmers in order to achieve the desired result. The respondents were asked questions on how the specific recommendations/practices were actually expected to be implemented. A correct response by the respondent to each of the impact point questions attracted one point. Each of the practices has a maximum of 2 points and a minimum of zero point. Based on the scores, the respondents were classified into the following knowledge categories: Low (0 - 8), Moderate (9 - 16) and High (17 - 24). Knowledge gap of the fadama farmers was determined from the scores obtained from each of the respondent through the use of knowledge gap index (Singh *et al*, 1991).

$$KGI = \frac{P - K}{P} \times \frac{100}{1}$$

KGI – Knowledge Gap Index,

P – Possible maximum score for all the respondents' practices,

K – Knowledge score by a respondent on overall practices.

Also, the interview schedule elicited information on level of extension contact. The level of extension contact was measured by use of selected extension effectiveness indicators namely: know the name of extension agent/worker (Yes – 1, No – 0), description of extension agent's visit (EA) (Always – 3, Occasionally – 2, Rarely – 1, Never – 0), seek advice from EA on problems on the farm (Yes – 1, No – 0), how often does EA solve problems (Always – 3, Occasionally – 2, Rarely – 1, Never – 0), know where EA lives (Yes – 1, No – 0) and where do you meet EA (At farmer's field/contact point – 1, others – 0). The maximum score obtainable was twelve while the minimum score obtainable was zero for each of the respondent. On the basis of the contact scores, the respondents were then grouped into three categories as follows: Low (0 – 4), Moderate (5 – 8) and High (9 – 12). In order to achieve objective 3, multiple regression was used to determine the influence of some demographic characteristics (gender, age, educational attainment, household size, membership of farmers' cooperative organization, annual income from dry season, dry season farming experience, dry season farmland) and extension contact on the knowledge gap of recommended fadama practices. Dummy variables were ascribed the values of 1 and 0 as in the case of gender where male is 1 and female 0. The model for influence of demographic characteristics and extension contact on knowledge gap is:

$$Y = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9).$$

Where

Y = Knowledge gap of farmer (Dependent Variable)

Independent Variables:

X₁ = Gender of the farmer (Male – 1, Female – 0)

X₂ = Age (measured in number of years)

X₃ = Educational attainment (measured by years spent in school)

X₄ = Household size (measured by number of people in the household)

X₅ = Membership of farmers' cooperative organization (measured by number of farmer organizations belonged to)

X₆ = Estimated annual income from dry season farming (measured in naira)

X₇ = Dry season farming experience (measured by number of years involved in farming)

X₈ = Size of farmland devoted to dry season farming (measured in hectares)

X₉ = Extension contact (respondent's total effectiveness indicator score as measured above).

RESULTS AND DISCUSSION

Demographic Characteristics of the Respondents

Gender

Table 1 reveals that 68.7% of the respondents were males, while 31.3% were females. The implication is that though both sexes were engaged in fadama farming, the male farmers predominated. This study differs from the study of Agwu and Eleghasim (2002) which reported the dominance of female farmers in the fadama programme in Okigwe agricultural zone of Imo State.

Age

Table 1 shows that greater proportion (37.3%) of the farmers were within 40-49 years, 25.3% were within 50 -59 years, while 19.3% were within 30-39 years. Also, 13.3% were 60 years or more, while 4.8% were within 20-29 years. The mean age of the farmers was 46.79 years. This implies that most of the respondents were mainly middle aged people who were in their active years. This is an advantage for the programme since majority of the farmers would be physically able and mentally alert in learning new technologies. The age distributions of farmers in this study show similar trend with what obtains in the fadama programme in Imo State (Agwu and Eleghasim, 2002).

Educational attainment

Table 1 further shows that a greater percentage (53%) of the farmers had formal education. Specifically 24.1% completed their primary school education, 8.4% of them completed their secondary school education, 7.2% attempted secondary school, and 3.6% attempted primary school, while 9.6% had other types of education like adult Education, National College of Education (NCE), Ordinary

National Diploma (OND) and Higher National Diploma (HND). The higher proportion of literate farmers implies that majority of them are in better position to understand and adopt improved fadama technologies.

Household size

It is evident from Table 1 that 49.4% of the respondents had small household size (1-5 people), 47% had household sizes of 6 to 10 people while 3.6% of them had 11 people or more in their households. The average household size was approximately six. This relatively large household size of the farmers may likely enable them to use family labour in carrying out some fadama farming operations, thereby reducing the incidence of reliance on hired labour.

Participation in farmers' cooperative organizations

Table 1 reveals that 9.6% of the respondents did not belong to any farmers' co-operative organizations, 24.1% were members of one farmer co-operative organization, 36.1% belonged to 2, while 22.9% of the respondents participated in/belonged to 3 farmers' co-operative organizations. Also, 6.0% belonged to 4 farmers' co-operative organizations while 1.2% of them belonged to 5 farmers' co-operative organizations. The implication is that a greater percentage (90.4%) of the farmers' belonged to at least one farmer co-operative organization.

Estimated annual income from Fadama farming

Data in Table 1 show that 33.7% of the farmers earned below ₦10,001 annually, 22.9% earned more than ₦50,000 and above while 12% of them earned between ₦20,001 and ₦30,000. About 11% of the respondents indicated that they earned between ₦40,001 to ₦50,000. The implication is that most of the respondents in the area realized reasonable income from fadama farming, in that about 23% of them earned more than ₦50,000 as their annual income from fadama enterprises.

Dry season farm size

Data in Table 1 also show that majority (95.2%) of the fadama farmers devoted less than 1 hectare of land to dry season farming. This implies that majority of the fadama farmers were subsistent farmers. The study by Agwu and Eleghasim (2002) also indicated that majority (81.7%) of the fadama farmers in Okigwe agricultural zone of Imo State cultivated less than 1 hectare of land, showing the predominance of small-scale farmers in the fadama programme of the two states.

Dry season farming experience

Table 1 shows that 22.9% of the respondents had between 1 and 10 years of dry season farming

experience, 49.4% had between 11 and 20 years of dry season farming experience, 14.4% had between 21 and 30 years of dry season farming experience, while 13.3% had 30 years and above farming experience in dry season farming. The mean dry season farming experience was 12.17 years.

Level of extension contact

Entries in Table 1 show that majority (74.7%) of the respondents had high level of extension contact, 8.4% of the respondents had moderate level of extension contact, while 16.9% of them had low level of extension contact. This implies that extension contact among the fadama farmers was high.

Prevalent Production Systems in the Area Sole crops cultivated in the area.

Data in Table 2 show that majority (75.9%) of the respondents cultivated *Amaranthus spp.* as a sole crop, 60.2% of them cultivated *Cochorus*, while 32.5% of them cultivated maize. Also, 15.7% of the respondents cultivated pepper as a sole crop, 14.5% cultivated okra, 10.8% cultivated rice, 9.6% cultivated cowpea, 9.6% cultivated tomato, 8.4% cultivated watermelon and 7.2% of them cultivated garden egg as sole crops. This implies that the most prevalent crops cultivated as sole crops in the area were *Amaranthus spp.*, *Cochorus*, and maize, while the least crop cultivated as sole was garden egg.

Crop combinations cultivated in the area

Majority (15.7%) of the farmers intercropped maize with *Amaranthus spp.* and *Cochorus* with *Amaranthus spp.* respectively. Also, 4.8% of the respondents practiced *Amaranthus* + pepper mixture and maize + pepper mixtures, respectively. Also, 2.4% of the respondents practiced Okra + maize mixtures, tomato + *Amaranthus spp.* mixtures, respectively, while 1.2% of the respondents intercropped *Amaranthus spp.* with pepper and tomato on their farms.

Sources of farmland

Table 2 shows that majority (96.4%) of the respondents rented their fadama farmland, 10.8% of them cultivated dry season crops on family lands, while 2.4% of them cultivated their dry season crops on farmland received as gift and purchased, respectively. The implication is that most farmers in the area rented their farmlands for dry season farming and this may contribute to degradation of land through the adoption of short-term land management practices by farmers.

Sources of farm labour

Table 2 also shows that majority (94.4%) of the respondents hired labour to carry out their dry season farming operations, while 84.3% used family labour.

Knowledge of Farmers on Recommended Fadama Practices

Entries in Table 3 reveal that majority (98.8%) of the respondents were knowledgeable about timely harvesting, followed by timely planting (96.4%), fertilizer application (92.8%), insect control (90.4%), irrigation skill (87.9%), seed treatment (81.3%),

irrigation pump use (66.9%), use of improved varieties (63.9%), crop spacing (61.4%) and use of tube well / wash bores (52.4%). However, only 46.4% and 45.8% were knowledgeable about herbicide use and improved land preparation, respectively.

Table 1: Distribution of respondents by their demographic characteristics (n = 83)

Demographic characteristics	No	%	Mean (\bar{X})
Gender			
Male	57	68.7	
Female	26	31.3	
Age (years)			
20 – 29	4	4.8	46.79 years
30 – 39	16	19.3	
40 – 49	31	37.3	
50 – 59	21	25.3	
60 and above	11	13.3	
Educational attainment			
No formal education	39	47.0	
Primary school attempted	3	3.6	
Primary school completed	20	24.1	
Secondary school attempted	6	7.2	
Secondary school completed	7	8.4	
Others	8	9.6	
Household size			
Small (1 – 5)	41	49.4	5.7
Medium (6 – 10)	39	47.0	
Large (11 and above)	3	3.6	
Number of farmers' co-operative organization belonged To			
None	8	9.6	
1	20	24.1	
2	30	36.1	
3	19	22.9	
4	5	6.0	
5	1	1.2	
Estimated Annual Income (₦)			
Below 10,001	28	33.7	₦ 25,602.41
10,001 – 20,000	13	15.7	
20,001 – 30,000	10	12.0	
30,001 – 40,000	9	10.8	
40,001 – 50,000	4	4.8	
50,001 and above	19	22.9	
Total Farmland Size (ha)			
< 1.0	60	72.3	2.20 hectares
1 – 5.99	14	16.9	
6 – 9.99	1	1.2	
10 and above	8	9.6	
Dry Season Farm Size (ha)			
< 1.0	79	95.2	0.9 hectares
1 – 5.99	1	1.2	
6 – 9.99	1	1.2	
10 and above	2	2.4	
Dry Season Farming Experience (years)			
1 – 10	19	22.9	12.17 years
11 – 20	41	49.4	
21 – 30	12	14.4	
Extension contact (scores)			
Low (0-4)	14	16.9	
Moderate (5-8)	7	8.4	
High (9-12)	62	74.7	
30 and above	11	13.3	

Table 2: Distribution of respondents based on prevalent crop production systems (n = 83)

Prevalent crop production	Number of people	Percent
Sole crop (production) cultivated*		
<i>Cochorus</i>	50	60.2
<i>Amaranthus</i>	63	75.9
Tomato	8	9.6
Rice	9	10.8
Maize	27	32.5
Beans (cowpea)	8	9.6
Okra	12	14.5
Water melon	7	8.4
Garden egg	6	7.2
Pepper	13	15.7
Combination of crop cultivated*		
Maize + <i>Amaranthus spp</i>	13	15.7
<i>Amaranthus</i> + <i>Cochorus</i>	13	15.7
Maize + <i>Cochorus</i>	4	4.8
<i>Amaranthus spp</i> + Pepper	4	4.8
Maize + Pepper	4	4.8
Okra + Maize	2	2.4
Tomato + <i>Amaranthus spp</i>	2	2.4
Okra + <i>Cochorus</i>	2	2.4
Okra + <i>Amaranthus spp</i>	2	2.4
Maize + Rice	2	2.4
Sources of farmland*		
Rent	80	96.4
Gift	2	2.4
Farming land	9	10.8
Purchased	2	2.4
Sources of farm labour*		
Family labour	70	84.3
Hired labour	78	94.0
<i>Amaranthus</i> / Pepper / Tomato	1	1.2

*Multiple responses

Table 3: Knowledge scores of respondents on recommended fadama practices (n = 83)

Recommended practices	Total score	Overall % score
Crop spacing	102	61.4
Use of improved varieties	106	63.9
Fertilizer application	154	92.8
Improved land preparation	76	45.8
Seed treatment	135	81.3
Insect control	150	90.4
Timely planting	160	96.4
Use of tube well / wash bores	87	52.4
Irrigation pump use	111	66.9
Irrigation skill	145	87.3
Timely harvesting	164	98.8
Herbicide use	77	46.4

Knowledge level and knowledge gap index of farmers on recommended fadama practices

Table 4 shows that a greater percentage (63.9%) of the farmers had high knowledge level of the recommended practices, 33.7% had moderate knowledge level, while only 2.4% of them had low knowledge level. This implies that majority of the

respondents were knowledgeable about recommended fadama practices. On the other hand, the table shows that 63.9% of the respondents had low knowledge gap, 33.7% of them had moderate knowledge gap, while only 2.4% of the respondents had high knowledge gap.

Table 4: Distribution of respondents on the basis of knowledge level and knowledge gap index of recommended fadama practices (n = 83).

Variables	Number of people	Percent
Knowledge level (score)		
Low (0-8)	2	2.4
Moderate (9-16)	28	33.7
High (17-24)	53	63.9
Knowledge gap index		
Low (0-13)	53	63.9
Moderate (31-60)	28	33.7
High (61-100)	2	2.4

Relationships between Respondents Demographic Characteristics, Extension Contact and Knowledge Gap of Recommended Fadama Practices

Data in Table 5 show that out of the eight demographic characteristics, only three namely: years spent in school, number of farmers' co-operative organizations belonged to, and gender had significant negative influence on knowledge gap of the respondents. This implies that the higher the number of years spent in school by the farmers, the lesser the knowledge gap of the farmers. This can be attributed to the fact that the higher the education level of an individual, the more knowledgeable the individual is because of his / her exposure to different learning situations. Also, the higher number of farmer's co-operative organizations belonged to by a farmer, the lesser the knowledge gap of such a farmer. This, also, could be attributed

to wider level of interaction and contact with many people and the sensitization of farmers psyche to make more profits. Finally, female farmers had lower knowledge gap than their male counterparts. This implies that the more female fadama farmers we have, the less the knowledge gap of these farmers. This could possibly be explained by the fact that most of the fadama crops cultivated by the farmers in the zone were vegetables, which in most cases, are mostly grown by women for household food security. Other demographic characteristics like age, household size, and estimated annual income from dry season, dry season farming experience and dry season farmland size were found to have no significant influence on knowledge gap of farmers. Also, there was no significant influence of extension contact on the knowledge gap of farmers in the study area, with regard to recommended fadama practices.

Table 5: Influence of demographic characteristics and extension contact on knowledge gap of farmers on recommended fadama practices.

Dependent variable	Coefficient	Standard Error	t-stat	p-value
Gender (female)	-16.2418	4.028668	-4.03157	0.00135*
Age	0.068305	0.159405	0.428498	0.66955
Years spent in school	-0.66821	.335548	-1.9914	0.050179*
Number of social / farmers Co-operative organizations	-3.09516	1.454491	-2.128	0.036713*
Dry season annual income	1.06E-05	4.73E-05	0.223156	0.824037
Dry season farming experience	-0.07862	0.183462	-0.42851	0.669543
Dry season farmland size	-1.5796	1.083671	-1.45428	0.150156
Extension contact	0.183646	0.498335	0.36852	0.713552

Significant $P = < 0.5$

SUMMARY AND CONCLUSION

Majority of the fadama farmers were males who were married and primarily engaged in farming. Majority of them were members of at least one farmers' co-operative organization who regularly participated in

dry season farming, though operating at subsistence level, cultivating less than one hectare of land with the use of both family and hired labour. The most common crops cultivated as sole crops were *Amaranthus spp*, *Cochorus* and Maize, while the

more common crop combinations found in the area were *Amaranthus spp* + Cochorus and Maize + *Amaranthus spp*. Farmers were mostly knowledgeable about timely harvesting, timely planting and fertilizer application. Majority (74.7%) of the respondents had high level of extension contact. A greater proportion (63.9%) of the respondents had high level of knowledge of the recommended fadama practices. Conversely, a greater proportion (63.9%) of the respondents had low knowledge gap of the recommended fadama practices. Of all the demographic characteristics of the respondents, years spent in school, number of farmers' co-operatives belonged to and gender of respondents were the variables that significantly influenced the knowledge gap of farmers. Since female farmers tend to be more knowledgeable about recommended fadama practices, extension agency and its agents should focus attention on involving more female farmers in the fadama programme and efforts should be geared towards increasing the knowledge level of the male farmers in order to improve productivity.

REFERENCES

- Agu, V. C. (2002) A comparative study of the extension systems of the agricultural and community development organizations in Sokoto State, Nigeria. Ph.D Research Proposal. Department of Agricultural, Extension, University of Nigeria Nsukka Pp. 21-24.
- Agwu, A. E. and Eleghasim, I. C. (2002) Farmers' perception of the contributions of the fadama programme to poverty alleviation in Okigwe agricultural zone, Imo State. In: V. C. Umeh and J. A. Fagbayide (Eds.). *Horticulture for Sustainable Environment and Economic Empowerment. Proceedings of the Annual Conference of Horticultural Society of Nigeria*, 14th – 17th May 2002. Pp. 108 – 114.
- Country Profile (2002) Nigeria. www.icid.org/v-nigeria.pdf
- FAO (1992) (Food and Agricultural Coordinating of the Nations) *Irrigation Subsector Review*. Investment Centre Report No 89/91 CJP-NIR45SR.FAO, Rome.
- FMANR (1997) (Federal Ministry of Agriculture and Natural Resources). *National Agricultural Research Strategy Plan:1996-2010*. Abuja, Nigeria. Pp 124-125.
- IITA (1992) International Institute of Tropical Agriculture. *Annual Report of IITA, 1992 Edition*.
- Imo ADP (1998), Imo State Agricultural Development Project: Study on adoption of national fadama development projects technologies.
- Imo ADPIICR (1998) *Imo State Agricultural Development Project Implementation Completion Report of the National Fadama Development Project*.
- OGADEP (1997). Ogun State Agricultural Development Programme: *Diagnostic Survey on Fadama Development in Ogun State*. Pp 1-67
- OGADEP (1998) *Ogun State Agricultural Development Programme Internal Implementation Completion Report of the National Fadama Development project* (1).
- OGADEP (2002). Ogun State Agricultural Development Programme: *Status and Evidence of NFDP-II Eligibility Criteria*. Pp 1-29.
- Oluwatosin G. A (2001): Land management practices under fadama system. Paper presented at a workshop on Fadama agriculture held at IAR&T, Moor Plantation Ibadan, Nigeria pp 1-2.
- Tyem, M. N (1995). Fadama development concept-procedures and approaches for implementation. *Abuja Agro voice* Vol. 1 (3). Pp4-6.
- World Bank (1995) Impact evaluation report on Nigeria, Kano and Sokoto Agricultural Development Projects. <http://inweb18worldbank.Org/oad/ocdoclib.nsf/Doc> UNID View for Java.
- World Bank (2003) *Second National Fadama Development Project. Report No. 26133 UNI*. Country Department 12. Africa Regional Office.
- Yahaya, M. K (2002). Development and challenges of Bakolori irrigation project in Sokoto State, Nigeria, *Nordic Journal of African Studies*, Vol. 11 (3) Pp 411-430.