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Impact of the Anambra State Fadama Project Phase -1 on the Socio-economic Life of the Rural Farmers

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ABSTRACT The study was undertaken to evaluate the Fadama phase-one vegetable production project of the Anambra State Agricultural Development Project (ADP). Data for the study were collected from 160 vegetable growers (80 project farmers and 80 non-project farmers), through the use of a set of structured interview schedule. Percentage, mean scores, factor analysis, t-test, and chi-square statistics were used in the data analysis. The result of the study indicated that telfaria and okra production were most preferred to other vegetables during dry and wet seasons, respectively, mainly due to their high income generating capacity, high market demand, high yielding capacity and usefulness and readily availability to the family. The project made some appreciable socio-economic impact on the growers and the socio-economic aspirations of the Project Farmers (PFs) shifted from personal to farm improvement for fadama vegetable production. The major constraints to the full implementation of the project objectives in the area included post-harvest, logistics and poor fadama incentive problems. It was therefore, recommended that there should be timely and adequate provisions of fadama inputs and infrastructure; and that low cost but improved technologies for storage, transportation, processing and marketing of fadama vegetable produce should be introduced by the National Fadama Development Project (NFDP) management.

INTRODUCTION

Self-sufficiency in food production based only in rainfed agriculture is difficult to achieve. This is particularly true for Nigeria. So, for self-sufficiency in food production, there is need to extend the farming season beyond the rainy season through irrigated agriculture (Anambra State Agricultural Development Project - ASADEP 2000). To ensure that this laudable objective of self-sufficiency in food production is achieved, the Federal Government approved the implementation of the national Fadama development project (Obiechina 2000).

The implementation of Fadama project ensures that agricultural production is carried on during both seasons. Fadama is an Hausa word regarded as the low-lying flood-prone lands found in the plains of rivers. Fadama areas are composed of deposited sediments and contain exploitable aquifers (water tables). It involves preparation of low-lying areas and flood plains for crops, agroforestry and livestock production (Nwadukwe 2000).

The National Fadama Facility (NFF) was established under the NFDP loan No. 3541 UNI to assist Fadama development in the states that met the pre-determined eligibility criteria (Federal Agricultural Coordinating Unit – FACU 1995) The NFDP was approved for funding on March 26, 1992 for a loan of US $ 67.5 million. It was to build on the achievements of some of the Northern ADPs in developing small-scale irrigation through extraction of shallow ground water, using low-cost petrol-driven pumps. It was intended to raise farmers' incomes and contribute to food security and poverty alleviation (World Bank 1992). The loan closed on December 1999. The initial beneficiary states included Bauchi, Kano, Sokoto, Jigawa and Kebbi. They were eligible to a loan of US $55.0 million, while a total amount of US $5.9 million was allocated for the NFF in other states of the federation that met certain eligibility criteria. The federal government had to retain US $6.6 million for environmental assessment, monitoring and studies (Tyem and Okoli 1997; Eremie 2000).

The project objectives were to: (i) install 50,000 shallow tubewells in the fadama lands for small-scale irrigation; (ii) simplify drilling technology for the tubewells; (iii) construct fadama infrastructure; (iv) organize farmers for irrigation services; (v) carry out aquifer studies; (vi) monitor and up grade irrigation technologies and (vii) complete a full assessment of the environmental and social impacts of fadama development (Umar and Tyem 1995).

The Anambra State ADP (ASADP) embarked on the NFDP phase I in 1996 by carrying out a study of both the surface and shallow underground water resources in the state as part of its programme to increase dry season crop production and other farming activities in the state. The study showed that small-scale fadama (irrigation) was feasible in Anambra State, using simple low cost technologies to harness both the surface and shallow underground water resources (Nwadukwe 2000). About 30,000 hectares of land in the state was then identified as having the capability to support fadama development. About 66.67% (20,000ha) of the land could be irrigated by the provision of tubewells / washbores, while 33.33% (10,000ha) could be irrigated by direct pumping/ diversion from surface water (Obiechina 2000). River Niger is the most prominent river in the state. Others include Anambra, Mamu and Ulasi. These together with the numerous tributaries and streams are capable of providing enormous low land and basins for fadama development in the state (ASADEP 1995a; Nwadukwe 2000).

The NFDP had the general goal of increasing food production in the state through expanded cultivation, using simple small-scale irrigation facilities and appropriate technologies. It was its aim to increase the land area under cultivation by providing an all-year round cropping of marketable and high-valued crops such as cereals (maize and rice), fruits and assorted vegetables. Fisheries and livestock production was to be incorporated into the fadama programme. The increase in the total population of these crops and livestock annually, would increase the incomes of the farmers and raise their standard of living. Furthermore, NFDP would serve as an insurance against crop failures as a result of environmental hazards. The disturbing demand-supply gap for agricultural products was also aimed to be narrowed and relative price stability ensured over time (ASADP 1995a). In all, the socio-economic life of the farmers would be improved. The strategies for achieving the above objectives involved the delivery of several inputs and services that would generate desired outputs. These include: (i) development of requisite infrastructure such as access roads, culverts, tubewells and pumps, etc. within the fadama areas in the state; (ii) provision of marketing/ storage facilities such as storage sheds, etc. and (iii) organizing farmers into Fadama Users Associations (FUAs) for irrigation management, better access to credit, cost recovery and training on improved technologies, etc. (Onugha 1998).

Since the NFDP phase – 1 covered many areas of agricultural production, which will be impossible to examine under this particular study, the study is therefore, limited to vegetable production. Vegetables are among the major dietary intake in our everyday life. They are succulent herbaceous plants that are eaten in part, whole, raw or cooked as a part of our main dish or in salad. They are characterized by high moisture content being of the order of 75% moisture or more and 25% or less dry matter (Uzo 1989).

Vegetables usually augment nutritive value of most of our staple food, which are deficient in vitamins, proteins and minerals. A remarkable change in nutritional requirements of an individual is bound to influence his health, skill and productivity. Now that we do not consume enough animal proteins, our dietary needs could be to some appreciable extent, met from the consumption of vegetables. A judicious mixture of different vegetable proteins is enough to meet our daily protein requirements. Vegetables are also a good source of oils, carbohydrates, minerals and vitamins. Despite the nutritional value of vegetable they are not accorded their appropriate uses in the diet of the West African peoples partly because of ignorance of nutritive value of these foods and largely due to cost, difficult of storage and distribution (Asiegbu 1983).

The NFDP phase – I which implementation lasted for a period of six years came to an end in December 2002 and the phase-2 is yet to take-off. Within the period of six years, the NFDP was expected to have achieved its pre-determined objectives especially, with respect to improved vegetable production and at the same time, made some impact on the socio-economic life of the rural farmers who are involved in vegetable production in the state. The question now relates to the impact of fadama phase – 1 project of the Anambra State agricultural development programme on vegetable production and socio-economic life of the rural farmers. Of what impact is the NFDP on vegetable production in Anambra State? To answer this question, this study was designed to evaluate the impact of NFDP phase-1 on vegetable production and socio-economic life of rural farmers in Anambra State of Nigeria.

Objective of the Study

(1) determine the vegetable production preference of the growers;
(2) assess the impact of the project on vegetable production and socio-economic life of the rural farmers;
(3) identify the major problems being faced by the project vegetable farmers.
(4) determine the socio-economic aspiration of the farmers

METHODOLOGY

The study area is Anambra State of Nigeria. It comprises 21 Local Government Areas (LGAs) and four Agricultural Zones (AZs) - Aguata, Anambra, Awka and Onitsha. There are 6 blocks in Aguata AZ, 4 blocks in Anambra AZ, 5 blocks in Awka AZ and 6 blocks in Onitsha AZ. The climate is typically equatorial with two main seasons, the dry and the rainy seasons. The state experiences dry season from late October to early May and has at least six dry months in the year. The vegetation consists of rainforest. Other parts consist of wooden savannah and grasslands. The state is drained by five major rivers and their tributaries. These are the River Niger, Anambra River, Mamu/Ezu River, Idemili River and River Ulasi. In addition to these, there are smaller perennial streams like the Oyi, Nkisi, and Obizi. In-land valley ponds and lake occur, with the Agulu lake draining a collection of towns in the state (Nwadukwe 2000).

All vegetable producers in the 4 AZs of Anambra State formed the population of the study. Out of the 4 AZs in the state, two (Anambra and Onitsha) zones were purposively selected because of the high activities of fadama vegetable production project and active participation of the vegetable farmers. Also, based on the same reasons, two blocks (Anambra East and Anambra West) were purposively selected from the Anambra AZ, while another two blocks (Ogbaru and Idemili South) were also purposively selected from the Onitsha AZ. This implies that a total of 4 blocks were purposively included in the study. From each of the 4 blocks, 2 circles that were actively involved in the activities of Fadama vegetable project were selected, using simple random sampling technique. This indicates that a total of 8 circles were involved in the study (Table 1).

The target populations for the study were the project farmers and the non-project farmers from the blocks/circles. The list of the 8 circles and registered fadama users associations (FUAs) were obtained from the headquarters of ASADEP. For the fadama project farmers (PFs), a total number of 80 respondents (10 respondents from each of the 8 circles) were selected through simple random technique from the registered FUAs list. For the non-fadama project farmers, from each of the 8 circles, a list of 20 vegetable farmers was drawn. From the list, a total of 10 vegetable farmers were selected, using simple random sampling technique. This implies that a total of 80 non-fadama farmers were involved in the study. Therefore, a total of 160 farmers formed the sample size of the study (Table 1).

Instrument for Data Collection

The primary data to fulfill objectives 1 – 4 were collected by developing a set of structured interview schedule for the project and non-project farmers. Copies of the interview schedule were administered by the researcher and three trained enumerators during the months of August, September, October and November 2004. The

Table 1: Study population and sampling procedure summary

Zone	*Block*	*Circle*	*PFs*		*NPFs*		*Sample total*
			P	*S*	*P*	*S*	
Anambra	Anambra East	Aguleri Uno	30	10	20	10	20
		Enugu Otu	45	10	20	10	20
	Anambra West	Nzam	15	10	20	10	20
		Ifite-Anam	75	10	20	10	20
Onitsha	Ogbaru	Odekpe	45	10	20	10	20
		Atani	60	10	20	10	20
	Idemili South	Nnobi	30	10	20	10	20
		Alor	60	10	20	10	20
Total =	4	8	360	80	160	80	160

P = Population; S = Sample

structured interview schedule was divided into 4 sections. Section one dealt with information on vegetable production preference of the farmers. Section two was designed to elicit information on the impact of fadama project on vegetable production and socio-economic life of the farmers. Section three highlighted the major problems being faced by the project farmers. For the purpose of determining the impact of the project on vegetable production and socio-economic life of the farmers, socio-economic data were sought under 2 different periods namely 'before project' (≤ 1996) and 'after project' (1996 – 2002) for comparison. Section four elicited relevant information on the socio-economic aspiration of the respondents.

Objectives 1 was analyzed by using percentage. Objective 2 was achieved by Chi-Square (χ^2) and t-test statistics. Data were generated from the measured and operationalized socio-economic variables emanated from the farmers' memory. Data measured with ordinal scales were subjected to t – test (P≤0.05), while those that were measured with nominal scale were subjected to chi-square (P≤0.05). Objective 3 was analyzed by using factor analysis with varimax rotation. Here, factor loading of 0.40 and above was adopted in naming and interpreting the factors and constraint variables. Objective 4 was analysed by using percentage.

RESULTS AND DISCUSSION

Vegetable Production Preference

Dry Season: Entries in table 2 indicate that during dry season, telferia was the most preferred vegetable by the PFs (70.0%). This was followed by okra (55.0%), amaranthus (27.6%), pepper (22.6%), tomatoes (15.0%) and garden eggs (10.0%). In the same vein, the most preferred vegetable by the NPFs (62.6%) was telferia. This was also followed by Okra (40.0%), amaranthus (30.0%), tomatoes (25.0%), pepper (22.6%) and garden eggs (20.0%). It implies from these findings that the generality of the farmers (PFs and NPFs) had preference for telferia, okra and amaranthus. However, telferia was the most preferred vegetable by the two groups of farmers. According to Ogungbaigbe (2001), *telferia spp* is the most prominent vegetable in the Southeastern zone of Nigeria but currently, is gradually becoming a vegetable of national reckoning.

Wet Season: Table 2 also reveals that during wet season, majority (57.6%) of the PFs preferred growing more of okra than any other vegetable. This was followed by telferia (55.0%), pepper (50.0%), amaranthus (22.6%), garden eggs (7.6%) and tomatoes (7.6%). On the part of the NPFs, the most preferred vegetable was also Okro (50.0%), while telferia (47.6%) was preferred to pepper (35.05), amaranthus (32.6%), tomatoes (22.6%) and garden eggs (12.6%). It implies from these findings that the PFs and NPFs had preference for Okra, telferia and peppers. However, okra was the most preferred vegetable by the two groups of farmers. This findings agrees with the finding of Ogungbaigbe et. al. (1997). In their study, they found out that okra production under fadama farming, especially, during wet season ranked very high among the farmers and it is preferred to wet season cultivation.

Reasons for the Vegetable Production Preference among Project and Non- Project Farmers during Dry and Wet Seasons

Entries in table 3 indicate that the most obvious reason for telferia preference during wet and dry seasons was its high market demand

Table 2: Percentage distribution of respondents according to their vegetable production preference

Type of vegetable	*Production preference*			
	Dry season		*Wet season*	
	*PFs (n = 80)(%)**	*NPFs (n = 80)(%)**	*PFs (n = 80)(%)**	*NPFs (n = 80)(%)**
Telferia	70.0	62.6	55.0	47.6
Okra	55.0	40.0	57.6	50.0
Amaranthus spp	27.6	30.0	22.6	32.6
Garden eggs	10.0	20.0	7.6	12.6
Pepper	22.6	22.6	50.0	35.0
Tomatoes	15.0	25.0	7.6	22.6

*More than one vegetable was preferred

Table 3: Percentage distribution of respondents according to their reasons for vegetable production preference during wet and dry seasons (n = 160)

Type of vegetable	*Reasons for preference***								
	*EM (%)**	*HYC (%)**	*HIGC (%)**	*CCP (%)**	*HMD (%)**	*LLR (%)**	*PDR (%)**	*DR (%)**	*URAF (%)**
Telferia	40.0	57.5	55.0	17.5	78.8	22.5	5.0	0.0	75.0
Okra	45.0	57.5	57.5	5.0	55.0	20.0	10.0	22.5	37.5
Amaranthus	25.0	40.0	52.5	5.0	47.5	20.0	10.0	0.0	35.0
Garden egg	40.0	40.0	52.5	5.0	71.0	31.3	1.3	7.5	21.3
Pepper	47.5	40.0	52.5	5.0	47.5	20.0	5.0	12.5	25.0
Tomatoes	47.5	31.3	45.0	1.3	47.5	30.0	0.0	7.5	10.0

*Multiple responses
**More than one reason was given EM = Early Maturity; HYC = High yielding Capacity; HIGC= High income generating capacity; CCP = Cheap cost of production;
HMD = High Market Demand; LLR = Less labour requirement; PDR = Pest/Disease Resistance; DR = Drought Resistance;
URAF = Usefulness and Readily Availability to the Family

value (78.8%). This was followed by its usefulness and readily availability to the family (75.0%); high yielding capacity (57.5%); high income generating capacity (55.0%) and early maturity (40.0%). Other minor reasons for telferia preference were cheap cost of production (17.5%), pest/disease resistance (5.0%) and less labour requirement (22.5%). In the same vein the respondents who preferred okra did so, mainly because of its high yielding capacity (57.5%), high income generating capacity (57.5%), high market demand (55.0%), early maturity (45.0%) usefulness and readily availability to the family (37.5%) and drought resistance (22.5%).

Also, amaranthus was preferred mainly because of its high income generating capacity (52.5%), high market demand (47.5%) and high yielding capacity (40.0%). About 53% of the respondents preferred garden egg because it generates high income, while 71.0%, 40.0% and 40.0% of the respondents preferred garden egg because of its high market demand, early maturity and high yielding capacity, respectively. Respondents who preferred pepper did so because of its high income generating capacity (52.5%); early maturity (47.5%); high market demand (47.5%); high yielding capacity (40.0%) and usefulness and readily availability to the family (25.0%). Also tomatoes were preferred by some respondents because of its high market demand (47.5), early maturity (47.5%); high-income generating capacity (45.0%) and usefulness and readily availability to the family (10.0%). It implies from these findings that the generality of the growers made their preferences with respect to the following major reasons: (1) high income generating capacity, (2) high market demand, (3) high yielding capacity, (4) usefulness and readily availability to the family and (5) early maturity.

Socio-economic Impacts of Fadama Vegetable Production

Hectarages of Fadama Vegetable Production: According to table 4, there was no significant different ($t = 1.17$, $p \leq 0.05$) between the total hectarage of fadama farmland owned by the PFs before 1996 ($\bar{X}$ =1.84ha) and after 1996 ($\bar{X}$ = 2.08ha). However, a significant difference ($t = 2.56$, $p \leq 0.05$) existed between the total hectarage of fadama vegetable crops grown before 1996 ($\bar{X}$ = 0.65ha) and after 1996 (= 0.87ha). Across the six vegetables studied, only the hectarages of telfaria (B = 0.18 and A = 0.25) and pepper (B = 0.12 and A = 0.17) indicated significant differences between before and after 1996 ($t = 2.30$ and 1.97, $P \leq 0.05$, respectively). The implication of these findings is that, as a result of the positive and direct influence of the project on the PFs, their former hectarages of fadama vegetable crops grown increased drastically. The little or no meaningful impact made by the project on the hectarages of some vegetable crops grown by the PFs could be attributed to vegetable production preference of the PFs and the nature of land tenure system prevalent in the area.

Table 4 further indicates that there was a significant difference ($t = 2.76$, $p \leq 0.05$) between the total hectarage of fadama farmland owned by the PFs ($\bar{X}$=2.08ha) and the NPFs ($\bar{X}$=1.50ha). The table also shows that a significant difference ($t = 2.88$, $p \leq 0.05$) existed between the total hectarage of fadama vegetable crops grown by

Table 4: t-test to compare the hectarages of fadama vegetable production among the farmers.

Hectarage (ha)	*Project farmers (PFs)*			*PFs and NPFs*		
	(X)Before	*(X) After*	*t-cal (p=≤0.05)*	*PF (X) After*	*NPF (X) After*	*t-cal (p≤0.05)*
Total hectarage of Fadama farm land	1.84(1.33)+	2.08(1.33)+	1.17	2.08(1.33)+	1.50(1.33)+	2.76*
Hectarage of total Fadama Vegetable crops grown	0.65(0.42)	0.87(0.47)	2.56*	0.87(0.47)	0.64(0.39)	2.88*
Telfaria	0.18(0.17)	0.25(0.20)	2.30*	0.25(0.20)	0.16(0.15)	3.17*
Okra	0.19(0.20)	0.25(0.25)	1.77	0.25(0.25)	0.18(0.22)	2.07*
Amaranthus	0.06(0.11)	0.06(0.11)	0.28	0.06(0.11)	0.05(0.10)	0.42
Garden egg	0.05(0.09)	0.07(0.11)	0.94	0.07(0.11)	0.06(0.11)	0.30
Pepper	0.12(0.13)	0.17(0.18)	1.97*	0.17(0.18)	0.12(0.14)	1.90
Tomatoes	0.05(0.11)	0.07(0.17)	0.80	0.07(0.7)	0.07(0.12)	0.05

df = 158; t-table value = 1.98
· Significant (p≤0.05)
· Data in parenthesis indicate standard deviation

PFs ($\bar{X}$ = 0.87ha) and the NPFs ($\bar{X}$ = 0.64ha). Table 7 also reveals that the total hectarage of telfaria vegetable grown by the PFs ($\bar{X}$ = 0.25ha) was significantly different (t = 3.17, p≤0.05) from the total hectarage of telfaria vegetable grown by the NPFs ($\bar{X}$ = 0.16ha). It is also evident from table 4 that a similar significant difference (t = 2.07, p =≤0.05) existed between the total hectarage of okra grown by the PFs ($\bar{X}$ = 0.25ha) and the total hectarage of okra grown by the NPFs ($\bar{X}$ = 0.18ha). The implication of these findings is that, the PFs after becoming project farmers were able to increase the hectarages of their fadama farmland, and fadama vegetable crops, (e.g. telfaria and okra). This was as a result of the direct influence of the project on them. It could be concluded that the project made an impact on vegetable production of the farmers.

Farmers' Annual Income from Vegetable Production: According to table 5, there was a significant difference (χ^2 = 42.56; p < 0.05; DF = 5) between the estimated annual income from vegetable production of the project-farmers before and after their involvement in the fadama project. Also, a similar significant difference (χ^2 = 15.92; p < 0.05; DF = 5) existed between the estimated annual income from vegetable production of the project farmers and non-project farmers as a result of the presence of the project. Before introduction of the project, majority of the PFs realized low annual income from fadama vegetable production. But as a result of the introduction of fadama project, majority of the PFs started earning high income. However, as a result of non-participation in the project by the non – project farmers, their annual income from vegetable production remained low. The implication of these findings is that, the project made an appreciable impact on the annual income of the project farmers.

Sources of Agrochemicals (Fertilizers, Herbicides and Insecticides): Entries in table 5 indicate that, there was a significant difference (χ^2= 48.59; p < 0.05; DF = 3) between the sources of agrochemicals to the PFs before and after their participation in the project. Also, a similar significant difference (χ^2 = 36.78; p < 0.05; DF = 3) existed between the sources of agrochemicals to the PFs and NPFs as a result of the presence of the project. The observed significant differences confirm the benefits of the project to the farmers.

Source of Irrigation Water: Table 5 shows that there was a significant difference (χ^2 = 38.69; p < 0.05; DF = 3) between the source of irrigation water to the PFs before and after their involvement in the project. A similar significant difference (χ^2 = 38.20; p < 0.05; DF = 3) existed between the sources of irrigation water to the PFs and NPFs as a result of the presence of the project. These findings imply that before the introduction of the project, the PFs were probably only making use of stream/river and pond / lake that were available, as their source of irrigation water for vegetable production. After the introduction of the project, the PFs started making use of washbore/tubewell introduced by the NFDP. The observed change in the PFs sources of irrigation water is an indication of the positive impact of the fadama project on the farmers.

Ownership of Fadama Infrastructure: Table 5 reveals that there was a significant difference (χ^2 = 108.18; p < 0.05; DF = 3) between the

Table 5: Chi-square analysis of the socio-economic impact of Fadama vegetable production among the farmers

Socio-economic variable	*Project Farmers*			*Project & Non project farmers*		
	Before (n = 80)	*After (n = 80)*	*χ^2 – value (P≤0.05)*	*PFs After (n = 80)*	*NPFs After (n = 80)*	*χ^2 – value (P≤0.05)*
Estimated Annual Income from Vegetable Production (₦)						
1,000 – 10,000	20	5		15	6	
11,000 – 20,000	29	12		12	27	
21,000 – 30,000	9	6	42.56*	6	10	15.92*
31,000 – 40,000	5	5		5	5	
41,000 – 50,000	2	22		22	20	
51,000 – 60, 000	15	30		30	12	
Source of Irrigation Water						
Stream / river	44	39		39	64	
Washbore/tubewell	3	27	38.69*	27	6	
Pond/lake	28	9		9	5	38.2
Open well	5	5		5	5	
Source of Agrochemicals						
ADP	5	8		8	5	
Market / dealer	39	62		62	47	
MANR	5	5	48.59*	5	5	36.78*
Do not apply agro-chemicals	31	5		5	23	
Ownership of Fadama Infrastructure						
Water pump	5	36		36	5	
Washbore/tubewell	5	21	108.18*	21	5	118.19*
Sprayers	18	18		18	7	
Do not have any of the above	52	5		5	63	
Status of Storing Produce						
Store before sale	5	34		34	14	
Do not store before sale	75	46	43.32*	46	66	13.31*
Place of Sale of Produce						
In the farm	6	6		6	5	
In the house	5	5		5	5	
Hawking	5	5	76.42*	5	5	36.6*
In local market	59	19		19	50	
In distant modern market	5	45		45	15	
Ease of Participating in Agricultural and Community Activities						
Very difficult	32	10		10	14	
Difficult	35	38	28.72*	38	45	
Easy	8	20		20	16	14.75*
Very easy	5	12		12	5	
Fadama Production Knowledge						
Poor knowledge	44	15		15	24	
Fair knowledge	31	54	22.73*	54	51	7.83*
Adequate knowledge	5	11		11	5	
Standard of Living						
Worse than others	5	5		5	5	
As good as others	56	35		35	45	
Better than others	7	33	23.85*	33	24	2.61
Don't know	12	7		7	6	
Attitude Towards Vegetable Production						
Very positive	5	34		34	10	
Positive	61	36	52.45*	36	60	18.23*
Negative	9	5		5	5	
Very negative	5	5		5	5	

* Significant (p≤0.05)

ownership of Fadama infrastructure by the PFs before and after their involvement in the project. Also, there was a similar significant difference (χ^2= 118.19; p < 0.05; DF = 3) existed between the ownership of fadama infrastructure by the PFs and NPFs as a result of the presence of the project. Before the project, majority of the PFs did not have any of the fadama infrastructure,

but after the introduction of the project, majority of them started acquiring water pumps and washbores introduced to them by the NFDP. Non-project farmers on the other hand had no access to the infrastructures. The implication of these findings is that, PFs adopt project innovations faster than NPFs, due to direct effects the project had on them

Status of Storing Produce: According to table 5, there was a significant difference (χ^2= 43.32; p < 0.05; DF= 1) between the status of storing produce by the PFs before and after becoming project farmers. Also, a significant difference (χ^2 = 13.31; p < 0.05; DF= 1) existed between the status of storing fadama vegetable produce by the PFs and NPFs due to the existence of the project. Before becoming PFs, very little proportion of the PFs stored their vegetables produce before sale. However, as a result of the positive influence of the project activities, a greater proportion of the PFs started storing their vegetable produce before sale. Also, indirectly influenced by the project, some proportion of the non-project farmers equally started storing their produce before sale. As a result of these findings, the project is said to have had positive effect on the farmers' decision to accept changes.

Place of Sale of Produce: Entries in table 5 show that there was a significant difference (χ^2 = 76.42; p < 0.05; DF= 4) between places of sale of produce before and after becoming project farmers by the PFs. There was a similar significant difference (χ^2 = 36.61; p < 0.05; DF= 4) between the place of sale of produce by the PFs and NPFs due to the existence of the project. Before becoming PFs, very little proportion of the PFs sold their vegetable produce in distant modern markets. As a result of the influence of the project activities, a greater proportion of both PFs and NPFs started taking their produce to distant modern markets for sale.

Ease of Participating in Agricultural and Community Activities: Table 5 indicates that there was a significant difference (χ^2 = 28.72; p < 0.05; DF= 3) between ease of participating in agricultural and community activities by the PFs before and after their involvement in the project. The table also shows there was a significant difference (χ^2= 14.75; p < 0.05; DF= 3) between the ease of participating in agricultural and community activities by the PFs and NPFs due to the existence of the project. Before their involvement in the project, the PFs found it very difficult to participate in the agricultural and community activities. However, after becoming project farmers, some of the PFs and NPFs started participating easily in agricultural and community activities. Agricultural and community activities could be attending of meetings and group works, payment of levies and taxes, etc.

Fadama Production Knowledge: Table 5 indicates that there was a significant difference (χ^2 = 22.73; p < 0.05; DF= 2) between the fadama production knowledge by the PFs before and after becoming project farmers. There was also a significant difference (χ^2 = 7.83; p < 0.05; DF= 2) between the fadama production knowledge by the PFs and NPFs due to the existence of the project. Majority of the PFs had poor knowledge about fadama vegetable production before becoming project farmers. On becoming project farmers, a greater proportion of both PFs and NPFs had fair and adequate knowledge about fadama production. It is possible to conclude that the project improved the knowledge of the PFs towards adoption of fadama vegetable innovations.

Standard of Living: Entries in table 5 show that there was significant difference (χ^2 = 23.86; p < 0.05; DF= 3) between the rating of standard of living before and after becoming project farmers by the PFs. The Table however shows that there was no significant difference (χ^2 = 2.61; p < 0.05; DF= 3) between the rating of standard of living after the project life by the PFs and NPFs. It could be deduced from these findings that the PFs had a positive change in the perception of their standard of living after becoming project farmers. This perception becomes insignificant when compared the standard of living of both PFs and NPFs as a result of the presence of the project. It is concluded that the standard of living of the PFs and NPFs due to the existence of the project are the same.

Attitude towards Vegetable Production: The contents of table 5 indicate that a significant difference (χ^2 = 52.45; p < 0.05; DF= 3) existed between the attitude towards vegetable production before and after becoming project farmers by the PFs. Also, there was a significant different (χ^2 = 18.23; p < 0.05; DF= 3) between the attitude towards vegetable production by the PFs and NPFs as a result of the presence of the project. Before becoming project farmers, little proportion of the PFs had very positive attitude towards vegetable production. On becoming project farmers greater proportion of the PFs and

NPFs had very positive attitude of vegetable production. The implication of these findings is that, the project had succeeded in increasing the attitude of farmers towards vegetable production.

Socio-economic Aspiration Indices of the Project Farmers

The PFs were asked this question: "suppose you suddenly acquire an income of ₦10, 000, what would you spend it on? The answers were tabulated in Table 6. It is obvious from the table that farm improvement for fadama vegetable production (better seeds, more farmland etc) was rated very high (80.0%). This was followed by family improvement (better medical attention, better house, more food, etc) (75.0%), education of children (72.5%) and personal improvement such as traveling and shopping etc (32.5%). This is a clear indication that the PFs wanted a better farm improvement for fadama vegetable production and a better family improvement, which is a shift from non-productive activities (personal improvement). Better farm improvement for fadama vegetable production would increase yields and the increased yields would provide more cash, which would be used to meet other rising expectations (Williams 1978; Ajayi 1998).

Table 7 shows the varimax rotated constraints to the effective performance of project farmers studied. Based on the clustering of item loadings, factor 1 was named "post harvest problems". Factor 2 was named "logistic problems", while factor 3 was named "poor fadama incentive". Thus, the three factors represent the major constraints being faced by the project farmers.

Specific issues with the high loadings under post-harvest problems included: difficulty in harvesting (0.75), low prices of fadama farm produces (0.72), lack of operational fund (0.58), difficulty in marketing (0.54), pests/diseases infestation (0.47) and poor fertility level of the soil (0.45). The importance of effective post-harvest handling of vegetable crops cannot be over-emphasized due to the perishable nature of the products. According to Ngoddy (2000), post-harvest technology holds two important keys to the problem of food wastage. First, is the key to effective conservation. Second, is the key to the maximization of value – added conversion.

Table 6: Percentage distribution of the PFs according to their socio-economic aspiration indices (n = 80)

Aspiration variable	*(%)**
Education of children	72.5
Farm improvement for Fadama vegetable production (better seeds, more farm land, etc)	80.0
Family improvement (better medical attention, better house, more food, etc)	75.0
Personal improvement (traveling, shopping acquisition of more wives and radio etc)	32.5

· Checked more than one aspiration variable

Table 7: Varimax rotated constraint factors being faced by the project farmers

Constraint variables to project farmers	*Factor 1 (Post harvest problems)*	*Factor 2 (Logistic problems)*	*Factor 3 (Poor fadama incentive)*
Harvesting (cutting and plucking)	0.75	-0.29	-0.18
Low prices of farm produce	0.72	-0.39	0.23
Lack of operational fund	0.58	0.11	0.14
Difficulty in marketing	0.54	-0.02	0.36
Pests and diseases infestation	0.47	0.36	0.05
Poor fertility level of soil	0.45	0.24	0.33
Low productivity	0.19	0.66	-0.08
High cost of farm input	0.13	-0.63	-0.04
Difficulty in getting water	0.17	-0.58	0.16
Lack of improved seeds for planting	0.21	0.57	-0.05
Lack of sufficient land	-0.18	0.44	0.19
Poor storage facilities	-0.07	-0.40	0.15
Poor extension service	0.08	0.25	0.07
Lack of credit facility	0.03	-0.13	0.72
Lack of Fadama access roads	0.03	-0.22	0.64
High cost of labour	0.19	0.09	0.57
Transportation	0.43	0.21	0.51
Lack of Fadama training	-0.09	-0.03	0.51

Major Problems Being Faced By the Project Farmers

Moreso, Njoku (2000) observed that lack of proper preservation and storage technology has forced farmers to sell their products at harvest time when there is a glut in the market and prices are at ridiculously low levels. He further stated that there are literally no linkage between the small farmers and the agricultural processing and product transformation industries, hence, highly perishable commodities like vegetables and citrus, etc. are lost annually.

Items with high loadings under logistic problems included: low productivity (0.66), high cost of farm input (0.63), difficulty in getting water (0.58), lack of improved seeds for planting (0.57), lack of sufficient land (0.44) and poor storage facilities (0.40). In order to ensure sustainable high vegetable productivity and enhance efforts in securing socio-economic change among growers, logistic supports such as adequate provision of planting materials, farm inputs, cost effective irrigation schemes and increase access to land and mobility should be made available to farmers. According to Njoku (2000), any strategy developed for achieving sustainable crop production by smallholder farmers in the 21st century must in the minimum, tackle the problems posed by the following: increase access to land, input supply; production and marketing infrastructure; and access to credit.

Items which loaded very high under poor fadama incentive included: lack of credit facility (0.72), lack of fadama access roads (0.64), high cost of labour (0.57) and lack of fadama training (0.51). This implies that project farmers were faced with absence of credit facility, absence of fadama access roads for evacuation of inputs and produce, high cost of labour and lack of fadama training which could lead to poor participation and low productivity of Fadama vegetable produce. It is only when a farmer is well equipped with incentives that he can participate actively and adopt a given innovation (Ajayi 1998; Obinne and Nnamah 1999).

CONCLUSION

Based on the findings of the study, the following conclusions were made:

1. Telfaria and okra were most preferred among vegetable production during dry and wet seasons, respectively, mainly due to their high income generating capacity, high market demand and high yielding capacity.
2. The socio-economic aspiration of the respondents had shifted from personal improvement to farm improvement
3. The project made some appreciable socio-economic impact on the growers.
4. Post-harvest, logistics and poor fadama incentive, posed some problems in the area, thereby slow down the full implementation of project objectives.

Based on the major findings of this study, the following recommendations were made:

1) Given the fact that agricultural operations are time-bound, there should be timely and adequate provisions of fadama inputs and infrastructure such as fertilizers, herbicides, insecticides, improved planting materials, water pumps, tubewells/washbore, etc. at reduced or subsidized cost by NFDP management. This would help the growers to maximize their production.
2) Given the fact that many farmers and businessmen trade in fadama produce such as vegetables which are highly perishable, it has become imperative to find low cost but improved technologies for storage, transportation, processing and marketing of fadama produce. The aim is to prolong shelve life, make food available and hence, increase farm income.
3) Project farmers should be motivated and encouraged to participate actively in the already formed FUAs in order to strengthen group action. Here massive intensive training of FUAs is necessary for maintenance of tube wells, water pumps and access roads.

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