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RURAL FARMERS' PARTICIPATION IN AGRICULTURAL DEVELOPMENT PROJECT (ADP) AND THE EFFECT ON THEIR ADOPTION OF INNOVATIONS: A CASE STUDY OF EKITI-AKOKO ADP IN ONDO STATE OF NIGERIA

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Abstract

The study assessed the Ondo State rural farmers' participation in Ekiti-Akoko Agricultural Develoment Project (ADP) and the effects on their adoption of innovations. Data for the study were collected from 60 project participant farmers (PPF), 60 project non-participant farmers (PNPFs) and 60 without project non-participant farmers (WPNPFs), through the use of structured interview schedule. Mean ($\bar{X}$) statistic was used in data analysis. The findings of the study revealed that the three groups of farmers adpoted many of the innovations introduced to them by the Ekiti-Akoko enclave ADP. However, the PPFs had the highest adpotion indices due to their direct participation in the extension activities of the project. This was followed by the PNPFs, who were the adjacent farmers; while the WPNPFs had the lowest adoption indices since they were only able to benefit from the trickle-down effect of the extension activites of the project. Enclave/pilot agricultural development projects should be properly managed for the purpose of fulfilling all their set objectives. After their life-span (5-6 years), they should be allowed to go state-wide so that many farm families could benefit.

Introduction

Within the last decade, serious efforts have been made to make the Nigerian economy self-sufficient in food production. One of those efforts was the establishment of the Agricultural Development Projects (ADPs) in 1974 (Mabawonku, 1986). The ADPs were created to boost extension work among farmers by expanding field-staff and improving the extension worker-farmer ratio from 1:2,500 to 1:250 (Poate, 1984; Hussain, 1986). According to Okorie (1981), there were two types of ADP operational in Nigeria: the enclave (pilot) ADPs and the state-wide ADPs. The state-wide ADPs covered the entire state, while the enclave ADPs were basically area development projects, concentrating on one or more Local Government Areas (LGAs). The latter were conceived as pilot projects which could be expanded state-wide if they succeeded in achieving their set objectives after a period of 5 years.

The Ekiti-Akoko Agricultural Development Project was established in 1981 as a pilot/enclave project, covering 5,000 km^2 in the five of the 17 LGAs in the Ondo State of Nigeria. Its broad objective was to increase food production and farm family incomes of the rural population it covered. The specific objectives of the project were to: (1) increase availability of locally-produced food and, thereby, reduce the food shortage in the state; (2) improve the quality of rural life in the project area and, thereby, reduce the rate of rural-urban migration; (3) provide social and farm services as well as timely supply of inputs and marketing facilities through 30-50 farm service centres, better and improved water resources and feeder roads; (4) increase productivity of enterprises of the rural population. The project was executed through a tripartite funding arrangement, involving the Ondo State Government, the Federal Government and the World Bank. At the end of 5 years period, the project went state-wide, which suggested that its objectives had been met (Federal Agricultural Coordinating Unit (FACU, 1987).

As a pilot project, the use of project farmers in

the dissemination of improved technologies (innovations) was embeded in its extension activities. Between 1983 and 1986, the impact of extension activities of the project with respect to the encouragement of the project of farmers by the village extension workers (VEWs) to adopt one or more improved technologies was great (FACU, 1987).

Agricultural technology is the application of technology for the promotion and development of agriculture (Olayide, 1980). According to Ellul (1965), agricultural technology has four major features. First, it serves as a major resource for creating agricutural wealth. Second, it is an instrument for facilitating the exercise of social control in such various forms as the exercise of monopoly in the diagnosis or pre-packaging of professional services, and subtle, but efficacious means of controlling demand. Third, it decisively effects modes of decision-making to achieve social change. Four, it constitutes a central arena wherein to counter alienation, which is the antithesis of meaningful living. The improved technologies that are employed in agriculture generally increase productivity and income of the farmers (Kelsey & Hearne, 1955; Bennett, 1990). The innovations that were introduced to the farmers between 1983 and 1986 included: improved crop and livestock practices; use of insecticides, herbicides and fertilizers; improved farm practices and crop combinations. The transfer of innovations and their subsequent adoption by the predominantly traditional farming population is one of the major challenges facing agricultural scientists and extensionists (Okoro, 1991).

According to Onyenwaku & Mbuba (1991), adoption is the mental process which an individual passes through in deciding to use an innovation. The level of adoption among target farmers in an extension programme/project is the most important index of success of the project, and effectiveness of the service (Okoro, 1991). There have been wide speculations in the literature that there is differential adoption levels of innovation among farmers within a social system (Jones, 1973; Monu & Omole, 1983; Onu, 1991).

The question, therefore, relates to the extent of adoption of the innovations introduced between 1983 and 1986 by the Ekiti-Akoko ADP to the project and non-project farmers. To what extent have the farmers adopted the innovations introduced to them by the Ekiti-Akoko ADP? To provide an answer to this question, this study was designed to carry out an ex-post evaluation of the levels of adoption of the project and non-project farmers in the study area. Specifically, the study was designed to:

1. determine the adoption indices of improved crop and livestock production practices by the project and non-project farmers;

2. determine the adoption indices of insecticides, herbicides and chemical fertilizers by the project and non-project farmers; and

3. determine the adoption indices of the farm practices and crop combinations by the project and non-project farmers.

Steel (1970) and Seepersad & Handerson (1984) viewed evaluation in extension as a continuous and systemic process of assessing the value or potential value of agricultural extension programmes.

According to Williams (1984), evaluation in agricultural extension could be classified into: (1) on-going evaluation; (2) terminal evaluation; and (3) ex-post evaluation. On-going evaluation refers to the type of evaluation that is carried out at the implementation phase of a programme and it provides the decision-makers with the necessary information about any needed adjustment in the objectives; policies and implementation strategies of the programme. Besides, it provides information for future planning. Terminal evaluation is the type of evaluation that is carried out 6-12 months after the completion of the project/programme; while ex-post evaluation is an evaluation that is undertaken some years after the completion of the programme, when the programme is expected to have reached its full development, and its impacts have been felt.

Ex-post evaluation is the type of evaluation that is more usually undertaken after many years of the project's completion (Maddock, 1987). It is an action-oriented analysis of an agricultural extention project several years after the completion of the investment, to review comprehensively the experience on a basis for future policy formulation and project design, especially under the current state-wide ADPs. Hartmut *et. al.* (1989) opined that ex-post evaluation is the type of evaluation that deals with the assessment of the success or failure of an agricultural extension project on its completion.

Experimental

The former Ekiti-Akoko enclave ADP covered five out 17 LGAs in Ondo State. Ekiti and Akoko are two different agro-ecological zones located in the northern part of the state. The state was carved out of the former Western State of Nigeria on 3 February 1976. The state which is situated between longitudes 4° 30' and 6° 00' East and Latitudes 5° 00' and 8° 15' North of the equator, covers a total area of about 211, 154.35 km^2. The area covered by the project was about 24 per cent of the state. It covered the former Ekiti Central, North and East; and Akoko North and South (World Bank, 1980).

Two (Ekiti North and East) out of three LGAs covered by the project in Ekiti Zone were randomly selected, while the only two LGAs covered by the project in Akoko Zone were purposively selected. In all, a total of four out of five LGAs covered by the project was involved in the study. From each of the four LGAs, a list of three communities was drawn, and from the list, a community was randomly picked for the study.

In case of the non-project area, a list of three LGAs was drawn, and from the list, one LGA (Ekiti South) was randomly selected. From Ekiti South (non-project area), four communities were randomly selected and they were included in the study as well.

The target population for the study was the rural farmers from the LGAs/communities covered by the project and the neighbouring LGA/communities that were not covered by the project. The sample was stratified into Project Participant Farmers (PPFs), Project Non-Participant Farmers (PNPFs) and Without Project Non-Participant Farmers (WPNPFs).

The lists of the PPFs from Ekiti and Akoko zones were obtained from the zonal extension officers (ZEOs). From the lists, 15 PPFs were randomly selected per each of the four communities from the two zones; and in all, 60 PPFs were involved in the study. For the PNPFs from the lists of the suggested farmers from each of the two project zones, 15 PNPFs were randomly sampled per each of the four communities; and in all, 60 PNPFs were also involved in the study. In the case of the WPNPFs, 15 farmers were randomly sampled from each of the four communities from the non-project area; and in all, a total of 60 WPNPFs was included in the study as well. The total sample size for the study, therefore, was 180 rural farmers.

Data for the study were collected from the farmers through the development and use of structured interview schedule. To determine the level of adoption of the farmers, a 6 - point adoption scale, developed and used by Anyanwu (1991) was adopted. For each of the innovations itemized in the interview schedule, the farmers were asked to indicate their adoption stage on the 6-point adoption scale. Their response categories and the corresponding weighted values were as follows: Never heard about (NHA) = 0; Know about, but not details (KBND) = 1; Know about, but not used or seen (KABNU) = 2; Seen used, but not personally used (SUNPU = 3; Have personally used (HPU) = 4; and Still in use (SIU) = 5. The adoption indices of the farmers were calculated as follows: (i) computation of the total mean ($\bar{x}$) adoption score; (ii) computation of the grand mean adoption score; and (iii) computation of the adoption index by dividing the grand mean adoption score

TABLE 1
Farmers' adoption indices of improved crop and livestock practices

Improved practices on farmers	*Cassava*	*Yam*	*Cowpeas*	*Rice*	*Maize*	*Soyabeans*	*Grand mean adoption score*	*Adoption*
PPFs	6.25	7.30	7.68	4.68	5.48	3.97	5.89	0.98
PNPFs	4.45	4.77	5.12	4.17	5.05	3.92	4.58	0.76
WPNPFs	3.65	3.45	2.53	3.20	4.10	2.67	3.27	0.55
Cummulative mean ($\bar{x}$) adoption	14.35	15.52	15.33	12.05	14.63	10.56		
Improved practices on farmers	*Rabbit*	*Goat*	*Sheep*	*Poultry*	*Feeds*	*Vaccination*		
PPFs	4.35	3.58	3.32	4.63	4.15	4.18	4.04	0.67
PNPFs	3.00	2.98	2.73	3.88	3.82	3.18	3.35	0.56
WPNPFs	1.68	2.17	1.92	2.58	2.25	1.98	2.10	0.35
Cummulative mean($\bar{x}$) adoption score	9.03	8.73	4.65	11.09	10.22	9.34		

Source: Survey Data, 1994.

by 6 (i.e. the 6-stages of adoption). The data were analyzed through the use of Mean ($\bar{x}$) statistic.

Results and discussion

Adoption indices of improved crop and livestock practices by the farmers

Entries in Table 1 indicate that the grand mean adoption scores for the improved practices by the PPFs, PNPFs and WPNPFs over the six crops (cassava, yam, cowpeas, rice, maize and soyabean) studied were 5.89, 4.58 and 3.27 respectively, out of a maximum of 6 - points; while their adoption indices were computed to be 0.98, 0.76 and 0.55 respectively, out of a maximum of 1-point. The cummulative mean adoption scores for the six crops studied were 14.35, 15.52, 15.33, 12.05, 14.63, and 10.35, respectively. The conclusion here is that the PPFs adopted more of the improved practices on the six crops than both the PNPFs and WPNPFs. Besides, the farmers (PPFs, PNPFs and WPNPFs) adopted more of the improved practices on yam than any other crop. This was because yam was the major arable crop grown by the majority of farmers from the study area, especially those from Ekiti zone.

Table 1 shows further that the grand meean adoption scores for the improved practices by the PPFs, PNPFs and WPNPFs over the six areas of livestock production were 4.04 3.35 and 2.10 respectively, out of a maximum of 6 - points, while their adoption indices were computed to be 0.67, 0.56 and 0.35 respectively, out of a maximum of 1-point. The cummulative mean adoption scores for the six areas of livestock production (rabbit, goat, sheep and poultry production; feed production/ utilization and vaccination) were 9.03, 8.73, 4.65, 11.09, 10.22 and 9.34 respectively. The implications of these findings are that the PPFs adopted more of the improved livestock production practices than the PNPFs and/or WPNPFs. Besides, the farmers (PPFs PNPFs and WPNPFs) adopted poultry production and the associated improved practices than any of the remaining five areas studied. This was because the poultry production sub-

programme of the project was more active than any of the remaining sub-programmes. Many farmers were motivated by the activities of the poultry production sub-programme. Apart from developing interest in the sub-programme by the farmers, poultry production helped them to generate more income, especially within a short period of time.

Adoption indices of insecticides, herbicides and fertilizers by the farmers.

Table 2 shows that the grand mean adoption scores by the PPFs, PNPFs and WPNPFs over the seven insecticides studied were 5.14, 3.94 and 2.34 respectively, out of a maximum of 6-points; while the adoption indices over the seven insecticides were computed to be 0.86, 0.66 and 0.39 respectively, out of a maximum of 1-point. The cummulative mean adoption scores for the seven insecticides (actellic-dust, fanasan-D, vetox-85, kerate, sharpa-plus, cymbush and phostoxin) were 15.59, 10.01, 11.87, 10.83, 7.18, 10.37 and 13.72 respectively. It is obvious from these findings that

TABLE 2
Farmers' adoption indices of Insecticides, herbicides and fertilizers

					Insecticides				
Farmers	*Actellic dust*	*Fanasan D*	*Vetox 85*	*Kerate*	*Sharpa-plus*	*Cymbust*	*Phostoxim*	*Grand mean adoption score*	*Adoption index*
PPFs	8.67	4.18	4.32	4.27	3.10	5.15	6.32	5.14	0.86
PNPFs	4.50	3.65	4.48	4.22	2.35	3.65	4.75	3.94	0.66
WPNPFs	2.78	2.18	3.07	2.37	1.73	1.57	2.65	2.34	0.39
Cummulative mean ($\bar{x}$) adoption score	15.95	10.01	11.87	10.83	7.18	10.37	13.72		
					Herbicides				
Farmers	*Round-up*	*Risane*	*Primextra*		*Gramozone*		*Tamarice*		
PPFs	3.87	4.12	4.52	4.52	4.52		3.83	4.17	0.70
PNPFs	2.63	3.30	4.25		3.85		2.13	2.69	0.45
WPNPFs	1.87	1.60	3.18		3.20		1.87	2.34	0.39
Cummulative mean ($\bar{x}$) adoption score	8.37	9.02	11.95		11.57		7.83		
Farmers					*Use of Inorganic fertilizers*				
PPFs					5.83			5.83	0.97
PNPFs					5.70			5.70	0.95
WPNPFs					5.05			5.05	0.84
Cummulative mean ($\bar{x}$) adoption score					16.58				

Source: Survey Data, 1994.

the PPFs adopted many of the insecticides more than the PNPFs and WPNPFs. In general, the three groups of farmers were more involved in the use of actellic-dust than any of the remaining six insecticides studied due to its familiarity, simplicity, relative low price and availability.

Table 2 also reveals that the grand mean adoption scores by the PPFs, PNPFs and WPNPFs over the five herbicides studied were 4.17, 2.69 and 2.34 respectively, out of a maximum of 6 - points; while the adoption indices were computed to be 0.70, 0.45 and 0.39 respectively. The cummulative mean adoption scores for the five herbicides (round-up, risane, primextra, gramozone and tamarice) were 8.37, 9.02, 11.95, 11.75 and 7.83 respectively. These findings indicate that the PPFs had the highest adoption index over the five herbicides and, besides, primextra was the most commonly-used herbicide by the three groups of farmers probably because of its ability to control weeds such as annual broadleaves, grasses and some sedges.

According to Table 2, the grand mean adoption scores by the PPFs, PNPFs and WPNPFs over the different inorganic fertilizers used were 5.83, 5.70 and 5.05 respectively, out of a maximum of 6-points; while their adoption indices were computed to be 0.97, 0.95 and 0.84 respectively. The cummulative mean adoption score for the inorganic fertilizers was 16.58. These findings show that generally, the application of inorganic fertilizers was very high among the three groups of farmers. However, the PPFs had the highest grand mean adoption score and adoption index. The explanation for the observed high adoption indices for the inorganic fertilizers by the PPFs, PNPFs and WPNPFs is that, before the advent of the project in the state, fertilizers were not readily obtainable (World Bank, 1980). The establishment of the project did not only make inorganic fertilizers readily available to the farmers directly or indirectly, it has also improved their levels of adoption of the fertilizers.

Adoption indices of farm practices and crop combinations by the farmers

The entries in Table 3 indicate that the grand mean adoption scores by the PPFs, PNPFs and WPNPFs over the six farm practices studied were 4.30, 4.02 and 2.29 respectively, out of a maximum of 6-points; while their adoption indices were 0.72, 0.67 and 0.38 respectively. The cummulative mean adoption scores for the six farm practices (swamp rice production, fire-tracing, dry season vegetable production, planting date/distance, ploughing/harrowing and soil conservation techniques) were 9.47, 12.21, 11.75, 10.53, 11.66 and 11.15 respectively. It is evident from these findings that the PPFs had the highest grand mean adoption and adoption index. The most generally-adopted farm practice by the three groups of farmers was the fire-tracing because every farmer was always very mindful of the safety of his farm during dry season and everything possible would be done to prevent fire out-break.

Table 3 also shows that the grand mean adoption scores by the PPFs, PNPFs and WPNPFs over the four crop combinations studied was 5.86, 5.10 and 4.03 respectively, out of a maximum of 6-points; while their adoption indices were computed to be 0.98, 0.85 and 0.67 respectively. The cummulative mean adoption scores for the four crop combinations (yam/maize/cassava; late maize/cassava; maize/cassava/melons (egusi); cassava/cocoyam) were 15.72, 14.52, 15.18 and 14.33, respectively. These findings reveal that the PPFs were the greatest adopters of the four crop combinations. In addition, the most adopted crop combination by the three groups of farmers was yam/maize/cassava, which contains the major crops grown in the area.

Conclusion

In conclusion, the farmers adopted many of the innovations introduced to them by the Ekiti Akoko Agricultural Development Project to a great extent. However, some differences were observed in the levels of adoption of the three groups of

TABLE 3
Farmers' adoption indices of farm practices and crop combinations

Farmers	*Swamp rice production*	*Fire tracing*	*Dry season vegetable production*	*Planting dates/ distance*	*Ploughing/ Harrowing*	*Soil conservation techniques*	*Grand mean*	*Adoption index*
			Farm practices					
PPFs	4.00	4.83	4.67	4.43	4.63	4.48	4.30	0.72
PNPFs	3.22	4.75*	3.78	3.82	4.13	3.32	4.02	0.67
WPNPFs	2.25	2.63	3.30	2.28	2.90	3.35	2.29	0.38
Cummulative mean ($\bar{x}$) adoption index	9.47	12.21	11.75	10.53	11.66	11.15		

Farmers	*Yam/Maize/ Cassava*	*Late maize/ Cassava*	*Maize/Cassava Egusi*	*Cassava/ Cocoyam*		
		Crop combinations				
PPFs	5.82	5.67	5.98	5.95	5.86	0.98
PNPFs	5.48	4.53	5.30	4.90	5.10	0.85
WPNPFs	4.42	4.32	3.90	3.48	4.03	0.67
Cummulative mean ($\bar{x}$) adoption score	15.72	14.52	15.18	14.33		

Source: Survey Data, 1994.

farmers. Generally, the PPFs had the highest adoption indices due to their direct participation in the extension activities of the project, while the WPNPFs had the lowest adoption indices. On the other hand, the adoption indices of the PNPFs (who were the adjacent farmers) were higher than those of the WPNPFs but lower than those of the PPFs.

It implies from the foregoing that the project did not only influence the PPFs to adopt innovations for the purpose of improving their socio-economic status but it has also influenced the PNPFs to adopt innovations. The trickle-down effect of its extension activities also influenced the WPNPFs to adopt innovations. There is a positive relationship between rural agricultural development projects and rural well-being (Okorie, 1981). Specifically, a positive relationship between adoption of agricultural innovations and rural farmers' socio-economic well-being has been reported (Welsch, 1965; Kidd, 1968; Clark & Akinbode, 1968; Williams 1978; Ajayi, 1996).

It is pertinent to say that any established enclave/pilot agricultural development project should be properly managed for the purpose of achieving its set objectives and if such objectives are fulfilled, it should go state-wide after its life-span (5 - 6 years) so that many farm-families could effectively benefit.

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