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Determinants of Training Needs of Fadama Farmers in Osun State of Nigerian and Implications for Extension Workers

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Abstract: The study determined factors influencing the training needs of fadama farmers and drew implications for extension work in Osun State, Nigeria. Primary data were collected from 150 fadama farmers through a multi-staged random sampling technique. The data were analysed using descriptive statistics, regression and factor analytical techniques. Six factors were isolated from the twenty-six variables with 66.22% contributions to training needs of fadama farmers. These include socio-economic, informational, credit, resources, culture and training related factors. While training related factors had the lowest contribution (5.01%), socio-economic factor contributed the highest (21.48%) to the training needs among the factors. Also two important variables, level of education (b = 1.701) and formal training attended (b = 1.57) were positively significant at $p<0.05$ to the training needs of fadama farmers.

Key words: Determinants, training needs, fadama farmers extension workers

INTRODUCTION

Fadama is an *Hausa* word meaning a valley-bottom, flood plain, or a lowland around a river that floods or becomes wet when the river is high. Fadama is defined as flood plains and lowland areas underlined by shallow aquifers and found along Nigeria's rivers system (Blench and Ingawa, 2004). Fadamas have been sources of economic power to many groups of individuals called Fadama Users Group (FUG). Fadama Users Groups according to Blench and Ingawa (2004) are farmers, pastoralists, fisherfolk/fisher women, hunters and others (e.g., gatherers), who directly depend upon the natural resources of the fadamas for their livelihoods. Fadamas usually flood naturally but the term is also applied to areas where people have channeled or pumped water for their farms or other purposes.

Fadama farmers are those that cultivate the low land areas. These groups of farmers usually produce vegetables during the dry season when the water context in the low land soil is highly reduced due to evaporation. Some of the common vegetables are shown in Table 1.

Some of the arable crops grown in the fadama and which the raised water table can support during the dry season are Maize (*Zea mays*) and Rice (*Oriza sativa*). Fadama farmers at times produce maize towards the on-set of raining season while rice is planted at the on-set of dry season. These dry seasons farming does not exclude women and also cut across productive ages. Ojo (2000) described dry season farming as a common practice in peri-urban or urban areas. Ladele and Omotos (2000) pointed out that urban agriculture in Nigeria has not been given much policy consideration. This has resulted in deficiencies in some technical and managerial skills of fadama resources users. Produce from low land fadama usually command high farm gate prices due to high demand for the produce at the time of low supply. Since farmers are generally encouraged to increase their income and consequently their outlook therefore, the need to improve their skill and knowledge in fadama farming is of paramount importance. Training is very important to improved skill, knowledge and practice of an individual.

Table 1: Common vegetables grown in Nigeria

Family name	Botanical name	English name
Malvaceae	*Abelmoschus esculentus* (L)	Okra
Malvaceae	*Hibiscus sabdariffa* (L)	Rosella
Amaranthaceae	*Amaranthus cruentus* (L)	Amaranth
Amaranthaceae	*Celosia argentea* var.*cristata kuntze*	Cockscomb
Solanaceae	*Solanum melongena* (L)	Eggplant
Solanaceae	*Lycopersicum esculentum* (Nill)	Tomato
Alliaceae	*Allium cepa* (L)	Onion
Curcubitaceae	*Cucumis melo* (L)	Melon
Umbelliferae	*Daucus carota* (L)	Carrot
Tiliaceae	*Corchorus alitorius* (L)	Long fruited juice

Source: Tindall (1983)

Training need is the differences between what is and what ought to be (Leagan, 1971). This implies a gap between the two conditions i.e what the farmer knows and what he is expected to know. Training need defined as skill, knowledge and attitude an individual requires in

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order to overcome problems as well as to avoid creating problem situations Proctor and Thonthon (1961). Ajayi (1995) stated that training is acquisition of the act of utilizing knowledge and skills while Van Dersal (1962) defined it as the process of teaching, informing, or educating people so that they may become qualified to perform in positions of greater difficulty and responsibility. In agricultural extension delivery systems, effective training is expected to change the knowledge, attitude and practices (KAPs) of a trainee. Marsden (1998) stated that the aim of training is threefolds: to provide workers with the appropriate tools, which include both conceptual and technical to carry out their work more effectively; to make them aware of recent comparative developments within their field of interest; and to open up alternative ways of thinking and implementing social development programmes. Training thus combines sectoral with holistic approaches in attempts to provide access to and interpretations of current information. Swanson *et al.* (1998) stated that training could readily be categorized into two types: pre-service training and inservice training. Preservice training is more academic in nature and is offered by formal institutions while inservice training is offered by the organization from time to time for the development of skills and knowledge of the incumbents or an employee.

The types of training given to trainee vary from organization, farmers' groups and institutions to others. This depends on so many factors such as conceived areas of specialization, expected works or tasks attached to a position and types of enterprise in focus. Many studies have demonstrated the differences or variations in the training needs of farmers, which are based on sets of determinates (Ajayi *et al.*, 2003; Ojo, 2000; Farinde and Ojo, 1999; Ajayi, 1995).

Ajayi *et al.* (2003) in their study of women farmers training needs and their correlates for effective extension programme and poverty reduction in Oyo State of Nigeria found that women farmers had low knowledge and skills in performing the following farm operations: chemical weeding and pest control, preparation and utilization of organic fertilizer, livestock and poultry breed selection and construction of livestock houses. Other areas of training needs are identification and treatment of sick animals, slaughtering and dressing of animals and marketing of livestock. Sabyasachi (2003) determined the perceived training needs of rural youths in diversified agriculture and other employment generating activities in Karnal district of Haryana, India. It was found that most of the rural youths desired training in vegetable cultivation, followed by dairy farming, crop farming, motor repairing and in the use of new information technologies, Farinde and Ajayi (2005) investigated training needs of women farmers in livestock production in Oyo State of Nigeria. The finding revealed that the weighed mean scores in knowledge and skills of women farmers were low in compounding animal feeds, breeding, identification and diagnosis of sick animals, selection and administration of drugs.

Adesoji *et al.* (2006) assessed the training needs of Fadama farmers for future agricultural extension work development in Osun State, Nigeria. The study identified areas of training need by fadama farmers as chemical control of insect pest, use of appropriate chemical and correct dose of application, appropriate herbicide to be used to reduce drudgery and storage of fadama produce. However, these studies have determined various areas of training needs, none of them have identified factors to be considered in organizing, planning and evaluating training needs of fadama farmers. What are the factors that determined 3 the training needs of fadama farmers in Osun State? What are the relationships between the crucial factors and training needs of Fadama farmers and what are the contributions of each factor to the training needs of the farmers?

The main objective of the study was to isolate determinants of training needs of fadama farmers in Osun State, Nigeria.

The specific objectives are to:

- Determine the crucial factors affecting the training needs of fadama farmers;
- Establish relationships between the crucial factors and training needs; and
- Determine contribution of each factor to the training needs of farmers.

MATERIALS AND METHODS

The study was carried out in Osun State, Nigeria between the months of October 2004 and January 2005. Osun State is made up of thirty Local Government Areas (LGAs). It is situated in the southwestern part of Nigeria. It lies between Longitude 21.65° and 6.75° East of Greenwich meridian and Latitudes 6°59' and 9° North. Ondo and Oyo State bound it in the East and West, respectively while Kwara and Ogun State are its boundaries in the North and South respectively. The State has landed area of 925,100 hectares or 9251 square kilometers with population of 2,172,005 (Federal office of statistics, 1998).

Fadama farmers in Osun State were the targets of this study. The State was divided into three agro-ecological zones namely Iwo, Osogbo and Ife/Ijesa under the Osun

State Agricultural Development Programme (OSSADEP). Five blocks per zone, five cells per block and two farmers per cell were selected using simple random sampling techniques. A total of one hundred and fifty fadama farmers were interviewed for the study using structured interview schedule. Data were collected on the demographic characteristics of the farmers, sources of information, size of fadama land cultivated, distance of farms to the city, membership of fadama association, hours worked on farm, sources of information among others. The dependent variable in the study was the training needs of the fadama farmers. The training needs of fadama farmers was indexed by the number of areas where training was required in fadama farming activities/utilization of fadama resources by each of the farmers. Descriptive statistics such as frequency and means and inferential statistics such as regression and factor analyses were used to analysed the data.

All the twenty-seven variables were subjected to factor and principal component analyses to isolate the factors. Six factors that were of immense importance to the training needs of fadama farmers were extracted. Kaiser (1958) rule of thumb, which says that variables with coefficient greater than or equal to 0.30 have a high loading and may be used in naming a factor. Considering this rule, high loading variables were extracted from the variable component matrix. Three criteria used to name the factors were employed by Farinde and Jibowo (1996). The criteria were:

- Picking synonyms of the highest loaded variables on each factor;
- Inferences from the correlation coefficient of the highly loaded component and
- The researchers' subjective interpretation of experiences from literatures.

RESULTS AND DISCUSSION

Personal Characteristics of fadama farmers: Data in Table 2 show that majority (76%) of the respondents were male and 24% were female. This showed that men dominated fadama farmers operations in Osun State. The (Table 2) also shows that about 66% of fadama farmers were within the production age of 15-45 years with the mean age of 40.8 years and standard deviation of 11.1. This study shows that aged farmers were few in fadama production. The reason might be the prevalence of tedious back bending activities in fadama production. Data in Table 2 also show that 76% of the respondents were Christians and 24% were Muslim. Majority (84%) was married, only 16% were single. The married farmers could utilize family labour both in the production and marketing of fadama crops. The mean years of formal education was 10.6 with standard deviation of 4.36. This showed that many of fadama farmers in Osun State had less than secondary school education, which is about 12 years. Only 20.83% attended various higher institutions and 35.42% attended secondary schools while 43.75% attended primary schools. Only 17.2% of fadama farmers in Osun State were cultivating inherited land, 32.7% were cultivating borrowed land where rents were not paid; only 5.8% cultivated purchased fadama land and majority 42.3% cultivated either hired or leased land for their fadama production. Majority (72.0%) of fadama farmers were indigene of the community where they cultivated fadama land and only 28% were non-indigenes. It may be expected that majority should cultivate inherited land since majority of the producers were indigenes of the community where they were operating, but this was not so. This showed that fadama farmers were found of looking for suitable farmland if they do not have. This may be the reason why majority (42.3%) cultivated either hired or leased fadama land.

Table 2: Demographic characteristics of fadama farmers

Demographic characteristics	Frequency	Percentage	Mean
Sex			
Male	114	76	
Female	36	24	
Total	150	100	
Age (years)			
15-45	99	66	40.8
46-60	42	28	
Above 61	9	6	
Total	150	100	
Religion			
Islam	36	24	
Christianity	114	76	
Total	150	100	
Marital status			
Single	24	16	
Married	126	84	
Total	150	100	
Level of formal education			
Primary school	63	43.75	
Secondary school	51	35.42	
Higher institution	30	20.83	
Total	150	100	
Source of farm land			
Borrowed	48	32.7	
Inherited	30	19.2	
Purchase	9	5.8	
Hired/lease	63	42.3	
Total	150	100	
Tribe			
Yoruba	108	72	
Ibo	42	28	
Total	150	100	

Source: Field survey, 2005

Table 3: Demographic characteristics of fadama farmers

Distance of nearest fadama farm from town/city			
Demographic characteristics	Frequently	Percentage	Mean
Distance	60	40	
<1-2km	69	46	2.8
2.1-4km	21	14	
4.1-5km	150	100	
Total			
Size of fadama farm land cultivated			
(Ha)			
<1Ha	78	52	
1-2	51	44	
>2	6	4	1.30
Total	150	100	
Crops cultivated			
Tomato	66	44	
Okro	12	8	
Leaf vegetable	129	86	
Maize	90	60	
Membership of fadama association			
Member	30	20	
Non-member	120	80	
Total	150	100	
Period of day work on farm			
Morning only	60	40	
Morning and afternoon	3	2	
Morning and evening	69	46	
Afternoon and evening	3	2	
Throughout the day	15	10	
Source of agrochemicals			
Government	12	8	
Private organization	12	8	
Open market	132	88	
Source of seed			
Government			
Private organization	15	10	
Open market	6	4	
Previous harvest	96	64	
Multiple responses	63	42	

Source: Field survey, 2005

Table 4: Information, credit and training characteristics of fadama farmers

Characteristics	Frequency	Percentage
Sources of information		
Television	3	2
Friends	87	58
Extension agents	63	42
Credit		
Loan	18	12
No loan	132	88
Total	150	100
Fadama training attended		
Attended trainings	51	34
No training	99	66
Total	150	100
Means of learning improved farm practices		
Other farmers		
Extension agent	63	42
Radio	84	56
Television	3	2
Cooperative societies	3	2
Posters	3	2
Training requirement	6	4
Training required		
Training not required	125	83
Not certain	21	14
Total	4	3
Training methods preference	150	100
Television	9	6
Practical demonstration	99	66
Small Plot Adoption Technique (SPAT)	24	16
Training need expressed		
Storage of farm produce	141	91
Storage of leafy vegetables	138	92
Storage of fruit vegetables	135	90
Use of herbicide on fadama farm	132	88
Appropriate and dosage of herbicide	114	76
Control of insect pest on fadama crops	123	82

Source: Field survey, 2005

Farm size and farm distance: Data in Table 3 show that majority (52%) of fadama farmers in Osun State cultivated less than one hectare of land. About 44% cultivated between 1 and 2 ha. Only about 4% cultivated more than 2 ha. The mean farm size was 1.3 ha. This table also show that 40% of respondents had their nearest fadama farm within 2 km from town, 46% had their farms between 2 and 4 km to town and only 14% had their farms between 4-5 km to town. The mean farm distance to the market was 2.86 km. The finding shows that most fadama farms were located very close to towns and cities while some are even within the towns. This finding may be true because suitable lands for fadama are mostly left undeveloped within town. In addition, farmers and individuals in farther villages would feed on edible vegetable, around them and may not require the cultivated leaf vegetables.

Crops cultivated by fadama farmers: Data in Table 3 further show that majority (86%) of the fadama farmers cultivated leaf vegetables, 60% cultivated maize while 44% cultivated fruit vegetable like tomato and only 8% cultivated okra. The finding showed that leaf vegetable is the major produce of the fadama farmers. As seen in Table 3, majority (80%) of fadama farmers were not members of fadama association while only 20% were members. The mean time committed to fadama farms by the respondents was 5.86 h per day. This amount of time is still less than the 8 h spend by civil servants at work. Also Table 2 shows that fadama farmers work in their farm both in the morning and evening periods. About 46% worked both in the morning and evening times while about 40% worked only in the morning period. About 10% indicated that they worked throughout the day in their farms.

Sourcing for farm input by fadama farmers: Data in Table 3 also show that majority (88%) of the respondents bought agrochemicals from open market, about 64% bought seeds from open market while 42% of the farmers used seeds from previous harvests. This shows that majority of the fadama farmers were not getting their inputs from government sources.

Data in Table 4 show that majority (58%) of the fadama farmers in Osun State received information from

friends. This is more than those served by extension agents which is 42%. Only 2% received information through television. Majority (88%) of the fadama farmers did not obtain loan for their farming. Only 12% obtained loan for their farming operations and all (100%) of the respondents that used loan obtained the loan from various cooperative societies. This is an indication of the relevance and importance of cooperative societies. The mean income of fadama farmers was N30, 687.50 per season. This indicates that fadama farming is a worthwhile enterprise.

Training of respondents in fadama activities: Data in Table 4 again show that majority (66%) of the respondents indicated that they never attended training in fadama farming before. The data further show that respondents learnt about improved farm practices from extension agents (56%) and other farmers (42%). Other media of information such as electronic media and posters were very low. However majority (86%) of the respondents indicated that they want training in fadama production. Areas of training needs Technique (SPAT) while only 6% preferred television as the training medium.

Results of the study show that the significant variables account for 73.8% of the variance of the training needs of fadama farmers (R^2 = 0.738). The remaining, about 26% is said to be residual and this could be due to error and other factors not investigated. The R^2 of the significant variables is statistically significant (F = 2.704). This is an indication that the variables pulled together would significantly influence the training.

Data in Table 5 show the significant variables at $p<0.05$. This means that the significant variables should be considered when planning and executing trainings for fadama farmers. Only two variables with significant value less than 0.05 can be used to predict the training needs of fadama farmers. These variables are: level of education of farmers and formal trainings attended. Employing the regression equation.

$$Y = a_1+b_1x_1 + b_2x_2 \ldots. b_nx_n.$$

Where

Y = Dependent variable (Training needs)
a_1 = Constant
b_1b_2 = Regression coefficient of x_1 and x_2 respectively
x_1 = Level of education
x_2 = Formal trainings attended

$$Y = 35.45 + 1.23x_1 + 7.57x_2$$

Table 5: Summary of regression analysis showing significant relationship between training needs and socio-economic characteristics of fadama farmers

Variables	B	Beta	T-ratio	Sig.
Sex	-3.695	-0.242	-1.132	0.269
Marital status	-2.173	-0.126	-0.563	0.579
Level of education	-1.701*	-0.326	-0.995	0.023
Size of farm land	1.245*	0.267	1.128	0.270
Tribe	1.759*	0.125	0.568	0.575
Crops cultivated	1.126*	0.114	7.7	0.486
Membership of association	0.719*	0.046	0.228	0.821
Source of seed	-0.586*	-0.057	-0.431	0.670
Source of chemicals	-3.057	-0.250	-1.234	0.229
Sources of information	-0.402*	-0.041	-0.235	0.817
Formal training attended	7.567*	0.567	3.332	0.003
Training method desired	-0.815*	-0.204	-0.726	0.475

*Significant variables at $p<0.05$, Constant = 35.446, Source: Field survey, 2005

Table 6: Result of principal component matrix extracted for training needs showing correlation coefficient of highly loaded variables

High loaded variables	I	II	III	IV	V	VI
Sex		0.592			0.444	
Age		-0.543				
Marital status						
Level of formal education	-0.755					
Size of household	0.739					
Source of farm land					0.527	
Size of farm land	0.700			-0.435		
Tribe					0.478	
Experience in fadama farming	0.663					
Membership of fadama association						0.373
Hours spent on farm	0.806					
Period of day on farm to work				0.456		
Source of input			-0.413			
Source of information		0.654				
Loan			0.592	0.467		
Source of loan		-0.654	-0.398			
Income	0.800					
Training attended before						0.378
Training required						0.498
Method of training						-0.406

Source: Field survey, 2005

Results of factor analysis (Isolated factors influencing training needs of fadama farmers): Data in Table 6 show the result of principal component matrix extracted for training needs. Five groups of factors were isolated from the thirteen variables with highly loaded components.

Factor I: Socio-economic factor: This factor was inferred of five variables from the first component. The variables are, level of formal education (-0.755), size of household (0.739), size of farmland (0.700), experience in fadama farming (0.633) and hours spent on farm (0.806). All the above variables are very important to training needs of fadama farmers. The level of formal education, size of farmland are important in determining the training needs, this is shown by the result of the regression equation above. Educated fadama farmers would want to learn more to improve his status quo of production, likewise the less

educated would want to learn more to improve in his production. Farmers with large family size would want to learn more to improve his/her production to maintain the family.

Factor II: Information related factor: This factor was also inferred from the highly loaded variables from the second component. The variables are source of information (0.654), source of loan (-0.654), sex (0.592) and age (-0.543). Importance of information cannot be over emphasized in training need. This is because those in need of training need to be informed through a source, which may be the extension agent, media houses, sales agents/friends and neighbour etc. Flow of information helps to create awareness in farmers and also exposes the needs of farmers.

Factor III: Credit related factors: This factor was derived from the related variables that have high loading coefficients. The variables are loan (0.592), source of input (-0.413), source of loan (-0.398) and training method (0.485). Most farmers in need of training may want to increase their production after the training and this may call for financial assistance from either the formal or informal sources.

Factor IV: Resource related factors: This factor was also inferred from the variables such as size of farmland (-0.435), period of day work on farm (0.456), loan (0.467). The variables are highly loaded. The resources include land, time and labour. Availability of resources will influence training needs of farmers. Training will update the knowledge of the trainee and resources as mentioned above must be available for the trainee to acquire adequate knowledge and skill for maximum out-put or productivity on the field.

Factor V: Culture related factors: Highly loaded variables such as marital status (0.553), source of farmland (0.527), tribe (0.478) and sex (0.444) were used in the naming of the factor. This has to do with the type of marriage, land tenure system and gender issues in the society that determines who marry who, who control land and take decision on the farming activities in the family (male or female). The culture of the trainee may influence their needs at a particular time. Data in Table 2 show that Yoruba and Ibo dominated the production of fadama crops in Osun State. The culture of these two tribes are not the same therefore, influence of culture on the training need cannot be over looked.

Factor VI: Training related factors: This factor was extracted from highly loaded variable such as need of training (0.498), training methods (-0.406), formal training attended (0.378) and membership of fadama association (0.373). Types of training attended before may expose an individual to more training needs. Also fadama association may organize training, which may further show the deficiency of members in terms of training.

Table 7: Principal component analysis of fadama farmers showing percentage variation in training needs as caused by each factor extracted

Component No.	Name of factor	Percentage	Cumulative percentage
I	Socio-economic	21.482	21.482
II	Information related factor	14.536	36.018
III	Credit related factor	9.165	45.183
IV	Resource related factor	8.010	53.193
V	Culture related factor	7.123	60.316
VI	Training related factor	5.902	66.218

*Eigen value greater than 1.5

Contribution of extracted factors to the training needs of fadama farmers: Data in Table 7 show that socio-economic factors contributed (21.48%) to the training need of fadama farmers. Information related factor contributed 14.536% while credit related factors contributed 9.165% to the training need of fadama farmer. Resource related factors and culture related factors contributed 8.010 and 7.123% to the training needs of fadama farmers respectively. The least contributor was the training related factor, which contributed 5.09%. The high contribution of socio-economic factor may be due to the fact that many variables like size of farm, income, experience in farming etc are involved in the factor. The least contribution of training related factor may be as a result of interaction of the factor with the dependent variable (training need). However, the total contribution of all the factors together (66.22%) was high. This indicates that the six factors together would contribute 66.2% to training need of fadama farmers in Osun State, Nigeria.

CONCLUSION AND RECOMMENDATIONS

The training needs of fadama farmers were assessed and crucial factors associated with it were isolated. The six factors isolated arranged in order of importance are: socio-economic, information, credit, resources culture and training. Furthermore, two important variables level of education and formal training attended were identified to be very crucial to predict the training needs of fadama farmers in Osun State. Areas of training needs identified include storage of both leafy and fruit vegetables and maize. Others include use of agrochemicals (appropriate chemicals and dosage to be used).

Extension agents should be encouraged or motivated to training fadama farmers on a regular basis. Also the factors mentioned above should be considered when

planning and executing fadama training for farmers. There is need for inclusion of fadama farming as a priority area for promotion under the Osun State agricultural development policy as away of (1) keeping farmers busy throughout the year through diversification of enterprises (2) improving income generation for farmers (3) employment creation for the unemployed and (4) enhancing food security in the State.

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