A STUDY OF THE NATURE AND IMPACT OF SMALL SCALE IRRIGATION SCHEMES IN ANAMBRA STATE

By

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A Thesis submitted to the Post-graduate School, Ahmadu Bello University, in partial fulfilment of the requirements for the degree of Master of Arts.

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Date: 30th November, 1982

DECLARATION

I hereby declare that this thesis has been written by me and that it is a record of my own research work. It has not been presented in any previous application for a higher degree. All quotations are indicated and the sources of information are specifically acknowledged by means of references.

Name FRANCIS I.N. UDE

Signature .....

Date - 30th November, 1982

Part of this study is permitted to be used or cited in future works on condition that the author fully acknowledges the source.

ACKNOWLEDGEMENTS

Like all works of this nature, the completion of this study was made possible by the help and co-operation as well as encouragement received, both directly and indirectly, from different individuals and sources. I owe sincere gratitude and appreciation to all - to the officials of the Anambra/Imo States World Bank Rice Project both at the Headquarters office in Enugu and at various locations; the officials of Adarice Production Company Nigeria Limited at Adani; village people, participating farmers and others whose invaluable pieces of information, both during official and informal discussions, helped in no small way to direct and sharpen my research and ideas.

I wish however, to give special thanks to Mr. J.A. Ifionu, Principal Agronomist, for making available to me useful documents for background information, Mr. M. Tarcisius, Irrigation Engineer and Mr. V.C. Anyalebechi, Assistant Registrar of Co-operatives for valuable insights they gave me into the workings of their sections; (all are of the World Bank Project Headquarters in Enugu) Mr. E.C. Epundu, the Project Manager, World Bank Project, Adani, for his kindness not only in giving me accommodation in the official Rest House but also in making it easier for me to secure the co-operation of his sub-ordinates; Mr. Peter Ifedikwe, Agricultural Superintendent and officer-in-charge of the Adani

World Bank project extension at Ifite Ogwari; Mr. J.I. Nwoye, Agricultural Superintendent with Adarice Production Company, for the very useful information he supplied and for the hospitalities, he and his wife showed to me while I was at Adani; Mr. L. Ozioko, Sales Manager, Adarice Production Company for his co-operation; Messrs. E.C. Ekekpazu, Project Manager, and C.C. Okpala, Agricultural Superintendent at Item-Ikwo World Bank Project for the immense help they gave me including the provision of transport from Abakaliki to Item. Others I wish to mention include Mr. G.U.P. Aneke, Project Manager, Ikem Nando project; Romanus Onuzu and L.I. Agbogu both Agricultural Superintendents at Enugu-Ebo-Ufuma and Ogboji World Bank projects respectively. Also worth mentioning is Mr. Isaiah Otubo who helped to co-ordinate the administration of the questionnaires in Item-Ikwo project area.

I am particularly grateful to my supervisor, Dr. A.T. Salau, of the Department of Geography, Ahmadu Bello University, Zaria, for his guidance and help. He patiently guided my progress through all the stages of the work. He and his wife readily welcome me in their home each time I had an occasion to consult him in his house. His advise and encouragement in moments of despondency gave me hope and renewed my energy to persevere with the work.

My thanks also go to Dr. R.J. Hyde for useful comments and suggestions both at the proposal and final drafting stages, and to Dr. J.N. Baba for comments which were very helpful at the proposal

stage. I am grateful to Dr. K.O. Ologe, the Head, Geography Department for readily helping to solve for me numerous difficulties that cropped up from time to time. I received help in various forms from these other members of staff of the Department - Dr. K.S. Leow on data interpretation, Dr. D.O. Ogbonna, Dr. J.A. Gana and Mr. J.A. Ukoje. I have also to mention very useful experiences and ideas I got from discussion with Mr. S.A. Idakwo, a fellow Postgraduate student. In general, I gained immeasurably by interacting with all the members of staff who, through their friendly disposition and willingness to be of service, have created a very congenial social atmosphere in the Department that fosters confidence and inspires one to greater efforts.

I am very indebted to Mr. Willy Ekemezie of the Computer Centre, Ahmadu Bello University, who for hours on end, patiently helped in sorting and arranging the jumbled data into usable form. Not only did he write and run the programmes but he also readily and cheerfully accommodated my incessant requests for modifications and trials. I am sincerely very grateful to him.

I am grateful to Anambra State College of Education, Awka, whose support in the form of two-year study leave enabled me to carry out the study and considerably lightened the financial strain.

I will also like to mention Messrs E. Dijeh and H. Amedu of Department of Geography of Anambra State College of Education, Awka, and Ahmadu Bello University

Zaria respectively in drawing the necessary maps. Mr. P.E. Ozoemena helped with the typing of the thesis.

I wish to acknowledge the contributions of my wife, Rossy, for her willingness, not only for taking additional responsibilities of looking after the children but also in ensuring that my obligations to other dependants were taken care of, thereby insulating me from unnecessary distractions and worries.

Finally, I wish to extend my general appreciation to all those who might have contributed in any way to this work, but whose names unfortunately, I am unable to mention for one reason or the other. While I acknowledge the contributions of various individuals to this work, I hasten to add that any weaknesses and shortcomings contained therein are in no way to be imputed to any but the author.

ABSTRACT

This study is concerned with the description and evaluation of the nature and impact of six small-scale irrigation projects in Anambra State that are primarily devoted to the growing of rice.

The aim of the study was to describe and account for the distribution of irrigation schemes in Anambra State; to analyse and evaluate the nature, degree and ramifications of their impact on agriculture and on the socio-economic and cultural environment of the project location areas; and to assess the resultant spatial linkages between them and other areas within the State.

It was hypothesized firstly, that the projects' impact varied between locations and was directly related to physical and socio-cultural qualities of individual areas. Secondly that the impact also varied between individuals and groups owing to the influence their socio-economic characteristics have on their response to new ideas and opportunities.

The data for the study were collected from two sets of questionnaires administered to project officials and participant farmers. Information was sought on various aspects of the projects such as organisational structure, input supply and use, institutional and infrastructural development and general project assessment. Tables, simple percentages, chi-square tests, one-way and two-way analysis were all used in the analysis of data.

Findings of the study are, namely there has been growing acceptability of rice cultivation by the people

in all the locations as reflected in a four-fold and five fold increase in the number of participating farm families and hecterage respectively, and also in aggregate total rice production by individuals in all the projects within the study period.

2. The projects offered employment opportunities but the local people have mostly benefitted as casual labour and junior staff. Those employed in these categories accounted for between 53 and 100% of these groups in individual locations. There has also been an enhancement in value of land and houses in the project areas.

3. There was a general rise in the rate of adoption of innovations propogated by the projects; this was found to bo more pronounced in the project farms than those outside them.

4. Employment opportunities and other prospects in the project areas were found to have induced migration of people from outside the locations as labourers, skilled workers and farmers. A majority of these were, however, found to have come from adjacent places to the project locations or from places whose people have cultural affinities with the project areas, or have long tradition of rice growing.

5. Accessibility to the project areas from outside was found to have improved considerably owing to the efforts of the project management in the maintenance of existing roads and construction of new ones.

6. The projects have contributed to economic and socio-cultural dislocations in the areas where they are located. For instances as many as 40% of the people in these areas lost both land and crops or other economic plants. The traditional communal land-tenure system was being undermined in favour of individual holdings. Moreover added labour demand from the traditional family source, occasioned by the projects' activities, has led to the worsening of labour scarcity. It was also found that attachment of undue importance to rice crop to the detriment of the peoples[1] traditional staples, and unenthusiastic, or at best belated support from project authorities to the development of institutional facilities like co-operatives and credit system will unlikely make the project self-sustaining in future.

7. The extent and degree of benefits derived by participants were found to vary not only between individuals but also projects. The cause of the variation was found to be strongly related to location and to the socio-economic characteristics of individual participants with reference to education, income, migrant and marital status.

The implication of the findings for future policy is that there is an urgent need for reassessment of agricultural development strategy and a design of alternative organisational structures that will emphasize more involvement of farmers, encourage equal attention to all crops and ensure social justice and equity.

DEDICATION

Dedicated to my wife

Rossy Nonyelum Ude

and children

Ngozi, Arinze, Nonso, Ify. and Lotam

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CHAPTER I

INTRODUCTION

Improvement in agriculture, with its consequent increase in productivity, has been identified as being essential in the overall economic and social development of any society. In fact, many authorities see economic development as dependent, to a very large degree, on modernisation of agriculture. This is so because firstly, agricultural improvement contributes to the structural transformation of the economy as a whole through the release of labour to other sectors as well as the supply of raw materials to industry. Secondly, improved agriculture leads to increased production which affects the relative prices of goods and hence the structure of wages and salaries. Thirdly agricultural improvement is necessary in order to ensure that the increased food demand - both in quantity and quality - generally needed for and associated with development is met. These important roles of agriculture have been noted by scholars such as Martin (1962, p.56), Kindleberger (1965, p.4), Mellor (1975, p.1) and Higgins and Higgins (1979, pp.155-7), who have consequently advised developing countries, in their eagerness to improve the living conditions of their peoples, to pay as much attention to agriculture, as they do to industrialisation, if their development efforts are not to be frustrated(1).

1.1 Background To The Problem

Agriculture has, over the years, played an important role in the growth of the economy as well as in the social development of Nigeria. In the "Ten-Year Plan of Development and Welfare" prepared for Nigeria in 1946 by the colonial government, a colonial officer, A.G. Beatle, justified the proposals made for the agricultural sector in the Plan, by asserting that "it has been recognised that the social and political advancement of the people is necessarily bound up with and dependent upon improvements in agricultural practices". Indeed agriculture was, and remained, the prime mover of Nigeria's economic development until the middle of the 1960s when, following the discovery and commercial production of petroleum, it started to lose its pride of place in the economy. Up to the beginning of the sixties, the contribution of agriculture to the Gross Domestic Product (GDP) and to the value of total exports had always exceeded 60%. For instance, in 1961, "agricultural exports totalled £134.0 million (₦268.0 million), thereby accounting for 89% of all exports and for 66% of foreign exchange earnings, contributed about 70% to the G.D.P., and provided the means of living for over 70% of the population" (Federal Republic of Nigeria, 1970, p.103; F.A.O,1965, p.A-1). Within this period, earnings from agriculture by way of foreign exchange made possible the importation of both capital and consumer goods. Money squeezed out of agriculture, through the mechanism of Marketing Boards and the pricing system they

operated, constituted the bulk of the investment capital both for industry and for the provision of infrastructure.

However, by the end of the 1960s, agriculture had lost its dominant position in the economy to the problem industry. While over 60% of the country's population still depend directly on agriculture for their livelihood, its share of the GDP as well as export values has registered a steady fall ever since (Tables 1.1, 1.2 and Fig. 1.1). The growth of the petroleum industry diverted the country's attention away from agriculture by giving her a false sense of affluence through a considerably increased revenue with which she embarked on programmes of infrastructural development, industrialisation and importation of food to make up for her ever-declining agricultural output. The neglect of agriculture gave rise to what Higgins and Higgings (Op.cit, p.55) referred to as 'agricultural lag'(2), which in turn manifested itself more

Table 1.1

Share of Agriculture In Gross Domestic Product (GDP) of Nigeria

Year	All Sectors (₦ Million)	Agricultural Sector (₦ Million)	Percentage of Agriculture's Share
1964	2,745.8	1,673.8	60.96
1965	2,894.4	1,676.4	57.92
1966	3,110.00	1,691.6	54.39
1967	3,374.8	1,855.0	54.97
1968	2,752.6	1,527.8	55.50
1969	2,656.2	1,415.2	53.28
1970	3,549.3	1,711.7	48.23
1971	5,281.1	2,576.4	48.49
1972	6,650.9	3,033.7	45.61
1973	7,187.5	3,092.7	43.03
1974	12,118.0	3,352.1	27.66
1975	16,462.8	3,943.0	23.95
1976	19,437.7	4,579.5	23.56
1977	23,826.0	4,898.3	20.56
1978	26,826.5	5,143.4	19.22
1979	27,370.2	5,389.1	19.69

Sources (1) Economic Indicator, Vol.12, December 1976
(2) Guidelines for the Fourth Development Plan, 1980

Table 1.2

Share Of Agriculture In Nigeria's Total Export Value

Year	Total Exports (₦ Million)	Agricultural Exports (₦ Million)	Agriculture's share as percentage of Total Exports
1964	429.4	304.0	70.80
1965	536.6	327.4	61.01
1966	568.2	292.6	51.50
1967	540.0	264.6	49.00
1968	467.0	269.7	57.75
1969	683.0	278.2	40.73
1970	885.0	286.8	32.38
1971	1,280.8	265.5	20.73
1972	1,404.7	190.2	13.54
1973	2,278.4	288.7	12.67
1974	5,794.8	307.7	5.31
1975	4,922.5	256.5	5.21
1976	6,751.1	261.5	3.87
1977	7,630.7	437.7	5.74
1978	6,064.4	444.2	7.32
1979	10,836.8	498.5	4.60

Sources (1) Federal Office of Statistics; Annual Abstracts of Statistics - Various Issues

(2) Central Bank of Nigeria - Annual Reports.

glaringly in various ways especially from the beginning of 1970s. For example, Nigeria lost its position as one of the leading exporters of such commodities as cocoa, palm produce, groundnut, cotton - all these, in addition to the steadily rising food import bill as shown in Table 1.3 and Fig. 1.1. The amount of food

Table 1.3

Rising Food Import Bill of Nigeria

Year	Total Yearly Imports (₦-Million)	Yearly Food Imports (₦ Million)	Food Imports as Percentage of Tot. Imports
1964	507.76	41.24	8.12
1965	550.79	46.08	8.37
1966	513.93	51.57	10.03
1967	447.10	42.56	9.52
1968	385.16	28.39	7.37
1969	497.38	41.73	8.39
1970	752.58	57.69	7.67
1971	1,075.07	87.91	8.15
1972	986.22	95.10	9.61
1973	1,220.95	126.26	10.31
1974	1,737.38	154.77	8.91
1975	3,717.38	298.80	8.03
1976	5,132.51	441.70	8.60
1977	7,159.92	781.20	10.91
1978	8,632.11	1,108.66	12.84
1979	7,472.50	766.00	10.26

Source (1) Central Bank of Nigeria - Econ.& Fin. Review, Dec.1976, Vol.14
(2) Central Bank of Nigeria - Monthly Reports, Dec.1978 and Dec.1979.

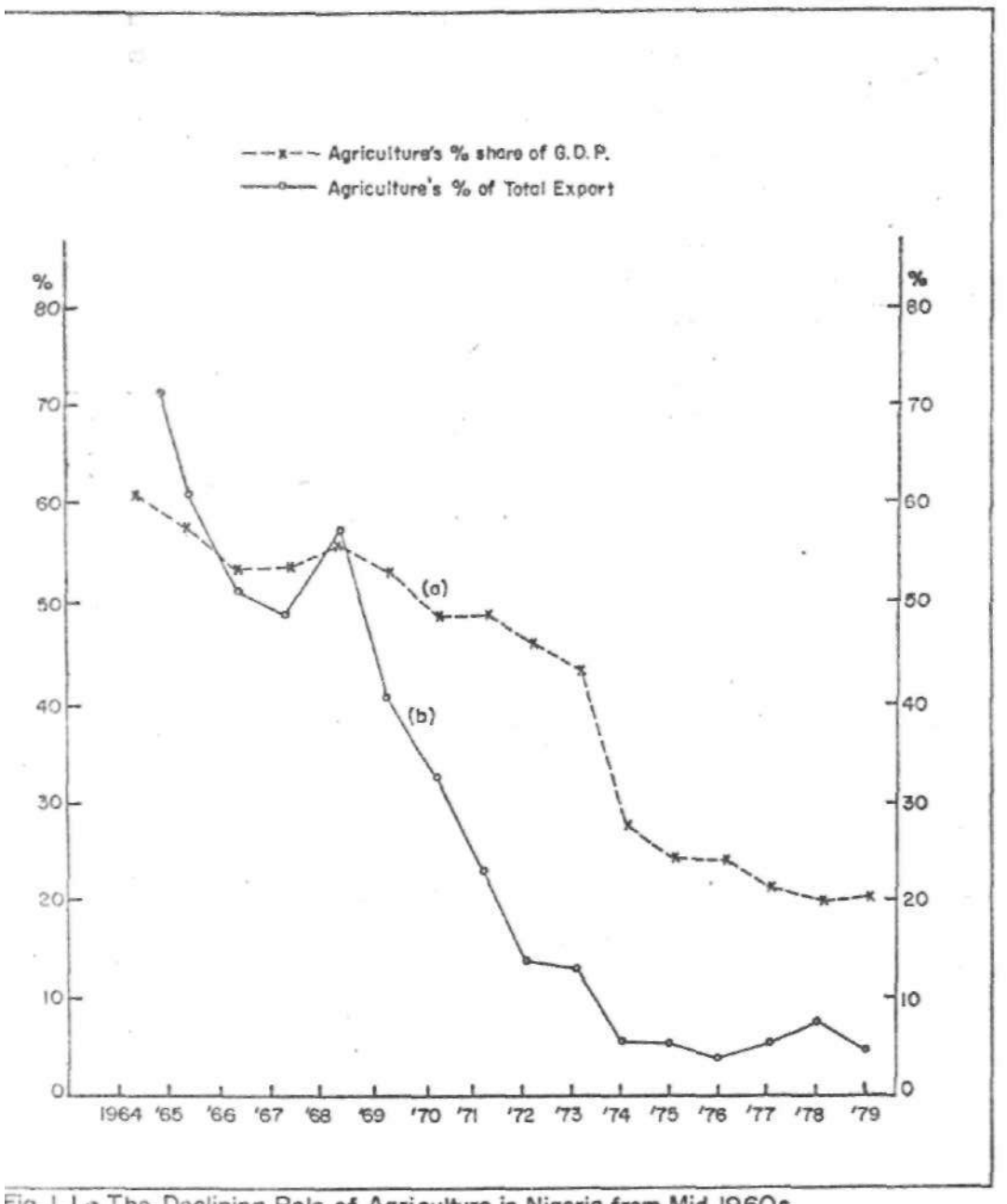


Fig. 1.1a The Declining Role of Agriculture in Nigeria from Mid 1960s

Source: Based on data of Tables 1.1, and 1.2

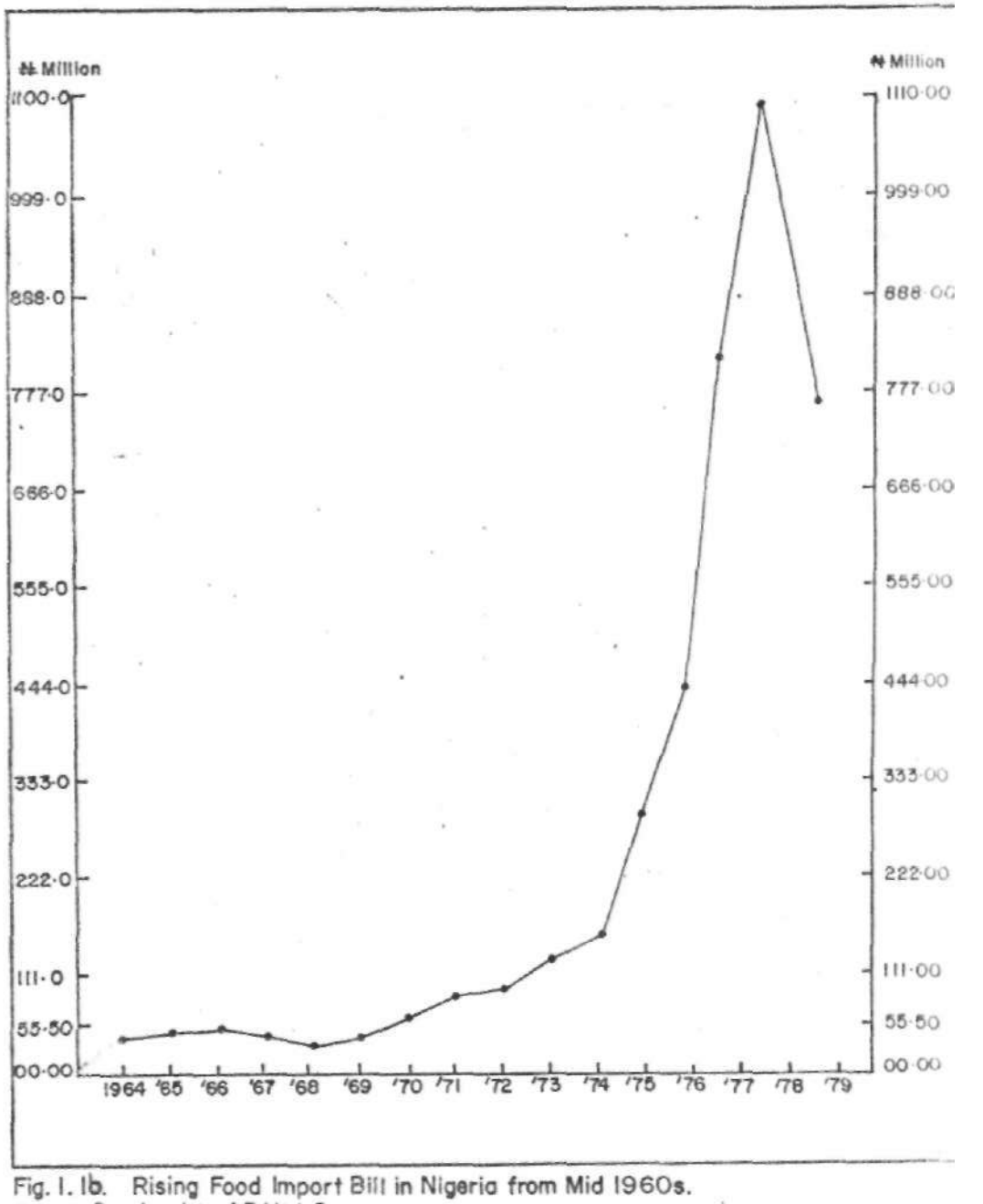


Fig. 1. 1b. Rising Food Import Bill in Nigeria from Mid 1960s.

Source : Based on data of Table 1. 3.

import in 1980 and 1981 is variously estimated to lie between 1.2 to 1.5 billion naira or about 12% to 21% of the total import value of the country (New Nigerian, 19 February, 1981, Pp.1 and 17; The Punch, 9 April, 1982, p.16 and The Nigeria Standard, 23 April, 1982, p.1). In fact, the situation has deteriorated to the extent that Nigeria is now importing such commodities as cotton, palm-oil and groundnut to sustain the industries that use them as raw materials. The neglect of agriculture, apart from resulting in a rising food import bill, has also led to inflation and to outmigration of people from the rural areas, as well as to dependence on foreign countries for food - a situation that can render the country very vulnerable in the context of the present day world system.

There is no gainsaying the fact that urgent measures are needed to arrest further deterioration of the situation in the country's agricultural sector. The agricultural sector has performed poorly thereby resulting in unrealised expectations of Nigerians on it (agriculture) to provide employment opportunities, self-reliance in basic food production..." (Federal Rep. of Nigeria 1981, p.19). It was projected in the 4th Plan that at the current rate of food demand and growth rate of population, a deficit of between 5 to 6.5 million tons of grain-equivalent of food, would be expected by 1985, the last year of the present Plan period. It was on the basis of projections such as this, and the realisation of the grave consequences for all facets of the national life of the continued neglect of agriculture

that the country's leaders, and other experts, reached the conclusion that urgent action must be taken to find remedies to the nation's agricultural and food problems.

The commitment to finding solutions to Nigeria's agricultural problems has been manifested in the various programmes as well as institutional and administrative reforms launched by successive governments since the past decade. Such programmes include the National Accelerated Food Production Programmes (NAFPP), the Operation Feed the Nation, the Green Revolution, etc., while institutional and administrative reforms include the passage of the Land Use Decree (now Act) in 1978 whose primary aim is to make acquisition of land for agricultural purposes easy; the establishment of commodity based Marketing Boards; Food Production Companies, Agricultural Credit Bank; Agricultural Service Centres for the distribution of agricultural inputs; establishment of agricultural research institutes and the reorganisation of the Ministry of Agriculture both at the Federal and State levels. These programmes and reforms are all aimed at increasing the quantity of both cash and food crops, with the ultimate objective being to make Nigeria self-sufficient in food production thereby helping to conserve foreign exchange spent on food imports, for the development of other sectors of the economy. Other objectives include modernisation of agriculture by a simultaneous injection of capital and improved technology, as well as elimination, or

at least a reduction to the barest minimum, of socio-cultural constraints on agricultural improvement.

The impact of some of these programmes and policies on agricultural development in general, and food production in particular, is debatable. They have however, helped to focus the nation's attention on the existence of the problem. Moreover, they have also contributed in making Nigeria more conscious of the need to appraise her other resources, such as water, as a means of boosing agriculture. Resource appraisal is necessary because, while it is true that lack of capital inputs and social institutions constitute a bottleneck to the development of agriculture, other resources like climate and water could also pose serious constraints. For instance, climatic and water constraints, in the form of insufficient and unreliable rainfall, especially in the northern part of the country were realised as a hindrance to the successful implementation of agricultural programmes. In the First National D Development Plan (1962, p.11) the importance of and need to take stock of water resources were knowledged when it was described as "essential pre-requisite to large-scale planning in agriculture and forestry resource development especially in those requiring irrigation works", and therefore a proposal was made for "a nation-wide survey of Nigeria's ... water resources ...".

In the Second National Development Plan, 1970-74 (Op.cit., p.110) the case for the exploitation and

harnessing of the country's water resources for the purpose of agricultural development and modernisation was more cogently made by arguing that

> in more than three quarters of the northern part of the country, rainfall is not more than five months duration. In addition, the beginning of the wet season is quite variable from year to year. Thus, full exploitation of the agricultural potential of the country is only possible if its water resources are developed for irrigation, which will not only permit double cropping, but also ensure sufficient water during the growing season of the crops.

The Study Group on Irrigation and Drainage of the National Agricultural Development Committee came out in stronger terms in support of irrigation development for agricultural purposes. It asserted in its report that "the available land and water resources in Nigeria, if developed scientifically under irrigation and drainage shall perhaps contribute the largest single factor for increasing the agricultural production. The unused potential in this sector is of considerable magnitude" (1971, p.5). It clearly spelt out the possible consequences of not embarking on irrigation projects, particularly in the northern part of the country. And even for the southern part of the country, which is generally thought of as having sufficient rainfall, the Study Group Report pointed out that there would be increased agricultural productivity through the development

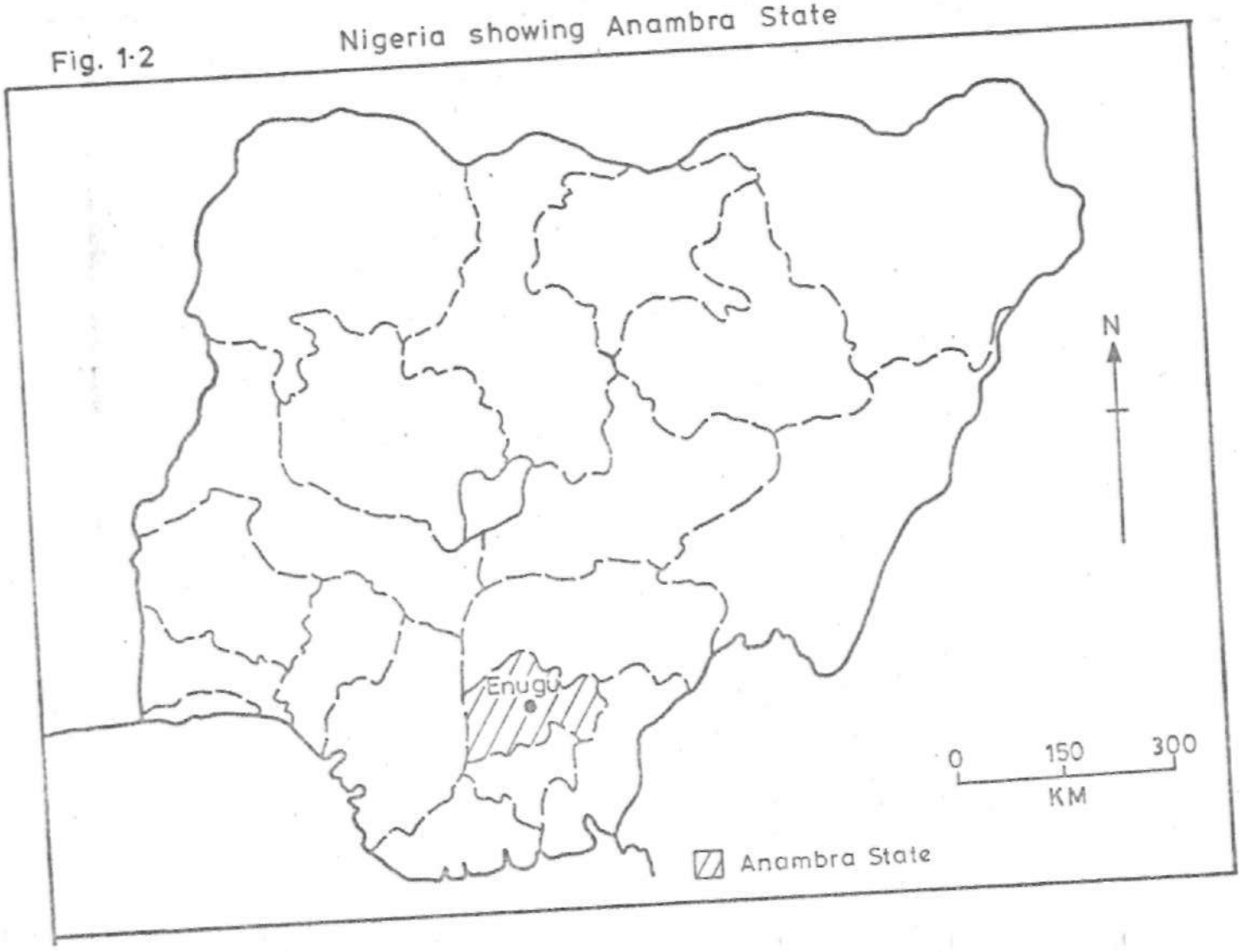
of irrigation in this area by arguing that

> in much of the southern states irrigation is needed to permit double cropping or to increase yields of plantation crops. In these areas, considerable amount of natural resources is being wasted in flooded and ill-drained lands lying along the river banks. These areas if reclaimed and provided with adequate water control and drainage can be highly productive for growing crops like fibre and rice (ibid, p.5).

With the foregoing line of thought among those capable of influencing policy, added "to the impact of four or more successive years of drought in the Sahelian and sub-Sahelian zones of Nigeria" (Taylor 1981, p.11) in the early years of the seventies, Nigeria had to make "irrigation development become a sine qua non for a dependable, viable agriculture" (Liman 1981, p.5). Or in the words of Iliasu (1981, p.3), Nigeria had to adopt 'the irrigation option' based on the control of water resources and the development of irrigation schemes" as a strategy for improving the food situation in the country. In pursuance of this policy or strategy, many irrigation projects had been planned and executed particularly in the northern part of the country. To further accelerate the pace of agricultural development through water resource exploitation, a number of River Basin Authorities covering the whole country, has been established(3)., Respective River-Basin Authorities have been making serious efforts to develop not only big irrigation works,but also minor schemes as well, both

for agriculture, flood control and water supply in their various river basins. The provision of more assured water supply and increased cultivable land in these irrigation works will facilitate the introduction to farmers of modern farm inputs, technology, farm management practices and organisations. The adoption of these by the farmers, it is believed, will help in the realisation of the national objective of self sufficiency in both cash and food crops as well as the betterment of living standard of people in rural areas. Nigeria has pursued the 'irrigation option' as a strategy for agricultural development and self-reliance in food production for about a decade now. At this stage, it is necessary to take stock and assess not only the extent to which the country has been able to realise the hopes it placed on this approach, but also the attendant economic, socio-cultural and environmental implications. In fact, interest in such 'assessment' is evident in the number of studies already carried out to ascertain the impact of these projects on the surrounding communities - for example, Baba (1975); Wallace (1980, 1981); Olaniyan (1981). With the exception of Iqbal (1975), these studies of Nigeria's irrigation are all devoted to big projects involving huge amounts of money and large expanses of land, and also affecting directly the lives of hundreds of people. A lot of criticisims have been directed at the big project approach. The argument has been that it would have been better to concentrate on small scale schemes which can then be evaluated before embarking on large ones. It is also significant to note that all the projects that have been studied so far are in the northern part of the

Fig. 1·2 Nigeria showing Anambra State



country.

1.2 Research Problems Or Issues

From the discussion above, it is obvious that the public is more aware of the existence of big irrigation projects. This is due to the fact that they feature more frequently in the news and also because they have been the subject of study by scholars and researchers from different disciplines. Because of this apparent bias in favour of big projects, many people are not aware of the existence of small irrigation schemes both in the northern (where there are about 40 of them totalling 8,575 hectares) (Iqbal, 1975) and southern parts of the country - which are making their own modest contributions to the realisation of increased agricultural production. These small schemes, like the big projects, have their own problems which need to be better understood. In a study of small scale irrigation works, several issues or questions come up to mind. These questions can be grouped into two categories - those which seek answers to issues relating to the dichotomy between the relative advantages and problems of big and small scale projects; and those which deal with issues that relate to specific projects or groups of projects. The main concern of this study is with the questions or problems of the second category - an assessment of the impact of small scale irrigation projects in Anambra State.

In this study, the following issues or questions

are specifically posed:

1. What are the factors, both physical and human, which influenced the choice and location of the projects under study?

2. To what extent have the projects affected the agricultural pattenrs and practices as well as the physical environment of the surrounding communities?

3. What are the type and nature of social and economic changes brought about by the projects and to what degree are the different groups and sections within the communities benefited or otherwise?

4. What are the nature and extent of linkages among these project areas on one hand, and between them and other parts of the state and the country on the other, in terms of trade, flow of information and inputs and movement of people?

1.3 Study Objectives

In the light of the introductory background and the research problems or questions posed, the objectives of the present study are:

1. To describe and account for the distribution of irrigation projects in Anambra State.

2. To analyse the agricultural and socio-economic changes which have been brought about by the projects.

3. To analyse and compare the nature and extent of linkages which the projects have generated

among themselves and between them and other communities in the state and the country.

4. To evaluate the net benefits and losses of the projects to the people as well as the major constraints and problems encountered by and in the projects.

5. To make recommendations for improving irrigation projects within the context of general agricultural and rural development policies.

1.4 Hypotheses

In the study of the impact of these projects on their respective surrounding areas, the following hypotheses are posed.

1. That the projects' impacts on the areas are both positive and negative but that their degree and extent differ from one project to the other.

2. That these projects have created growth environments as well as centres of opportunities which have stimulated rural-rural population movements.

3. That the projects have helped in the introduction and diffusion of innovations among the farmers in the areas of the projects.

4. That the rate of innovation adoption by and the extent of other benefits accruing to

participant farmers seem to suggest a bias towards those within higher socio-cultural groups in the communities.

1.5 Study Instruments

The instruments used in the study include

(i) Questionnaires: Two sets of questions were prepared for the study (these are attached as appendices VIII and IX). The first questionnaire (appendix VIII) was administered to the officials of the respective projects. The questions, which are mostly open-ended, sought for essential background information on the following aspects of the projects concerned - date the project was started; method of land acquisition; reasons for the choice of the area; area presently under cultivation; whether there was displacement of people and/or destruction of economic crops; number and category of workers and from where they came; the amount of money spent on the project since inception. Other questions wanted information on crops, input supply; land allocation to participating farmers, type of infrastructure and other institutional facilities available in the project; how and by whom such were provided or established as well as the degree of service these render, not only to the participating farmers but also to the generality of the community. The last section of the

questionnaire wanted to elicit information on what the officials perceive as the contributions of and problems encountered by the projects, as well as the measures the authorities have taken to solve them.

The second questionnaire (Appendix IX) was administered to the participating farmers. The questionnaire was divided into seven sections and each section consists of both structured and open-ended questions. In section one, information sought was of a general nature regarding the respondent's age, education, estimated annual income from the project farm; marital status and number of wives and children. Questions in section two dealt with land ownership and allocation, the type of economic and food crops grown in the areas before the coming of the projects, whether these were destroyed and the amount of compensation they were paid; if any. In section three, information sought related mainly to the type of land use pattern prevailing in the project areas before and after the coming of the projects, with particular reference to crops grown, their combinations and relative importance. Questions were also asked regarding yield and their attitude to the present crop vis-a-vis the former crops grown. In section four, the questions probed for answers to issues of inputs - types, quantity, regularity and use,

not only on their project farms but also on farms but also on farms outside the projects. These questions are supposed to throw light on the rate of innovation adoption and associated problems. Questions regarding labour with reference to type, source and problems were also covered in this section.

Questions in section five wanted information on institutional developments in the projects, the extent of the farmers participation in them and their assessment of the usefulness of such institutions to them. In section six, the questions are concerned with the overall evaluation, by participants, of the benefits and problems of the projects to themselves in particular and the community in general. Questions in section seven are specifically for those respondents who had earlier indicated that they were not indigenes of the areas where the projects are sited - in other words, to migrants. Information sought from them includes their town/village, reasons for choosing a particular project, whether or not they have other occupations, source of information about the project, length of period they had stayed in the project areas as well as the extra length of time they anticipate to live their, how they got accommodation, the nature of their link with their home towns/villages and the nature of problems they encounter if any as non-indigenes.

(ii) Interview and Direct Observation

Questionnaires were supplemented with interviews and field observation. The observation involved going out

to the field where the farmers were working to see, at first hand, what they were doing and the processes of certain farm operations. At this stage, interviews were held informally with both the farmers and officials aimed at clarifying or checking some of the information supplied in the questionnaires.

(iii) Documentary sources

Efforts were made at the respective project offices to get access to financial reports of income and expenditure, survey plans and/or maps of the respective operational areas of the projects; records of yields, sales and input supplies, lists of participant farmers as well as other information that were thought to be relevant to the projects.

Topographical and other maps were brought from the sales divisions of the State Survey Department while other relevant materials were gathered from libraries.

1.6 Sample selection

There were 2,549 participating farmers as at the wet season planting period (that is from about May/June to October/November) of 1981 in

the six projects under study. A list of participating farmers was collected from each project for the purpose of sample selection. A total sample population of 323 or approximately 13% was selected, by a random sampling method, from the total number of participating farmers in all the projects. About 13% of the population from each project area was selected as a sample, except in the case of Ekem Nando where the percentage was higher because of the small number of

Table 1.4

Distribution of Participant Farmer Population and Samples to Different Projects

Project	Total Number of Participating Farmers	Number of Sample Population
Adarice Production Company, Adani	470	59
World Bank Project, Uzo-Uwani, Adani	558	70
World Bank Project, Ogboji	576	72
World Bank Project, Enuguabo, Ufuma	500	63
World Bank Project, Item-Ikwo	425	53
World Bank Project, Ikem Nando	20	6
Total	2,549	323

Source: Field work, 1981

participant farmers. The distribution of participant farmer population and the selected samples in each project under study is set on Table 1.4 above.

Having decided on the size of samples for individual project locations, the following selection procedure was followed. Numbers were written on pieces of paper and put in a bag and thoroughly shuffled. Then, a boy of between 15 and 18 years was called to pick a piece of paper at a time, until the number of sample population required for each location was completed. After each selection, the remaining number of pieces of paper in the bag were reshuffled before the next number was

picked. The process was repeated until the sample population for all the six project locations were selected. Each number selected was written down and the names on the list corresponding with the selected numbers constituted the sample population for the respective project locations.

The sample for the questionnaire meant for the officials of the projects had no systematic method of selection. The questionnaires were given to the head of each project area, who were requested to ensure that they were filled and returned. This procedure was adopted because it was reasoned that heads of projects were in a position to know who within the organisation was in a position to supply answers to questions in specific sections of the questionnaire.

1.7 Data Collection - Administration of the Questionnaires

Two field assistants with a good knowledge of the areas and an educational standard equivalent to School Certificate or Teachers' Grade II Certificate were selected in each project area. These assistants were taught how to administer the questionnaires to the respondents, followed by practical demonstration as they accompanied and watched the questionnaire administered to about five of the respondents in each area. After the practical deminstration, the list of the sample farmers was split equally between the assistants and the writer met every other day at a scheduled place for a review of the progress made. The problems they encountered were also discussed and

efforts made to find solutions to them. The projects were covered one after the other. At Ikem Mando projects, the questionnaires were administered by the writer personally with help of a boy who acted as his escort.

The services of field-assistants were necessary because the farmers locations were scattered and it would have been difficult, if not impossible, for one not familiar with the communities concerned to locate them. Moreover, two other considerations made for the adoption of that method - firstly, it was felt that the farmers might be more forthcoming in their answers if they were interviewed by people familiar to them. Secondly, it was decided not to disrupt the farmers' work schedule, in addition to other conveniences that could be involved, by asking them to gather at specific locations such as the project office for the purpose of the interview.

With regard to project officials, permission for interview was sought and got from the managers or heads of individual project locations. They were also requested to supply the names of officials whom they considered most competent to answer questions related to specific sections of the project organisation such as accounts, stores, sales personnel etc. With the help of the list, appointments were booked with the officers concerned for an interview. In cases where it was not possible to get the officer in question after repeated attempts, questionnaires were left with the manager/head of the

project specifying the relevant section the officer should fill. These were later collected.

The recovery rate of questionnaires from the respondent farmers was high - about 84% for all the projects combined. However, this varied between projects, with the range lying between 69 to 100%, as shown in Table 1.5. Questionnaires from officials were recovered from all the projects.

Table 1.5

Recovery Rate of Questionnaires from Sample Population of Respondent Farmers In Different Project Locations

Project Location	Size of Sample Population	No. of Returned Question-naires	Recovery Rate in Percentage
Adarice Production Company, Adani	59	41	69.5
World Bank Project, Adani(Uzo-Uwani)	70	68	91.1
World Bank Project, Ogboji	72	56	77.8
World Bank Project, Enuguabo-Ufumo	63	53	84.1
World Bank Project, Item Ikwo	53	50	94.3
World Bank Project, Ikem Nando	6	6	100.0
Total	323	274	84.8

Source: Field Work,1981

Although the recovery rate of questionnaires was high. the response rate to some of the questions was poor.

This was particularly so for questions on income, labour use, crop yields and sales beyond the previous harvest season. This poor response to questions was not restricted to the farmers alone; it was also applicable to officials especially where it concerned expenditure of money and product disposal in terms of specific quantities, destinations and dates. Indications are given in the text where no response or incomplete responses were received. The probable causes of and the limitations imposed by poor response to questions are discussed in Section 1.11 of this chapter.

1.8 Method of Analysis

Different methods were employed in the analysis of data collected from the field. The first and most commonly used method was the frequency table with the accompanying descriptive statistics as well as simple percentages. These were used in the calculation, presentation and description of such variables as area of land cultivated in each location, sizes of farm holdings by individual participants, the amount of fertilizer used by individuals and per unit area, quantity of rice production in different locations, by individuals as well as yield per hectare. They were also used to measure such other variables relating to the personal traits of individual participants like age, sex, income, number of wives, education as well as whether they were migrants or engaged in other occupations. Also the extent of loss of economic trees and rate of innovations were among variables which were analysed for grouping variability and distribution among

project locations and within each project among individuals and groups.

Contingency table analysis with Chi-square (X^2) test was used to analyse the significance or otherwise of the relationship between innovation adoption rate and such variables as size of holdings within and outside the project; sex, age, education and number of wives and income of the participants as well as whether or not he is a migrant ot engaged in another occupation. It was also used to evaluate the relationship between the amount of loans received by the participant, amount of fertiliser used, size of holding and quantity of production, with different variables relating to the participants' characteristics as well as to location. Contingency table analysis was also used to evaluate whether the differences existing between locations with regards to such variables as education, income, innovation adoption, size of holdings and production quantity is significant or not.

One-way or simple analysis of variance with 'F' test was used to evaluate the significance of variations observed in the quantity of rice production; quantity of fertilizer used, size of holdings with such variables like income, education, location, etc.

Two-way analysis of variance was also used to test the effect of given pairs of factors on the following variables - amount of fertiliser used,

quantity of rice production, and size of holdings.

Maps employing divided circles and proportional circles and lines of proportional width were used to show the proportion as well as the size of contribution to migrant population and labour pool by different local government areas to each of the project locations.

1.9 Delimitation of Study Area

The study is concerned with six small scale irrigation schemes in Anambra State. Iqbal (1975, p.1) defined small irrigation schemes as those "that range from a couple of acres to 3,000 acres (1,200 ha)", and none of the schemes in this study exceeded the range. The projects are located in four local government areas - Aguata, Anambra, Ikwo and Uzo-Uwani. They are managed by two different bodies - Adarice Production Company Nigeria Limited, a quasi-government limited liability company runs the Uzo-Uwani Pioneer Irrigation project at Adani; and the World Bank which runs the other five projects - Adani project in Uzo-Uwani Local government and contiguous to Adarice Production Company project; the two schemes at Ufuma and Ogboji towns in Aguata L.G.A; the Item-Ikwo project in Ikwo L.G.A. and Ikem-Nando scheme in Anambra L.G.A. The above named towns/villages serve as operational head-quarters of the managing bodies from which they co-ordinate their activities which in locations like the

World Bank projects at Adani, Ogboji and Ufuma, have extended to surrounding communities. In all, the six projects involve 2,085 hectares of cultivated land. The World Bank projects accounted for 1,551 hectares of about three quarters of the total area while Adarice Production Company cultivates the remaining 534 hectares (see Fig. 3.2 for locations).

1.10 Justification for the study

A study of small scale irrigation projects such as the ones undertaken here is justified on the following grounds. As already mentioned above, there is a need to know more about small scale irrigation schemes in the country partly because it will help to upgrade our knowledge about irrigation agriculture in Nigeria generally on one hand; and on the other because, findings from such studies may be of use in the planning and execution of bigger projects. It will also prove helpful in appraising the relative advantages or otherwise of the two types of irrigation in terms of monetary and social costs.

Within the context of Anambra State this study has an added attraction as these schemes represent a pioneering stage in a policy of irrigation development as a means of boosting agriculture. In fact, within the Do-Anambra river basin alone, in the north-western part of the State (Fig.3.5), covering Uzo-Uwani, Anambra and Igbo-Etiti Local Government Areas, no less than seven irrigation projects totalling a gross

irrigable area of 40,000 hectares (Nzewi, 1979, p.5) have been identified[4]. At this stage in the history of irrigation development in the State, therefore, this type of study becomes necessary, because, apart from helping to high-light problems and constraints likely to be experienced in big irrigation development in a relatively small and densely populated area like Anambra State, it will also serve as basis for future work.

1.11 Problems, Limitations and Plan of Study

The field investigations for this study faced three constraints. Firstly, the officials of the projects were very reluctant to co-operate or to make available relevant and important documents which would have served as basic data. For instance, in spite of introductory letter from the Department of Geography, and assurances given to them that the documents would only be used for research work, it was not possible to get such records as feasibility studies, soil maps, air photographs as well as records of sales, expenses and even mapped or surveyed area of their operational locations. Where such records are available, they were invariably insufficiently complete to be of much use. The problem was not helped by the very limited information available on the projects outside the projects themselves

which could have provided alternative sources of data for the study.

Secondly, both because of the short training given to the field assistants as well as suspicion, ignorance or memory lapse on the part of the respondents, and even deliberate suppression of information for reasons best known to them, particularly on the part of project officials, answers given to some of the questions turned out to be meaningless or false with the result that they had to be discarded during data analysis.

Thirdly, the study of six projects located in different parts of the state and separated one from the other by many kilometres meant that the little available resources of time and material were spread rather too thinly. This has resulted in some aspects of the rural economy and life that would have thrown further insight into the study from either being left out entirely or not fully investigated.

Because of the foregoing constraints, the analysis in this study has been done by the blending of theoretical with empirical materials and of quantitative with qualitative explanations.

The study is organised into six chapters - Chapter I consists of introductory information dealing with brief discussion of Nigerian food problem, the declining role of agriculture to the country's economy, efforts made to revamp agriculture with particular reference to the development of irrigation

in the country. It also deals with the methodology of the study.

Chapter II deals with the theoretical framework and review of relevant literature about development generally and rural and agricultural development in particular. It also reviewed the role played by international aid agencies with particular reference to the World Bank in rural and agricultural development of developing countries generally and Nigeria in particular.

Chapter III is devoted to the physical as well as environmental setting of Anambra State with particular reference to their influence on the location of the projects.

The next two chapters are concerned with the analysis, interpretation and discussion of the findings of the study. Chapter IV discussed the impact of the projects on the land-use pattern, land tenure, production innovation adoption and labour question.

Chapter V discussed the linkages that have developed in the project areas such as labour and migrant farmers movements. It also looked into the development of institutional as well as infrastructural facilities in the area that may have been due to the coming of the projects.

Chapter VI is the conclusion consisting of summary of findings and implications they are likely to have on future agricultural development.

On Table 1.6 below is summarised the distribution of participant farmers to the six projects under study on the basis of such demographic and socio-economic characteristics as sex, age, education, average annual income, number of wives and number of children. It is easy to appreciate the unequal distribution of participants among the projects on the basis of the mentioned characteristics:

Table 1.6

Summary of the Distribution of Participants Farmers To Different Projects According to Some Demographic Characteristics

(a) SEX

Sex	Adarice Adani		World Bank Adani		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	40	97.6	68	100.0	48	85.7	46	86.8	49	98.0	6	100.0	257	93.8
Female	1	2.4	0	0.0	8	14.3	7	13.2	1	2.0	0	0.0	17	6.2
TOTAL	41		68		56		53		50		6		274	100

(b) AGE

Under 21yrs	2	4.9	-	-	2	3.6	-	-	3	6.0	-	-	7	2.6
21-41 yrs.	21	51.2	42	61.8	30	53.6	30	56.6	30	60.0	3	50.0	156	51.2
41-60 yrs.	17	41.5	24	35.3	17	30.4	20	37.7	15	30.0	3	50.0	96	35.0
Over 60 yrs	-	-	1	1.5	4	7.1	2	3.8	2	4.0	-	-	9	3.3
No response	1	2.4	1	1.5	3	5.4	1	1.9	-	-	-	-	6	2.2
TOTAL	41		68		56		53		50		6		274	100

Table 1.6 (Contd)

(c) EDUCATION

Sex	Adarice Adani		World Bank Adani		World Bank Ogboji		World bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No formal Education	12	29.3	33	48.5	20	35.7	15	28.3	31	62-0	2	33.3	113	41.2
Elementary Education	17	41.5	28	41.2	23	41.1	30	56.6	13	26.0	4	66.7	115	42.0
Secondary Education	7	17.1	4	5.9	12	21.4	7	13.2	4	8.0	-	-	34	12.4
Post-Secondary Educ.	5	12.2	2	2.9	1	1.8	1	1.9	1	2.0	-	-	10	3.6
No Response	-	-	1	1.5	-	-	-	-	1	2.0	-	-	2	0.7
TOTAL	41		68		56		53		50		6		274	100

(d) AVERAGE ANNUAL INCOME

₦500 and less	-	-	1	1.5	5	8.9	3	5.7	3	6.0	1	16.7	13	4.7
₦501-1,000	5	12.2	19	27.9	11	19.6	10	18.9	18	36.0	1	16.7	64	23.4
₦1,001-1,500	12	29.3	19	27.9	16	28.6	23	43.4	15	30.0	1	16.7	86	31.4
₦1,501-2,000	8	19.5	8	11.8	12	21.4	6	11.3	4	8.0	2	33.3	40	14.6
₦2,000-2,500	2	4.9	8	11.8	6	10.7	5	9.4	2	4.0	-	-	23	8.4
₦2,501 and over	14	34.1	13	19.1	6	10.7	6	11.3	8	16.0	1	16.7	48	17.5
TOTAL	41		68		56		53		50		6		274	100

Table 1.6 (Contd)

(e) NUMBER OF WIVES

No. of Wives	ADARICE ADANI		WORLD BANK ADANI		WORLD BANK OGBOJI		WORLD BANK UFUMA		WORLD BANK ITEM		WORLD BANK IKEM		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
One wife	29	70.7	46	67.6	27	48.2	30	56.6	12	24.0	3	50.0	147	53.6
Two wives	6	14.6	13	19.1	6	10.7	5	9.4	13	26.0	3	50.0	46	16.8
More than two wives	-	-	3	4.4	4	7.1	-	-	20	40.0	-	-	27	9.9
Not married	6	14.6	4	5.9	11	19.6	9	17.0	2	4.0	-	-	32	11.7
No Response	-	-	2	2.9	8	14.3	9	17.0	3	6.0	-	-	22	8.0
Total	41		68		56		53		50		6		274	100.0

(f) NUMBER OF CHILDREN

No child	-	-	-	-	-	-	3	5.7	1	2.0	-	-	4	1.5
1-5 children	22	53.7	36	52.9	26	46.4	29	54.7	24	48.0	2	33.3	139	50.7
6-10 children	9	22.0	22	32.4	14	25.0	10	18.9	14	28.0	4	66.7	73	26.6
11-15 children	3	7.3	2	2.9	3	5.4	1	1.9	7	14.0	-	-	16	5.8
16 children and over	-	-	1	1.5	2	3.6	1	1.9	2	4.0	-	-	6	2.2
Not Applicable	5	12.2	5	7.4	11	19.6	9	17.0	2	4.0	-	-	32	11.7
No Response	2	4.9	2	2.9	-	-	-	-	-	-	-	-	4	1.5
Total	41		68		56		53		50		6		274	100.0

NOTES

1. This is referring to the age-long controversy among development economists, scholars in, and those associated with development planning in developing countries, as to whether these countries should concentrate their development efforts first and foremost on one sector of the economy (either agriculture or industry), or strive to give equal emphasis to the two sectors simultaneously. The policy of emphasizing one of the sectors to the detriment or neglect of the other is said to bring about an "unbalanced growth". of the economy while the second approach ensures "balanced growth". There is however, a general tendency by many developing countries to lay more emphasis on industrialisation as a basis for development. Unfortunately this policy tends to create more problems than it sets out to solve. For instance it is known to cause a rise in the import bill for raw materials to sustain the industries and for food owing to the neglect of agriculture. Because of problems like these, informed opinions are of the view that developing countries are more likely to benefit by pursuing the policy of "balanced growth" (that is, trying to emphasize the development of both agriculture and industry), for, after all, the two sectors are very much inter-dependent and therefore no healthy development can possibly take place where one sector is left in utter neglect.

2. 'Agricultural lag' is a situation where actual agricultural production falls below the anticipated target. It can also refer to persistently low agricultural productivity. 'Food problem' arises due to 'agricultural lag'. 'Agricultural lag' can be caused by either physical and environmental factors, institutional constraints, socio-economic and structural problems or all of them combined.

3. There are at present 11 such River Basin Development Authorities created in 1976 by Decree No.25. They cover the whole country and individual authorities generally extend over two or more states. A lot of money has been sunk into these River Basin Authorities but most of them are yet to do something concrete to justify such huge expenses.

4. One of the identified irrigation projects within the Do-Anambra River Basin, known as the Lower Anambra Irrigation Project centred at Omor in Uzo-Uwani Local Government area has been taken over by the Anambra-Imo River Basin Development Authority. It has a gross irrigable area of 7,700 hectares. At the beginning of this year, a contract was signed by the Anambra-Imo River Basin Development Authority with a Japanese consulting engineering company for the construction of irrigation structures. It was estimated that when the irrigation is fully operational, about 35,000 tonnes of rice will be produced annually.

CHAPTER II

THEORETICAL BASIS AND LITERATURE REVIEW

In this chapter, a brief review of related studies and assumptions underlying agricultural development policies is made, so as to put the study in its theoretical context. In this survey, some models of development will first be discussed, followed by examination of how these models influence thinking on and policies of agricultural development. Next, the relationship between rural and agricultural development is discussed and then the role of international aid agencies with particular reference to the World Bank, in rural and agricultural development efforts will be discussed. The survey concludes with a look into the development of water resources as a basis for agricultural improvement both in Nigeria and elsewhere.

2.1 Development Concepts And Models

The debate of what constitutes development and the best strategy to adopt to bring it about has been a long standing one. This is attested to by the abundant literature by development economists and scholars in related disciplines. The literature contains various views as to what development is all about based on different perspectives through which the issue is approached. However, these views have been categorised into three by Goulet (1977, pp.X-XIV). The first view holds development as being synonymous with economic growth which can be measured or measurable in aggregate terms such as number of household items

owned; agricultural and industrial commodities produced, income per capita etc. This perspective of development, held mostly by economists of the classical and non-classical school of thought (such as Keynes, 1936; Rostow, 1962; Murkse, 1953; Myrdal, 1956), tends to subordinate other considerations to that of pursuit of growth in terms of quantities of different items of production. Development from this perspective is perceived within the context of the market economy (market system), supply and demand, economics of scale, specialisation, efficiency in factor use, etc., both at micro and macro levels - with emphasis on increased spending and consumption to stimulate increased productivity and employment.

The second view of development sees it as economic growth preceded by or accompanied with fundamental social change - a process that is considered necessary for or conducive to growth. This social change (generally referred to as 'modernisation') involves discarding of indigenous cultures, attitudes and values by a group for other cultures, attitudes and norms 'believed' or 'considered' to make people more receptive to developmental influences. Implicit in this view is the idea that cultures constitute barriers to development. The protagonists of this view such as (Streeten, 1981; Habakkuk, 1981) tend to emphasize the dependence of development on the removal of constraints to growth through a process of socio-economic modernisation or reforms, which also include spatial reorganisation, as well as the identification of groups and areas of high potential for growth for

Special attention.

The third view sees development from a humanistic perspective in that more premium is placed on man rather than on mere economic growth or acquisition of material things as the ultimate objective of development. Champions of this development perspective emphasize growth with distribution, full participation of all concerned in the process of development and the creation of a socio-economic environment that will enable all to have access, on a fairly equitable basis, to the resources of the society for their own welfare (Smith,1977; Mishan, 1964; Nat, 1973; Mabogunje, 1980).

Perceptions of development held by policy makers in a given society often influence the type of development model pursued. While it is neither possible nor desirable to examine here the full scope of the various development models which have been advanced, it is pertinent to review a few of them to enable us to appreciate their influence on policies regarding agricultural development.

The first group of development models is based on the so-called dual economy typical of developing countries (I.L.O., 1973; Jorgensen, 1967). Their economy is characterised as consisting of two sectors - 'modern' and 'traditional'. The formal or modern sector, often associated with urban areas, is characterised by large scale production, formal marketing organisations and links and high level of technology and capital requirement. On the other hand, the informal or traditional

sector, usually associated with a rural subsistence economy is characterised by production for self-subsistence, ease of entry, reliance on indigenous resources, family ownership of enterprise, small scale of operation, labour intensiveness and unregulated and unorganised markets. Moreover, the informal sector, unlike the modern sector, is portrayed as incapable of making savings and capital formation thereby accentuating low productivity and resource under-utilisation. Because of the disparate nature of the two sectors of the economy of developing countries, the development strategy or model often prescribed invariably favour the more dynamic commercial sector. The rational for this policy is that returns to investment in the sector is presumably higher and that it will lead to a higher aggregate growth of the economy generally. The end result of this bias to formal sector by policy-makers in developing countries is that the subsistence sector, which is in the main, rural and agricultural is generally relegated to the background in neglect.

The second development strategy is what Essang (1975, p.304) called the Export-Led Growth Model. This model seeks to explain development as resulting from the exploitation of opportunities offered by international trade and the so-called comparative costs theory (specialisation). According to this model, developing countries in response to demand stimulus from other countries embarked upon the development of their resources of agriculture and mines.

Myint (1981, pp.99-107) in his 'Vent-For Surplus Theory' set out to show that a great deal of development which has taken place in developing countries is due to the fact that international trade provides 'new effective demand for the output of surplus resources which would have remained unused in the absence of trade ... and inelastic domestic demand for exportable commodity'. The idea of surplus resources of land and labour in developing countries that could be used in producing for export without seriously affecting domestic subsistence, reinforced by the law of comparative costs or advantage, is the basis for assigning the production of primary commodities to these countries within the international system. Moreover, the fact that much of the economic growth and development in most developing countries within the first five to six decades of this century has depended on the export of one or two primary commodities has tended to increase the faith of policy-makers in it as an option of development.

The Export-Led Growth Model has however been criticised on the ground that it works to the disadvantage of developing countries in terms of unfavourable terms of trade, leads to undue exploitation of labour and resources of these countries and creates a state of helpless dependency(1). Referring to the problems of the export-led growth model, Dos Santos (1970, pp.231-6) declared:

> This system is a dependent one because it reproduces a productive system whose development is limited by those world relations which necessarily lead to the

> development of only certain economic sectors, to trade under unequal condition, to domestic competition with international capital under unequal conditions, to the imposition of relations of super-exploitation of the domestic labour labour force with a view to dividing the economic surplus thus generated between internal and external forces of domination.

This model, in terms of practical policy leads to the development of export cash crops to the detriment of food production agriculture.

The High Input Pay-off model (Schultz, 1964) as a strategy for development is advocated for developing countries by some authorities in view of the dominant position of the rural sector in their economies and its charcteristic low productivity and use of low technology. With regards to agricultural development, this model emphasizes the provision of "new high yielding varieties and educated rural labour" (Essang 1975, p.304) as well as more sophisticated technology and packages of incentives to induce their adoption by farmers. This approach is rationalised by the following arguments - that the low productivity and the consequent low incomes which characterised the traditional agriculture are due to the use of static technology and inputs (Schultz, 1964). By implication therefore, the situation could be improved by supplying the missing inputs and technology; hence the assertion by Johnston and Mellor

(1961, p.569) that

> the most practical and economic approach to achieving sizeable increases in agricultural productivity and output lies in enhancing the efficiency of the existing agricultural economy through the introduction of modern technology on a broad front - especially in boosting expenditures for 'developmental services' or 'unconventional inputs' like agricultural research, education and extension.

Ruttan and Hayami (1971) in supporting this strategy or model of development stressed the effect of new technologies in helping to evoke reforms by asserting that "new technology creates a demand for institutional change by opening up productive opportunities unrealisable without such change".

The Diffusion model of development, the last to be discussed here, is implicit in the concept of development as a modernisation process, implying as it does that differences among groups and areas, whether in agricultural productivity or other aspects of development arise mainly due to differences in the rate of adoption of new ideas and practices. The diffusion of innovation (the spread and adoption of new ideas, practices and technology) involves persuading people to accept new technology, skill attitudes and institutions, thought or believed to be better or more useful than the existing ones prevalent among them. The importance attached to innovation diffusion as a vehicle of development is evidenced by

the many theories that have been propounded to enhance the understanding of causes, processes, rate of, as well as inducing and constraining factors to innovation acceptance.

The first of such theories attempts to explain the process of innovation diffusion from the perspective of information dissemination. This group of theory, in summery says that the most important prerequisite for innovation is the availability of information, and that the possibility of getting this information depends in turn on the spatial distribution of the potential adopters' information sources. This implies that the nearer a potential adopter is to the source of information regarding an innovation, the more likely he is to adopt - a phenomenon Johansen referred to as the 'neighbourhood effect'. Exponents of this theory include Hagerstrand (1952, pp.3-19); Morrill and Pitts (1967); Johansen (1971, pp.670-2). Critics of this group of diffusion theory point out the absence of reference to socio-economic as well as cultural factors which are potential barriers to adoption in spite of information availability. They also point out the unrealistic implicit assumptions in the theory - the demonstrable untility characteristics of all innovation as well as uniform spread of information in all directions.

The second group of diffusion theories emphasize socio-cultural factors as the main determinants of the adoption process. The proponents of these theories believe that while information is important in

the innovation adoption process, its absence does not necessarily inhibit it, because all that is needed for information search to begin is the presence of all the necessary socio-economic conditions. Hence, Blaut (1977) asserted that 'technological innovations tend to be rejected, not through ignorance, but through incompatibility with the existing cultural system as a whole', and therefore went on to argue that 'when the socio-cultural conditions for adopting a new innovation have been fulfilled, the needed information will be sought'.

Yappa (1977, 1979) in reference to the effect of socio-cultural factors on innovation adoption, pointed out that information-based theories of diffusion tend to ignore 'structural variables' and the underlying and determinant factors of 'who adopts' and 'who does not adopt and why'. He further pointed out that 'for any particular innovation, the rate of diffusion will follow the space-time rates of information, but intensity of adoption will conform to the gradients of location of profits'. Pastore (1978, pp.65-7) and Johansen (op.cit) cautioned that the emphasis on 'neighbourhood effect' as a factor in innovation adoption should not blind us from appreciating the greater influence of the effect of neighbourhood'. The importance of socio-cultural structures of societies on the innovation diffusion process lies in the fact that they tend to clothe innovations with bias properties in favour of members having either political, financial or educational power to exploit the available

opportunities, while those that lack the foregoing social resources generally do not adopt, the availability of information nothwithstanding.

The third type of diffusion theory associated with Berry (1972) is known as the Central Place Theory of Diffusion, or Hierarchical Diffusion or Filtering. The theory posits that the process of innovation depends on size or rank of a centre in the urban hierarchy thereby implying that urban centres and urbanisation are not only sources of innovation but also vehicles for their spread. The process of innovation diffusion takes place from one centre to the other in three ways - through 'market-searching' behaviour by industries located in bigger centres; through a 'trickle-down' process induced by expansion and the desire to minimise costs; and finally through the 'imitation (or demonstration) process' in which entrepreneaurs and people in smaller centres copy the actions of those in bigger cities. To hasten the process of innovation adoption, Berry suggested the creation of centres of smaller thresholds within the periphery which should be as centrally located as possible for easy accessibility and transmission of information to and from the periphery.

2.2 Agricultural Development Strategies And Policies

Agricultural development policies in many developing countries are influenced firstly by the type of framework through which development as a

whole is perceived and secondly by the role agriculture is supposed to play in the economy as well as perceived causal factors of change in the agricultural sector. The following discussion deals with the influence of the two foregoing factors on agricultural development policies. It should, however, be pointed out that neither the growth models nor the perceived roles of agriculture in the economy are mutually exclusive - hence the apparent conflict that at times characterise these policies.

Within the dual economy growth model, agriculture is seen, first as existing to serve the ends of industrialisation through "the provision of cheap food, cheap raw materials and cheap labour" (Essang, op.cit). The basis of this line of thought is the supposed excess capacity or potential of labour and land in the agricultural or rural sector which could be transferred to industry to the mutual benefit of both sectors in terms of increased productivity - an outcome of the vent for surplus theory of Lewis (1955, Pp.400-49) that champion the idea of development through the utilisation of 'surplus or unlimited resources'. Secondly, within this framework, farmers are characterised as lazy, ignorant, unproductive and unresponsive to incentives or profit motive. Given the above perception, within this development model, agricultural policy adopted can best be described as one of benign neglect of the rural sector as opposed to the formal or industrial sector. When however, government takes action in the rural sector, it is often elitist in nature with little or no involvement of, or consultation with, the

farmers, since their role is seen merely as that of obeying orders and directives from above.

Problems inherent in this approach include, firstly, a likely fall in food production, at least in the short run. Secondly, prices of food are more likely to rise thereby constituting a bottleneck for industry. Thirdly, the elitist planning which characterises government initiative under this strategy invariably leads to passive resistance by farmers and ultimately to outright failure in some cases for example, the Groundnut Scheme in Tazania (Coulson, 1981, pp.52-8) and the Niger Agricultural Project at Mokwa in Nigeria (Baldwin 1957). Pointing out the danger and illusion of the surplus theory as a basis for policy, Kindleberger and Herrick (1977, p.172) observed that "... this model encounters the formidable difficulty that these workers are fed automatically when they are on the farm and may not be, when they leave", and Higgins and Higgins (1979, p.157) cautioned that "no country has a 'reserve army' of agricultural workers, completely unemployed, who can be transferred the year round with no rise in industrial wages, no investment in agricultural sector, and no drop in agricultural output".

The agricultural development strategy adopted within the framework of the export-led growth model, varies from one country to the other. However, they essentially consist of measures aimed at improving the quantity and quality of export crops mostly. This is done, among other methods, through plantation system using paid labour and producing for export. Plantations are common in sparsely populated tropical areas as

in Central America, Asia and Africa. Such plantations were initially owned by foreign interests but ownership has changed or is changing hands with the attainment of independence by various countries (Beckford, 1969, pp.321-47).

However, because the plantation system as a mode of agricultural production is becoming less attractive to both investors and governments, it is being replaced by "the nucleus estate and small-holder (out-grower)" system (Leech, 1981, pp.8-10, Williams 1981 p.18) for growing such cash crops as sugar, tea, coffee, tobacco, oil palm etc. In this system agro-industrial companies such as Nigerian Tobacco Company and Cadbury both in Nigeria, Brooker Brothers in Kenya etc. (Heyer, 1981, p.115) engage in the promotion of certain crops like tobacco, tomato, sugar, etc. to feed the processing factories which they instal within their own nucleus estates. In addition to products from their own estates, out-grower schemes are introduced by these companies whereby individual growers are encouraged to grow and sell to the agency while the agency runs the estates, buys and processes the crops, supplies the inputs and supervises production by out-growers. This scheme thus gives the firms control over small-holder producer and the price of his product without the expenses and problems of having to recruit and supervise wage labour, or buy the land, as in the plantation system.

In the nucleus estate approach, the supervising agency, whether it be a government or an agro-industrial company is concerned mainly with the supply of inputs

such as high-yielding seed varieties, the provision of social and physical infrastructure as well as instituting reforms regarding quality and marketing. Extension education is also undertaken among the outgrower smallholders. Inputs, extension education, infrastructures and incentives are provided to the farmers so as to arouse their urge to exploit the available opportunities. That farmers can and do respond to economic opportunities is a theory or view held by Schultz (1970, pp.105-10) and Mellor (1970, pp.219-21) which advocates adequate incentives, market and institutional reforms as means of evoking positive response from farmers. In an apparent support for this view, Wolpert (1964, pp.545-6) pointed out that failure by farmers to act rationally in response to opportunities could be attributed to what he described as 'objective uncertainty' which can arise from any of five sources personal factors, institutional arrangements, technological changes, market structures and physical factors. In situation of such uncertainty, which arise in the first instance from information and communication defects and lags, decision-making is imbued with an element of risk - and farmers differ as to their ability to take or bear risks. Nigerian Farmers' readiness to seize opportunities offered by economic openings has been more than demonstrated by the eagerness with which they took to the planting of such cash crops like cocoa, oil palm, cotton etc. in the past. Tiffen (1972) has shown how such a response to the cash crop economy led to the opening up of Gombe Emirate of Nigeria in the first half of this century.

The view of the agricultural sector in the High Input Pay Off Model of development is that of exhausted potentials. Within this framework, farmers are perceived as having little or no opportunity for further increased production as they are believed to have exhausted the potentials of the static technology available to them. Moreover, apart from working with exhausted and static technology, farmers are also constrained by other factors of economic, political and social nature. These, argued the protagonists, must be removed through institutional reforms as well as investment in research, education of farmers and input provision. It is on basis of this line of thought that policy-makers justify government direct action in agriculture to induce rapid change.

Such direct government action in agriculture includes the establishment of single projects planned to have a very quick impact on productivity such as big irrigation work, a road, massive supply of inputs, farm settlement scheme as in the former Eastern and Western regions of Nigeria. Government can also directly get involved in food production as in Ghana and Niger (Nweke, 1978, pp.202-8). Another option within this framework is through a massive injection of high intensive technological package into a given area or directed against the solution of a specific agricultural problem such as the Chilalo and Walomo Agricultural Units (CADU and WADU) in Ethiopia (Tecle, 1975, p.3), the Intensive Development Zone as practised in Zambia (Okwuosa, 1976, p.140) and the Agricultural Development Projects (ADP) in Nigeria. More attention is also paid to research to produce and disseminate inputs embodying

new technology aimed at increased productivity. The concept underlying this option is the assumption that it is more profitable to concentrate efforts in a given region or aspect of agriculture rather than spread them too thinly over space with little or no visible evidence.

The strategy or policy of agricultural development, within the Diffusion Model of growth, involves the spread of new ideas about agriculture, and hence it has to do with finding the most effective way or method to influence farmers to accept new technologies, inputs or practices being introduced. During the colonial administration, especially at the early stages, force and taxation were the main weapons employed to compel farmers to adopt the cultivation of given crops or practices. For instance, Coulson (op.cit, p.55) reported that in Tanzania, "by-laws covering almost every conceivable aspect of agricultural production were passed under the 1927 Native Authorities Ordinance and enforced with fines or imprisonment in Native Courts by the chiefs". In Kenya, Africans were first barred by law from growing some crops (Heyer, op.cit) while in Niger Republic farmers were forced to reserve cereals contrary to traditional practices (Roberts, 1981, Pp.193-201). These measures, everywhere evoked opposition from the farmers either passively or violently. Such opposition was attributed to the farmers' ignorance by the erstwhile administrators, but in reality the contrary is the case. For instance, Coulson in explaining the cause of such opposition declared that "it is now

clear that the agricultural and economic logic behind many of the rules are wrong, so that the peasants were absolutely right to oppose them" (op cit. p.56).

Apart from compulsion, as a strategy of innovation diffusion, colonial governments in different countries employed the method of offering services, inputs, and subsidies to farmers. The method is still being used extensively by post colonial governments of developing countries. The strategy or approach variously referred to as Minimum Package Approach (Tecle, op. cit p.144; Okwuosa, op.cit p.140), Functional Programme Approach Approach (Lele, 1975, p.17), or Basic Needs Approach[2] (Aziz, 1978, p.XV; ILO, 1976, p.32; Higgins and Higgins op.cit pp.168-9), involves the introduction of simple but new technology, inputs or practices. Such technologies or new practices could be better method of fertiliser application, use of insecticides, ridge-making, contour ploughing, input provision or formation of co-operative (Abalu, 1978, p.128). These innovations are generally spread through extension or change agents.

The popularity of this Minimum Package Approach with developing countries stems from the fact that, compared with other alternative approaches, it is relatively cheaper. More over, it rarely involves major structural or technological change of great outlay but at the same time better then the practices and inputs previously in use. In addition, local materials and technical capabilities as well as institutions are mostly used. Other point in its favour is that it aims at satisfying the basic physiological needs of the bulk of the population for food, shelter and

clothing thereby helping to minimise inequality among individuals and regions since many more farmers and areas are reached through this approach. However, it has been pointed out that the benefits of this approach are rarely fully realised owing to insufficient number of extension agents, poor incentives given them and uneven infrstructural facilities like roads which make it difficult for these agents to get to all the farmers and places they are assigned to cover. The alleged conservatism of the peasants help to hamper the realisation of the full potential of this approach.

The above identified problems facing the minimum package approach have made an alternative strategy necessary. Such alternative approach referred to by Coulson (op.cit, p.58) as the Focal Point Approach involves the concentration of efforts and resources in areas where they are more likely to pay off within a short time. For instance resources might be concentrated on few individual farmers considered as 'progressive' or 'advanced' and therefore receptive of new ideas (Mabogunje and Gana, 1981, pp.72-74, Coulson, op.cit p.59); on the organisation of co-operatives, credit provision, or even on single agricultural projects like farm settlements etc. Specific regions or areas could even be chosen or selected for special development effort as in the agricultural development units of Ethiopia or the agricultural development project areas in Nigeria. Protagonists of this approach argue that apart from achieving more positive results through the concentration of available resources on specific projects

or areas, the impact of the projects, would with time diffuse to other regions and farmers through the process of trickle-down mechanism'.

Critics of this approach however, point out that the 'trickle-down' from the project rarely occurs. They further argue that such approach tend to be socially biased in favour of people in upper strata of the society. In addition, 'enclave economies' surrounded by depressed areas are generally the consequence of this approach to agricultural development. Other criticisms of this approach include - that participation of local peoples both at the management and grass-root level is very adversely affected, owing to the involvement of foreign firms and consultants in planning and execution of such projects. Also, that the cost in terms of money is generally very high relative to the area covered, the number of people involved and the yield realised (Baun 1978, pp.10-11; Clough, 1982, pp.55-56, Wallace, 1980 pp.10-20, Mabogunje and Gana, 1981, pp.102-110).

2.3 Agricultural And Rural Development - An Overview

In a discussion of agricultural development, the issue of rural development necessarily comes up, because the former is seen as a part of, if not a pre-condition, for the latter. In fact some authorities do not make any distinction between the two; for instance Okongwu (1972, p.17) categorically declared that "we observe no distinction between agricultural and rural development: authentic agricultural development implies rural development. For agricultural development should have as its goal a sustained increment in agricultural

productivity as well as in the quality of rural life". Others who share views similar to that of Okongwu, are Famoriyo (1979, p.22, Ebong (1972, p.18), Ajaegbu (1977, pp.154-5). Generally, officials and planners tend to share the above view for as Abalu and D'Silva (1980, pp.52-3) pointed out, "they see agricultural problems as rooted in the rural sector ... (and also as) owing to the absence of improved physical inputs and/or absence of incentives". This view probably emanates from the fact that the greater proportion of the world's population, at least in the developing countries, live in the rural areas, and depend for their incomes and well-being, on what they can realise from their agricultural activity(3) - hence the observation by the World Bank Mission to Nigeria that "if rural transformation is to take place, it necessarily will involve not only the absolute expansion of agricultural activities, but also the whole range of changes necessary to raise the level of agricultural productivity and incomes"(4) (1974, p.31). The need for improvement in agriculture as a basis for rural development has similarly been emphasized by Lele (1975, p.1), Yudelman (1976, p.360) and Ojo (1977, p.82).

On the other hand, there are people who make fine distinction between agricultural and rural development such as Aribisala (1982, pp.25-6); Aziz (1978, pp.63-82) and Ekong (1978, pp.162-3). For instance, Munisi (1981, p.63) while agreeing that the question of food production is very much linked with rural development, however pointed out that the latter should be seen as

> the whole strategy of growth, the approach to development and the prism through which all policies are perceived, and given priority. An effective attack on the world of poverty can only be made by going direct to the rural areas and dealing with the problems there. The objective is, and must be, the provision of food, clothing, shelter, education and health services for every one under conditions which provide for universal human dignity.

From the foregoing discussion, it could be concluded that the two things are interdependent and have similar objectives - improvement in the living conditions of rural people through the creation of conditions that are conducive to increased production. What is contentious however, is the means whereby the end objectives are to be realised with the minimum cost, social disruption and for the greatest number within the shortest possible time. For instance, while some hold the view that these could be achieved sectorally, others advocate the integrated approach.

On the issue of involvement of the people on whose behalf development projects are undertaken, it has been observed that it is a rare occurence - hence, Heyer, Roberts and Williams (1981, p.1) argue that rural development as presently promoted amounted to "planned change by public agencies based outside the rural areas. These agencies include national governments acting alone, and international organisations acting in association with them. These agencies generally represent development as an impossibility without their intervention". This approach implies therefore that development is undertaken for peasants and not by them; and also that the rural people are

looked upon as constituting an obstacle to their own development.

2.4 International Aid For Rural/Agricultural Development: The Case of the World Bank

The World Bank's role in the agricultural and rural development programmes of developing countries, its activities have to a large extent determined the tempo and pattern of such programmes. This arises from the fact that in the face of the twin problems of low productivity in agriculture and rural poverty, often exacerbated by a phenomenal increase in population, adverse physical and environmental factors, socio-cultural as well as politico-economic constraints (Marei, 1978, pp.20-3; Crossen, 1975, pp.17-21), these countries could hardly on their own effect any appreciable change in their lot - hence the need for outside aid.

Aid for agricultural and rural development in developing countries come from various sources - directly from other countries (on both bilateral and multi-lateral basis) voluntary aid and other organisations such as the Norwegian Church Relief, World Council of Churches, Oxfarm, Rockeffeler Foundations, etc. However, the bulk of this type of aid has come from international aid or finance agencies like the F.A.O., W.H.O., C.D.C. (Commonwealth Development Corporation), African Development Bank (ADB), European Development Fund (EDF), International Bank for Reconstruction and Development (IBRD), otherwise called the World Bank. Of all these bodies, the World Bank, together

with its affiliate agencies - the International Development Association (IDA) and International Finance Corporation (IFC), contributed, within the last twenty years over 50% of all aid to agricultural and rural development in developing countries (Pickering, 1981; Baun, 1978, pp.10-3).

Ever since the Bank came into operation in 1946, its business has been to "lend for development projects", and in the process of doing this, its lending policy as well as the geographical spread of its loans had gone through different evolutionary stages. Most of the Bank's loans, in its first fifteen years went to Europe and Latin America and mainly for industrial and urban development. With the United Nation's declaration of 1960-1970, the First Development Decade, the Bank responded by expanding the geographical spread of its lending to include Asian and African countries. However, substantial fraction of such loans was still allocated to industrial and urban-based projects. The Bank's loans to agriculture at this period were meant for specific and already pre-selected projects, planned and executed in isolation with little or no regard to other economic, socio-cultural as well as sectoral linkages - hence this method of using the Bank's loan was described as 'Project or Partial Approach' by Van de Laar (1976, p.843), Yudelman (1976, p.367). Favourite projects for the Bank's loans at this stage include large-scale irrigation, agricultural credit scheme, settlement schemes, cash crops like oil palm etc.

With time, this approach came under question. Critics charged that it encouraged 'growth without development' since the filtering or trickling down of the benefits of these projects was hardly visible in the surrounding areas. Instead, they contended, the projects tended to cause more suffering and deprivation among a greater number of people in developing countries. Baun (op.cit., p.10) for instance, viewed these projects as mere

> 'enclaves', designed and supervised by foreign consultants, executed by foreign contractors and suppliers, and managed with the help of expatriates ... little attention is paid to the socio-cultural setting - hence the need for another type of approach in the 1970s which will emphasize appropriate technology and the use of local institutions and personnel as well as embody different packages.

In place of the foregoing approach, an integrated strategy involving attack on the problem of rural areas, was advocated. It was argued that this new strategy is better suited to cater for the different needs of the rural people, especially the rural poor, majority of whom are farmers. Yudelman (op.cit, p.368) named the new strategy 'Projects New Style' and Van de Laar (op. cit., p.840) referred to it as 'Rural Strategy'. However, it is commonly known as the 'Integrated Rural Development' approach. The implementation of this new approach called for increased lending to agriculture since the Bank believed that the poor could only be reached through agric. Referring to the emerging concept of lending by the

Bank, Christofferson asserted that "improving agriculture is the linchpin of the Bank's endeavour to reach the poor" (1978, pp.18-22). The crystallisation of this policy began in 1973 in Nairobi, with the formal declaration by the then President of the World Bank; Mr. Robert McNamara, and the adoption by the Bank of the policy of increased lending to agriculture and integrated rural development approach as a means of getting to the poor. The World Bank, by this 'new style' of lending for the development of the smallholders' agriculture (Poleman, 1975, pp.8-16), hoped not only to accelerate economic growth and development but also effect a much more equitable distribution of the fruits of such growth between individuals, socio-economic groups and regions.

In keeping with the requirement of this new policy, the World Bank has involved itself more in developing countries' agricultural and rural development. For instance, the World Bank's involvement in Nigeria can be better appreciated by the revelation during the recently concluded annual conference of the Nigerian Agricultural Society at Ibadan that the Bank has invested up to ₦540 million in the country's agriculture. The Bank's pervasive influence in Nigeria's agricultural development efforts is becoming evident. For instance, Ugochukwu (1982, p.3) in reference to it, declared that:

> the bedrock of Nigeria's Green Revolution is the World Bank proposed and assisted Integrated Rural Development Programme known in Nigeria as Agricultural/Rural Development Projects (ADP). By 1981, seven such pilot projects were in existence in the country at Funtua, Gusau, Gombe,

> Ayangba, Lafia, Ilorin and Bida. The Federal Government considered the results of the pilot schemes as successful and intends, during this Fourth National Plan period to extend the approach to all the States.

This approach appears to have dominated the thinking of the nation's policy-makers as to preclude the conceptualisation of other solutions to agricultural and rural problems outside the framework of the Bank and its strategy. It is this type of the Bank's rather negative influence on the country's agricultural development policy that Ugochukwu (ibid, p.3) had in mind in his concluding remarks to the effect that "... here in Nigeria, it (that is, integrated rural development approach) is treated with a respect that all but says, 'the World Bank knows best'."

The cost of the integrated rural development programmes envisaged in the Fourth National Plan is put at ₦234.9 million. Out of this, the World Bank is expected to supply 40% while the rest comes from the Federal Government and the State in which the project is to be sited at the ratio of 25% and 35% respectively. In addition to these integrated programmes, the Bank is also involved in 'small-holder' agricultural projects in Nigeria. The cost of such projects is shared between the Bank, the Federal Government and the State concerned in the following proportion 50%, 25% and 25%. For instance, small-holder oil palm rehabilitation shheme is currently being undertaken in Imo State; while in both Anambra and Imo States small-holder irrigated rice projects are in operation financed partly with the World Bank

loan. Five of these projects are in Anambra State. The Federal contribution to these projects in Anambra State as at March, 1980, was ₦2,366,750. The total area involved in the projects within the same period was 2,630 hectares. Within the same period about 5,000 tons of milled rice was estimated to have been produced from the State's projects (Federal Ministry of Agriculture, 1981, pp.14-5). This study is concerned with these small holder rice projects in Anambra State.

Agricultural development aid by international aid agencies, but more particularly from the World Bank, has come under serious attack in recent times. Doubts are being expressed about the Bank's 'New Style' approach with particular reference to its real motive, effectiveness and method of execution. Criticisms of the approach include sacrifice of growth and efficiency for equity (Poleman, 1975, p.16; Meadley 1981, pp.13-14, Feder, 1976, 344-7). This criticism mainly come from the officials of these international aid agencies who are generally more interested in yields and profit. Secondly, it has been pointed out that it creates and deepens dependency relationship for the farmers, since they have to depend more than ever before on external bodies for decisions on such issues as inputs, planting time, sales, credits etc. (Dahlberg, 1979, pp.112-24). Thirdly, the possibility of holding a country's agricultural development plan to ransom owing to foreign manipulation and possibly sabotage - for example, the Bank had to refuse the disbursement of already negotiated loan to Kaduna State because the government insisted on playing a more active role in the running of the programme.

A fourth criticism is that the money from the Bank for these programmes really goes back to grease the machinery of international capitalism - that is, to the Bank itself, to foreign contractors and consultants in the form of inflated payments to many 'experts' often employed and prices of inputs and services - hence the declaration by Heyer, Roberts and Williams (1981, p.12) that the Bank's lending has become 'a big business'. Feder (1976, p.343-54), Ugochukwu (1982, p.3) and Odesanya (1982, p.24) - all share similar views. And Feder (1976, p.347) was of the opinion that "the Banks activities are aimed at strengthening the arms of capitalism throughout the Third World". Another common criticism is that the people are hardly involved in the decision-making process and management - these matters are handled by the Bank's officials to the virtual exclusion of the farmers and local officials who are merely expected to carry out instructions. Finally, critics point to the in-built bias in the Bank's programmes to 'progressive farmers' in the supply of inputs and services - hence Williams (1981, p.25) in his review of the Banks 'New Style' approach came to the conclusion that the World Bank sponsored agricultural projects, have not benefited the poorest farmers and in fact was never intended to do so. Ugochukwu (1982, p.3) and Mabangunje and Gana (1981, p.45) came to similar conclusion regarding the Bank's projects in Nigeria. In fact, Feder (1976) to drive home this point of view aptly titled his study "The New World Bank Programme for the Self Liquidation of the Third World Peasantry".

From the foregoing criticism, it is easy to conclude that the World Bank needs to change its method of approach for it to be more effective in solving the problems of rural areas. Unfortunately it is doubtful whether the Bank is capable of reforming itself. Yudelman (1976, p.849) voiced this doubt when he observed that the Bank operates under certain constraints which:

> Makes it singularly unsuitable institution to practice what it preaches ... there is a contradiction between what the Bank says should be done and what it can do or does. Moreover the Bank's 'new poverty focus' is highly political, in that it requires and exhorts the mighty to share their power with the powerless. Historically, has this occured without a struggle?

Similar sentiment was expressed by Dahlberg (1979, p.131) when he observed that:

> any shift to programmes that would genuinely benefit the small farmer ... would also tend to undermine the network of social, economic and political sanctions that gave the large farmers and creditors their dominant political position ... (therefore) those development aid programmes that seek to improve the condition of the small peasant farmer, must necessarily address the question of how the existing administrative and political power patterns need to be changed if such programmes are to have any chances of success.

The issue then, is whether the World Bank, being as it is a capitalist world dominated institution, is capable of mustering enough moral courage to persuade internal privileged individuals and groups in Third World countries, to make and support the necessary

changes needed to bring about a real improvement in the living conditions of the poor in rural areas? The answer to this poser will only be known as events unfold themselves.

2.5 Water Resources Exploitation For Increased Agricultural Expansion And Productivity

In a quest for increased agricultural productivity as well as expansion of cultivated areas and use of more intensive technology, informed opinions seem to agree that success will depend on the availability of water. This also implies that the effectiveness of any agricultural development strategy could be greatly enhanced through the exploitation and application of available water resources. The importance of proper water exploitation for enhanced agricultural performance has been emphasized at various levels and forums. For instance, Y.A. Mageed in an opening address to the United Nations Water Conference in Mar del Plata highlighted the role of water in raising agricultural productivity by observing that "at present, about a sixth of the world's cultivated land is currently under irrigation. Yet this same irrigated land produces between 40 and 50% of all agricultural output. It is clear that if future famines are to be avoided, more land has to be placed under irrigation (U.N. 1978, p.2). This increased use of irrigation to raise production and productivity in agriculture is considered to be much more urgent among developing countries that are confronted by perennial food deficit (F.A.O., 1971, p.35).

Irrigation is said to help in agricultural development in various ways - expansion of cultirable land as well as in the introduction of high technology packages like high yielding variety seeds, improved farming practices and fertilisers. It also leads to double or even triple cropping on the same piece of land, thereby increasing yield per hectare and output per man, and in that way helps to ensure sustained economic growth. All the above are the benefits that are expected to accrue to countries that stepped up the development of irrigation (Viachos, 1972, p.8; Brown, 1974, p.48; Lloyd, 1972, p.4, Campbell, 1979, p.39; Frederick, 1975, p.2; Farmer, 1977, p.12). Many developing countries have taken significant steps towards the development of their water resources in anticipation of the boost to their agriculture. China, India, Pakistan, Egypt, Sudan - have all increased, not only the total crop output and cultivated hecterage, but also have managed to diversify the crops they can grow within their borders.

While there is unanimous agreement regarding the important role irrigation can play in the process of agricultural development, there is a considerable difference of opinion on some of its aspects. Such aspects include the most appropriate scale of irrigation projects; the possible implications with particular reference to its negative effects not only on distribution of wealth, access to productive capital, employment etc, but also on the ecosystem. The problems of efficient use of irrigation water as well as unequal development between regions which are

concomitants of irrigation development are among the topics of debate. Opinions from some experts on these issues could be of relevance to authorities in Third World countries.

For instance, on the question of the ideal size of irrigation project, Bordoillet (1968, p.82), while agreeing that both large and small-scale projects contribute to the development of agriculture in their own respective ways, was however of the opinion that small-scale projects have special advantages, particularly when viewed in the context of developing countries. According to him, "they help in the training of the future generations of technicians and peasants so that they will become accustomed to a new type of rural civilisation based on controlling water and managing the environment in which they live". Referring to the relative advantages of large and small projects, Revelle (1970), noted that the former cost much more and have longer gestation periods, while the latter, apart from lower costs have added advantage that the local farmers can build and maintain them on their own. He however, observed that in spite of the advantages of the medium and small-scale projects over the large ones, most countries tend to choose the latter because, according to him, they "have great appeal especially from the political view-point."

The issues of water depeletion and water use efficiency in irrigation projects are also worth noting. Frederick (1975, pp.2-4) studied the degree of water use efficiency of both surface and under-

ground water in the context of the prevailing water-use pattern in the irrigated areas of Guyo Region of Argentina. His findings revealed that water-use efficiency was low. This, he attributed to the unrealistic pricing system which amounted to a subsidy of more than 50% in favour of the rich. The effect was to encourage them to drill more wells and use more water than they actually need to the detriment of the greater number of poor farmers, in addition to the risk of depleting the underground water much faster than it is replenished. He also noted that poor and unco-ordinated management contributed to the inefficient and excessive use of water in the region. In the North Arcot District of Tamil Nadu, India, Bandara (1980, pp.323-39) found evidence of both of "lowering water table conditions, even within a period as short as three years and decreasing yields of natural streams in relation to the rainfall of the area", while in Egypt, Meyer (1980, pp.96-116) in his study of the "New Valley" projects noted a fall in underground water as well as ground water salinisation.

Cantor (1970, p.86) studied the impact of irrigation agriculture on socio-cultural and politico-economic organisations of societies through history. He concluded that irrigation agriculture leads to changes in the socio-economic relations within any society but that these changes "are determined by the character and scope of irrigation" - (that is, size, type, and method of management and control). Some of the changes in the socio-economic relations consequent upon irrigation farming, lead to fall in production and to the

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proletarialisation of the peasantry. Referring to some aspects of these changes that constitute constraints to food production, Crosson (1975, p.20) noted that irrigation institutions, especially in large projects are inefficient and consequently inhibit innovation adoption among farmers. From the foregoing, it will be clear that while irrigation gives a big boost to agricultural development, it has some adverse socio-cultural impacts and also causes environmental degradation. However, in spite of these, most developing countries, including Nigeria, hard-pressed by ever-increasing population growth and socio-political realities have little option but to make maximum use of their water resources in order to increase food production and develop rural areas.

2.6 Irrigation Development - Nigeria's Experience

Official interest in irrigation development in Nigeria can be traced to the mention of "soil conservation and irrigation development for the western divisions of the Northern Province" made in the Ten-Year Development and Welfare Plan for Nigeria (1946, p.96) under agriculture. In the revised Plan (1951, p.18), irrigation, water control and land reclamation schemes for agricultural purposes were proposed for the three regions. However, not much, in a way of practical action was done, beyond the proposals, until after independence, hence the assertion in the First National Plan (1962, p.14) that "irrigation has been little used to increase the output of the land". The same problem was identified by the F.A.O. (1966) in its report on agricultural development in Nigeria. From the

mid 1960s onwards, opinions from scholars, experts and policy-makers seemed to agree on the need to harness the nations water resources for a successful agricultural development of the country (Ayoade, 1975, p.44; Okigbo, 1972, p.36; Francis, 1972, p.189). The drought that ravaged Sahelian and sub-sahelian Africa (including northern parts of Nigeria) in the early 1970s, in addition to concerted call from well-meaning individuals, combined to influence the adoption by Nigeria of irrigation development as a strategy for the development of agriculture. Since the beginning of the 1970s practical steps have been taken to concretise this policy-increased fund has been allocated for irrigation development and many projects - both big and small - have actually been executed in different parts of the country.

It is relevant at this point to state that the use of irrigation in Nigeria did not begin with the large scale irrigation development of just ten to fifteen years ago. Nigerian farmers practised a considerable amount of irrigation farming, particularly in the northern parts of the country where rainfall is short and unreliable. However, it has to be pointed out also that the irrigation practised by the farmers hardly allowed for all year round farming because of the absence of formal structures to impound large amount of water. The main traditional types of irrigation practised include flood water irrigation prevalent in the fadamas, due to seasonal flooding of low-lying lands and the deposition of wet soil enriched with silt, where cane sugar, tobacco and rice are usually grown. Another type is the shadoof

which consists of a counter-balanced dipper used for raising water from a river or shallow well for irrigation purposes. This counter-balanced dipper is either controlled manually or by cattle. Shadoof irrigation is used mainly for the growing of vegetable during the dry season. Canals irrigation, in which flood water is controlled and led through canals to the farms, is also used.

In the southern part of the country, and particularly Anambra State, there is no tradition of irrigation farming as a way of life as exists in the north. Therefore, there is no specific type of irrigation which can be identified with this part of the country. However, in some localities some enterprising farmers (these are usually women) clear and cultivate patches of farmland along streams and rivers during the dry season. The main crops grown in such farms include okro, light-green amarant, solanium, fluted pumpkin and at times pepper. The crops are watered twice daily (in the morning and evening) by manually scooping water with a basin or bucket from a nearby stream/river. Because of the tedious nature of this type of irrigation the farms are rarely more than a few square metres in size. The products from these farms are highly priced coming as they do at a time when vegetables are generally scarce. However, it has not developed beyond its elementary stage owing probably to the fact that they operate far from centres of effective demand such as urban centres. The general non-application of irrigation in the traditional agricultural system in the state can also be attributed to two other factors -

more plentiful and reliable rainfall, and the difficulty to be surmounted in trying to grow the traditional root crops (yam, cocoyam cassava) prevalent in this area through irrigation. Modern irrigation development is therefore introduced to Nigerian farmers with different traditional irrigation backgrounds.

In other parts of the world with a long tradition of modern irrigation, the socio-economic as well as ecological impacts of these schemes have received considerable attention. In Nigeria, however, studies of irrigation impacts seem to emphasize the positive effects such as increase in yield, expansion in cultivated area, employment, opportunity for mechanised farming and use of high technology (Ayoade, 1975, p.44; Salihu, 1981, p.3; Mustafa 1981, pp.5 and 12; Mafara 1980, p.7, Famoriyo 1981, p.12). Some studies are however coming out with the facts that our short experience so far with modern irrigation is not without unpleasant side-effects. Studies by Baba (1975), Wallace (1979, 1980) and Ejiga (1979) r reveal that there are a lot of sociological problems that are coming in the trail of irrigation such as unemployment, landlessness, unequal distribution of and access to wealth, etc. It has also been shown that productivity per unit area has not always measured up to world standards or to projected estimates (Wallace, 1979 p.10; Ayotade, 1981).

Other bad side-effects of irrigation which have been noted include the disruption of life-patterns

of people downstream of an irrigation or dam project, with the attendant socio-psychological stresses as well as adverse environmental effects. For instance, the people of Ngala in Gongola State along the border with the Cameroons have virtually been deprived of their means of livelihood as a result of a dam being built on the Ebeji River by Cameroon (Salihu, 1981); the Bakolori incident where the farmers were reported to have been shot because they rioted as the only way available to them to register their opposition to their disinheritance; and the mounting opposition against the proposed Lokoja Dam (Lawal, 1982, p.12). The works of Igbozurike (1977) and Kiley-Worthington (1980), though not dealing on irrigation agriculture specifically, by pointing out the serious dangers of high technology agriculture from ecological perspective, are of particular relevance in helping to alert Nigeria to the possible consequences of irrigation development.

In spite of the increasing evidence that irrigation agriculture could bring various harmful side-effects both physical and social, some people would like such discernible signs of possible future crisis to be ignored. Because according to them, any sacrifice could be made in order to provide food for the masses; or that such problems of irrigation are not yet present in Nigeria (Anaso, 1981, pp.25 and 47; Duru 1981, p.1). However, the consencus appears to favour the view that while Nigeria can go on to develop her water resources for the benefit of her agricultural development, measures should be taken at the same time to eliminate, or at least reduce the possible side effects. To this end,

the First National Seminar on the Green Revolution (Abalu, 1982, p.4) made far-reaching recommendations that will 'ensure an adequate and appropriate development of irrigation system in the country'. The recommended measures include:

> efforts to maintain a balance between irrigation and drainage in order to avoid salinity; ensure maximum and efficient use of available water through adequate legislation; ensure realistic and meaningful phasing of all irrigation projects; ensure effective co-ordination of various water-use agencies; relate water development to ecological zones since water-shed development is often more useful and more effective than large-scale schemes and; finally, protect the health and welfare of farmers through adequate measures to eliminate and/or reduce the health hazards usually associated with irrigation development.

If the above recommendations are taken seriously by policy-makers, the evil side-effects of the country's policy of irrigation development may be contained.

NOTES

1. Dependency Theory postulates that the underdeveloped condition of the poor nations of the World is due to the core-periphery situation operating on world scale. In this theory, the developed countries of Europe and North America are seen as the core or centre of the world region, while developing countries constitute the periphery from which the former takes raw materials and in return send their manufactured goods at a very disadvantageous terms of trade against the Third World countries. This system perpetuated by the present international economic system makes the developing countries dependent on the developed countries, and to the extent of this dependence is their effort towards development frustrated. Dos Santos (1970, pp.231-6) in his work The Structure Of Dependence distinguished three forms of dependence - colonial, financial - industrial and technological-industrial dependence. The last named is being created by multinational corporations.

2. The doctrine of 'Basic Needs' as an objective of development is relatively new in development literature. The doctrine acvocates the direction of efforts to the satisfaction of those needs that are basic for survival - food, clothing and shelter. Goulet referred to them as Needs of the First Order (or Necessity). The need for a new concept of development results from a mounting doubt as to the wisdom of having as a goal of development what Alvin Toffler in his book Future Shock referred to, as the 'throw-away culture' of the affluent western societies, in the fact of all too glaring deprivations,

meagre resources and 'exploding' population pressure characteristic of most, if not all the developing countries.

3. It is pertinent to point out that there are a good number of people in the rural areas whose main income does not come from agriculture. They are engaged in local craft industries and professions such as weaving, blacksmithing, medicine-making etc. However, most of this class of rural dwellers engage in crop-growing on part-time basis.

4. The protagonists of agricultural development option as a basis for the development of the rural areas, base their argument on the supposed 'spread-effect' mechanism to stimulate other rural sectors of the economy particularly the craft and industrial sectors, through increased income and demand from agriculture. However, the fact that this spread effect has been minimal on other rural sectors has given rise to a call for an alternative option that will involve simultaneous action on all sectors of the rural economy - the basis of this alternative strategy is the interdependence of various sectors of the rural economy for stimulation.

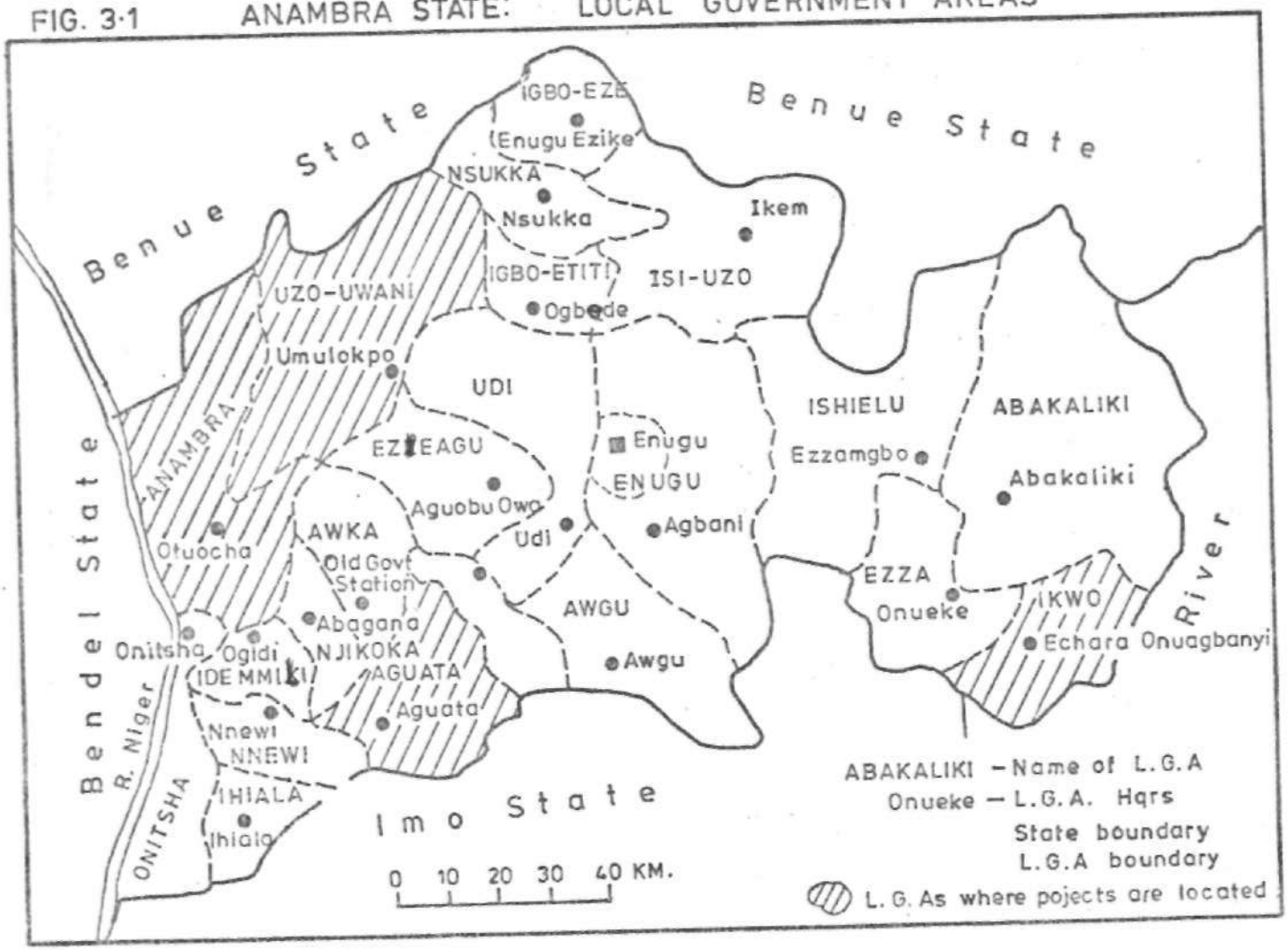
CHAPTER III

ENVIRONMENTAL SETTING OF THE STUDY AREA

3.1 Introduction

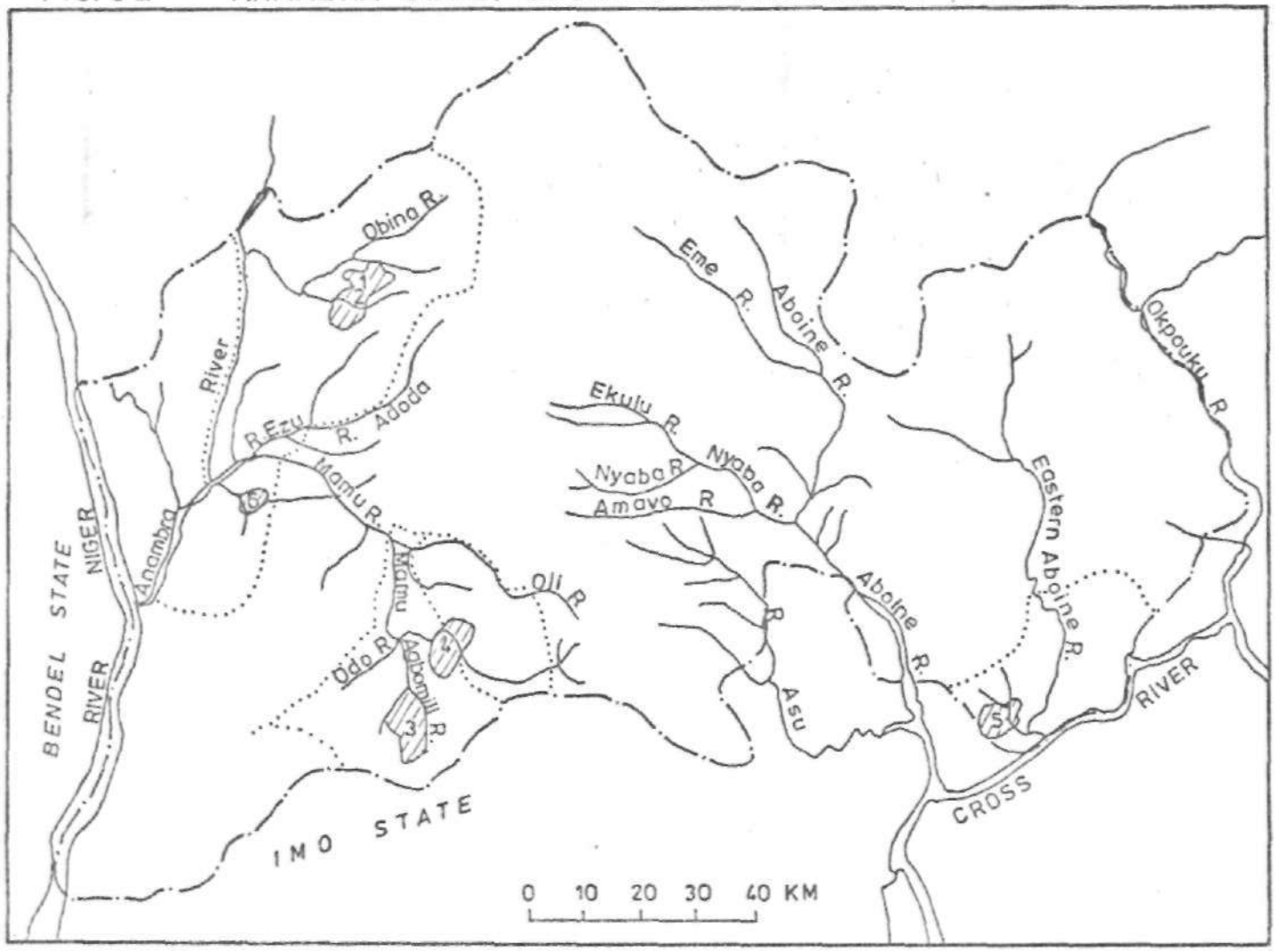
Politically, the study area evolved from the former Eastern Region of Nigeria, first as East Central State in 1967 and later as Anambra State in 1976 (Fig. 1.1). The State has a total land area of approximately 17,000 square kilometres and an estimated population of 5,126,705 people in 1976 (Anambra State, 1977, p.1). The State is divided into 23 administrative or local government areas[1] (Fig.3.1). The projects under study are located in four local government areas - Aguata, Anambra, Ikwo and Uzo-Uwani (Fig.3.1). Aguata and Uzo-Uwani Local Government Areas have two projects each, while the remaining two projects are located in Anambra and Ikwo. Within these local government areas the projects are sited in the following towns and/or villages - Adani in Uzo-Uwani (the two projects in the local government area are sited in the town); Ogboji and Enuguabo-Ufuma in Aguata; Ikem-Nando in Anambra and Item-Ikwo in Ikwo[2]. Geographically, these towns/villages can be located by the following lines of longitude and latitude Adani ($7^{\circ}13'E$, $6^{\circ}45'N$); Ogboji ($7^{\circ}11'E$, $6^{\circ}03'N$); Enuguabo-Ufuma ($7^{\circ}13'E$, $6^{\circ}05'N$); Ikem-Nando ($7^{\circ}00'E$, $6^{\circ}17'N$) and Item-Ikwo ($8^{\circ}05'E$, $6^{\circ}02'N$)(Fig.3.2). The rest of the chapter will be devoted to a general survey of the physical, climatic, vegetational and socio-cultural aspects of the state with emphasis on the local government areas where the projects are located.

FIG. 3·1 ANAMBRA STATE: LOCAL GOVERNMENT AREAS



74(a)

FIG. 3-2 ANAMBRA STATE: SHOWING LOCATIONS OF PROJECTS



KEY

PROJECTS

UZO-UWANI L.G.A.

(1) Adrice at Adana

(2) World Bank Uzo-Uwani

AGUATA L.G.A.

(3) World Bank Ogboji

(4) World Bank Ufuma

IKWO L.G.A

(5) World Bank Item

ANAMBRA L.G.A.

(1) World Bank Ikem

..... L.G.A. Boundary

74(b)

3.2 Geology

Geology, topography and soils are very closely related, and within any given setting, they in a complex way greatly determine the pattern of agricultural system that emerges. This complex relationship has its genesis from geological formations which in turn determine topography and soil types.

Fig. 3.3 shows the geology, in outcrop, over the eastern states as an inset and the geological formations that are represented in Anambra State. Geological formations in the State can be grouped into three sections. The first section consists of alluvium deposits along the River Niger, Coastal Plain sands, Bende-Ameki and Imo Clay shales of both quaternary and tertiary age. The alluvium is a zone of sandy deposits flanking the River Niger for about 16 kilometres wide, while Bende-Ameki group is made up of fine to coarse sandstones intercalated with shales, clays, grits and in some parts, beds of lignite. More resistant sandstones and grits form ridges and low plateaus while shales and clays form valleys and depressions. These ridges and plateaus generally lack surface water because of the permeable nature of the sub-strata. Imo clay-shale is the oldest formation immediately overlying the rocks of cretaceous period and itself overlain by the Bende-Ameki group. It is characterised by impervious clay shales with occasional bands of clay and sandstone. The clay-shales carry surface drainage with broad and poorly drained valleys (Floyd, 1969, pp.68-75; Orajaka, 1975, p.5).

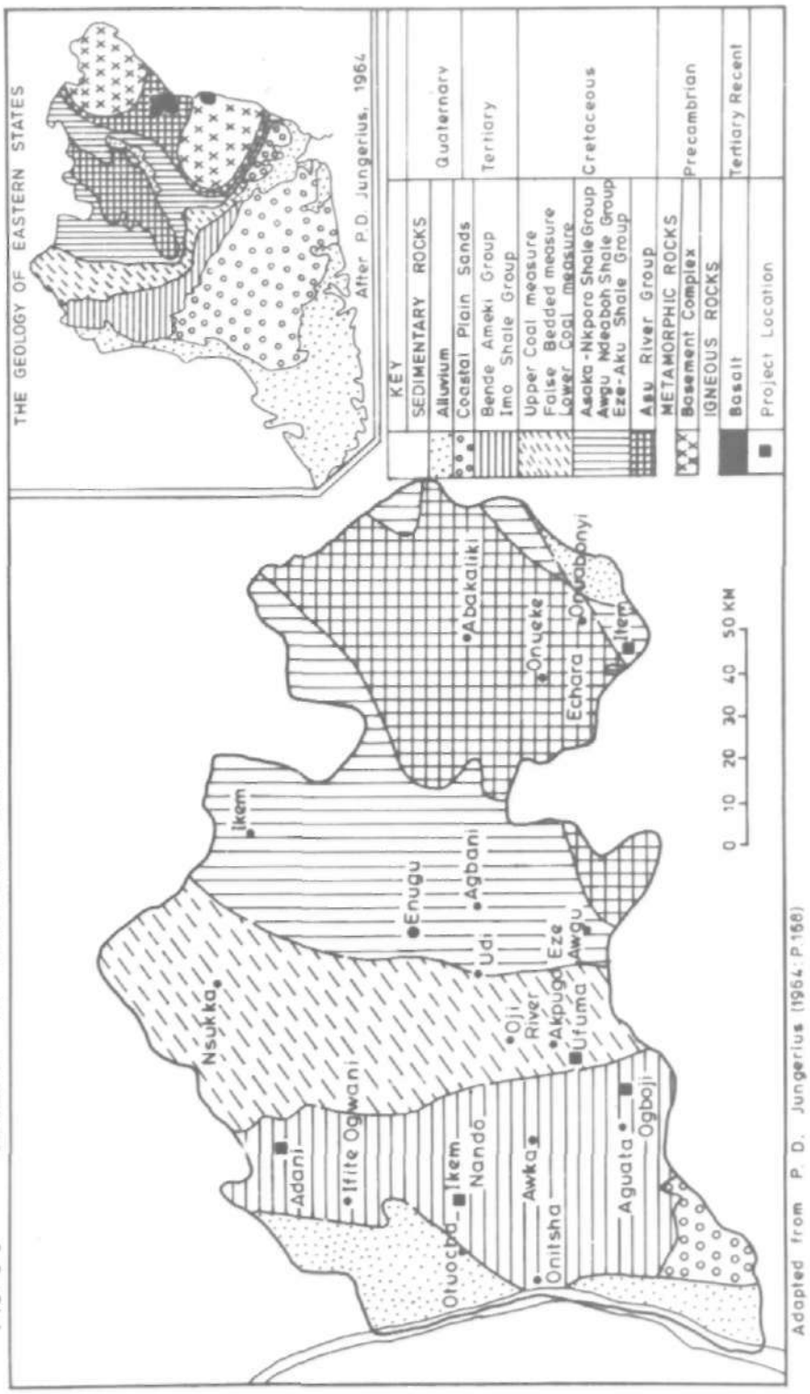


FIG. 3·3 GEOLOGY OF ANAMBRA STATE

Adapted from P. D. Jungerius (1964: P.158)

The second section in the central part of the State and designated by Floyd (p.75) as Plateau and Escarpment group, consists of various sedimentary formations of Upper Cretaceous period and are of varying resistance and permeability. The oldest formation in this group, the Lower Coal Measures, outcrops mainly on the eastern part of the section and consists of different horizons of siltstones, sandstones, coal and even shales. This formation makes up the lower slopes of the scarp face of the escarpment. On top of the Lower Coal Measures, lies the false-bedded sandstone comprising coarse-grained white and friable sandstone, interbedded occasionally with thin bands of shales and grey clays. It outcrops mainly in the central part of this section where it has given rise to a plateau that runs from Nsukka southwards to Udi, and Awgu. The Upper Coal Measures, as the youngest of this group, lies on top of the false-bedded sandstone. It outcrops mainly on the western side of the unit and consists mostly of coarse quartz sand, white, pink or yellowish in colour with some clay, coal and shales. Ironstones or layers of laterite, highly resistant to weathering or erosion, are formed by groundwater that seep through clay bands or shale partings in the sandstone. These iron stones acting as capping stone have given rise to mesas, buttes, conical and round topped hills which are familiar sights in Nsukka and Udi areas (Ofomata, 1967, pp.3-7; Floyd, 1964 pp.94-6).

The eastern section is made up of old sedimentary rocks of lower cretaceous period. They are argillaceous in origin and of various formations. Asu River

Group is the most widespread in this section and also the oldest rock formation found in the state. Rocks of this section consists mainly of series of shales interbedded with sandstone and limestone of varying thickness. But for a slight folding, the rock formations here have been relatively undisturbed hence, the occurence of an extensive plain known as the Cross River Plain, which is interrupted only by minor undulating hills (Grove 1951, pp.5-6; Jungerius, 1964, pp.187-94; Buchanan and Pugh, 1966, pp.2-9).

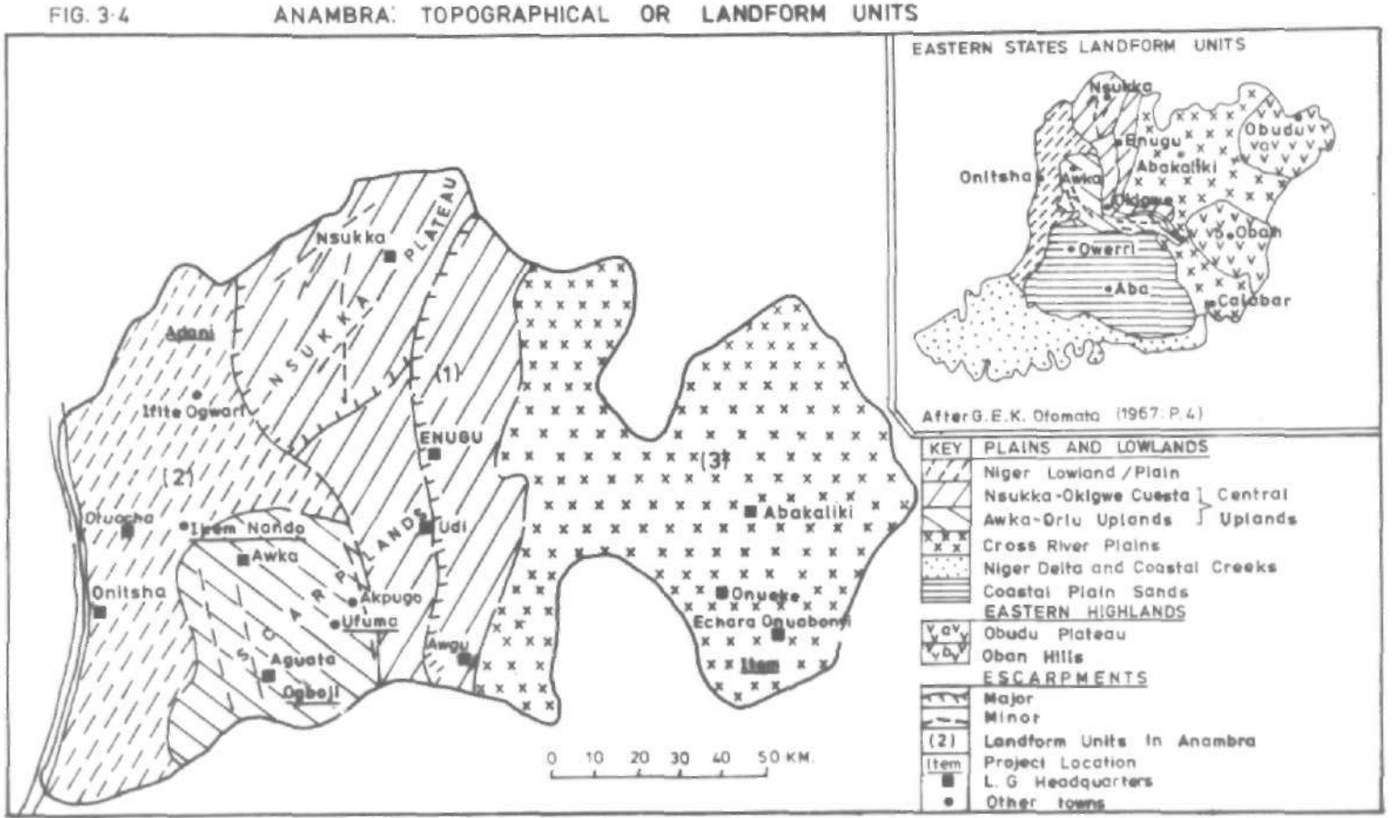
3.3 Landform or Topographical Units

Three landforms or topographical units corresponding roughly to the state's geology discussed above are identifiable - the Niger-Anambra Plain; the Plateaux and Uplands in the centre and the Plains of the Cross River Basin. The Niger-Anambra Plain is about 32 kilometres wide and runs almost parallel with the River Niger. However, where the Bende-Ameki sandstone juts into the Niger valley, the plain tapers only to a very narrow width. Included in this unit are the flood plains of Mamu, Aghomili and Azu rivers, which though rising from the scarp slopes of Bende-Ameki sandstones (Nanka sands) flowed through and cut down their valleys to the impervious Imo Clay-shales to form features almost similar to that of the Niger-Anambra flood plain. This unit covers an area of roughly 4,143 square kilometres or about one-quarter of the State's land surface. Aguata, Anambra and Uzo-Uwani local government areas fall either wholly or partly within this topographical unit. Five of the six projects under study are located in these local government areas and within the flood plain topography (Fig. 3.4).

The flood plain unit is characterised by gently undulating topography rarely exceeding 120 metres high. It is drained by Anambra river and its tributaries, principal among which are Adada, Ezu, Do, Mamu, Aghomili, and Oji. Extensive areas of the plain are inundated annually, owing to the low-lying nature of the relief-resulting in swamps, meandering channels abandoned courses and ox-bow lakes. These features restrict the scope of crops to be grown, and makes farming in them very risky as flood can sweep away a farmer's year's effort in less than a few minutes. Another feature of the flood plains is the sparsity of population because settlement is possible only on higher grounds provided by natural sand levees, low strike ridges of intraformational sandstones and small ridges of terrace gravels. Because of the features just discussed the flood plain provides "a good environment for specialised agricultural practices" (Wigwe, 1975, p.10) such as those involved in the project locations. (Floyd, pp.86, 95).

The Plateau and Upland topographical unit includes the coal measures, Bende-Ameki as well as Imo Clay-Shales geological formations. Considerable attention from scholars has been devoted to this relief unit who have variously named it 'Nsukka Plateau', 'Scarplands', 'Southeast Downlands', 'Awka-Orlu Uplands' (Ofomata, 1967, p.1;' Udo, 1970, p.77; Buchanan and Pugh 1966, p.13; Iloeje 1980, p.158). The interest arises from the fact that it is the only highland in the state as well as the major water divide for the rivers that drain into the lowlands to its western and eastern sides. This physical unit

FIG. 3·4 ANAMBRA: TOPOGRAPHICAL OR LANDFORM UNITS



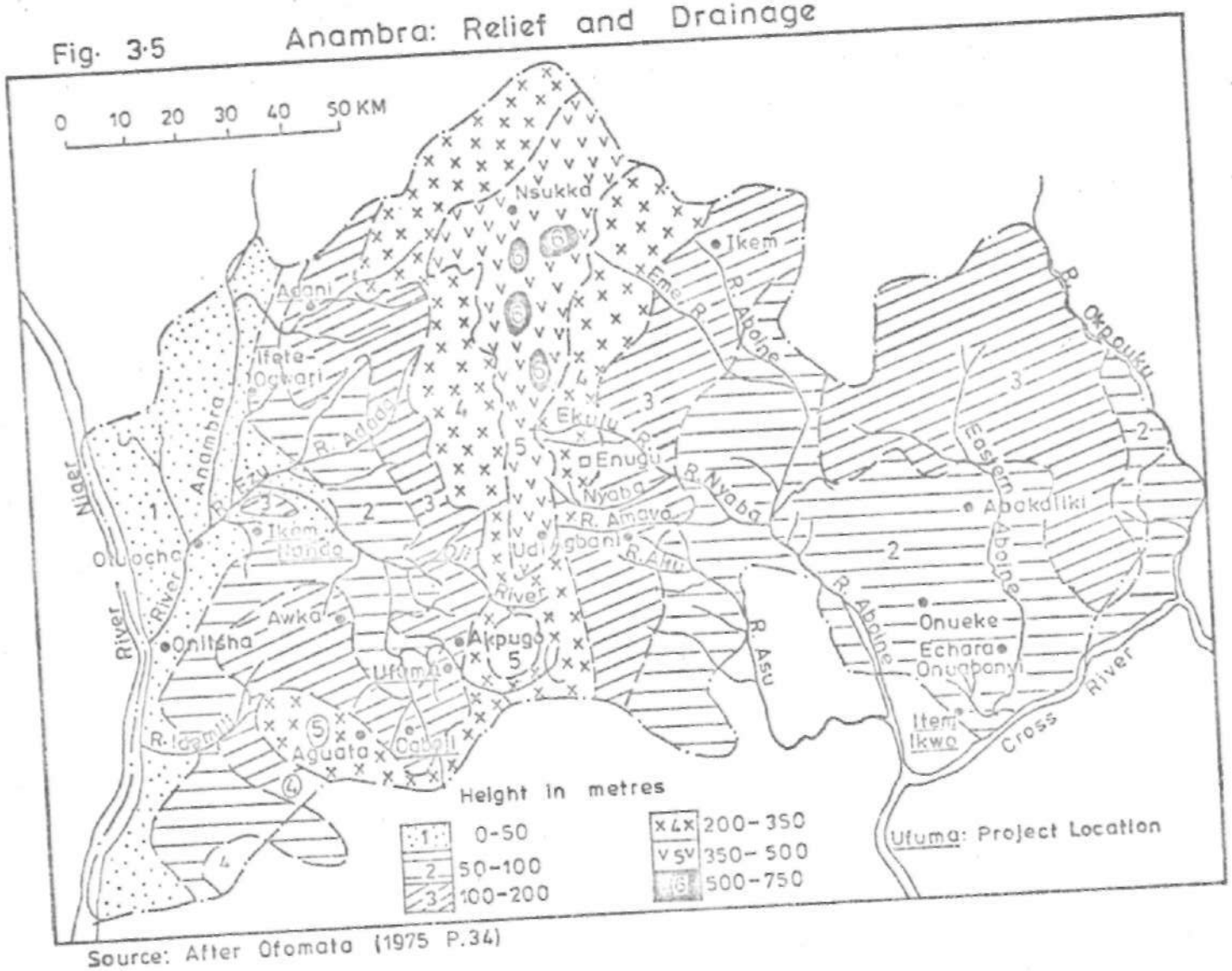
Source: Adapted from G. E. K. Ofomata (1967 P. 4)

forms a plateau in the northern section from Nsukka to Udi with a general level of over 300 metre above sea level, with a general residual hills reaching up to 180 metres from the plateau surface. The plateau decreases in height as well as in breadth to Awgu and thence to Okigwe in Imo State. South and west of the northern plateau is the Awka Uplands formed on the Bende-Ameki sandstones and which runs southwards to Orlu in Imo State.

Generally, the plateau/upland physiographic unit has no surface drainage, though several streams, with wide and deep gullies, especially on the scarp faces of both major and minor escarpments, issue out from the underlying impermeable coal, shale and clay measures. These streams form the headwaters of the rivers that drain the State both east and westwards. The topographical unit covers about 5,744 square kilometres or a little under two fifths of the land surface of the state. The area is densely populated because of its well-drained nature (Fig. 3.5), also (Fig. 3.4).

The Cross River Plain starts right from the foot of the scarp of the plateau and upland region along roughly longitude 7°30'E, which can be taken as the boundary between the two. The plain stretches eastwards into Cross River State and southwards into Imo State. Within Anambra State, the Plain covers about 7,203 square kilometres, which is a little over two fifths of its land area. It is drained by Aboine River and its tributaries which eventually drain into the Cross River (Fig. 3.5). Topographically, the Plain consists essentially of an undulating terrain, the

Fig. 3·5 Anambra: Relief and Drainage



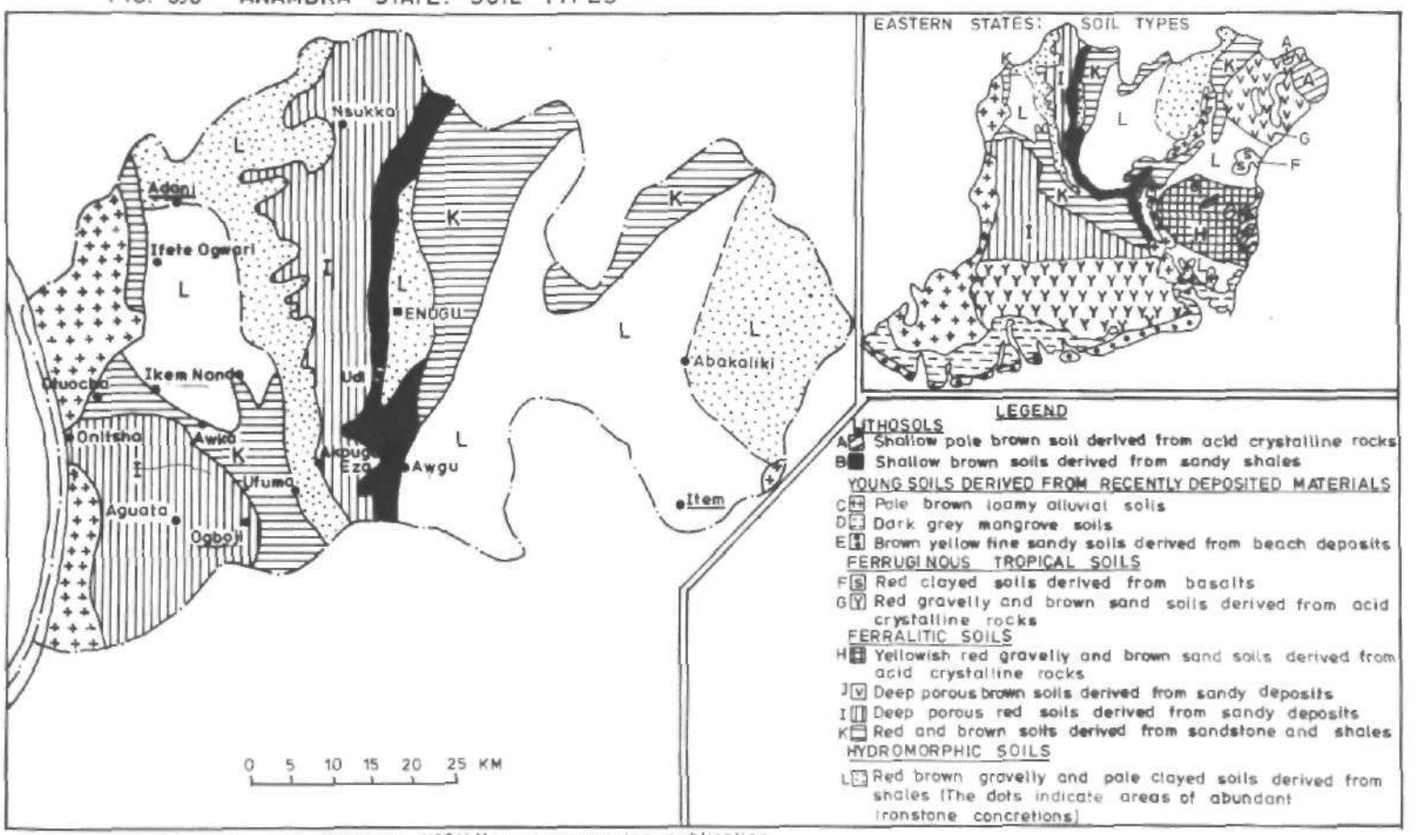
Source: After Ofomata (1975 P.34)

greater part of which lies between 60 and 100 metres above sea level. The general land slope is from the west to the east and south. The impervious underlying shale and limestone of the Plain, coupled with the lowlying nature of the terrain combine to produce impeded drainage characteristic of the area especially during the rainy season. During the dry season, however, the streams, particularly those rising from within the Plain, dry up and the top soil is left baked and cracked. The poor drainage of the plain has produced peculiar agricultural system characterised by big and high mounds for yams with rice grown in-between. Item, in Ikwo Local Government Area, the site of one of the projects, is within this physiographic region. It is 45 kilometres south of Abakaliki, the most important town within the area and about 70 kilometres south-east of Enugu, along a straight line (Figs. 3.4 and 3.5).

3.4 Soils

Jungerius (1964, p.189) grouped the soils of the eastern states into five classes (Fig. 3.6) with several sub-units. Only some sub-units of four of these classes are represented in Anambra. One sub-unit within the Young Soils class is identified in the State in the Niger-Anambra flood Plain. It is known as Freshwater Swamp or Alluvial soil. It is a pale brown loamy soil derived from recent alluvium deposited on the swamps. The soils are immature with poorly developed horizons because of yearly fresh detrital materials. Sample profiles of alluvial soils are shown in Fig.3.7(a). The texture of this soil unit ranges from sand to clay

FIG. 3:6 ANAMBRA STATE: SOIL TYPES



Source: Adapted from P. D. Jungerius (1964) Map accompanying publication

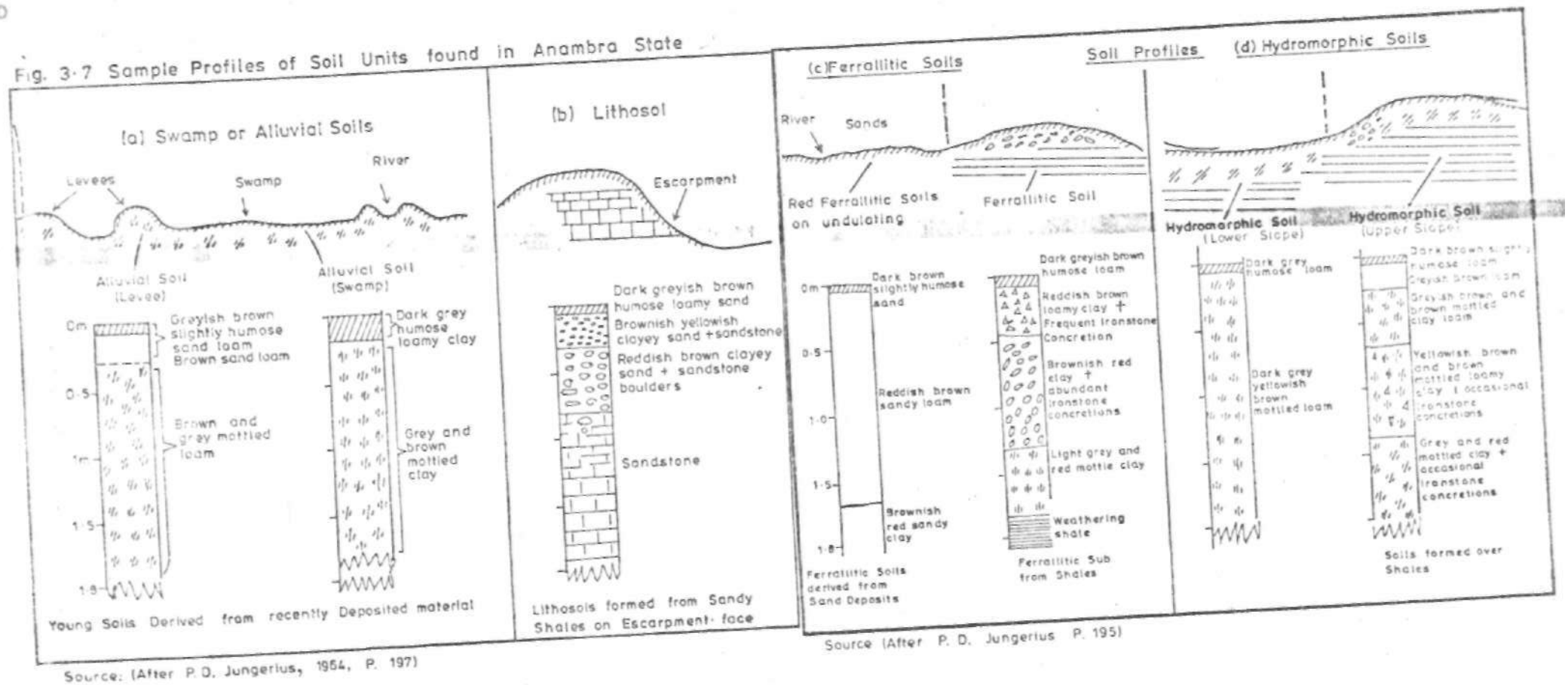
80(a)

but they are predominantly loamy. These soils are also present, but on a small scale, along the flood plains of Ezu, Mamu, Aghomili rivers. Refering to the agricultural potentials of these soils, Floyd (1969, p.103), said "... raphia swamp soils are potentially useful for the cultivation of wet rice and other crops but ... most of them remain in native swamp vegetation. Drainage control is the principal hurdle retarding their exploitation". Jungerius (p.190) and Ofomata (1975, p.41) also had similar observation to make with regards to agricultural possibilities of these soils. It is therefore no mere coincidence that the projects at Adani, Ogboji, Ufuma and Ikem fall within parts of these swamp soils.

Sub-units of the Lithosol and Ferrallitic soil classes (groups) are found in Anambra State - all within the Plateau and Upland landform unit. The Lithosol sub-unit soil is the shallow, brown and skeletal soil found mainly on the steep escarpment slopes of the plateau or upland. They are derived from the resistant sandy shales and siltstones. They contain abundant rock fragments and just very close to the surface lies unweathered rock - hence these soils are often left uncultivated, unless with an extra effort as in Maku terrace farming (Floyd, 1964, pp.94-97)(Figs. 3.6 and 3.7(b).

Ferrallitic soils represented in the State are derived from coarse-grained sandstone or shales intercalated with clay. They are formed as a result of deep weathering which produce thick mantle of weathered materials. They are characterised by high permeability,

Fig. 3·7 Sample Profiles of Soil Units found in Anambra State



Source: (After P. D. Jungerius, 1964, P. 197)

Source (After P. D. Jungerius P. 195)

absence of surface drainage, low mineral content, leaching, little and no humus and low fertility. The main difference between the two sub-units of ferrallitic soil in the State is colour. For instance, on the plateau of Nsukka and Udi areas, the ferrallitic soil derived from sandstones, are red to brownish red in colour. They consist of coarse sandy clays with loose, reddish brown, coarse sandy loamy upper layers and slight humus in the top soil. On the undulating to rolling relief, on the other hand, characteristic of the southern parts of the plateau and Awka Uplands, the ferrallitic soils derive from shales and sandstones and are characterised by red and brown colour derived from the latter. Ferrallitic soils are easy to work and in addition to high population, they constitute the most worked soils in the state with the attendant twin evils of soil exhaustion and soil erosion (Figs 3.6 and 3.7(c).

Within the Cross River Plain and north-eastern parts of Anambra River plain, hydromorphic soils occur. Hydromorphic sub-unit which consists of reddish brown gravelly and pale clayey soils generally, are formed as a result of the undulating to nearly level terrain as well as seasonal water-logging caused by the underlying impervious shales of the area. In the elevated uplands and gently sloping areas which are better drained reddish brown gravelly soils with some ferrallitic characteristics occur. In the depressions, eroded materials are deposited to form swamp soils which generally consist of loamy sand or loamy clay, grey and brown mottled. In general, hydromorphic soils of these

basins are characterised by the following:

> soil depth is about one metre, medium to fine in texture, fairly uniform in mineral constituents (30-40% clay content, 10% silt and 50-60% sand), permeability is low to medium, massive granular in structure, medium to high in water holding capacity which is about 30 to 40% by volume in general, and slightly sticky and plastic in consistency. Their natural fertility is low to moderate as the shales contain only limited amounts of weatherable minerals. They are also rather poor in humus content less than 2% at the most, low to very low in cation exchange capacity - about 10 to 30 mili-equivalents per 100 grammes of soil, about 20 to 40% moderate to fairly strong acidity which is about 5 to 5.5 pH value (Nzewi, 1979, p.11)

The soils are good for such crops as yam, maize, cassava and rice - with the last named crop doing well in the swamp hydromorphic soils formed in the depressions. World Bank (1974, p.6), Nippon Koei Co. Ltd (1978, p.6) (Figs 3.6 and 3.7(d).

3.5 Climate

Anambra climate is a transitional one between the constantly humid coastal region further south and the drier north. The prevailing climate in the State is characterised by high rainfall of over 150cm in a year with rain falling in virtually all the months of the year, high temperature and a relatively moderate to high humidity. However, there are some very slight variations between the northern and southern parts of the State. The climate is influenced by the seasonal shifting of the pressure belts and the associated wind system (the dry continental north-east and the south-west maritime). The dominance of either of these two

winds determines the prevailing season- hence the state has two distinct seasons - rainy season when the south-west moist wind is dominant and dry season when the dry continental north-east winds prevail. The rainy season lasts about 7 months from April to October while the dry season lasts from November to March though this varies.

All the project locations are south of latitude 9° N and therefore fall within the areas of Nigeria categorised by Ilesanmi as medium to high rainfall with mean annual rainfall ranging between 150 to 300cm (Ilesanmi, 1972, p.26). Total annual rainfall in some of the project locations or stations near them are Adani 166cm, Ifite-Ogwari 140cm, Echara Onuabonyi (about 20 kilometres to Item) 171cm and Onitsha close to locations at Ufuma, Ogboji and Ikem has a total of 173cm (Figs.3.8 and 3.9(b), Table 3.1). The rainfall figures for the stations fall within the rainfall range of 120cm to 160cm required by rice to do well. It is however relevant to stress that even in the rainy season, the distribution of rainfall is not always even and reliable hence supplemental irrigation is essential for crop cultivation.

Over the study area, temperature is uniformly high throughout the year with the mean monthly temperature ranging between 23°C to 30°C. Annual mean temperature rarely exceeds 30°C. Generally speaking, the temperature is cooler between June and November, but more particularly between July and September due to increased cloudiness (Figs. 3.8 and 3.9(a).

Table 3.1

Climatic Data of Selected Locations At Or Near The Projects

	Jan.	Feb.	March	April	May	Jun.	Jul.	Aug.	Sept.	Oct	Nov.	Dec.	Total or Mean
Adani (a)													
Rainfall cm.	1.4	1.7	6.5	14.0	18.6	24.7	27.5	19.7	29.2	17.8	3.2	1.7	166.0
Temp. °C	26.8	28.0	29.0	28.3	27.6	28.4	27.5	27.C	26.2	26.9	27.1	27.0	27.5
Humidity %	58	73	76	77	84	85	86	83	85	80	77	66	77
Ifite-Ogwari(a)													
Rainfall cm.	0.8	1.0	7.0	13.2	17.9	21.3	16.1	21.6	22.2	14.9	2.3	1.4	139.7
Temp. °C	27.0	29.0	29.0	28.0	27.0	27.0	26.0	26.C	26.0	26.0	28.0	27.0	27.0
Humidity %	60	74	77	77	83	84	86	85	84	83	79	71	79
Echara Onuabonyi(b)(3)													
Rainfail cm	0.0	0.9	3.4	14.0	19.0	25.0	23.4	22.3	41.0	18.3	30.0	0.0	171.0
Temp. °C	24.7	26.9	27.8	26.4	25.3	24.4	23.3	23.3	23.1	24.2	25.0	23.6	24.8
Humidity %	← N . A →												

	Jan.	Feb.	March	April	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total or Mean
Onitsha(c)													
Rainfall cm.	1.3	4.3	5.9	13.6	23.9	22.6	26.8	21.2	25.8	21.6	4.4	1.8	173.2
Temp. °C	28.6	29.2	29.2	29.1	27.5	26.6	26.7	25.7	26.7	26.9	26.0	26.5	27.4
Humidity %	63	75	79	80	84	86	89	87	84	84	80	72	80.3

Sources (a) From World Bank Rice Project Office at Adani

(b) From the former 'NORCAP' Office at Echara Onuabonyi.

(c) From Onitsha Meteorological Office.

N.A. - Not available.

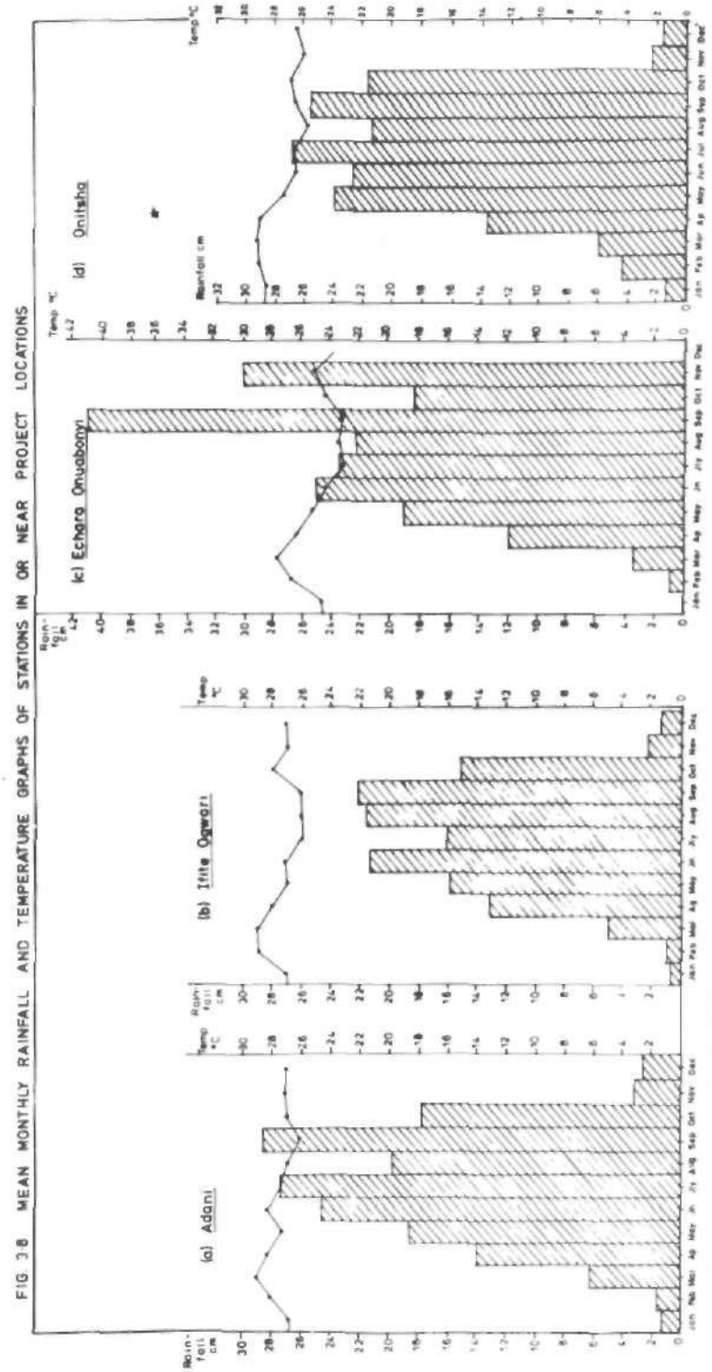


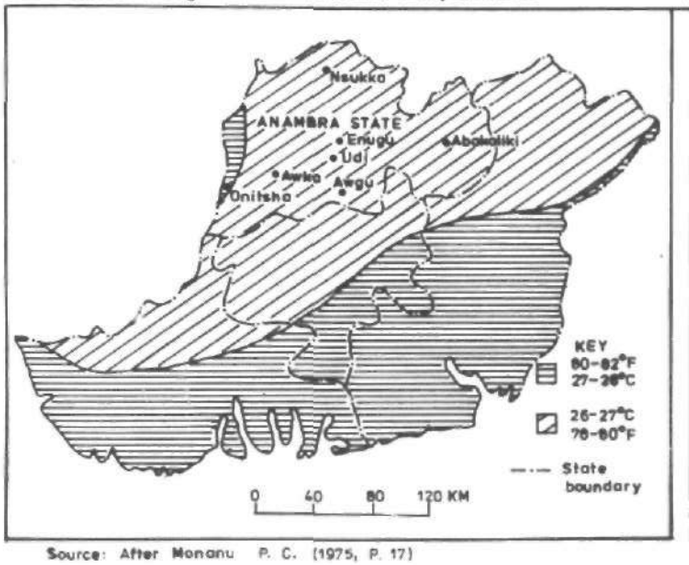
FIG 3.8 MEAN MONTHLY RAINFALL AND TEMPERATURE GRAPHS OF STATIONS IN OR NEAR PROJECT LOCATIONS

Source Based on data of Table 3.1

FIG. 3·9

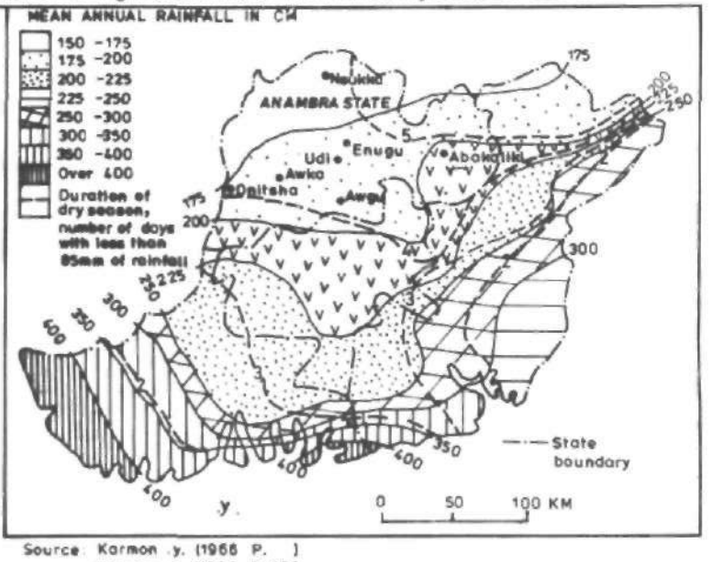
EASTERN STATES:

(a) Showing Mean Annual Temperature



Source: After Monanu P. C. (1975, P. 17)

(b) Showing Mean Annual Rainfall & Dry Season Duration



Source: Karmon .y. (1966 P.)
Karmon .y. (1966 P. 20)

86(b)

Relative humidity in the area is generally high though it varies as between seasons being higher during the rainy season. It ranges from 60 to 85% throughout the State (Table 3.1).

3.6 Vegetation

Three major vegetation types were recognised by Keay in Nigeria (1949) - the swamp forests of the coastal areas, the high or rain forests of the more rainy zones north of the swamp forests, and then the savanna vegetation that covers over two thirds of Nigeria. The diminution of vegetation northwards reflects the general decrease of rainfall from the south to the north of the country.

The study areas fall within the climax vegetation of the rain forest zone. However, the original forests are simply not there owing to combination of circumstances - long interference by man, increasing population, porous and thin soils prevalent in most of the area. All these factors have combined to produce the present vegetation referred to as Wooded Grassland (Floyd, 1969, p.161) or Rainforest-Savanna Ecotone by Igbozurike (1975, p.30). Variations in vegetation do occur. For instance, in the poorer more porous and thin soils prevalent in the plateau areas of Udi, Nsukka, and Awgu as well as in the hydromorphic soils of Abakaliki areas, the vegetation is dominated by grass after the original forests had been cleared. The density and height of grasses as well as species differ as between the areas. On the Nsukka-Udi plateau, the grass is much more open and dominated by Andropogon

and Imperata (Spear grass) while in the hydromorphic soils of Abakaliki and parts of Uzo-Uwani, the grasses become denser and taller with elephant grass (pennisetum purpurem) and other related species dominating.

In the more humid areas to the south of Awka, Onitsha and Awgu areas as well as the river flood plains clumps of forests can be seen in certain locations. Freshwater swamp forests with certain species of trees like raphia spp. dominating occur along flood plains of rivers. In the State however, only certain trees dominate the vegetation either because they are resistant to the many constant fires employed by the people for bush-clearing or because of their usefulness to man which ensured their survival through the process of selective destruction of the vegetation. Such is the oil palm (Elaeis guineensis) which has become the dominant plant in the ferrallitic soils of the southern scarplands, Anambra lowlands and the valleys of Udi and Nsukka areas. Because of the dominance of the oil palm within this part of the State, the resultant vegetation is often referred to as the 'Oil Palm Bush'.

Generally speaking however, there is no distinct boundary between the grass and forest dominated areas as the two types can be seen usually existing in close association - hence the term 'Forest-Savanna Mosaic' is often used to refer to the resultant vegetation.

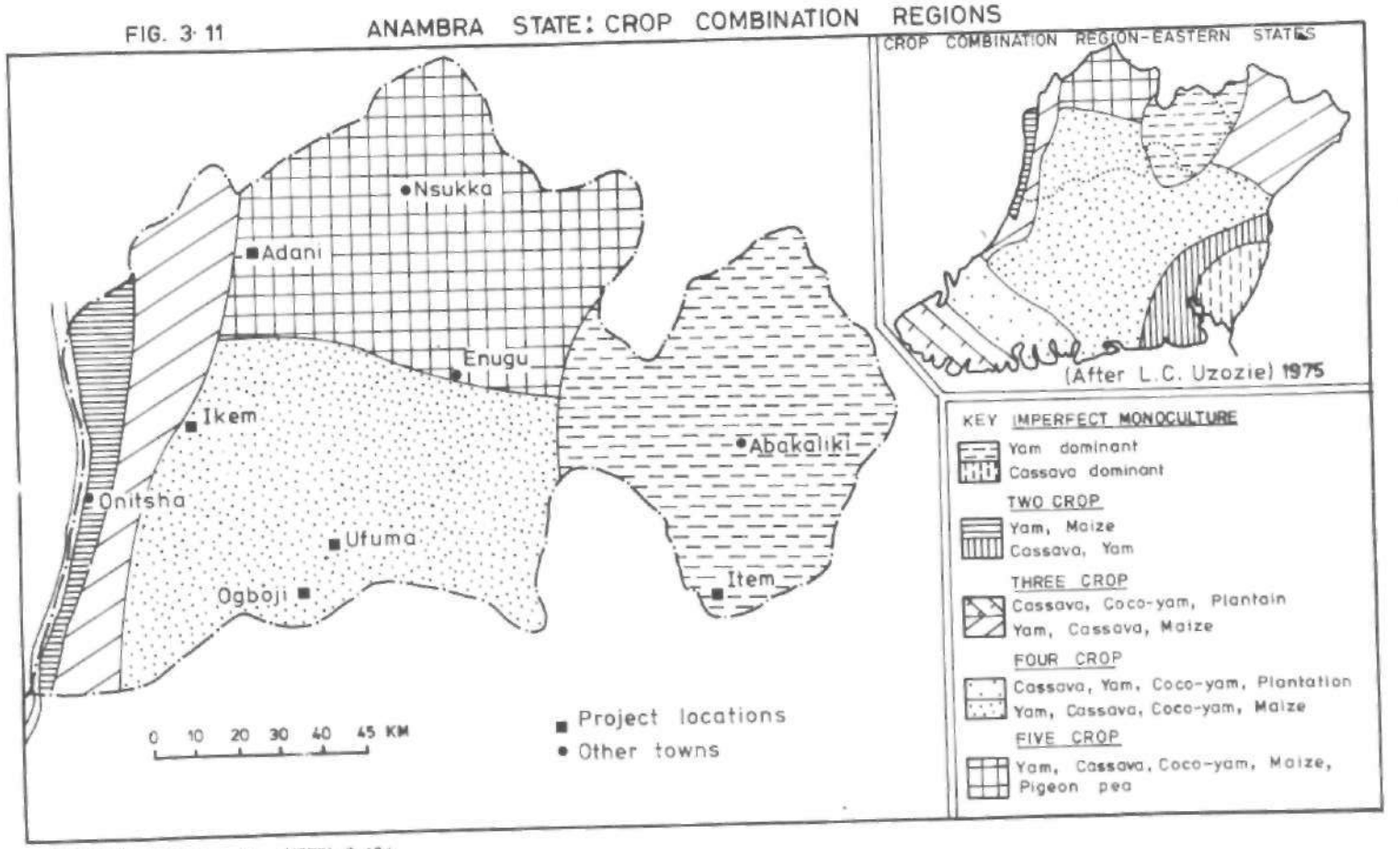
3.7 Socio-cultural Background

This section surveys the population, land and agricultural practices in the study areas within the context of the relationship existing between them.

Anambra is one of the most densely populated parts of Nigeria. With an area of 17,090 kilometres and an estimated population, in 1976 of 5,126,705, the State has a population density of about 300 persons per square kilometre[4]. Densities however, vary from over 600 in some local government areas to under 200 in others. However, using 249 and 499 persons per square kilometre as upper limits of low and medium density parts of the State, three patterns of population density can be distinguished (Fig. 3.10).

It is interesting to observe that but for a break by the sparsely populated local government areas of Ezeagu, Udi and Oji, all the medium to high density areas are in the plateau—upland physiographic region with the red and red-brownish, porous, leached, acid and generally infertile ferrallitic soils. The only exceptions to this observation are Enugu and Ezza local government areas which are within the hydromorphic soils of the Cross River Plain. On the other hand, low population density characterises the Cross River Plain and the Flood Plain areas, especially in the north of Anambra river plain as well as in Aghomili, Mamu and Ezu flood plains that carry medium population density. The cause of the generally low population density in these areas has been pointed out in section 3.3 above. It is significant to note that four of the project areas are located in the low population density parts of the State - Adani (Uzo-Uwani), Ikem (Anambra), Item (Ikwo), while Ufuma and Ogboji (Aguata), though falling within the medium density areas, also carry low population (Figs. 3.5 and 3.10).

FIG. 3·11 ANAMBRA STATE: CROP COMBINATION REGIONS



SOURCE: Uzozie L.C. (1975), P.104.

The most immediate implication of the population density pattern discussed above relates to man-land ratio, settlement, farming practices and land-tenure. The man-land ratio is definitely higher in medium and high density parts of the State than in the low density areas. In the former, more people are supported by a given unit of arable land, as opposed to fewer people in the latter, and this in turn increases pressure on land in the form of more intensive use and also on the pattern of settlement. For instance, partly because of increasing population a dispersed settlement pattern has replaced the once nucleated settlement characteristic of the plateau-upland region of Udi, Onitsha and Nsukka areas. This pattern of settlement results from a process of infilling of empty spaces between compounds and communities thus giving rise to the merging of neighbouring villages or towns and the consequent continuous settlement over large expanses of land characteristic of these parts of the State. Here, individual houses are set within its compounds that rarely amounts to more than some tens of square metres and bounded by other similar compounds which may or may not be walled.

In the Cross River Plain, a rather more extreme form of dispersed form of settlement is obtained. Udo (1970, p.93) referring to this pattern of settlement in this part of the State observed that "in Ezzikwo (that is, the present Izza and Ikwo local government areas) area of Abakaliki there is an extreme case of dispersal of habitation, such that compounds are scattered about, the landscape at intervals of 0·2 to 0·4 of a kilometre. Each compound is thus surrounded by

a 'fence' which Iloeje (1981, p.160) considered 'a necessary addition as it provides some privacy in the wide open plains'. The reason for this form of highly dispersed settlement is not necessarily due to scarcity of land as in the Plateau-Upland areas but rather to a desire to acquire as much land as possible for the type of farming prevalent in the area. Item falls within this zone of settlement pattern.

In the flood plains of Anambra river and its tributaries as well as within some depressions in the Cross River basin, where apart from swamps, there is constant danger of flooding, settlement pattern is generally nucleated in form. Areas of this type of settlement include parts of Anambra, Onitsha, Uzo-Uwani Awka, Ezeagu, Oji-River, Nkanu, Ishielu local government areas. Nucleated settlement in these areas results from the fact that the people take advantages offered by minor prominences and interfluves which are generally well-drained, cultivable, relatively free from mosquito and tse-tse-fly and also safely distant from the river course. Outside the built-up sections of these settlements the people own land both in the dry land areas as well as the swamps for agriculture and other uses. Projects located at Adani, Ogboji, Ufuma and Ekem are all within parts of the State dominated by nucleated pattern of settlement.

Anambra rural population are farmers who grow root crops like yam, cassava and cocoyam as their major farm crops while maize and various types of vegetables as minor ones. There are of course wide differences as between different parts of the State with regards to

to emphasis put on certain crops, or on farming as a full-time and rewarding occupation as well as on actual and potential yields of given crops. These differences in turn, depend not only on soil type and its fertility but also, and to a large extent, on the availability of land. It is also pertinent to observe that in spite of general similarity in farming practices and calendar among farmers in the State, differences attributable to soil types, water and availability of land also do exist.

For instance, agriculture is more difficult and less rewarding, for obvious reasons, in the ferrallitic soils of the plateau and upland areas of the State characterised by high population density, poor soils and high man-land ratio. Here, owing to land scarcity fallow period is virtually non-existent and because of poor soil fertility, farmers are constrained to put extra effort in the form of mulching, tillage, weeding and manure application for them to get a meagre harvest. Again, because of the poor soils, the farmers tend to put more emphasis on cassava and cocoyam intead of yam which is the principal crop in the State. Referring to the drudgery and unremunerative nature of agriculture in this part of the State, with Maku as a test case, Floyd (1964, p.105) concluded that 'despite the superficial appearance of an efficient and prosperous agricultural community ... the hard statistical facts record an increasingly frustrating struggle to win subsistence from an austere environment with but few natural resources, and these already sorely overtapped'. It is not therefore surprising that these upland areas

constitute food deficit region that has to import food to supplement its food needs. The above problems facing agriculture in these areas combine to push energetic and ambitious farmers to migrate to other areas-- Udo (1970, p.83, 1975, pp.326-39), Floyd (1969, p.185) and Adegbola (1975, p.60).

On the other hand, farming is more important and lucrative in the Anambra river and its associated tributary flood plains as well as in the Cross River Plain due principally to increased soil fertility as well as availability of more land and the consequent higher yields. In Anambra flood plain, north of Onitsha, yam is the most important crop grown by the indigenous farmers. Their yams, harvested by June because of early planting to avoid flooding of farmlands by the Niger-Anambra rivers, fill an important gap in yam demand in the huge Onitsha urban market and the surrounding food deficit areas of the southern scarpland. Cassava is also important crop particularly among non-indigenous farmers (Onyemelukwe 1972, p.18). Farmers in the plains of the small rivers of Ezu, Mamu, Aghomili etc. produce enough to satisfy at least their own needs and often they do have some surplus for sale.

The report on 'The Village Listing Exercise' (Kaduna, 1980, p.6) for the proposed Anambra State Agricultural Development Project has this to say about the high agricultural potentials of the Cross River Plain 'practically every part of the proposed area gives satisfactory yield for yam, cassava and maize (and that)

areas of exceptionally crop potential are Abakaliki, Ezza, Ikwo, Ishielu, Isi-Uzo and Nkanu". This area is the most important in the State agriculturally because of fairly fertile land and generally big farm sizes that ensure higher yields and bigger incomes - hence the attraction farming holds for all age groups in this area and their willingness to take to it as a full time occupation than in other parts of the State. Nweke (1981, p.268) however attributed this partly to the fact that there is no major tree crop in the area, like oil palm, as in the scarplands and Anambra plains, to divert the farmers' attention. The most important crop grown in this area is yam of which it accounts for well over 50% of the State's total production. Rice is the next in importance and about this, the report of the 'Rural Economic Survey of East Central State' (1977, p.36) said that 'Abakaliki, Ezzikwo, Ishielu (all are now in Anambra State) and Afikpo (Imo State) divisions account for over 96% of the State's production'. Maize and cassava are also significant.

The great agricultural potentials of Anambra plain and Cross River basin, as shown above, have attracted migrant farmers from other parts of the State (Udo, 1975, 113-124). The government was also aware of the potentials of increasing the production of existing staple crops and even of introducing new ones in these regions, hence two of the farm settlements (there were six in number) by the then Eastern Nigerian government which were in the present Anambra State, were located in the Anambra flood plain - at Igbariam and Adani in

Anambra and Uzo-Uwani local government areas respectively. Two projects of the present study are located in the former farm settlement site at Adani while the Ikem Nando project is just about five kilometres south of yet another settlement site at Igbariam. Again in 1964, the Ministry of Agriculture of the then Eastern Nigeria initiated pilot irrigation and flood water control schemes in some swamps within these two regions in an effort to encourage the adoption as well as improve the production of rice crop. Places of such pioneering effort include Ogboji, Ikem, Ikwo, etc, though the ventures were seriously disrupted by and eventually abandoned as a result of the Civil War. Not surprisingly therefore, the present effort in the State to boost agriculture has to start in these areas at the old schemes and projects as nucleus. In fact, excepting the Ufuma project, all the other five are in locations of previous schemes of one type or the other - Adani, Ogboji, Item and Ikem.

By way of summary, therefore, the project areas are food surplus producing parts of Anambra with relatively extensive land and low population that combine to attract in-migration of farmers and the attention of the government. On the other hand, upland and plateau areas have unviable agricultural system unable to sustain the population, hence they constitute out-migration region of farmers and able-bodied people. Farming practice is more intensive in the upland area but more extensive in the plains, though everywhere, yam is regarded as the most important crops followed by cassava (Nweke, 1981,p.272).

Migrant farmers into Niger-Anambra flood plain tend to engage more in cassava growing while those moving in the Cross River plain get more interested in rice growing and trading. Yam growing is not as popular to these two groups of migrant farmers as cassava and rice.

Another important and relevant aspect of socio-cultural environment of agriculture in the project areas is the issue of land tenure for according to Floyd (1969, p.199) "... ideas about land have dictated when, where, how and by whom it should be used for agricultural purposes". In the State, land tenure is essentially the same - both group and individual ownership co-exist (Famoriyo; 1977, p.48). The group system of land tenure is the most common in the state. Two variants of group land tenure system can be identified - communal ownership where a large social group such as a village or a town owns a sizeable portion of agricultural and forest lands communally. The second variant is what Iwuora (1981, p.15) called macro family tenure. This is ownership by an extended family made up of a number of family units. In the group land tenure system - both communal and macro - every adult male of the community has an inalienable right of ownership and use of land by virtue of his membership of the community or family. The right of ownership of such land is however limited to that of use (usufructuary right) "in perpetuity as long as he uses the land in a way beneficial to himself and his community. He cannot dispose the land ... and as soon as he discontinues its use, the land reverts to the community" (Adeniyi, 1971, p.52). Land is administered

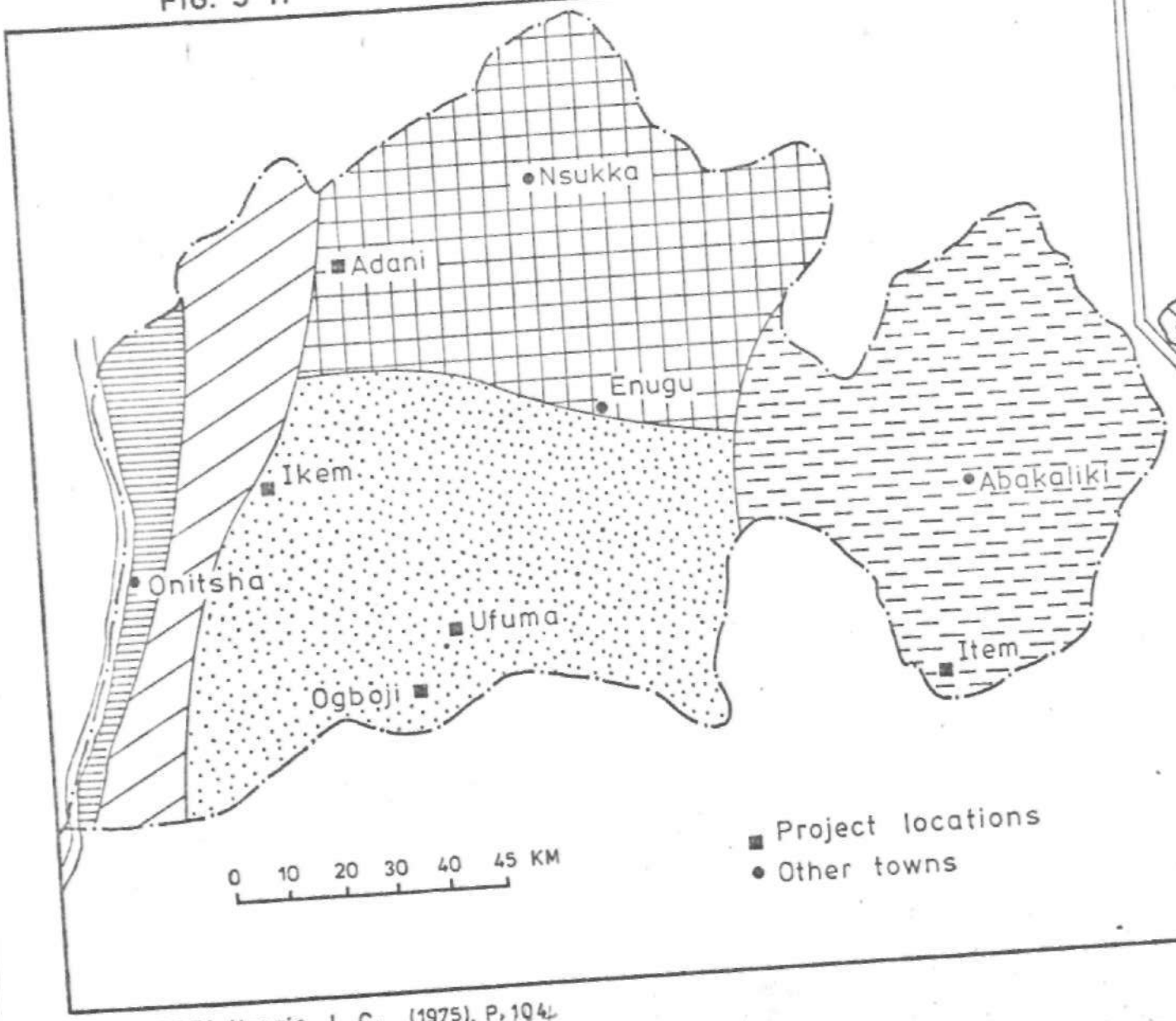
collegially by the elders in the case of the macro family tenure, and by representatives of individual macro-families in the case of communal land - their duty is that of custodians of the group's land without any right whatsoever to dispose of it on their own authority without a mandate from the members of the group.

There is also individual or micro family land tenure system where a man owns land on his own right which is inherited by his heirs at his death. The owner could also dispose such pieces of land without reference to anyone. Individual land tenure is increasing at the expense of group tenure especially the communally owned lands. In the high population density parts of Anambra State, especially in Onitsha and Awka areas, communal tenure has virtually been superseded by macro and micro family tenure systems. In the low density areas of Anambra and Cross River plain, on the other hand communal land tenure is more common - for instance, the swamp lands are generally either owned by the village or an extended family. Whether land is owned by the whole community or a macro family, it is generally not sold. This is particularly so with farmlands. However, individuals and groups who want additional land can get it either on seasonal or temporary basis at minimal cost by going through the appropriate authority such as the elders or other such groups entrusted with the administration of such lands.

Three different cultivation systems or farmland types (Nweke, 1981, p.270; Essiet, 1981, p.4) based on

the length of fallow period and intensity of cropping can be identified in the State. Depending on the availability of land and the scale of operation, a farmer may have one, two or all the three types. These farmland types consist of a number of farm plots in different locations at varying distances from homesteads. The first farmland type is the compound farm or garden around the homestead, usually cultivated annually with the use of farm-yard manure and other household wastes. Most of the staple crops grown within a given area are planted in such farm plots. The second type of farmland is the village farm (equivalent of upland or non-swamp bottom land in the hydromorphic soils of the Cross River plan and the flood plain areas). This is cultivated less intensively and carries fewer number of crops, generally however, yams, cassava, maize and other crops like okro, beans, pepper are grown. However, crop combinations in this category of farmlands vary from place to place depending on the emphasis on given crop/s in a particular locality - hence in Abakaliki areas within the Cross River plain, yam has such a dominant place in the farming system that Uzozie (1975, pp.103-5) has to describe the farming practice as imperfect monoculture. In different parts of the State, various crop combinations prevail as major crops. Besides, there are usually some minor ones planted throughout the State or just peculiar to given area (Fig. 3.11). Unlike the homestead farmland, cultivation in the village or outer farmland is on the basis of bush fallowing with length of fallow decreasing inversely with population. The third type of farmland is located rather very far from areas of human settlement of up to five or more kilo-

FIG. 3·11 ANAMBRA STATE: CROP COMBINATION REGIONS





KEY

IMPERFECT MONOCULTURE
- Yam dominant
- Cassava dominant

TWO CROP
- Yam, Maize
- Cassava, Yam

THREE CROP
- Cassava, Coco-yam, Plantain
- Yam, Cassava, Maize

FOUR CROP
- Cassava, Yam, Coco-yam, Plantation
- Yam, Cassava, Coco-yam, Maize

FIVE CROP
- Yam, Cassava, Coco-yam, Maize, Pigeon pea

SOURCE: Uzozie L.C. (1975), P. 104

metres. In the plateau part of the State, it is known as the 'open-farm', while in areas of generally poor drainage, the equivalent farmtype is the swamp farmland or according to Floyd (1969, p.176), it may "comprise of land unsuited for cropping". Generally, farmland of this category falls within the communal land tenure group. This type of farmland is the least intensively cultivated, and generally carries less number of crops (in most cases only one crop is grown) and worked only by more enterprising farmers.

The agricultural projects which form the subject of this study are located within the Anambra basin and the Cross River plain characterised by low population density, extensive low to undulating plain; regions of in-migration by farmers, adequate or surplus food production, hydromorphic and freshswamp soils as well as group land tenure system. Another characteristic of these areas is its poor communication network which no doubt constitutes a bottleneck to development. The study's main objective is to assess the type, direction and extent of the impact of these projects on the environmental setting sketched above.

1. Anambra state carved out 31 new Local Government Areas out of the existing 23 towards the end of 1981, thus bringing the total number of local government areas in the State to 54. Data for this study were collected on the basis of the existing local government areas and therefore, in the analysis that will follow, the original local governments in operation at the time of data collection will be used.

2. In the rest of the text the towns/villages where the projects are located will simply be referred to as Adani, Ogboji, Ufuma, Item and Ikem.

3. NORCAP (Norwegian Church Agricultural Project) is an agricultural project in Ikwo local government area established and run by the Norwegian Church Relief - a voluntary organisation. It was established in 1962 but its activities were disrupted during the Civil war. However, after the war, the project was reactivated. It involved training of farmers, input and credit supply, farmers organisation, experiments aimed at adapting crops and determining the amount and type of fertiliser suitable for the area as well as extension services among the farmers. Its headquarter was located at Echara Onuabonyi, the administrative centre for Ikwo Local Government. The managing aid agency withdrew in 1979 when the project was handed to the State Government which has turned the project's operational headquarters into an agricultural

vocational training school.

4. The density was calculated from figures given for each Local Government area in the State as at 1976 in the "Quarterly Abstract of Statistics, 1978", Statistics Division, Ministry of Finance and Economic Development, Enugu.

CHAPTER IV

LAND-USE PATTERN AND PRODUCTION SYSTEM

Modern agricultural projects are designed to induce changes in technology and practices employed in peasant agriculture so as to increase productivity and improve the living standard of the rural people. To bring about real and sustained changes in the traditional agricultural system, the complex production environment within which the farmer operates must be affected in one way or the other. Therefore, this and subsequent chapter are devoted to the analysis of different changes that have been brought about by the projects in the areas where they are located. The general question which we seek to answer is about the nature and extent of such changes. Specifically, we want to know whether the impacts or changes are physical, socio-economic or cultural in nature, and how widely or otherwise those changes are felt. In the analysis that follows, some projects' impacts may not be easily quantifiable owing to paucity of data, consequently, both quantitative and qualitative methods will be used in the presentation of findings. In this Chapter, the impacts of the projects will be discussed as they affect land-use pattern, productivity and income of farmers, innovation of adoption and labour demand.

4.1 Land-use Pattern

The six projects under study are run by two authorities - Agricice Production Company Nigeria Limited which is in-charge of Uzo-Uwani Pioneer irrigation

project at Adani; and the World Bank which has the other five projects, one of which is also located at Adani (Figs. 3.1 and 3.2). Rice is the crop that is presently promoted in these projects. Barrages are built across nearby rivers or valleys to provide irrigation water, while bunds and dykes as well as drains are built to prevent flooding and also to enhance drainage. In the project areas, there are already well-established food and cash crops with their associated organisational systems which are bound to be affected by the new crop being promoted. The major crops grown in the State include yam, cassava, maize, cocoyam together with a variety of crops such as melon, pigeon pea, vegetable etc. which have local significance in different localities (East Central State, 1977). Both the major and minor crops are grown in various combinations in different parts of the State. The domination of given crops in various crop combinations in different parts of State has been studied and mapped as crop regions (Uzozie, 1975, p.103-5) (Fig. 3.11).

To get an idea of the crops within the cropping system in the project areas before the schemes were introduced, the respondents were asked to name as many as three important crops they were growing. Their responses shown on Table 4.1 reveals that the

most widely cultivated and/or rated crops

Table 4.1

Number and Percentage of Participants And Crops Rated as Important in the Land-use Pattern Before the Projects

Crop	Base No.	No. of Participants That Mentioned a crop as important	Percentage of the Total Participants
Yam	274	145	52.9
Cassava	274	90	32.8
Maize	274	78	28.5
Others	274	52	19.0
No Response	274	14	5.1

Source: Field work, 1981

are yam, cassava and maize. Yam is easily considered the most important of all the crops followed by cassava and maize. The fourth important group of crops includes cocoyam, leaf vegetables, rice, etc. Few respondents regarded them as important because their cultivation is not generalised in the various project areas. For instance, rice was mentioned as one of the important crops in Adoni, Item, and Ikem areas, but in Ufuma and Ogboji they were not mentioned at all which could mean that rice was either not among the crops in the cropping system in these areas or that its cultivation was restricted to only very few people before the coming of the project. About 5% of the participants did not give any response to this question.

The introduction and promotion of rice by the projects in the study areas has started to change the attitude of farmers with regards to the emphasis on or importance attached to individual crops. This is revealed in their responses shown on Tables 4.2 and 4.3. To the question as to whether they would like to combine the growing of traditional crops with rice farming or rather concentrate on the latter, more than half of the respondents indicated their preference for rice growing to the exclusion of other crops. About 40% would however like to combine the cultivation of both the traditional crops and the newly introduced rice. Twenty-two (8%) of the respondents did not indicate their preference as can be seen on Table 4.2. As more people take to rice cultivation, more land will increasingly be devoted to rice cultivation with the corresponding displacement and fall in importance of crops like yam, cassava etc. Reasons given by respondents for preferring to concentrate on rice farming include the fact that rice is more profitable than other crops; incompatibility of rice with and unsuitability of land for other crops. Other reasons include the insistence by the project authority on the growing of rice alone and finally, the inability to cater for different crops at the same time. This last reason obviously has to do with financial inability to hire

Table 4.2

Farmers' Preference for Either Exclusive Rice Farming Or Growing Both Rice and Other Crops

FARMERS' PREFERENCE	ADARICE ADANI		WORLD BANK ADANI		WORLD BANK OGBOJI		WORLD BANK UFUMA		WORLD BANK ITEM		WORLD BANK IKEM		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Exclusive rice growing	27	65.9	31	45.6	33	58.9	26	49.1	24	48.0	2	33.3	143	52.2
Both rice and other crops	11	26.8	28	41.2	20	35.7	22	41.5	24	48.0	4	66.7	109	39.8
No response	3	7.3	9	13.2	3	5.4	5	9.4	2	4.0	-	-	22	8.0
TOTAL	41		68		56		53		50		6		274	100.0

Source: Fieldwork, 1981

labour and buy other necessary inputs for all the crops, though the attractions of other side occupations cannot be ignored. On the other hand, those who responded that they would continue to grow both rice and other crops gave as their reasons - the desire to produce variety of food items; get more money; maximum utilisation of land; to exercise freedom of choice of what to grow; to guard against crop failure and finally, lack of sufficient land.

They were also asked whether they had any rice farms outside the project since the scheme started. From Table 4.3 it is seen that 107 (39.1%) of the sample population had rice farms in addition to their holdings within the projects. This large number of participants with outside farms could be taken as a practical reflection of the wish expressed by many farmers (see Table 4.2) to take to rice farming. The distribution of those with outside farms among the project areas reveals that there is no outside farm holding in Ufuma World Bank project; while over 60% of the participants in Item project had holdings outside the scheme. In Ogboji, a large proportion of participants - over 50%, also had outside holdings. Large number of farmers with outside holdings in these latter projects as against the position in Ufuma could be explained by the fact that in Ufuma rice was introduced only six years ago as a completely new crop within the agricultural system. In Ogboji, and

Table 4.3

Participants with Outside Rice Farms and Sizes of Holdings
(N = 107)

Holding Size (Hectare)	Adarice Adeni		World Bank Adeni		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0.1 - 0.9	3	15.8	3	13.0	18	60.0	-		12	37.5	2	66.7	38	35.5
1.0 - 1.9	15	78.9	12	52.2	12	40.0	-		15	46.9	-		54	50.5
2.0 - 2.9	1	5.3	6	26.0	-		-		3	9.4	1	33.3	11	10.3
3.0 - 3.9	-		2	8.7	-		-		-		-		2	1.9
4.0 - 5.0	-		-		-		-		2	6.5	-		2	1.9
Total	19	46.3	23	33.8	30	53.5	-		32	64.0	3	50.0	107	39.1

Source: Fieldwork, 1981

Item project area in particular, rice has become more or less part of the cropping system. In Adani project areas, there were not as many farmers with outside holding as in Ogboji, Item and Ikem areas even though the area has as long a tradition of rice growing as those other places. The reason might be attributed to the fact that participants in Adani project areas generally have bigger holdings within the projects than participants in other project locations.

This fact is better appreciated by comparing size of holdings of participants within project schemes shown in Table 4.8 with outside holdings on Table 4.3. Both within and outside the projects farm holdings have common characteristic - smallness of size, over 80% being under two hectares with just about 14% exceeding such size and none being more than five hectares. Though holdings both in and outside the projects are small in size, it is pertinent to observe that while over 80% of the participants in Ogboji, Ufuma and Item had holdings of under one hectare within the projects, as many as about 70% of participants in Adani projects had holdings of one hectare and above. Within the project schemes, the small size of holdings could partly be ascribed to the policy of ensuring that as many of the farmers as possible are accommodated. On the other hand, it could be as a result of a more fundamental problem such as limitation imposed by lack of extensive areas suitable for rice growing. This latter reason is a more plausible one moreso as small farm holdings are also prevalent outside the project schemes. It could still be that the demands by other crops and occupations constitute a limiting factor on the size of holdings farmers are

are willing to cultivate. Notwithstanding the small size of holdings and the responsible factors, it can reasonably be asserted that with time, more people will take to rice farming and this will lead to suitable locations outside the project areas being acquired for personal plots thereby leading to further expansion of the area devoted to rice cultivation.

Expansion programmes by the projects since their inception have led to an increase not only in the area of land cultivated to rice but also to the number of participant farm families. From 1976 when the projects started, a total of about two thousand hectares of land in different locations all over the state have been brought under cultivation. In the World Bank projects the number of participant farm families increased from a total of 545 in 1976 to over 2,000 in 1980; while in Adarice project, 200 families participated in 1980 (Table 4.4). The projected area to be cultivated in the project areas during 1981 main season (wet season) cropping was 700 ha. for Adarice and 2,380 ha. for the World Bank. The distribution of the target hectares for cultivation is shown in (Fig. 4.1). When the areas cultivated in the different project locations are added to the ones developed by individuals outside the projects the area cultivated to rice would increase substantially with the consequent alteration in the land-use pattern and crop combination mix in which rice is increasingly becoming prominent.

The introduction of rice in addition to displacing some staple crops has also brought about the destruction

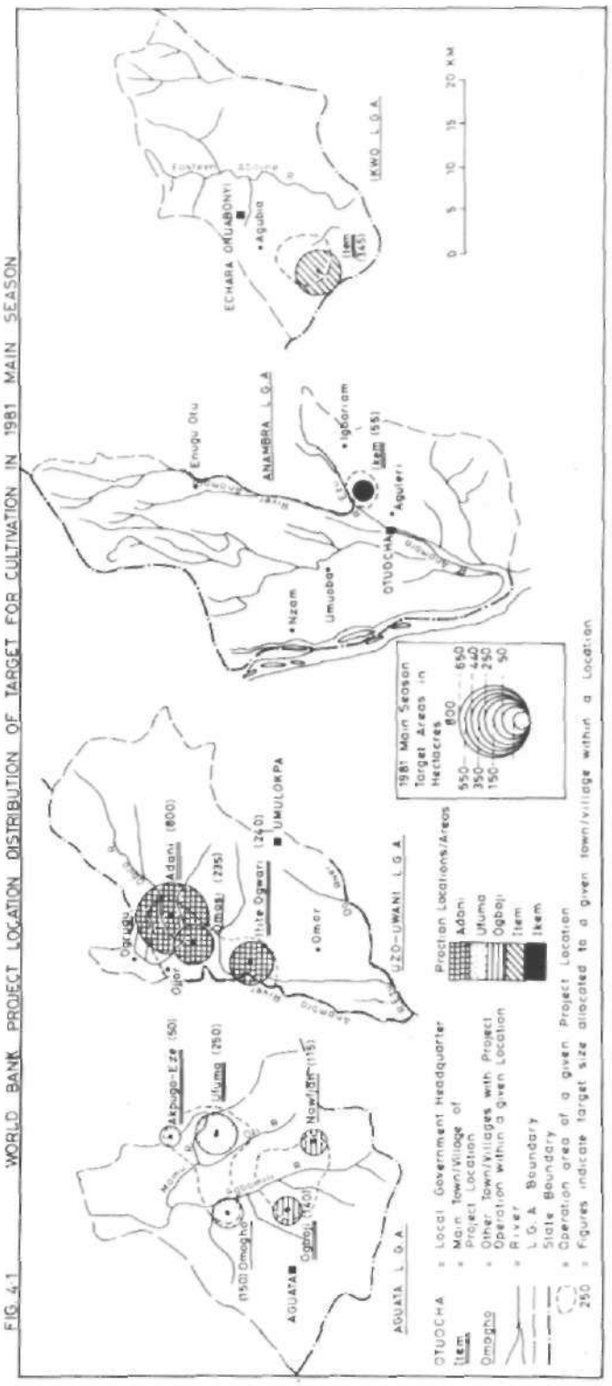


FIG. 4.1 WORLD BANK PROJECT LOCATION DISTRIBUTION OF TARGET FOR CULTIVATION IN 1981 MAIN SEASON

Table 4.4

Number of Farm Family participants and Areas Cultivated in project locations

Year	World Bank projects(combined)[a]		Adarice Production Co.(b)	
	Area (Ha.)	No.of participants	Area(Ha.)	No.of participants
1976	345	545	76	n.a
1977	478	685	250	n.a
1978	511	970	258	n.a
1979	962	1,344	457	141
1980	1,551	2,109	534	200

Source: (a) World Bank Headquarters Office, Enugu.
(b) Adarice Production Company Ltd, Adani-
n.a. - Information not available

of trees and other crops thereby adversely affecting the means of livelihood of the peoples living in these areas. The trees that are particularly affected are raffia and oil palms which dominate the inland rainfed swamps and river flood plains. Even though the World Bank (1974, pp.7, 16) in its appraisal report asserted that the oil and raffia palm groves are 'wild', and that their "loss would not be significant as the project localities are small in comparison with the total swamp area", the extent of the loss of these trees cannot be evaluated only by the total area involved alone. To be included in the evaluation of the loss should be the number of people affected as well as the foregone uses reckoned in money terms. For instance, as shown on Table 4.5 as many as 109 representing 40% of the sample population were affected with the highest incidence occuring at Item project area where as high as 36 (72%) of the

Table 4.5
Incidence of Loss of Tree/Cash Crops in the Project Areas

	Adarice Adeni		World Bank Adeni		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No.affected by loss	8	20.0	11	16.0	20	36.0	31	58.0	36	72.0	3	50.0	109	40.0
No. not affected	-		8	12.0	1	2.0	1	2.0	4	8.0	1	16.7	15	5.5
No response	33	80.0	49	72.0	35	62.0	21	40.0	10	20.0	2	33.3	150	54.5
Total	41		68		56		53		50		6		274	

Source: Fieldwork, 1981

people interviewed lost some economic tree/crop, followed by farmers in Ufum and Ogboji project areas with 58% and 36% respectively. Only 15 participants representing 5.5% were not effected by the loss.

Table 4.6 shows that in terms of number and type of tree/cash crops effected the raffia palm leads followed by oil palm and various types of useful trees and plants such as indian bamboo, native pear (dacyodes edulis) etc. grouned under others. The highest number of cash/tree crops destroyed was in Ufum project area, followed by Mbani, Ogboji, Item and Ikem locations. Within each location, the incidence of loss on individuals varies as can easily be appreciated from the figures of the central tendency under Table 4.6. From that, it is seen that while the least number of raffia palm trees lost was as low as 8, there was a report of a loss of up to 7,000. Even after making allowance for possible exaggerations of losses by participants some individuals did sustain considerable loss.

Such losses can better be appreciated when viewed in monetary terms. For instance, a farmer whose raffia grove of about 756 (the average reported loss) palms was destroyed might be losing as much as ₦60.00 on the average per month. This was based on the assumption that his grove has at least two matured palms at any time of the year, and that they have a tapping live span of a month with an average daily yield of 6 litres (1.32 gallons) of wine per palm. If only 4.5 litres (1 gallon) of the average daily yield of a palm is sold for ₦1.00, the farmer would be making ₦30.00 from one palm and ₦60.00 for the two palms in a month.

Table 4.6

Total Number of Tree/Cash Crops Destroyed in the Project Locations

Type of Crop	Adarice Adani	World Bank Adani	World Bank Ogboji	World Bank Ufuma	World Bank Item	World Bank Ikem	Total
Raffia Palm	15,999	481	10,600	15,963	2,132	631	46,306
Oil Palm	1,331	227	3,606	6,928	3,880	588	16,094
Others	180	71	643	863	653	43	2,485
TOTAL	17,510	779	14,849	23,754	6,665	1,252	64,885

	Max.	Min.	Mean	Median	Mode
Raffia Palm	7,000	8	756	300	100
Oil Palm	900	5	185	120	100
Others	95	2	41	35	20

Source: Field-Work, 1981

This amounts to ₦720.00 per annum from his raffia palm grove. Ogbonna had (1979, p.263) estimated that income derivable from a single oil palm in a year could be as much as ₦19.20. He also estimated that a palm tree has a life-span of 40 years. On the basis of these estimates a farmer who has about 185 mature oil palms destroyed would be loosing in a year about ₦3,552.00. The foregoing estimates for the two types of trees did not include other useful and household products derived from them such as fronds and leaves for fencing, roofing, brooms, mat and basket-making. Also not included are losses of direct and indirect employment that depend on these trees in the form of wine-tapping and flourishing trade in raffia and palm-wine as well as craft industries that depend on them for raw materials. The overall cost of the loss both by individuals and communities cannot be fully computed because of lack of comprehensive data, but it is not difficult to appreciate its enormity.

Even if the revenue derived from the destroyed tree/cash crops by an average farmer is not as high as estimated above, it nevertheless goes a long way in sustaining the rural people, hence its loss must be seen as a very serious blow. This is more so when it is realised that the amount paid as compensation to the farmers is provocatively out of touch with the reality of present prices of commodities and inflation. Appendix I, which is a valuation list, shows clearly that recommended compensation rates for economic trees and crops are very low indeed. Even more serious is the fact that the very meagre compensation to those whose property were destroyed is usually paid very late. In actual fact many victims end up not receiving any compensation at all. For

instance, only 11 persons representing 10% of the 109 respondents that indicated that they sustained loss of property in the various project areas admitted of having received compensation (Table 4.7) while the rest replied that they received nothing. Out of the 11 respondents who admitted that they received compensation, eight actually mentioned the amount they were paid. Three of them received under ₦500.00, one got ₦800.00; two were paid ₦1,000.00 each while the remaining two got ₦1,200.00 and ₦4,500.00 respectively. While it is possible that some of the respondents would not admit of having received any compensation, it is equally true that authorities in this country are reluctant to pay compensation to victims whose property are either expropriated or destroyed (Wallace, 1980, p.4; Ogbonna, 1979, p.261). Corruption and favouritism are not unknown in connection with compensation claims and payment.

4.2 Land Tenure Changes

Land is a very important factors in agricultural production and its ownership confers on the individual and/or group both economic and political power. The prevailing land tenure in Nigeria is often cited as one of the constraints on agricultural production, either because it is concentrated in the hands of few individuals or due to small size of individual plots. The vital role played by land in agricultural development explains why almost all agricultural projects have as one of the objectives, the issue of land-tenure re-organisation in one way or the other, ostensibly

Table 4.7

Number of Compensation Recipients in Various Locations (N = 109)

	Adarice Adani		World Bank Adani		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No	%	No	%	No.	%	No.	%	No.	%	No.	%
No.paid compensation	1	12.3	3	27.3	3	15.0	4	12.9	-		-		11	10.1
No.without compensation	5	62.5	7	63.6	17	85.0	25	80.6	33	91.7	3	100.00	90	82.6
No response	2	25.5	1	9.1	-		2	6.5	3	8.3	-		8	7.3
Total	8		11		20		31		36		3		109	

Source: Fieldwork, 1981

to improve farm management practices and increase productivity. Such re-organisation invariably benefits some individuals and/or groups more than others. With the exception of some personal land ownership, group land tenure system is the most prevalent in the project areas (Chapter III, section 3.7) with individual members of the group exercising usufructuary rights. It was also noted that extra land for agricultural purposes are leased on annual basis or for specified period of time either from individuals, families or communities. In such transactions, land is not necessarily sold.

In the study areas, the prevailing land tenure system is under serious strain and it is gradually giving way to a new system. In the project areas, land has been alienated from the owners by the authorities after entering into a lease agreement with the people concerned (Appendix II). The project authority assumes the ownership and management of the land in question, instal irrigation structures, stump the fields and parcel it out into plots with earth works. In the Adani project locations the plots are half a hectare each while in other locations, plot sizes are one-tenth of a hectare (40m by 25m). The plots are allocated to participant farmers on payment of land development rate of ₦30.00 and ₦15.00 per hectare of irrigated and swamp land respectively in World Bank project locations; while in Adarice Co. project, land development rate is ₦50.00 per hectare, all per cropping basis. The decision as to what to plant, when and how, is entirely in the hands of the project officials. Farmers depend on their goodwill for continued allocation of land - in short, as far as freedom of action and decision

regarding land are concerned, the farmer is now completely dependent on an agent over whom he has no control with its attendant implications for long-term planning.

As of 1980, the combined total area under cultivation in the various project areas was 2,085 hectares (See table 4.4) Out of the total 534 hectares cultivated in the Adarice project in 1980, the Company used 200 hectares for its own direct planting thereby leaving 334 hectares for participant farmers. All developed lands in World Bank projects are shared out to farmers. Table 4.8 shows size of holdings and the number of participants in each category. It reveals that 50% of the sample population had holdings of three hectares and above. While almost all the participants in the Adani projects had one hectare or more, those in other projects had mostly less than one hectare of farm holding * in fact, in Ogboji and Item locations, the model holding size was .200 hectare which is far below the size in other locations.

The size of holdings as shown on Table 4.8 reveals that there are some differences as between project locations. Variations between projects with regards to the number of participants that had rice farms outside the schemes as well as the size of such holdings was also observed above (see Table 4.3). In order to see whether or not the observed difference is significant, one-way or simple analysis of variance was used with holding size within and outside the project locations as dependent variables and and eight other variables as independent. The 'F' test on the results of the analysis are summarized on Table 4.9. It reveals, for instance

Table 4.8

Size of Holdings Cultivated by Participants In Different Projects Location

Holding Size (Ha.)	Adarice Adani		World Bank Adani		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0.1 - 0.9	-		3	4.4	50	89.3	42	79.2	41	82.0	1	16.7	137	50.0
1.0 - 1.9	28	68.3	47	69.1	5	8.9	8	15.1	5	10.0	3	50.0	96	35.0
2.0 - 2.9	10	24.4	13	19.1	-		2	3.8	2	4.0	2	33.3	29	10.6
3.0 - 3.9	3	7.3	3	4.4	1	1.8	-		1	2.0	-		8	2.9
4.0 - 4.9	-		2	2.9	-		1	1.9	1	2.0	-		4	1.5

Mean holding size	= 0.97 ha.
Median holding size	= 0.95 ha.
Modal holding size	= 1.00 ha.
Minimum holding size per participant	= 0.10 ha.
Maximum holding size per participant	= 4.40 ha.
Standard deviation from mean holding size	= 0.74 ha.

Source: Field-work, 1981

Table 4.9

Analysis of Variance Between Holding Size In and Outside the Project Areas and Eight Independent Variables

Dependent Variables / Independent Variables	Holdings Within Project			Holdings Outside Project		
	'F' ratio	Significant level level	Effect of Independent on dependent Variables (%)	'F' ratio	Significant level	Effect of Independent on dependent variables (%)
Sex	6.943	.01	12.0	.001	.93	0.13
Age	1.667	.17	2.0	.243	.78	1.2
Education	9.767	.001	10.0	2.730	.05	10.0
Indigene	6.679	.01	3.0	1.467	.23	1.8
Income	16.590	.001	36.0	3.474	.01	11.0
Number of wives	.002	.99	0.2	.189	.83	0.3
Other Occupation	1.530	.20	1.7	.383	.82	0.5
Location	24.721	.001	32.0	1.221	.31	1.5

Source: Fieldwork, 1981

that the relationship between size of farm holdings within the project areas and the other variables is significant at .001 for education and income of participants as well as the location of the project. The effect of these three variables on the difference in holding size in project areas account for 10%, 36% and 32% respectively. For sex of the participant and whether or not he is a migrant (INDIGENE) the significance level is .01 or 1% and the two variables account for 12% and 3% respectively. The significance level for the remaining variables - age, number of wives (NOWIVES) and whether or not a participant is engaged in other occupation is very much lower indeed (17%, 99% and 20% respectively), and their effect on the dependent variable is very negligible. On the other hand, except for the independent variables education and income whose relationship with holding size outside project schemes is significant at .05 and .01 (5% and 1%) respectively, the other six variables do not seem to have significant effect. Two-way analysis to further evaluate the differences in holdings within project and holdings outside project using two factors was also made. Location and income factors were used for holdings within project and they were found to be significant individually at .001 level. However, their interaction effect on holdings within project was not significant. Jointly the two factors accounted for 51.6% of the variations in holdings within the projects but individually, location is more important factor by accounting for 41.0% while income accounts for only 18.5% of the variations. In the case of holdings outside projects, education and income factors were used. They were significant at .05 and .01 respectively but

their interaction significance is low. The two factors explain 26.9% of the variations observed in the size of outside holdings with income of course being the more dominant factor by accounting for 19.4% while education accounts for only 9.6% (See Appendix III).

The influence of education and income in determining the size of holdings both within the project locations and outside them is not unexpected. Participants who are either more educated or have more money are better equipped to influence officials to allocate them larger sizes within the projects; and as for outside locations, not only are they able to anticipate future developments and prospects, they also have the means to bring about the realisation of their aspirations. The effect of location on average size of holding has been discussed above with regards to outside holding (see discussion following Table 4.3). With regards to sex as a significant factor in determining holding size in the project location, it is due to the fact that men are more in number in the projects. Moreover, the society would frown on a woman going to secure plots in the project on her own. And of course, husbands are likely to be cautious in permitting their wives to participate on their own in project farming, which, apart from being new, also entails that the women are more or less outside their control.
In outside holdings, sex has no significance probably because anyone (including women) could buy land if he/she likes provided the person has the money to pay for the negotiated price. Age, number of wives and engagement in other occupation by a participant seem not to have any significant effect on the size of holdings. The reason

might be that the proper management of farms in terms of labour depends very much on financial capability to hire such labour especially within the present social and economic context of family development in the project areas. That the status of participants as to whether they are migrants or indigenes should affect their holdings within the projects is understandable. For instance the indigenes are generally more in number and secondly, if the projects are to keep to their commitment of allocating plots to indigenes first, then they definitely have an advantage. As for holdings outside the projects, there seem to be no discernible significance of being an indigene or not since other considerations such as mutual trust, money and aspiration are more important factors in determining whether or not one gets the extra land he requires.

The issue of acquisition of extra rice farms outside the project schemes naturally raises the question of land transaction and its impact on the existing land tenure (holding) system. Table 4.10 shows that while 95 admitted that they had leased land since the inception of the projects in the different locations, 73 indicated that they had had land transactions involving outright sale. Over 70% and 50.5% of the sample population who admitted respectively of having leased or bought land are in the Adani project locations. In other locations, land transactions involving leasing dominates unlike in Adani locations where land transaction appears to involve more of outright sale. There was no formal agreement for the leased lands except the traditional gift of wine and kola, which of course now includes some

Table 4.10

Emerging Trend in Land Holding System in the Project Areas

Type of Land Transaction	Adarice Adani		World Bank Adani		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sale (N = 73)	24	32.9	28	38.4	5	6.8	9	12.3	7	9.6	--		73	100.00
Lease (N = 95)	23	24.2	25	26.3	14	14.7	9	9.5	16	16.8	8	8.4	95	100.00
	47	28.0	53	31.5	19	11.3	18	10.7	23	13.7	8	4.8	168	100

Source: Fieldwork, 1981

amount of money. Some of the respondents indicated that they paid some money for the leased land which ranged between ₦20.00 and ₦80.00 depending on the size of land in question as well as the length of period of use. On the other hand, prices of land sold ranged from about ₦150.00 to ₦2,000.00 again depending on the size. In response to the question as to what the land bought or leased was used for all the respondents in locations other than Adani indicated that they were presently using the land for farming. In Adani locations, 22 (42%) of those who bought land indicated that the main purpose was for building a house while the rest replied they bought the land for farming Even though there are no data available to facilitate comparison to be made as to the rate of land transactions between the periods before and after the coming of the schemes, there is reason to believe that they must have been one of the contributory factors to the recent increased land sales and leases.

The increased land transactions has created a growing pressure on the traditional land-tenure system with the attendant social stresses and problems. For instance, there is presently a conflict between the remnants of the original farm settlers and Adarice Production Company over tenure right in respect of the former farm settlement land which was conveyed to the Company by the government of the former East Central State after officially abrogating the Farm Settlement Scheme in 1972 (East Central State, 1972). These farmer-settlers, 90 in number, who are still living and

farming within the former Farm Settlement property, and whose fate appeared not to have been taken into consideration by the government at the time of the Scheme's abrogation, are now regarded as squatters by Adarice Production Company. They are no longer allowed to farm in any part of the area which they had been making use of since 1962, unless they are willing to farm under the Company as farmer-participants. However, the farmers do not cherish the participation arrangement and said so. They rather preferred their independence.

In order to compel them to accept its orders, squatting as they are in what it considers its legal property, the Company had to destroy already matured crops of these people in 1979. Again in the 1981 wet season planting, the company ploughed over the settlers' farms which had just been planted, even though the court action taken by the latter against the former seeking both reparation for damaged property and injunction restraining the company from further molesting them or interferring with their farming activities, was still pending. Meanwhile, they and their families are suffering. Here is a clear case of conflict of interests. The farmers want to retain not only their independence of action but also the control of what they considered their own-land. The Company on the other hand would want to control the land together with the farmers for it is only by doing so that it considers its interests to be better served - more profit. In this conflict of interests, these helpless people must be sacrificed in order to solve what capitalists, whether national or international, as well as technocrats regard as "the peasant problem" (Williams, 1981, pp.28-37), that

is, a determined and systematic policy of undermining the peasants' independence of action based on their ownership and control of means of agricultural production-land and labour, by seeking to wrest the former from them and in the process be in a position to influence both the quantity, type and rhythm of the latter.

Apart from the problems of the farmer-settlers at Adani, many participants did complain that they received far less land in the projects than was taken away from them. At Item, the writer met six elderly farmers who complained that they were being discriminated against by the authorities in the allocation of land. They threatened to take matters into their own hands if the discrimination was not stopped. In other locations, the same problem of land is also encountered as farmers hesitate to surrender their land to be included in the projects partly because of little or no payment of compensation and partly owing to their suspicion of the intentions of the managing bodies. There are also conflicts between communities, groups and individuals in parts of Ufuma, Item and Ikem locations over land because, no doubt, of its enhanced value and the increasing pressure brought about partly by the presence of these projects. These conflicts, though admittedly not confined to or caused by the projects only, are manifestations of deep seated malady and also underline the dilemma faced by policy makers as to which objectives to pursue and which to sacrifice in agricultural development. The dilemma is even more acute in areas of relatively high population pressure and its consequent land scarcity as in

Anambra State.

4.3 Productivity and Income of Farmers

In this section, the impact of the projects on agricultural production in the areas and indirectly on the living conditions of the people is discussed. As earlier pointed out, rice is the crop promoted by the projects and in the State, the yield is generally low. Estimates are of the order of between 1 tonne and 1.8 tonnes per hectare. The World Bank, (1974, p.24) in its appraisal report, however, projected average yield per hectare of 2.5 tonnes and 3.75 tonnes in swamp and irrigated fields respectively under adequate input and proper management envisaged in the project schemes. A good number of the participants were not rice farmers before the project and even for those who were doing so, it was not possible to get data of actual production or yield per hectare upon which to assess conclusively the impacts of the projects on yields and overall production. Because of this the estimated average per hectare for the State as well as the projected yields in the appraisal report are used as reference points.

From the figures given by the sample population, the total rice production in 1978 was 692.4 tonnes, which in 1979 rose to 940.3 tonnes an increase of 35.8%. In 1980, the quantity increased to 1227.1 tonnes which represented a percentage increase of 30.5% over the preceeding year. Normally, two crops

are grown in a year - the rainy season crop which depends mainly on rainfall with irrigation and

Table 4.11

Total Rice Production from 1978-1980 per Cropping Season in Tonnes

	1978		1979		1980	
	Wet Season Crop	Dry Season Crop	Wet Season Crop	Dry Season Crop	Wet Season Crop	Dry Season Crop
	512.55	179.85	687.15	253.125	885.15	341.925
Total	692.4		940.3		1227.1	

Source: Fieldwork, 1981

the dry season crop which depends solely on irrigation. Generally, rainy season crop production is higher due largely to increased hecterage and more water availability. However, as shown on Table 4.11, production increased steadily in both seasons over the period under survey.

The average yield for all the locations combined for 1980 was 2.30 tonnes per hectare. Table 4.12 reveals that it was only in Ogboji that rice yield exceeded the combined average. In Adarice and Item project locations the average yield per hectare almost equalled the average for the whole project with World Bank locations at Adani, Ufuma and Ikem having yields below overall average. Apart from the fact that the average yield per hectare varied as between projects, it is also noteworthy that, except at Ogboji, no other project

achieved the projected estimate of 3.75 tonnes per hectare claimed to be achievable within four years, the maturity period of the projects, in the appraisal report (1974, p.24, Annex I, P.5). Simple one-way analysis with 'F'-test were used to probe the relationship between quantity of rice production and the following variables, sex, age, income and education of the respondents as well as project location, quantity of fertiliser used and the area cultivated. The result of the test is set down on Table 4.13 and it reveals that the following factors - fertilizer, income location and area have statistically significant effects on the quantity of rice (rice yield) produced at .001 level while education of the participants and whether or not they are migrants or indigenes also have some effect on yield at .05 level. Individually, these factors account for 21.4%, 7.8%, 7.1%, 6.4%, 3.5% and 16.0% of the variations in production in the project areas respectively. Age and sex factors are found to have no statistical significance on yield. As the categorized groups within each of the statistically significant factors (independent variables) decrease in magnitude their mean production quantity deviates the more from the mean for all participants put together. Hence participants within lower income groups, those with smaller holding, as well as those who used smaller quantity of fertilizer or have lower educational attainment realised smaller yields. The reverse was observed to hold for those participants with larger holdings, higher income and educational attainment or those that on the average used more quantity of fertilizer. It is interesting to note that

Table 4.12

Rice Yield Per Hectare in Project Locations In 1980

Locations	Area Cultivated (Hectare) (1)	No. of sampled farmers (2)	Quantity of Production (Tonnes) Main Season Production (3)	Dry Season Production (4)	Total (5)	Average based on col.(5) (6)	Yield per Hectare based on col.(6) (7)
Aderice - Adani	62.5	41	174.1	108.4	282.5	141.3	2.26
World Band -Adani	96.5	68	278.2	86.1	364.3	182.2	1.89
World Bank-Ogbodi	26.8	56	129.9	72.0	201.9	101.0	3.77
World Bank-Ufuma	39.2	53	119.4	45.8	165.2	82.6	2.11
World Bank-Item	34.0	50	171.1	29.6	200.7	100.4	2.95
World Bank-Item	7.7	6	12.5	-	12.5	6.3	0.82
Summary	266.7	274	885.2	341.9	1227.1	613.6	2.30

Source: Fieldwork, 1981

Table 4.13

Result of One-way Analysis of Variance of Effects of Eight Factors on the Quantity of Rice Produced

Independent Variable Factor	'F' ratio	Effect of the Factor on Produced Quantity (%)
Location	4.113*	7.1
Age	.284	0.3
Sex	1.020	0.4
Education	3.233+	3.5
Income	4.532*	7.8
Whether migrant or not	4.449+	16.0
Area cultivated	4.627*	6.4
Amount of fertilizer used	22.141*	21.4

Source: Fieldwork, 1981.

N.B. *Significant at .01 or 1% level.
+Significant at .05 or 5% level.

migrant participants had higher yields than indigene-participants; but on the other hand, age and sex were found not to have little or no significance on the production variation.

From the above result it is easy to see that participants within the higher brackets of socio-economic status here operationalised as higher income and higher education tend to secure higher yields. This is not very surprising as these are linked to and explained by the fact that they also tend to have larger sizes of holdings both within and outside the project areas (cf. Table 4.9), and incidentally, large size of holdings makes for greater quantity. The reasons for this have been discussed earlier - that participants with these characteristics find it much easier to relate with project officials who, more often than not, are more likely to be of the same social status. The influence of whether indigene or migrant on production can also be appreciated. Migrants on the whole had higher yields and this could be attributed to the fact that since they are not as encumbered with social responsibilities as the indigenes, they are more likely to devote more time and attention to their farms which invariably is rewarded with higher yield. Age and sex are expected to have some significant effect but as earlier explained, women play subordinate roles in farming which rarely gives them a separate identity in rural agricultural society like in the areas under study - hence there were only 17 females in the sample. Age factor was also suppressed as a result of unbalanced representation of age groups of 20 years and under and

those of over 60 years. These two age groups are represented by only 16 people (6.0%) of the sample population.

Two-way analysis of variance was used to test the combined effect and the extent or degree of significance of some factors on the production quantity. The results of the analysis are displayed on (Appendix III), and they show that while individual effects of the factors on production variability are significant within the acceptable levels, except area, their interaction effect is not significant except for indigene and quantity of fertilizer used. Of the three pairs of factors used in the analysis of variance indigene and quantity of fertilizer used seem to be the greatest cause of variability in production quantity followed by education and income of the participants and lastly location and area (size) of farm holdings. The pairs explained respectively 22.7%, 16.0% and 14.1% of the total variation in production quantity. However, as individual factors, the order of importance in terms of their contribution to variation in production quantity, is as follows: fertilizer quantity used, income of the farmer, location, that is place of the farm, size of farm holding, education of the farmer and whether or not he is a migrant.

The important role fertilizer plays in production as revealed by the foregoing analyses appears apparently to have been confirmed by the relationship between quantity of rice produced in 1980 and the amount of

fertilizer use as shown on Table 4.14. In 1980, a total of 1270 bags of 50 kgs. each were used in all the locations combined and this worked out at an average of 4.8 bags per hectare. However, the average use of fertilizer varies as between locations, but generally, those locations with higher fertilizer use per hectare tended to record higher yields except in the case of the World Bank locations at Adani and Ufuma. This discrepancy in these two locations could be due to

Table 4.14

Comparison of Fertilizer Use Per Hectare and Rice Yield

Location	Area Cultivated (Hectares)	Qty. of Fertilizer used (50kg.bag)	Avg. Fertilizer per Hectare (50kg.bags)	Yield per Hectare
Adarice - Adani	62.5	282	4.4	2.26
World Bank - Adani	96.5	313	3.2	1.89
World Bank-Ogboji	26.8	181	6.6	3.77
World Bank-Ufuma	39.2	191	2.6	2.11
World Bank - Item	34.0	290	4.5	2.95
World Bank - Ikem	7.7	14	1.8	0.82
Summary	266.7	1270	4.8	2.30

Source: Fieldwork, 1981

exaggeration of either the quantity of rice produced or quantity of fertilizer used. While rice yield in the project areas was no doubt affected by the quantity of fertilizer used, it is relevant to observe that other factors like better cultural practices and expansion of cultivation into yet unused land might have also contributed their quotas. Also see Appendix III for two-way

analysis of factors that influence the use of fertilizer.

Some of the rice was kept aside for consumption and planting and the rest sold. The proportion of the quantity sold and that kept aside for the three years under review is shown on Table 14.15. The quantity of rice kept for both consumption and planting purposes for the period amounted on the average to 11.6% of the total production, while the remaining 88.4% was sold. This high proportion of rice sold indicates that it is grown essentially as a food cash crop since only about 7.0% of the production is consumed by the producers. The total amount realised by the participants in the period from their rice sale was about 1.2 million naira which certainly consistuted a considerable infusion of money into the rural areas where these projects operate. The amount realised by individual participants varied both within and between projects. On Table 4.16 is shown the distribution of income among the participants. In each of the three years over 50% of the participants derived a gross income of ₦2,000.00 and less from their operations in the Projects. On the other hand, during the three years under review, 14.3%, 28.8% and 40.0% respectively reported incomes exceeding ₦2,000.00 in a year from rice cultivation. It is clear from the table and the figures of central tendency that there was a big variation among participants regarding their earned income - while a few of them claimed they realised about ₦5,000.00 and above yearly, a good

Table 4.15

Disposal of Rice Production and the Amount Realised:1978-80

Year	Total Production Quantity (Tonnes)	Consumption (Tonnes)		Planting Reserve (Tonnes)		Total Kept aside for both purpose (Tonnes)		Amount Realised from sale
		Qty.	%	Qty.	%	Qty.	%	₦
1978	692.4	49.7	7.2	40.8	4.4	80.0	11.6	269,676.00
1979	940.3	71.0	7.8	40.2	4.0	111.2	11.8	426,044.00
1980	1,227.1	88.0	7.2	53.3	4.4	141.3	11.5	577,142.00
Summary	2,859.8	208.7	7.3	124.1	4.3	332.5	11.5	1,272,862.00

Source: Fieldwork, 1981

Table 4.16

Distribution of Gross Income by Participants:1978-80

Income Group ₦	1978 No.	1978 %	1979 No.	1979 %	1980 No.	1980 %
1 - 1,000.00	63	23.0	50	18.2	50	18.2
1,001 - 2,000.00	74	27.0	91	33.2	108	39.4
2,001 - 3,000.00	24	8.8	46	16.8	50	18.2
3,001 - 4,000.00	8	2.9	13	4.7	30	10.9
4,001 - 5,000.00	6	2.2	13	4.7	14	5.1
5,001 +	1	0.4	7	2.6	16	5.8
No Response	98	35.8	54	19.7	6	2.2
Total	274		274		274	
Mean Income	1,532.3		1,936.6		2,153.5	
Median Income	1,261.0		1,555.0		1,681.0	
Mode Income	600.0		1,050.0		1,050.0	
Minimum Income	280.0		180.0		250.0	
Maximum Income	6,000.00		5,800.0		9,000.0	
Standard Deviation	1,023.5		1,257.0		1,445.2	

Source: Fieldwork, 1981

number earned quite very small amount. The variations are attributable to differences in size of holdings, use of fertilizer, etc. It has to be pointed out that the amount of income being considered was gross earning from which the cost of labour and inputs has to be subtracted in order to get what is actually available to the farmer, for his personal use, but this fact notwithstanding, there is no doubt that in terms of income many farmers have benefitted from rice growing.

This was borne out by the fact that many of them agreed that rice cultivation was much more lucrative for them than other types of crops. They also admitted that there has been a considerable improvement in their material well-being in terms of increased household property they have acquired and their enhanced financial ability to cater for their family in general and their children's education in particular. It is not possible to calculate the degree of contribution earnings from the project farming made towards the participants household expenses because they had extra income either from other kinds of employment or from other crops planted outside the project - and such incomes are neither kept nor used separately. Increased rice consumption by the farmers can also be counted as a benefit because in terms of nutritious value, it is considered to be superior to other traditional staple foods. To that extent therefore, the projects are contributing to the improvement of the health of the peoples of the areas concerned.

4.4 Innovation: Degree of and Constraints on Adoption

Agricultural projects, particularly irrigation schemes are seen as vehicles through which farmers are taught and encouraged to adopt new farm practices, inputs as well as technologies with a view to bringing about an increase in their productivity and income. In the projects under survey, the farmers are encouraged to use fertilizers, agro-chemicals like insecticides and herbicides, better varieties of seeds as well as machinery such as tractor. Other practices being encouraged included early planting, transplanting of rice from nursery

and more regular weeding. The assessment of the projects' impact on innovation adoption by farmers in the survey areas is made on two levels - first on the level of project farms which considers the extent of innovation adoption by farmers within their project farms; while the second level assessment looks at the extent the farmers have been able to use or adopt the innovations in their farms outside the project locations.

The innovations included for investigation are fertilizer, tractor, insecticide, herbicide, rice transplanting and double weedings. To ascertain whether or not the inputs and farm practices being propagated by the projects were already known to the farmers, they were asked to indicate whether they were aware of them before, and if so, whether they had made use of them before the projects came. Their responses shown on Table 4.17 reveals that double weeding,

Table 4.17

Relative Awareness and Adoption Scores of Selected Innovations in the Study Areas Before the Projects came (N = 274)

Innovation Type	Awareness Knowledge		Actual Use/Adoption	
	No.	%	No.	%
Fertilizer	263	95.98	143	52.18
Tractor	91	33.21	10	3.64
Insecticide	124	45.25	19	6.93
Herbicide	40	14.59	8	2.91
Transplanting	219	79.92	120	43.79
Double Weeding	274	100.00	82	29.92
	274		274	

Source: Fieldwork, 1981

fertilizer and the practice of transplanting with 100%, 96% and 80% scores respectively appear to be the most widely known of the innovations. However, their actual use or adoption rate was much lower. For instance, among the three most widely known of the innovations, only fertilizer exceeded 50% adoption rate, followed by transplanting practice which had 44%. As for other innovations both their awareness and adoption scores were much lower than the first three. The Table shows that although awareness and adoption scores of some of the innovations are low, they could not be said to be entirely novel to the population of the areas at the time the projects came. In the circumstance, therefore, the impact of the projects, in further diffusing the adoption of these innovations would be judged by how many more farmers adopted them both in and outside the projects farms from the period the projects were launched.

The number of participants and the innovations they had adopted since after they joined the projects is shown on Table 4.18. As the Table shows, there was a general increase in the rate of adoption of these innovations when compared with the pre-project period. Highest increases were recorded for transplanting, double weeding and fertilizer use. There was also a big increase in the use of insecticide which rose from just 5.5% adoption in 1978 to 21.2% in 1980 a rise of about 400%. The adoption of tractor and herbicide did not appreciably increase over their pre-project period. Though on the whole the adoption rate for all the innovations within the project farms showed

Table 14.18

Trend of Innovation Adoption Rate in Project Areas: 1978-1980

Year	Trans-planting		Ferti-lizer		Double Weeding		Insecti-cide		Trac-tor		Herbi-cide	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1978	129	47.1	139	50.7	117	42.7	15	5.5	10	3.6	6	2.1
1979	204	74.5	184	67.2	168	61.3	31	11.3	26	9.5	8	2.9
1980	270	98.5	245	89.4	202	73.7	58	21.2	29	10.6	11	4.0

Source: Fieldwork, 1981

some increase, it was felt that the true situation with regards to the use of these inputs and practices can be better evaluated by looking into how far they were adopted in outside farms. This is relevant because in the projects, farmers could be subjected under pressure overtly or otherwise to adopt some of the practices. Moreover, a person should only be considered to have actually adopted an innovation when he can, on his own seek for, and make use of a given input. It is in keeping with this line of thought that they were asked to indicate which of the inputs and farm practices they had used in farms other than those in the projects.

From their responses, as shown on Table 4.19 it can be seen that far fewer number of the respondents had used the inputs in their outside farms. The most widely adopted innovations were the same as within the project farms - transplanting practice, double weeding, and use of of fertilizer but the number of adopters was lower.

The trend for other inputs and practices was the same -

Table 4.19

Innovation Adoption Rate in Outside Farms and Crops
(N = 274)

	Trans-planting		Ferti-lizer		Double Weeding		Insecti-cide		Herbi cide		Machine (Tractor)	
	No.	%	No.	%	No.	%	No.	%	No	%	No	%
No. of Adopters	223	81.4	85	31.0	108	39.4	34	12.4	5	1.8	3	1.1

Source: Fieldwork, 1981

lower adoption rate in outside farms than in those within the projects. This can easily be appreciated by comparing Tables 4.18 and 4.19. Considering that some of the participant were aware of the existence of some of the farm inputs and practices ever before the projects came, it was expected that their adoption rate would have been much higher than what was observed. Perhaps the lower adoption rate was either due to problems of supply or it could be associated with the socio-economic characteristics of the farmers. To probe further into this, the contingency table analysis with chi-square test (X^2) was used to evaluate the nature and degree of significance between some variables and the adoption or otherwise of the above innovations. The result of the test is shown on Table 4.20. From the table, the variables that seem to have much influence on whether or not innovations are adopted are whether the participant is a migrant or non-migrant location of the project, size of holding

Table 4.20

Degree of Significance in Relationship Between Innovation Adoption and Ten Variables: Raw Chi-square (X^2) Values

Independent Variables / Innovation types	Holding Within Project Area	Holding Outside Project Area	Sex	Age	Education	Income	No.of wives	Location	Other occupation	Indigene
Fertiliser	7.781+	0.922	2.491	21.951*	15.887+	37.643*	6.761	28.724*	3.143	8.900+
Thresher	11.032+	2.271	1.062	0.910	1.490	4.704	0.273	17.708*	4.872	4.861+
Herbicide	19.027+	3.083	0.671	3.512	3.310	17.781*	1.618	5.063	9.224+	0.023
Insecticide	1.879	0.372	0.063	2.604	0.662	5.223	5.390	15.174*	2.912	5.523+
Double Weeding	0.137	1.941	1.731	3.532	0.581	6.374	7.470+	16.721*	1.532	4.442+
Transplanting	← almost fully adopted →									

Source: Fieldwork, 1981

N.B. * Significant at .01 or 1% level

\+ Significant at .05 or 5% level

awareness, time factor, money and youthful age, they tend to be more venturesome which find expression in their readiness to try new things. The positive correlation of these socio-economic variables and the rate of innovation has also been found in some studies done here in Nigeria like those of Ajaegbu, (1976, p.85), Mirchaulum, (1976, pp.26-8), Kahu (1978, p.24). Size of holding within the project as well as location are other variables which influence innovation adoption. Both of them are related as one is dependent on the other. For instance, the size of holdings varies according to projects and the project location influences both the type of weeds, pests as well as soils and these in turn determine the type and quantity of inputs to use. But in the final analysis it is the size of holdings that determines the profitability or otherwise of the adoption of any innovation.

Other factors which determine the rate of innovation adoption apart from the socio-economic status of the participants as well as location and size of holdings have to do with the nature of innovations themselves with particular reference to the source of their supply and information regarding them. The sources of inputs such as tractor, insecticide, herbicide and fertilizer and information regarding their use are shown on Table 4.21. The table shows that most of the inputs have the projects as their main source of supply. Other sources of supply account for a negligible proportion. The situation is not different in terms of information about the inputs. The dependence of participants on the projects for the supply of, and information about inputs was almost complete. The implication of this

Table 4.21

Sources of Input Supply and Information (N = 274)

(a) Sources of Input Supply

Sources	No. of Response	%
Project Office/Stores	199	72.6
Private (Market) Source	52	19.0
Min. of Agriculture/ Local Govt. Office	21	7.7
Co-operative	6	2.2
Other sources	4	1.5
No response	17	6.2

(b) Information Sources Regarding Input

Information Channel	No. of Response	%
Project Officials	153	55.8
Neighbours/Relations/ Friends	81	29.6
Information Media	16	5.8
Extension Staff from Ministry	3	1.1
No Response	69	25.2

Source: Fieldwork, 1981

dependence on the projects is that their role becomes a crucial one with regards to the spread and adoption of these inputs - they must see that the relevant inputs are stocked in good quantity and given out to the participants at the right time, their officials must be willing to attend to the participants as well as explain to them method of application or use and how to contain any possible problems. This aspect of the projects' role is particularly relevant with regards to those inputs in which the farmers have no knowledge as to how to use or apply such as tractor, herbicide and insecticide - because for a good number of the farmers their use of these inputs depends on the goodwill of a third party. Not surprisingly therefore, the adoption rate of these innovations is low (cf. Tables 4.18 and 4.19). And from the reasons given by the participants much of the constraints on innovation adoption could be traced to the part played by the projects' officials.

As Table 4.22 shows, the most important reason given by the participants for non-adoption of innovation include ignorance or lack of proper knowledge not only about the usefulness of such inputs but also about their application and use. Another reason given was non-availability of the requisite inputs which included break-down of machinery like tractor. These were mentioned as constraints by 165 (60.2%) and 161 (58.8%) respectively. The third important reason has to do with transport problems. These reasons given constitute real constraints on adoption of innovation by participants as the following two examples will show. At Item, farmers did not

Table 4.22

Reasons for Non-adoption of Innovations by Participants
(N = 274)

Reasons	No. that gave it as constraint	Percentage (%)
Ignorance/Lack of proper knowledge of use or application	165	60.2
Non-availability of inputs/breakdown of machinery	161	58.8
Transport or road problem ..	142	51.8
Bureaucratic/official red tape or indifference	113	41.2
Financial constraint	106	38.7
Lateness in the supply of inputs	66	24.8
Prejudice against some types of inputs	40	14.6

Source: Fieldwork, 1981

receive the loans which farmers in other locations received about the second week of September, until the second week in October, 1981, because the officer who was to distribute the loan complained that the road to Item was too bad for him to travel. The loan was of course meant to be used for the wet season cropping which started by June (See Appendix V). Again at Adarice location at Adani, a farmer approached an officer to pay for tractor service to till his plot because he felt that he was already being late in planting. He was told to make alternative arrangements because for one thing, most of the tractors had broken down and for another, that there were many other farmers

who had already paid and had been waiting for over two weeks. The above two real examples show, in the context of the reasons given for the non-adoption of some innovation, that forces more or less beyond the control of the farmers are significant contributors to the poor adoption rate. This can also be appreciated from Table 4.22 where financial constraint constitute one of the least important of the reasons given for non adoption. Also, among the three most widely adopted innovations- transplanting, fertilizer use and double weeding, only the second named innovation can be said to be outside the immediate control of the farmers as far as decision regarding whether or not to use them and when to do so are concerned.

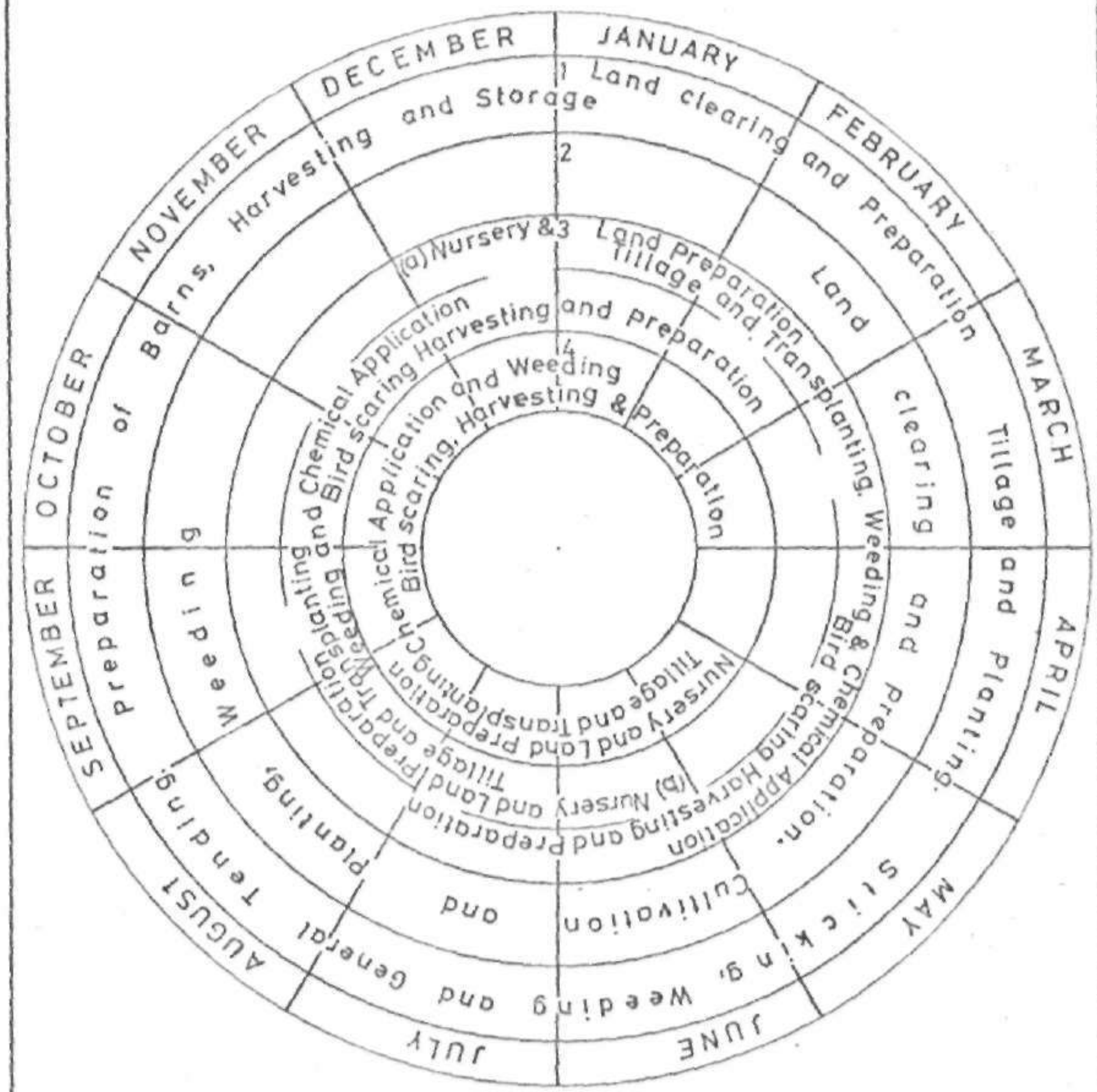
In view of what has been discussed above about innovation, the conclusion to be drawn is that although the projects have helped to spread the use of new inputs, at least among the well-off farmers and in farms within their management, they have not done enough to spread the innovation especially beyond their immediate operational areas and outside rice, the crop they are promoting. This follows from the fact that the projects in most cases, neither have sufficient quantity of the inputs needed nor do they always supply them in time. Moreover, the projects' policy emphasizes priority attention to farmers who participate in their schemes and rice crop, to the neglect of the wider community and other crops which actually form much more important food staples.

4.5 Labour Need and Demand

Labour need and demand associated with the projects are discussed in this section while the consequent labour mobility that arises is treated in chapter V, section 5.2. The issue of labour need and demand in the projects such as theones under study is an important one in view of the implicit assumption by planners that most indigenous agricultural economies have excess labour which could be utilized in expanding industry and agricultural schemes with little or no stress on the labour market. For instance, Lewis (1955, p.327) arrived at a conclusion after a set of calculations "that at least a quarter of the agricultural population is surplus to requirement". This 'Theory of Surplus Labour' has greatly influenced agricultural project planners into ignoring the critical consideration of labour problem in their plans, because they tend to assume that a farmer can always get all his labour requirements from his family. This assumption has been shown to be incorrect from studies of labour problems in large irrigation works in and outside Nigeria (Baba, 1975; Wallace, 1980; Chinnappa and Silva, 1980, p.208).

Farmers in the project areas are encouraged to grow two rice crops in a year, and already 144 (52.6% of the sample population had taken to doing so. Moreover, except those who were engaged in other activities other than farming on full-time basis, all the participants grow in addition, the traditional crops - yam, cassava, maize, etc. These crops are grown because they constitute indispensable components of the peoples'

FIG. 4·2 GENERALISED FARM CALENDAR OF ACTIVITIES OF FARMERS UNDER DIFFERENT CROP SYSTEMS



CROP SYSTEMS

1. Yam Intercropped with other crops, including cassava
2. Cassava Intercropped with other crops excluding yam
3. Two Rice crops per year
   (a) Dry season crop (depends mainly on irrigating)
   (b) Wet main season crop supplemental irrigation
4. One Rice crop per year

staple, and secondly because, though rice is increasingly consumed locally, it is essentially regarded and grown as cash crop by farmers. The combination of rice and other crops by a farmer inevitably gives rise to some changes, not only in his farming calendar but also in his labour need. For instance, Fig. 4.2 shows a generalized calendar of activities of a typical farmer under different cropping systems. It is pertinent to observe that for various reasons the sequence of activities in the calendar can be disrupted by or contracted as a result of such factors as late rains, or on ecological considerations like in areas liable to river flooding in which case crops must be planted and harvested earlier than indicated in the calendar. However, the point that is meant to be brought out by the calendar is the fact that for a farmer who combines any two of the four cropping systems, there is hardly any slack period in the year - and his out-of-farm occupations must also be attended to. This obviously will have serious implications for farm labour need and demand.

Normally, a farmer is expected to depend for his labour supply on his family in the first instance. But the amount of such labour available varies from one farmer to the other, depending on the number of persons in the family, their age, sex, health, the social attitude to the use of such person's labour and finally on whether or not such person is engaged in non-farm activities. The assessment of labour supply potential of families in the project areas can better be made by looking into the family structure obtainable in those places. Among the

sample population, 240 (87.6%) reported that they were married, 32 (11.7%) were single, while two gave no response. The break-down and distribution of married participants is shown on Table 4.23. A little over 61% (147) of them reported having only one wife, 19.2% (46) had two wives, while 27 (11.2%) reported that they had three or more wives and the remaining 20 gave no response. The average number of wives for the projects combined is 1.5. It is only in Item with its average of 2.2 that the average is exceeded. The respondents reported of having a total of 1,562 children which works out at an average of 5.7 children per family exceeded again only in Item. Taking all into consideration - children, wives and the man himself - the average number of persons per family in the project area ranges from 7.1 to 9.8. Theoretically, this number constitutes the family labour pool from which a farmer can draw labour for his farm requirement. The question however, is how many of these people are, in practice, capable of actually contributing to farm labour in view of inherent disparity in potential arising from age and sex differences?

Norman (1972, pp.17-19) devised a method of computing labour contributions of individuals in a family known as "Age-sex labour Weights" (shown on Table 4.24) which takes into account age and sex differentials.

Table 4.23

Marital Status and Family Size of Participants (N = 240)

No. of wives	Adarice Adani		World Bank: Adani		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No.of wives	29	81.6	46	74.2	27	60.0	30	69.8	12	25.0	3	50.0	147	61.3
Two wives	6	16.7	13	21.0	6	13.3	5	11.6	13	27.0	3	50.0	46	19.2
Three wives and more	-	-	3	4.8	4	8.9	-	-	20	20.0	-	-	27	11.2
No response	1	2.8	-	-	8	16.8	8	18.6	3	6.3	-	-	20	8.3
Total	36		62		45		43		48		6		240	
Mean No.of wives	1.2		1.1		1.4		1.1		2.2		1.5		1.5	
Mean No.of children	5.6		5.5		5.7		5.0		6.6		5.2		5.7	
Addition of one man each	1.0		1.0		1.0		1.0		1.0		1.0		1.0	
Mean No. of persons per family	7.8		7.6		8.1		7.1		9.8		7.7		8.2	

Source: Fieldwork, 1981

In this method a male adult contribution is taken as a unit and others are scored less than a unit depending on sex and age. Baba (1975, p.98) modified the weighting measures to take into account sex differences within each age group because he reasoned that males and females have not equal capacity. His own method is quite reasonable but Norman's method was considered more relevant in this study in view of the nature of the data. From the

Table 4.24

Age-sex Labour Weights

Labour Class	Age Range (Years)	Adult Male Labour Equivalent
Small child	Less than 7	0.00
Large child	7 - 14	0.50
Female Adult	15 - 64	0.75
Male Adult	15 - 64	1.00
Female Adult	65 and over	0.50
Male Adult	65 and over	0.50

Source: D.W. Norman "An Economic Survey of Three Villages in Zaria Province" 1972, pp.17-19.

responses of the participants it was discovered that 625 (40%) of the children were under seven years of age while 547 (35%) aged between 7 and 14 years. When all is taken into account, the computation of family labour potential will give an average family in the different projects. the equivalent adult male labour shown on Table 4.25. The table reveals that the average adult male labour

Table 4.25

Family Size and Labour Potential in Different Project Locations

Age Group	Adarice Adani	World Bank Adani	World Bank Ogboji	World Bank Ufuma	World Bank Item	World Bank Ikem	Total
Children under 7 years (small child)	2.4	2.3	2.5	2.0	3.1	2.3	2.5
Children of 7-14 years (Large children)	2.0	1.9	2.1	1.8	2.8	2.0	2.2
Adult	3.4	3.4	3.5	3.3	3.9	3.4	3.5
Total Number of Persons in family	7.8	7.6	8.1	7.1	9.8	7.7	8.2
Adult Male Labour Equivalent	3.8	3.8	3.9	3.6	4.6	3.8	4.0

Source: Fieldwork, 1981

equivalent for all the projects is 4.0, but all the projects except Item had a little less than that. On basis of the figures on Table 4.25, it is easy to appreciate that an average family hardly has up to four equivalent male adult workers for its farm work even though it has over 7 persons. The number of available farm hand is in actual fact much smaller than the figure in the table when it is realised that some of the children might have got married and therefore no longer available for labour, some might have migrated out of the village/town and still others may still be in school.

There were no data gathered during the survey on the amount and intensity of family labour as well as on the labour devoted to either a particular crop or farm activity and therefore, it is neither possible to estimate the actual labour need of an average family or a unit area, nor accurately judge labour adequacy or otherwise in the project areas. Everything considered however, it is reasonable to deduce from what has been said about and from Table 4.25 that no farmer depended solely on his family for all his farm labour need. What this implies was that farmers were being compelled to look outside their families to augument their farm labour. For instance, 210 (76.6%) of the participants indicated that they used hired labour in their farms in addition to what they could get from their families, while 48 (17.5%) showed that they depended solely on hired labour in their farm work. Only 10 participants

(3.6%) reported that they depended entirely on family labour while there was no response from six participants. The degree of dependence on hired labour varies as between projects in view of variations in the number of wives and children among participants of the projects. The chi-square (X^2) test applied to evaluate the relationship between the number of wives and children of participants showed a very significant relationship at .001 level between location and the two variables. There is a fundamental difference between the project areas especially between Item and other locations in terms of number of wives and children participants have. For instance, while participants with one wife are in the majority in other locations the reverse is the case in Item - in fact, participants with two wives and above accounted for 40% of the sample population in this location and those with only one wife represented barely 24%. This is not surprising because Item location had the highest number of participants with no formal education among the projects followed by the World Bank location at Adani. And significantly enough, Adani location had the next highest percentage of participants with more than a wife.

The implication of these differentials in terms of labour availability is that Item location will have, relative to other locations, more plentiful labour. The relative abundance of labour in Item is bound to affect the labour wage and also must have partly contributed to the rate certain innovations were adopted in certain locations - such as more use of tractors and

herbicide in Adani in order to cut down labour cost possibly. It is also one of the reasons why instead of getting in-flow of migrants, especially labour, more people migrate from Item to other places (this is further discussed in Section 5.2 of Chapter V). In spite of the relative advantage in terms of labour some locations have over others, owing to the apparent plentiful labour supply, participants in all the projects indicated that the need for hired farm hands had increased tremendously since the projects came into being. Most of them also responded that they had hired more labour ever since than they used to. In fact, high cost of labour and its scarcity was top in the list of problems confronting farmers in these projects (cf. Table 5.16, Chapter V). The farmers however, could not give definite number of labour they hired or the amount it cost them in the last three years.

Labour problem in the project areas is such a serious one that at least in one of the locations an overt attempt was made to regulate its cost. This was done at Ufuma location through prescription of amounts to be paid as wages to labourers for specific farm operation. Specific farm operations and the prescribed amount payable is shown on Table 4.26. The regulation was made in order to reduce excessive labour cost particularly during the dry season cropping which incidentally coincides with the planting period of yam, cassava and other crops (See Fig. 4.2). An official

Table 4.26

Prescribed Wages for some Farm Operations at Ufuma Project

Farm Operation	Labour Cost In ₦	
	per 0.1 Hectare	per 1.0 Hectare
Bush cutting or clearing only	8.00	80.00
Clearing and packing of the cutting	10.00	100.00
Tillage	10.00	100.00
Transplanting (i) in lines	12.00	120.00
(ii) scattered	8-10.00	80-100.00
Threshing and winnowing	12.00	120.00
Transporting from the plot to storage stage - ₦1.00 per bag		

Source: Ufuma World Bank Office

who was interviewed as to how the regulation was enforced explained that a participant found to have paid more than the stipulated wage is blanklisted from land allocation register. He admitted however, that such measure had never been taken in spite of the fact that they were aware that many farmers actually paid higher than the prescribed amount in addition to feeding the labourers. The infringement of the regulation is more rampart during the dry season planting when competition for labour is exacerbated between rice farmers and traditional crop farmers. Most participants revealed that the cost of cultivating 0.1 hectare of rice could be as high as ₦150.00 when the cost of inputs like fertilizers seeds, etc. harvesting and birdscaring is taken into account - hence the need for cash credit facility to the farmers (the problem of loan is discussed in Chapter V). To ensure that the labourers do not cheat, they are hired and paid on piece rate basis rather than on time-

rate which was the traditional method of hiring labour.

It is pertinent to observe that the intensity of labour need varies from one farm operation to the other depending on whether it has to be performed within a stipulated time limit, or on whether its performance is a prerequisite for other operation - for instance, rice transplanting once started must be finished within a day if possible or at most three days. Farmer-participants indicated that their labour need is greatest for land tillage and preparation followed by rice transplanting. On the other hand fertilizer and chemical application were given as farm operations that require the least amount of labour. Table 4.27 shows the number of participants who mentioned specific farm operations as the most labour demanding. As these farm operations need different amount of labour so also do they need different type of labourers. For instance, the participants showed in their responses that demand for females and children as farm hands has increased because such farm operations as transplanting, weeding as well as bird-scaring are predominantly undertaken by these group of workers. School children in these project areas earn some extra money to satisfy some of their needs by working in the rice fields on week-ends or after school hours.

Table 4.27

Farm Activities and the Intensity of their Labour Need

Type of Farm Operation/Activity	Base No.	No. that regard it as the most labour demand	Total
Land tillage and preperation	274	148	54.0
Transplanting	274	130	47.4
Bush clearing and packing	274	106	38.7
Harvesting	274	80	29.2
Weeding	274	48	17.5
Bird scaring	274	18	6.6
Fertilizer and chemical application	274	4	1.5

Source: Fieldwork, 1981

Another source of traditional labour source for the farmers is what will be termed co-operative labour exchange. It is a system of labour exchange whereby a group of people pool their labour resources together by working on the farms of individual members in turn. The rationale behind the system is partly to save labour cost in terms of cash, partly to ensure, in the spirit of the traditional societies that every member plants and harvests his crops, and partly also to make more impact on the work done in the farm at a given time through an increased labour which the farmer could not have been able to raise either by hiring or from his family. This co-operative labour exchange was only in existence in Item, Adani World Bank and Ogboji but only

96 (35%) of the entire sample population were involved and most of these people either have no formal education or have some elementary education. Non-participants in the co-operative labour exchange, gave the following reasons for their decision not to join - that it interferes with their other activities; that some members of the group do not work conscientiously in other peoples' farms; that they were few people from their village/town in the locations with whom they could form a group. While some of the foregoing reasons may be genuine for non-participation in a system that would have alleviated the labour problem of participants, they reflect a deep-seated change taking place in the socio-economic structure of the society - the increasing monetization and individualisation of the socio-economic relationship engendered by the different 'modernisation' processes of which the projects constitute one aspect. Other sources of traditional labour supply such as voluntary labour either by an individual or a group has dried up except at Item where the writer met a group of about 20 men being entertained by a man they had worked for voluntarily. What all the foregoing boils down to is that future agricultural development must no longer be planned on the assumption of surplus labour in the family and the society waiting to be harnessed.

project farm holdings by participants are higher in Adani projects than in other locations. While at Adani, individual holdings are generally over one hectare, in other locations only a negligible few had holdings of one hectare and above. It was also observed that participants at Adani, Ufuma and Ogboji have among them more people who are migrants and those who engage in other occupations than they are in Item and Ikem locations. On the other hand, participants in the World Bank projects at Item and Adani tended to marry more wives than those in other locations. However, in Adani, Ufuma and to some extent Ogboji, participants were found to have higher educational attainment than Ikem and Item, but in terms of income participants in other locations have relatively lower incomes than those at Adani projects.

Attempt has been made to explain the possible reasons for these apparent relationship between location. Regarding variation in the size of farm holdings, it was noted that apart from the fact that the projects at Adani were larger than others, they were originally planned as a farm settlement and since settlers were meant to be commercial farmers holdings were considerably made to be bigger. It has to be observed that the present holdings are not based on those of the farm settlement days but there is a likelihood that the present farm holdings may have been influenced by the farm settlement tradition. In other areas such as Item and Ogboji, the small holdings are partly due to the smallness of the project compared to those of Adani and partly due to the desire on the part of the authorities to ensure that as many of the aspiring

4.6 Conclusion

In the foregoing analysis of production systems induced by, or emerging in the projects, a considerable degree of differences among the locations was noticed, especially with regards to variables which can be regarded as crucial in the success of any agricultural project. Contingency table analysis with chi-square test for statistical significance in relationship between project locations and the following variables - Age, Education, Income, Number of wives, size of farm holding in the project, migrant status and engagement in other occupations - revealed the existence of strong association between them as shown on Table 4.28. It is only age that is found not to have strong association with location. Specific associations observed between location and the other variables include the fact that

Table 4.28
Relationship between Location of Project and Seven Variables: Raw Chi-square (X^2) Values.

Variable	Raw Chi-square (X^2) Values	Degrees of Freedom (df)
Age	15.957	15
Education	34.121*	15
Income	44.222+	25
Number of wives of participants	72.450*	10
Size of holding in the project	152.214*	20
Engagement in other occupation	47.759*	20
Migrant Status	32.187+	5

Source: Field Work, 1981

NB: * Significant at .01 level or 1% level
+ Significant at .05 or 5% level

participants as possible are given rice plots, the size notwithstanding. The relatively high demand for plots in these locations is in turn due to the fact that the people are already growing rice and therefore eager to take advantage of the improved or modern facilities supposed to be provided in the projects. In Ufuma, and Ikem the projects are not only recent but rice growing culture is quite a new one and the people seem to be taking to it rather cautiously. The people of Item are essentially agricultural people engaged in yam, and rice cultivation and therefore needed more hands for the farms - hence the tendency for them to marry more wives unlike what obtains in other locations where the people, though farmers by occupation, are much more open to other ideas such as education, christianity and trading The pre-occupation with farm work by Item famers contributed to their low educational attainment and the consequent lower incomes as opposed to participants in other locations. Poor communication network exacerbated these differences by making some locations like Adani and Ufuma more accessible than others and therefore more attractive as places of migration destinations and places of economic opportunities.

The issue of location vis-a-vis the variables under discussion and their role in the eventual success, or failure of the projects is a crucial one. The projects emphasize the adoption of new methods in agriculture, the use of new inputs etc., but from the analysis of innovation adoption it was observed that participants position on the scale of these variables - education, income, number of wives, migration - very much determine

whether or not they adopted. It was also noted that adoption of these innovations as well as the size of holdings in turn lead to higher yield and by extension to more income and improvement in living conditions - the ultimate objective of the project. In the light of this proven relationship between location and farmers' characteristics on one hand and on the hand, between these characteristics and the projects' success or failure, the authorities should endeavour to improve not only the human resource but also the faatures of the projects. Action taken towards these directions will certainly yield handsome dividend both to the participants, the authorities and the nation.

CHAPTER V

INFRASTRUCTURAL AND INSTITUTIONAL DEVELOPMENTS

One of the main policy objectives of agricultural development in Nigeria is to increase the productivity capacity of the rural areas so as to enable the country meet the ever-increasing internal food demand and thus help reduce dependence on foreign food imports. However, another objective which policy-makers hope to achieve through agricultural projects, though not always explicitly stated, is to arrest the rising tide of population movement from rural to urban centres. These two problems are interdependent and measures taken to remove the cause of one will considerably help to solve the other. The relationship is based on the fact that food deficiency is largely due to the draining away of potential agricultural labour through rural-urban migration. It has been argued by well-informed opinions that this phenomenon can best be tackled by creating, in the rural setting, conditions comparable to what obtain in the towns which act as a 'pull' factor on the rural population. Such conditions include physical, social and economic infrastructures which are necessary for the smooth functioning of any production system. It is partly to provide nuclei around which these infrastructures are to be built in rural areas that governments embark on development projects including agricultural schemes such as the ones under study.

The concern of this chapter is therefore to analyse the rural infrastructures which have developed in these areas as a result of the projects, as well as the nature and extent of their effects both within and outside their immediate environment in terms of spatial and

social interactions. Specifically, the analysis involves the examination of the impact of the projects in terms of improvements on and establishment of new physical, social and institutional infrastructures. It is expected that such improvements in these infrastructures will produce both 'direct' and 'indirect' as well as 'induced' impacts. However, the discussion that follows centres mainly on the direct effects of the projects.

5.1 Investment and Employment

As at the end of 1980, the authorities that run the projects - Adarice Production Company Nigeria Limited and the World Bank - had funds up to the tune of about 22 million naira available to them for investment (Table 5.1). There was no information from the World Bank regarding how the money was disbursed among its various locations or utilised for specific projects. Adarice Production Company put ₦7.5 million representing 60.8% of its fund into capital investments, and ₦4.1 million (33.3%) in revenue or recurrent expenditure. These investments obviously must have generated employment both for general administration and construction within the areas concerned and employment is one of the means through which the benefits of the projects are expected to 'trickle' down to the people - hence, the impacts of these projects could be judged by the amount of labour generated and the number of and in what capacity the people of the project areas were employed.

Table 5.1

Funds Available to the Project Authorities since Inception

(a) Adarice Production Company Limited[1]	
	₦
(i) Capital paid by Anambra State Government	2,542,000.00
(ii) Loans and Overdrafts from various Banks	7,539,200.00
(iii) Internally generated income from sales of rice from 1976-1980	2,232,014.45
Total	12,313,214.45
(b) World Bank Project	₦
(i) World Bank	4,733,500.00*
(ii) Federal Government Share of fund for the projects	2,366,750.00[2]
(iii) Anambra State Government share of fund for the projects	2,366,750.00*
Total	9,467,000.00

Source: (1) Adarice Production Nigeria Ltd. Office, Adani

(2) Federal Department of Agriculture, Lagos: 1979-80 Annual Report.

* Estimates based on the terms of agreement which provides that funding the project should be shared by the World Bank, Federal and State Governments at the ratio of 50%, 25% and 25%.

As of the middle of 1981, Adarice Production Company at Adani had in its employ a total of 385 people comprising 135 permanent staff of all categories and 250 casual labourers. The World Bank at its various projects also had 400 permanent staff as well as 300 casual labourers. The Adarice Company proportionately had more casual

labourers than the World Bank because it engages in some direct farming. Fig. 5.1 shows the contributions from various local government areas in Anambra State of of workers both in magnitude and proportion of different categories in all the projects combined. On Table 5.2 is shown the areas from where workers of Adarice were drawn. About 18.7% of the labour force employed in the project is drawn from Adani and its environs. However, most of these, 111 of them representing 79.3%, belong to the lowest category - the seasonal or casual labour. Three of the contiguous local government areas of Nsukka, Igbo-Etiti and Udi contributed 127 (or 34%) of the workers in the project, while Nsukka, Igbo-Etiti, Igbo-Eze and Isi-Uzo that have political and social affiliation with Uzo-uwani combined, made up 44.6% of the entire work-force on the project. Altogether five local government areas - Nsukka, Igbo-Etiti, Igbo-Eze, Isi-Uzo and Udi - which are either geographically or socio-culturally related to Uzo-Uwani contributed 190 (49.4%) or almost half of the people employed on the Adarice project. The four remaining local governments of Aguata, Oji River, Ikwo and Ishielu which are further away from Uzo-Uwani between them contributed 55 or 14.3% of the direct labour force in Adarice Production Company Project, at Adani. Fig. 5.2 shows the spatial distribution of the origins of workers at Adani for both Adarice and World Bank projects.

Of the 400 permanent staff employed by the World Bank, 141 were deployed in Imo State, the co-sponsors of the rice projects being managed by the Bank.

FIG. 5-1 SIZE AND PREPORTION OF DIFFERENT CATEGORIES OF WORKERS CONTRIBUTED BY VARIOUS LOCAL GOVERNMENT AREAS IN ANAMBRA STATE IN BOTH ADARICE AND WORLD BANK PROJECTS COMBINED

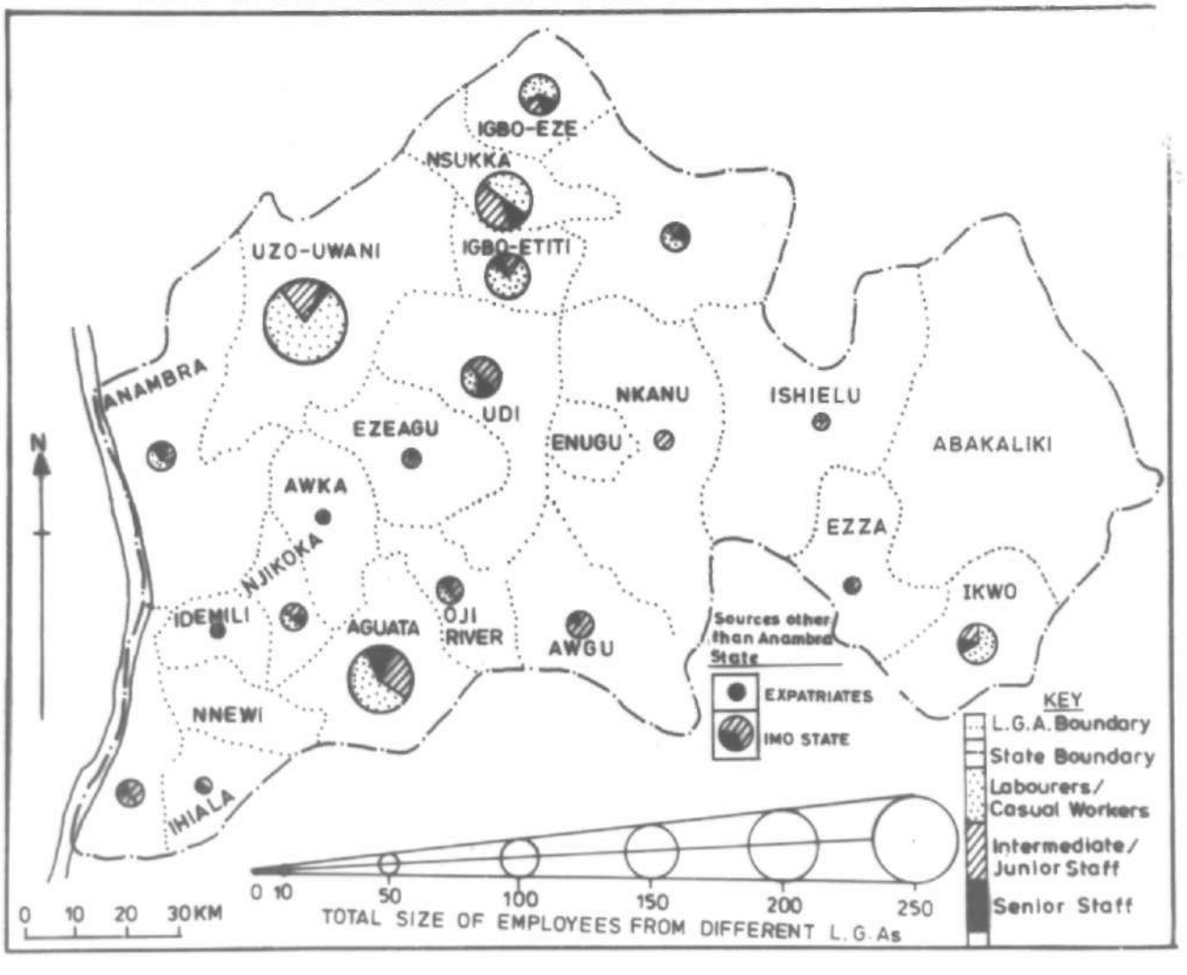


Table 5.2

Sources of Adarice Production Company Work Force at Adani

Sources (Local Government Areas)	Category (Cadre) of Workers/staff						Total Number of Staff/Workers	
	Senior		Intermediate And Junior		Casual/Labourers			
	No.	%	No.	%	No.	%	No.	%
Adani and Environs	-	-	10	10.5	62	24.8	72	18.7
Uzo-Uwani-others	2	5.0	17	17.9	49	19.6	68	17.7
Nsukka	10	25.0	15	15.8	38	15.2	63	16.6
Igbo-Etiti	4	10.0	8	8.4	33	13.2	45	11.7
Igbo-Eze	7	17.5	12	12.6	14	5.6	33	8.6
Isi-Uzo	5	12.5	5	5.3	20	8.0	30	7.7
Aguata	6	15.0	13	13.7	9	3.6	28	7.3
Udi	-	-	7	7.3	12	4.8	19	4.8
Oji River	4	10.0	2	2.1	6	2.4	12	3.1
Ikwo	2	5.0	1	1.0	6	2.4	9	2.3
Ishielu	-	-	5	5.3	1	0.4	6	1.6
Total ..	40	100.0	95	100.0	250	100.0	385	100.0

Source: Fieldwork, 1981

remaining 259 permanent staff and the 300 casual labourers are in Anambra State located projects and are distributed

Table 5.3

Distribution of World Bank Employees According to Project Locations

Project Locations	Permanent Staff		Labourers/ Casual Workers		Total	
	No.	%	No.	%	No.	%
Enugu Headqtrs. Office	149	57.5	-	-	149	26.7
Adani	40	15.5	150	50.0	190	34.0
Ogboji	29	11.2	74	24.7	103	18.4
Ufuma	16	6.2	30	10.0	46	8.2
Item	14	5.4	28	9.3	42	7.5
Ikem	11	4.2	18	6.0	29	5.2
Total	259	100.0	300	100.0	559	100.0

Source: Field Work, 1981

as shown on Table 5.3. The table reveals that over 50% of the employees of the World Bank were deployed at the headquarters office in Enugu, outside the areas where the projects are located and the actual farming is done. In the five World Bank projects, the staff live within the villages/towns where they are located except in Item, where they live in Abakaliki, 56 kilometres away from where they travel to the farm site/office every day. This fact, testifies to the remoteness and unattractiveness of Item. No doubt, where workers live outside their operational locations, the anticipated stimulating effects of their demand and presence in the rural economy will

remain largely unrealised.

In Appendix IV is shown the sources, both within and outside, the state from where workers in the different world Bank project locations are drawn. The workers at the headquarters office accounts for 52.4% and 60.0% of the senior and intermediate/junior staff categories, but only 26.3% of all types of workers in all the Bank's projects put together. In the Enugu headquarters office, over one quarter (26.2%) of the staff came from Imo State but they constitute 32.6% and 23.6% of the senior and intermediate/ junior categories respectively. There were also five expatriates, all of them senior staff incharge of different sections of the projects' operations such as Agronomy, Irrigation, Civil Engineering etc. The rest of the employees were drawn from ten local government areas in the State with Udi, Awgu and Nkanu which are contiguous with Enugu contributing 36 (24%) workers. While Nsukka Local Government has the largest number of intermediate/junior workers, Aguata dominated in the senior category. In the field locations of Adani, Ogboji, Ufuma, Item and Ikem the workers have tended to be drawn from within the immediate village/town and the local government area in which a given project is located. For instance, the percentage of these for different locations is Adani (49%), Ogboji (71%), Ufuma (70%), Item (80%) and Ikem (93%). It is however pertinent to observe that the bulk of these workers drawn from the village/town and local government area of given project location belong to the casual labourer category - Adani (52.6%), Ogboji (73%), Ufuma (76.6%), Item (100%), and Ikem (100%). On the other hand, the source origins of the workers

within the permanent category, both senior and junior, tend to be more diffused throughout the state but generally a high proportion of them is drawn from local government areas outside the ones where the projects are located. The spatial distribution of workers in different project locations is illustrated in Figs. 5.2, 5.3 and 5.4.

There is other type of direct employment in the project locations such as in construction of roads, culverts, houses and building of storage facilities and offices. These are normally contracted out and generally they involve very heavy amount of money. There is no reason to believe that the indigenes of the areas where the projects are located will be more fortunate in winning these contract works than they are in securing permanent employment. They are, however, the people mostly employed by the contractors and also given such menial contract jobs in the farm locations as canal digging, channel clearing, bund building and repair, bush clearing and stumping. Even though there were no available data to ascertain who and from where those who secured juicy contracts from the projects come, but considering the fact that only minor contracts generally go to the indigenes where the projects are located and also that in direct employment they tend to get opportunity mainly in casual labour and to some extent intermediate/junior categories, it is not difficult to reach to the conclusion that the employment created by the projects tend to benefit more the people and places outside these localities.

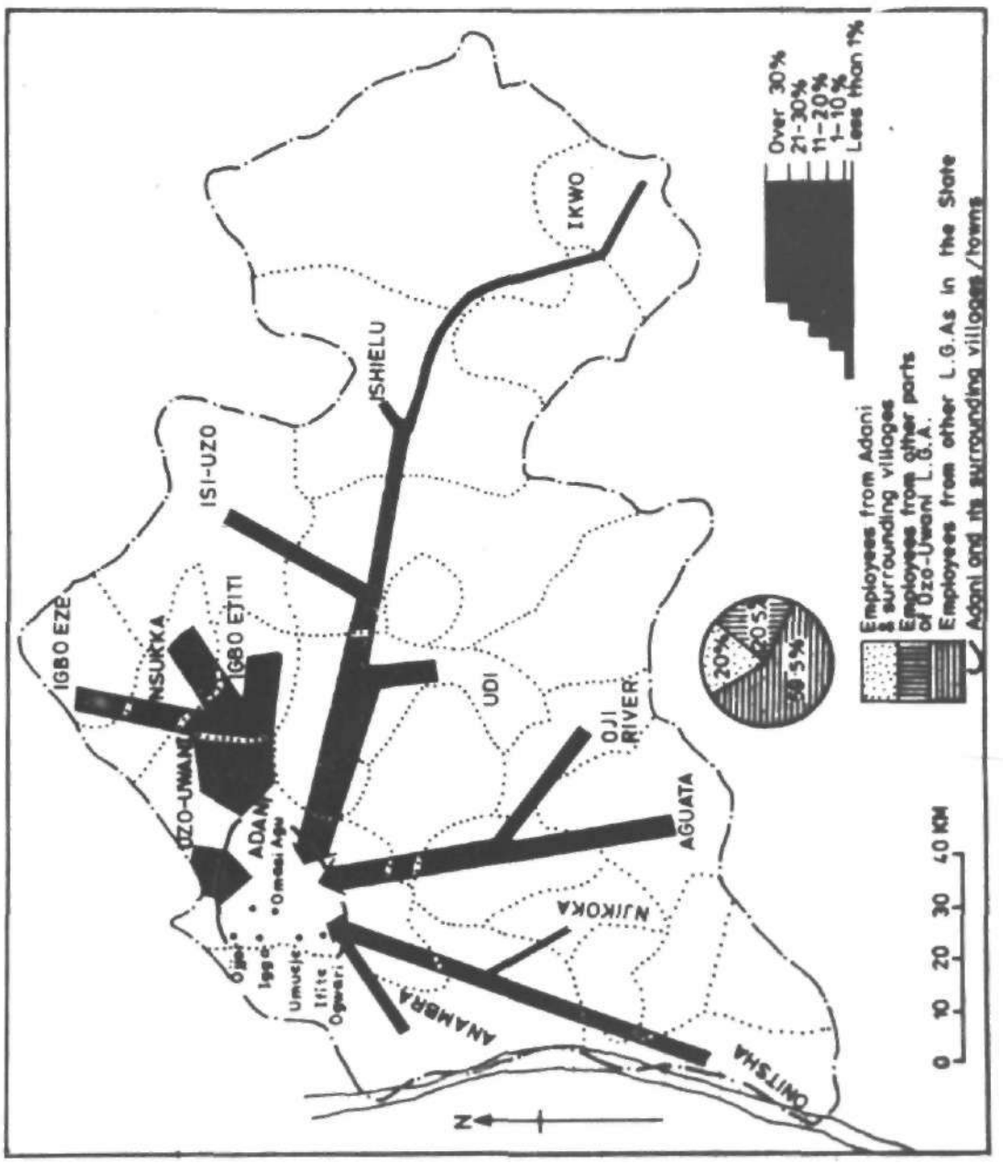


FIG. 5·2 SPATIAL DISTRIBUTION OF DIRECT EMPLOYEES IN ADARICE PROJECT AT ADANI UZO-UWANI L.G.A

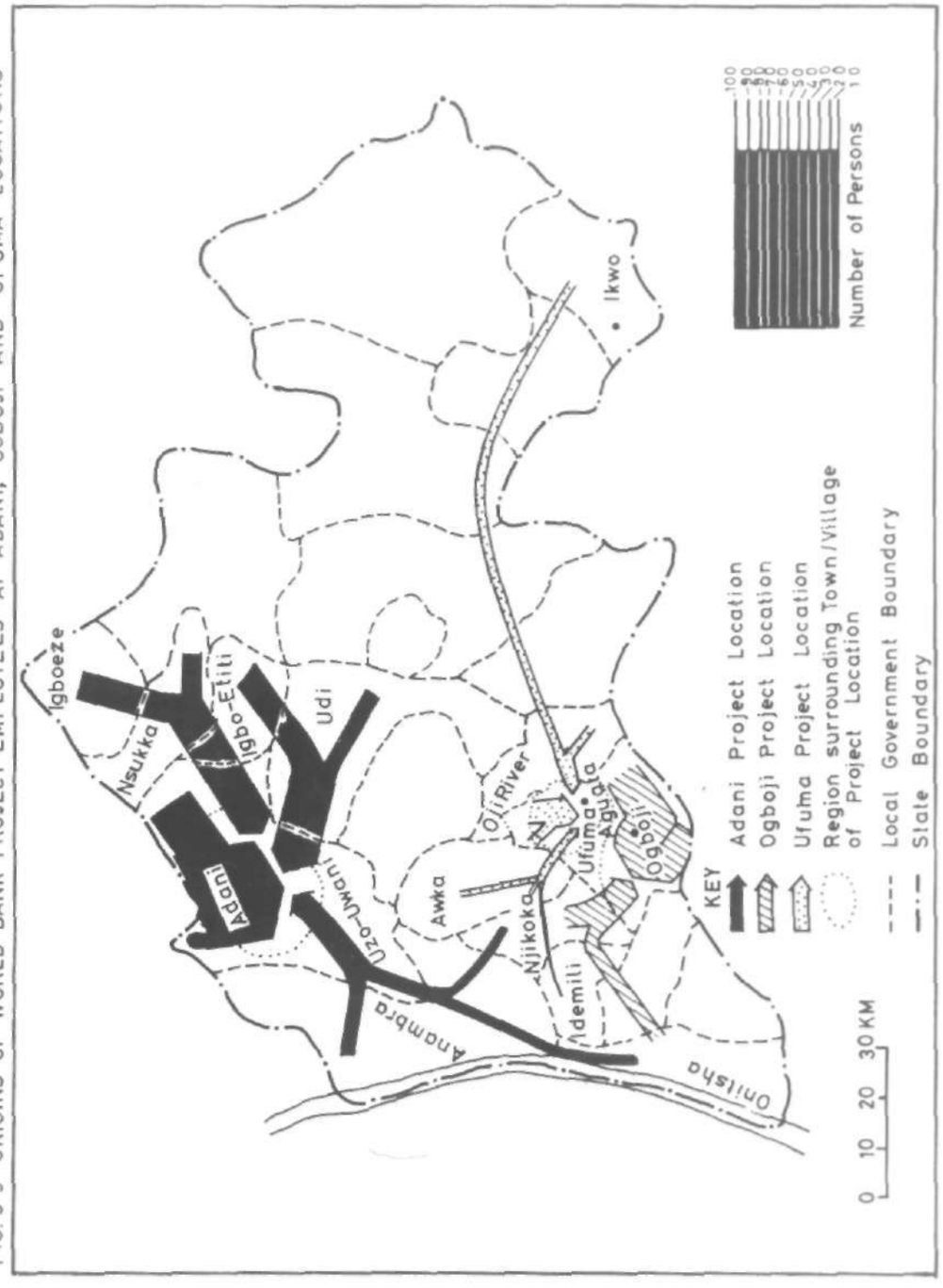


FIG. 5·3 ORIGINS OF WORLD BANK PROJECT EMPLOYEES AT ADANI, OGBOJI AND UFUMA LOCATIONS

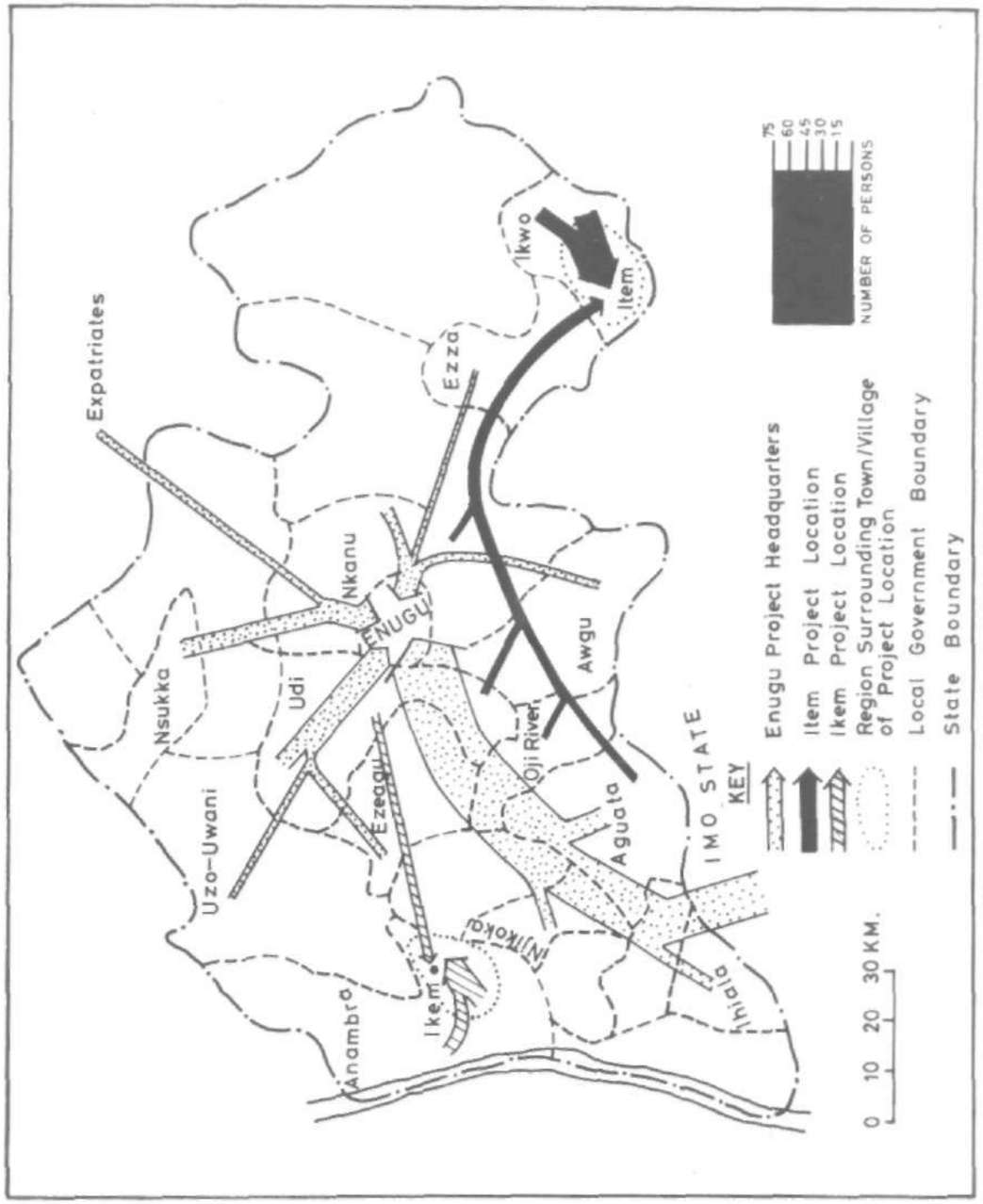


FIG. 5·4 ORIGINS OF WORLD BANK PROJECTS EMPLOYEES AT ENUGU ITEM AND IKEM LOCATIONS

5.2 Population Mobility: Labour Movement

In the last chapter the resultant exacerbation of labour demand situation as a result of the introduction of rice growing into an already established cropping system and the consequent inability of the traditional family unit to meet its own labour requirement any longer for both rice and other crops, was discussed. The resulting increased labour demand from this situation and the possibility of being able to secure land from the project authorities, if one is inclined to rice farming, naturally combined to create in these areas opportunities for people in rural areas in search of extra cash income either as farm labour, or in form of additional farmlands. Reaction to these opportunities has given rise to the movement of people into these areas both as labourers and farmers. Population mobility or migration especially between rural areas has been associated in Nigeria with agricultural development such as the introduction of new cash crop like cocoa, rubber cotton etc. or land availability. This phenomenon and its effect on the development of the country's economy has been noted by many scholars (Tiffen, 1976, pp.147-60; Udo, 1975; Prothero, 1958; Green, 1970). Rural-rural migration set off by modern development projects, particularly agricultural works, has been documented both here in Nigeria and elsewhere (Baba, 1980; Wallace, 1980; Essang and Ogunfowora, 1975; Chambers and Harris 1980; pp.311-12, 320-1).

The rural-rural population movement into the project areas is discussed under two sub-headings - labour and farmers. With regard to labour, most farmers, in fact 76.6% of them indicated that they had hired labour to supplement

their family labour while 48 (17.5%) of the respondents declared that they relied entirely on hired labour to run their project farms. Only 10 respondents (3.6%) indicated that all their labour needs were met from their families while 6 (2.3%) gave no reply to this question. While some of these farmers, even before the coming of the project made use of hired labour, they indicated that most of such labourers were drawn within the village or town as well as the surrounding villages/towns up to a radius of about 20 kilometres - in fact as high as 84% - and other towns within the local government area. Some labour, though less significant, about 10%, were also drawn from outside the respective local government areas where the projects are located. The LGAs often mentioned by the respondents as extra sources of labour before the projects came, include Awgu, Oji River and Nsukka. (It is pertinent to mention here that Nsukka, like Abakaliki, is a generic name often used to refer to a much wider geographical area than the present local government areas bearing those names).

However, with the coming of the projects, the sources of labour, in terms of local government areas, have not only increased but have also become more diversified. Table 5.4 shows the contributions of different local government areas to the migrant labour pool in the project locations. The data for the table were derived from the employers (respondents) of labour who were asked to name the places of their present labour supply. From the table, it can easily be seen that the preponderant proportion of the labourers are

still being drawn from the surrounding towns and villages within the same local government areas where individual projects are located. However, labour was also drawn from outside the local government areas. For instance, Adarice and World Bank projects at Adani drew their labour from nine more local government areas in addition to Imo and Benue States. Farmers at Ogboji and Ufuma locations indicated that their hired labour were drawn from seven and eight local government areas respectively; while in the former location, some labour was also drawn from Imo State. Item and Ikem locations got their extra labour from one other local government area each besides their own.

Labour supply to Adani from Benue State can be attributed to geographical contiguity as well as ethnic similarity between the people of Benue State and the inhabitants of Ogrugu, Igga and Ojjo villages/ towns in Uzo-Uwani - in language and culture. The same factor of contiguity partly explains the supply of labour to Ogboji location from Imo State.
The less diversified labour source of Item can be explained partly by the fact that the area has more than the average internal labour supply for the project areas as a whole (see section 4.4, Chapter IV) and partly also by its relative remoteness owing to poor communication. The Ikem project also drew its labour from one more local government area in addition to Anambra. It can be explained by the smallness of the project in the area. On the other hand, while Adani

Table 5.4

Sources of Hired Labour Available in Different Project Locations by Local Government Areas

Sources Areas States/Local Government Areas	Ada-ricc Adani	World Bank Adani	World Bank Ogboji	World Bank Ufuma	World Bank Item	World Bank Ikem	Total
Uzo-Uwani*	123	190	2	5			320
Aguata*	3	3	169	37			212
Ikwo*			2	15	181		198
Abakaliki	3	5	36	50		6	100
Nsukka	14	26	23	22			85
Ezza			11	4	24		39
Igbo-Eze	11	10					21
Oji River				21			21
Anambra*	2	1				14	17
Igbo-Etiti	4	2					12
Ishielu	2		5				7
Awgu		1	2	3			6
Udi	1	5					6
Isi-Uzo	2	1					3
Nkanu				2			2
Other states							
Imo	3	1	8				12
Benue	6	5					11
Total of Sources	12	12	9	9	2	2	17

Source: Fieldwork, 1981

Note(1) *Local Government Areas within which projects are located.

(2) The underlined figures refer to the amount of labour supplied by the local government area in which the project is located.

projects got most of their labourers from local government areas which are within the Nsukka zone (Uzo-Uwani, Igbo-Eze, Igbo-Etiti, Nsukka and Isi-Uzo) and whose people also have some social as well as cultural affiliation, Ufuma and Ogboji locations had very few, if any labour from areas adjacent to them. Rather the bulk of their labourers were drawn from Local government areas that are relatively far from them - Abakaliki, Nsukka, Ikwo, and Ezza. The most important labour supply sources in terms of volume and diversification of the destination of their labourers are Abakaliki, Nsukka, Ezza, Igbo-Etiti, Awgu and Igbo-Eze local government areas - all in the northern section of the State. All the local government areas where these projects are located still export some labour. While this may not necessarily imply the existence of relatively surplus exportable labour, except possibly Ikwo, it certainly can be partly attributed to the practice of farmers preferring labourers from their home localities, even if it means taking the trouble of their transportation to and fro, as well as accommodation. Also, some hard pressed farmers do hire themselves out from time to time for immediate cash income. Fig. 5.5 shows the contributions of labour to the project area from different local government areas.

The labour supply pattern generated by the projects can thus be summarised in these observations. Most of the labour came from the local government areas of the Nsukka plateau and those of the Cross River basin. It is likely that labourers from the non-rice growing Nsukka plateau might have been attracted to the project areas

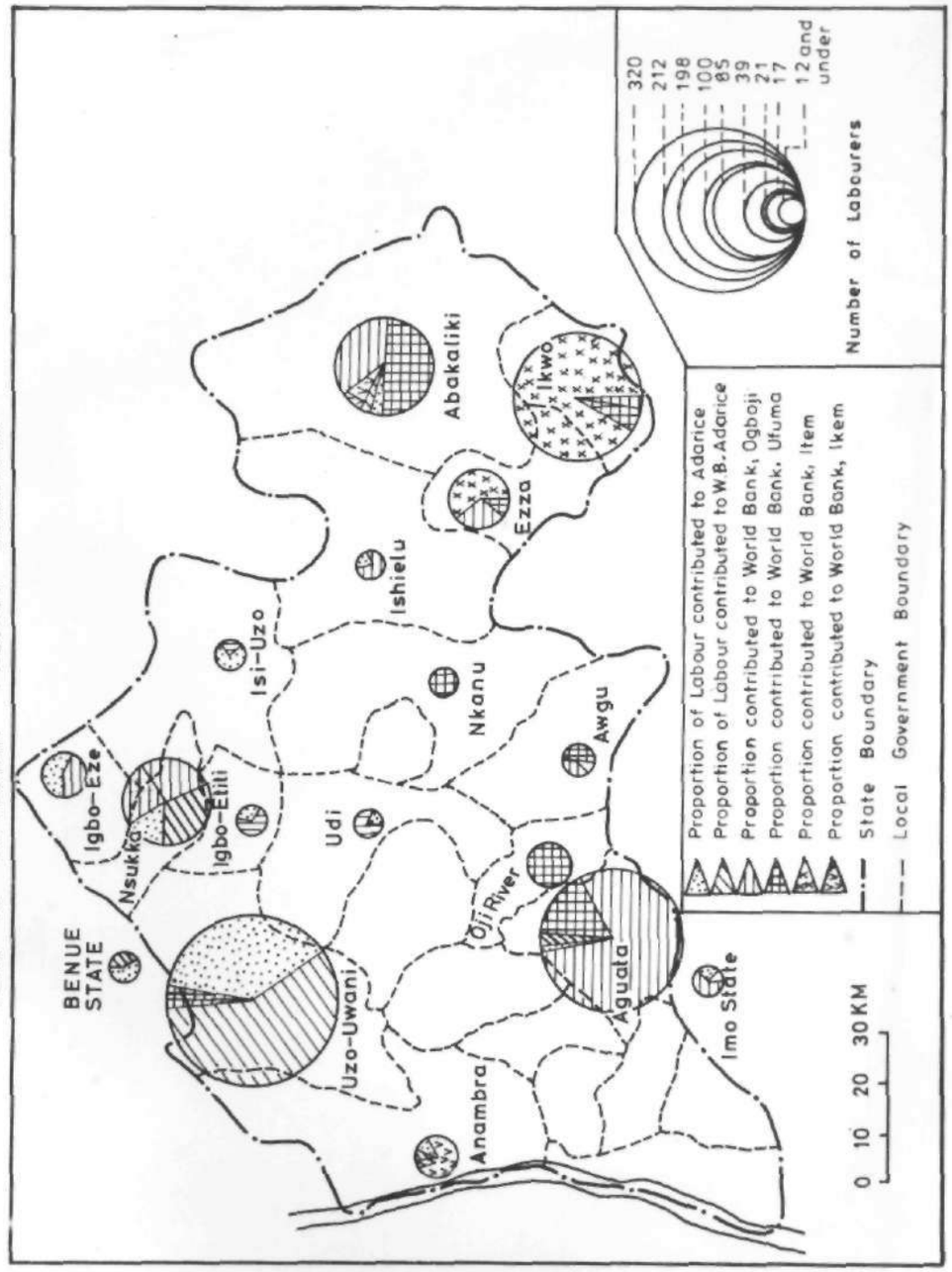


FIG. 5·5 ANAMBRA STATE: SIZE AND PROPORTION OF FARM LABOUR CONTRIBUTION FROM LGAs TO DIFFERENT PROJECT LOCATIONS

mainly by a possible higher labour wage, while those from the rice growing Cross River basin might have been pulled to these locations not only by the higher wages but also by the prospect of participating in the actual rice farming. Secondly, there is very little if any supply of labour from the high density but poor soils of Awka upland local government areas. This is rather surprising considering the fact that Udo (1975) identified this region as migrants exporting area. This apparent anomaly can be attributed to the fact that the would-be migrants from this region tend, because of their relative higher education, to see petty trading and other related occupations as more lucrative than farming. Thirdly, in spite of the inward population movement into these project areas, the outward flow of people from them do not seem to have been abated.

5.3 Population Movement: Migrant Farmers

On Table 5.5 is shown the number of participants in each project who indicated that they came from outside the villages/towns in which the projects were located. Thirty-four percent or 93 of the participants were migrants. More than half of these participants (52) representing 55.9% were found at Adani projects. The remaining 41 migrant participants were distributed as follows - Ufuma (21 or 22.6%), Ogboji (16 or 17.2%), Item and Ikem (2 or 2.3%) each. It is easy to see that the migrant participants were concentrated at Adani and Ufuma locations with Item and Ikem having only very few.

Table 5.5

Distribution of Migrants and Non-Migrants by Locations

Participants' Status	Ada-rice Adani		World Bank Adani		World Bank Ogboji		World Bank Ufuma		World Bank Item		World Bank Ikem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Migrant	17	41.5	35	51.5	16	28.6	21	39.6	2	4.0	2	33.3	93	33.9
Non-migrant	24	58.5	33	48.5	40	71.4	32	60.4	48	96.0	4	66.7	181	66.1
Total	41		68		56		53		50		6		274	

Source: Fieldwork, 1981

The distribution of the migrant population by local government areas shown on Table 5.6 revealed that four of the 16 local government areas mentioned by the migrants as their origin - Isi-Uzo, Aguata, Ikwo and Nsukka - between them accounted for almost 50% of migrant farmer population. Udi, Awgu and Igbo-Eze Local governments as well as Imo State also contributed significantly. Unlike in the case of labour in which a high proportion was generated within the logal government areas in which the projects are located, migrant farmers tend to come mostly from outside, though adjacent local government areas - for instance, most if not all migrants from Nsukka, Isi-Uzo, Igbo-Eze and Igbo-Etiti go mostly to Adani. However, in Ufuma location almost 50% of the migrants come from a far away local government of Ikwo. It is interesting to note that a good number of the labourers in this location also came from Ikwo. Like in labour supply, most migrant farmers come from the local government areas of Nsukka plateau and the Cross River basin, but unlike in the case of labour movement, the local government areas of the Awka Upland supplied more migrant farmers than they did in farm labour but on the whole, they are not a major source of out-migration as far as rice farming and its labour are concerned. A possible explanation of this situation was given in the last section.

Table 5.6

Sources of Migrant Farmers/Participants by Local Government Areas

Source-Local Government Areas/Others	Ada-rice Adani	World Bank Adani	World Bank Ogboji	World Bank Ufuma	World Bank Item	World Bank Ikem	Total No.	Total %
Isi-Uzo	4	10		1			15	16.1
Aguata	1	1	6	4			12	12.9
Ikwo			1	9	1		11	11.8
Nsukka	4	4					8	8.6
Udi		4	1	1	1		7	7.5
Awgu		1	2	3			6	6.5
Igbo-Eze	2	4					6	6.5
Uzo-Uwani	1	3					4	4.3
Anambra	2	1					3	3.2
Ishielu	1					2	3	3.2
Njikoka			2	1			3	3.2
Ihiala	1	1					2	2.15
Onitsha			1	1			2	2.15
Igbo-Etiti		2					2	2.15
Awka				1			1	1.1
Nkanu			1				1	1.1
Others								
Imo State	1	4	2				7	7.5
Total	17	35	16	21	2	2	93	100.0

Source: Fieldwork, 1981

However, not all the migrant participants were in the projects as full-time farmers. Table 5.7 shows that about 56% of the migrants indicated that they were engaged in farming on full-time basis while 42% were either teachers, public servants or self employed as artisans and traders. But they were attracted by

Table 5.7

Distribution of Participant Migrants by Occupation
(N = 93)

Occupational Type	Number	Percentage of Total
Full-time farming	52	55.9
Employee of Projects/ Public Establishment	16	17.2
Teaching	13	14.0
Trading	7	7.5
Artisans eg. tailoring, Carpentry, etc.	3	3.2
No Response	2	2.2
Total	93	100.0

Source: Fieldwork, 1981

opportunities of rice farming offered by the projects as avenues of investment both for extra income and food. It is from this category of migrants that the local government areas of the Awka Upland-Awka, Njikoka, Ihiala and Onitsha - were represented in the group of migrant farmers, and therefore goes to explain that migrants from these areas are not really interested in rice farming on full time basis. The extra money this group of participants get from their jobs partly

explains why they were ready to adopt some of the innovations introduced by the projects as already referred to in Chapter IV.

The migrants moved for various reasons. The most important one given by the respondents was that they were influenced to move by the interest they have in rice farming which is more profitable than other crops. Forty respondents representing 43% gave this as their reason. The prospect of securing land that is not only more fertile than what they had at home but also more extensive for both rice and other crop farming was given by 29 (31.2%); while 23 (24.8%) replied that their main reason was the prospects of employment or other business with the remaining two giving no response. From the above answers, it is clear that migrants are enticed to move by the prospects of easy land acquisition as well as possibility of profitable agriculture. These prospects however do not explain why migrants choose specific locations rather than another. Table 5.8 shows the responses given by the migrants for their choice of destination. The reasons once again underscores the important role information plays in the choice of possible alternative destinations in migration process and the dependence for the accuracy of such information on distance and connections (information field), that is, the factors of nearness and relations.

While only two of the migrants indicated that they would like to settle permanently in the places where they are presently living as many as 51 (54.8%) would

Table 5.8

Reasons Why Migrants Choose Specific Projects as Destinations

Reasons	Base No.	Frequency of Mention	Percentage of Total
Nearness of project to own village/town	93	42	45.2
Posted as employee/worker in the area	93	25	26.9
Previous familiary with area	93	24	25.8
Presence of relatives/friends	93	47	50.5

Source: Fieldwork, 1981

live in their areas of destination for as long as they were doing well in either farming or business, the remaining 40 migrants indicated that they were likely to live in their areas for more number of years ranging from 5 to 30. The foregoing answers reveal that while only very few of the migrants were prepared to live in their areas of destination for good, a good number of them plan for a fairly long stay. This, together with the fact that as many as 70 or 75.3% of the migrants live with their families, naturally raises the issue of accommodation-do they rent houses or build their own. The demand for houses by the migrants has led to a relative commercialisation of houses in rural areas particularly at Adani and Ufuma - the major areas of migrant destination. Table 5.9 shows that 67 (72%) of the migrants were living in rented rooms/houses while 13 (14%) live in owner-built houses. Most of those who live in rented houses, in fact 46 (68.7%) of them

Table 5.9

Modes of Accommodation of Migrants in the Project Areas (N = 93)

Accommodation Mode	Number	Percentage of Total
Rented rooms/houses	67	72.0
Occupier-built houses	13	14.0
Living with relations/friends	10	10.8
No response	3	3.2
	93	100.0

Source: Fieldwork, 1981

rented two rooms, 17 (25.4%) had only one room each and four (6.0%) rented three to four rooms. The amount of rent paid for each room monthly varies, but the average was ₦5.00, though some indicated that they were paying ₦3.00 while five participants said that they were paying ₦7.00 to ₦8.00. Those migrants living in their own houses, had to acquire land and this they did by either outright purchase from individuals or families, or through traditional lease agreements in which it is understood that the land would revert to the original owners after the settler packs out to another place or leaves the town. These transactions over land for residential purposes by migrants in the project areas, and increased land demand for farming together combine to accelerate emerging trend of monetization of land transaction - a process partly helped to set in motion by the projects and which had been discussed in section 4.2 of Chapter IV. While this trend may bring money

to some people in the rural areas, it is likely to lead to increased land speculation, weakening of the traditional land-tenure system and in the process bring about the proletarisation of the rural people.

5.4 Institutional Development

The success of agricultural programmes depends, to a very large extent, on the provision of the necessary institutions that will facilitate both the production and distribution of commodities. The institutions or facilities that are supposed to be part of the projects include - training and research, farm service centres, credit system, product marketing, farmer organisations and social services. Not all the foregoing facilities are intended for the direct use or benefit of the farmers such as the training and research, as well as farm service centres, but others like credit, marketing and farmers' organisations as well as social facilities impinge directly on the farmers' ability to produce.

Among these facilities, credit takes a very prominent position because without it, farmers can hardly improve their operations through investment in form of new inputs and labour - hence a French proverb (quoted by Padmanabhan, 1982, p.21) says of credit that it "supports the farmer as the hangman's rope supports the hanged" - in fact, many participants complained that they could neither use some of the innovations nor hire extra needed labour because of financial constraints. The question that readily comes to mind is to what extent have the projects helped in ameliorating this

problem of credit. The relevance of this question can be appreciated by the fact that only 17 (6.2%) of the sample population of 274 indicated that they had not sought for a loan because their personal resources were sufficient for their present operations. Even this group would need some form of credit for expansion, but as for the rest, they were positive in their conviction that lack of loan is a serious set-back for them. One form of credit provided by the projects comprised subsidized inputs like fertilisers, chemicals and other services like chemical application, land clearing and tillage etc. Apart from their subsidized prices, payment for them could be deferred until after harvest. However, as already mentioned in the preceeding chapter, section 4.3, farmers were often constrained to get these inputs from other sources owing to their insufficient quantity as well as lateness in coming.

Because of this, the case for credit in form of cash becomes obvious, particularly when the need for labour is also taken into account. However, only very few of the participants admitted of actually having used a loan at one time or the other between 1978 and 1980 as shown on Table 5.10, for the total amount of loan involved and the average loan per individual. While the average loan barely exceeded ₦100.00 in each of the years, the actual amount got by individuals ranged from as low as ₦50.00 to as high as ₦900.00. A test of relationship between, and significance on the amount and difference of loan received by individuals and groups, showed that

Table 5.10

Number of Participants Ever Used Loan from 1978 to 1980

Year	Absolute Number	Number that use loan		Amt.of money involved	
		No.	Percentage Of Total	Yearly Total Amount	Yearly Average of Loan
1978	274	55	20.1	₦6,335.00	₦ 115.18
1979	274	61	22.3	9,194.00	150.72
1980	274	125	45.6	16,619.00	133.00

Source: Fieldwork, 1981

none of the following factors - location, age and education of the participant, whether or not the participant was a migrant, or had one or more wives, as well as his annual income and area cultivated - had any discernible relationship or significant impact. It is not surprising that none of the listed factors showed significant influence on the amount of loan received or used since lending institutions and government actually take little or no positive step to give money to rural people to improve their farming in spite of rhetorics to the contrary. Apart from the smallness of the loans taken by participants, the sources are mainly from the traditional channels - friends, relations, money-lenders as shown on Table 5.11. It is clear from the table that participants did not receive any direct cash credit from the projects, at least, there was no mention of such, or from the government. However, there was a plan under way to grant loan to the participants by the Federal Government through the World Bank for the 1981 wet season planting (see Appendix V for a specimen application form for the

Table 5.11

Main Sources of Loan Used by the Participants

Type of Source	Number of Times Mentioned
Friends	69
Relations - wives/husband/children etc.	30
Money Lenders	29
Co-operatives/societies/meetings	28
Others	6

Source: Fieldwork, 1981

proposed loan). The authorities at the World Bank project, in defence of their policy of credit facility to the farmers explained that what they felt farmers needed in the final analysis were farm inputs and that the projects were doing their best to supply these to them. On the other hand Adarice Production Company has no credit facility because according to one of its officials, "it is a limited liability company out to make profit and not a lending organisation for the farmers" - in fact, the company insists on cash payments by the farmers for the inputs it supplies except for the members of its staff. It is easy to conclude that there has not been a well developed credit system in the projects to which farmers could turn for cash. The importance of evolving such a system cannot be underestimated, the provision of credit in kind notwithstanding, because labour, which accounts for 50% of the total cost of farming investment, is yet to be replaced in these projects. And moreover, there are other social obligations which need money to be solved for farmers

to be able to devote their full attention to their farms.

In the area of organising farmers there is not much progress. For instance, Advance had no policy of organising farmers into co-operatives or unions because it had no intention of making use of formal farmers' organisation in its management. In fact, co-operative shop and health centre which were in existence for and used by the original farm settlers were either disbanded, closed or rendered impotent as part of the measures by the Company to break the resistance and solidarity of the settlers (Section 4.2, Chapter IV). It could, with some justification, be concluded that the Company, while it has not overtly forbidden or discouraged its participant farmers from forming co-operatives/unions, it has certainly not created conducive atmosphere for such organisations to take root and flourish.

On the other hand, the World Bank has a policy, at least in principle of helping or encouraging its farmers to form co-operatives because it envisages to hand over the running of the projects to these co-operatives when its management term must have expired. As of September, 1981, 29 co-operative societies were at different stages of formation, and they were distributed according to different locations as shown on Table 5.12. Membership of these societies ranges from a low of 10 to as high as 213 people. These

Table 5.12

Number of Co-operative Societies In Different World Bank Project Locations

Location	Number of Co-operatives
World Bank, Adani	16
World Bank, Ogboji	6
World Bank, Ufuma	4
World Bank, Item	3
World Bank, Ikem	0
Total	29

Source: Fieldwork, 1981

with large number of members tend to be the ones already in existence before the projects came, as multi-purpose co-operatives, These include the ones at Ogboji, Item and some at Adani and membership include both participants and non-participants in the project farming. One of the objectives of the World Bank projects with regards to co-operatives is to use them as operational organisations in the farms. To this end they would be assigned blocks of farm land large enough for the use of machines and large scale inputs. However, because the co-operatives have not been well organised or non-existent in some areas, as to be able to manage collective farming, allocation of farm plots is still done on individual basis

(see Appendix V, paragraph 2), though during the wet season cropping of 1981, three co-operatives in Ogboji operational area were each allocated farm blocks of 10 hectares.

Even though the World Bank project has as its main objectives the organisation of farmers, no appreciable step was taken to this end until 1981. And this belated attempt can even be argued to have been influenced by the desire to take advantage of the Federal Government land clearance and loan schemes under the Green Revolution Programme made conditional on the formation and membership of a co-operative as can be discerned from Appendix VI setting out proposal for the formation of co-operatives. In fact shortly after this circular letter, another one was sent out to the various locations instructing Farm Managers to allocate about 10 hectares of land to each co-operative society so as to make them eligible to enjoy the land clearance scheme, to nominate one tractor driver trainee for each group to be trained free of charge by the Federal Government (presumably to work in the society's farm) and also ensure that they applied for a loan (see also Appendix V.) The idea of using co-operatives as instruments of farm organisation and management is laudable but it is not difficult to see that they will develop as mere dependent organs incapable of taking their own initiative, considering the way they were being evolved in the project locations. To guard against this and to ensure viable farmers' organisations, there should

be well-defined guidelines as to who should be a member and the role of project and government officials in them. As far as possible, the members should be given free-hand in decision making within their societies, without undue interference from project officials, or any outsider for that matter.

5.5 Marketing Facilities

One of the problems of the rural production system is that of marketing of the products. The rural markets provide channels through which rural products reach consumers, but because of the absence of such facilities like storage and price adjustment mechanism, which should normally form part of formal marketing system, farmers face a lot of price fluctuations both between seasons and places which adversely affect their income and well-being. Both Adarice and the World Bank have marketing facilities for their participant farmers. Farmers are expected to sell their products to the authorities at prices previously announced at the beginning of harvest. During the period covered by the survey, the prices shown below were fixed for a standard bag of rice paddy of 75kg. for short and long-grained rice respectively.

1979 -	Short-grain	₦22.0
	Long-grain	₦24.00
1980 -	Short-grain	₦31.50
	Long-grain	₦35.00
1981 -	All varieties	₦40.00

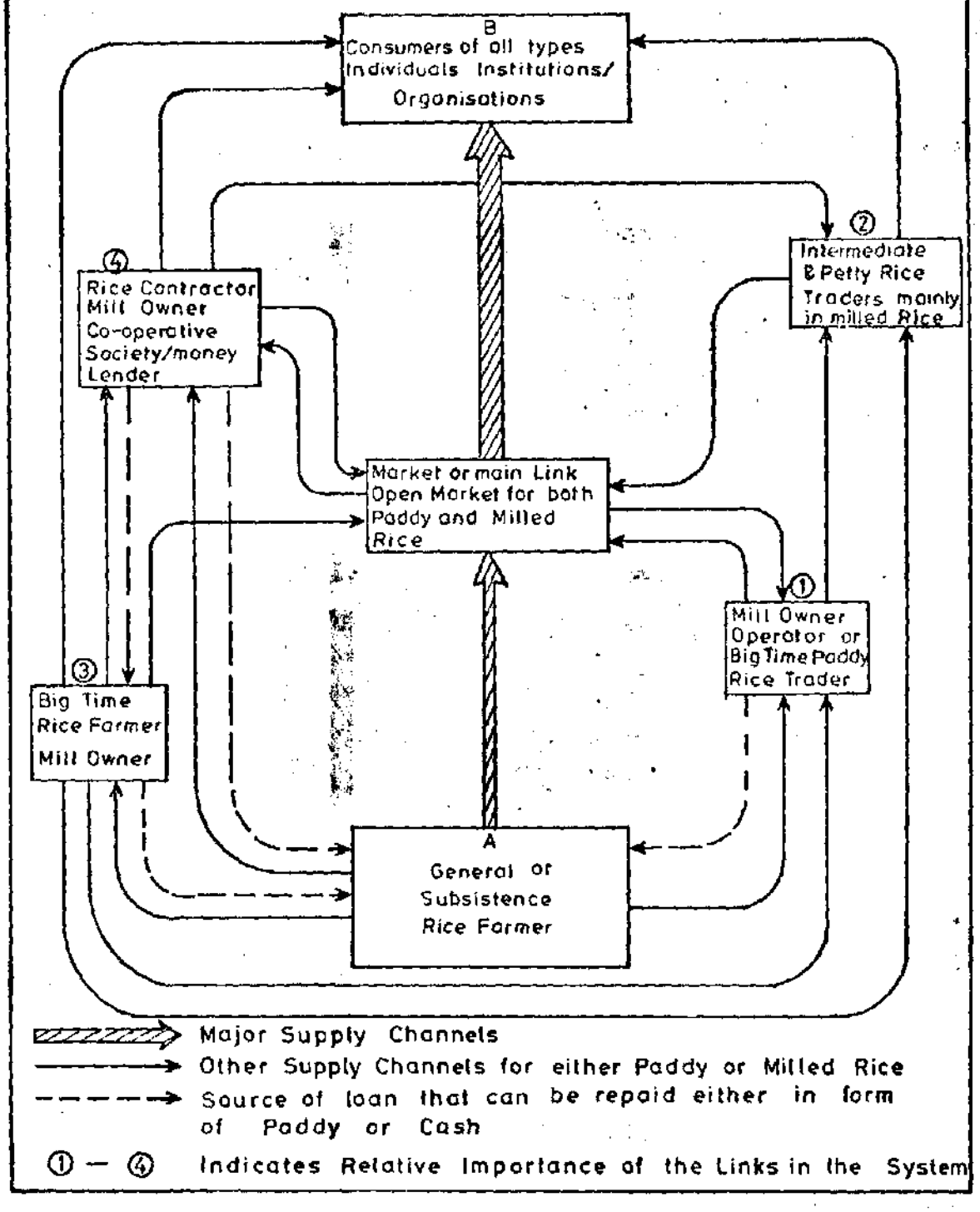
Source: World Bank Project Office, Enuguabo-Ufuma.

The prices for the product had maintained steady increase over the period, a reflection of the supply and demand situation of rice in the country. However, the same standard bag of 75kg. which the projects were buying at ₦40.00 in 1981 was sold at Adani market in July for ₦50.00, though by the middle of August, the price had fallen to between ₦40 - ₦50.00, and by the second week in September, the average price was ₦36.50 at Item; ₦38.00 at Ogboji and Ufuma, while at Adani and Ikem the price was between ₦39.00 and ₦40.00. This price trend over a period of three months reveals that the projects' prices tend to be lower than what obtains in the market. However, one has to be cautious about this, considering the fact that three months' price movement is not enough to make a conclusive statement about rice prices generally within the period. However, because of the price differentials between what obtained in the authorities' buying stations and the markets, farmers tend to keep back some of their products and divert them to the markets. The traditional market consists of many middle men and intermediate stages between the rice farmer and consumers. For instance, besides the open market where transactions in both paddy and milled rice are carried on both between consumers and rice farmers directly, and other various groups, four other stages or middle men intervening between the consumers and rice traders can be identified. These are the mill owner or operator or just a big time trader but he invariably performs the function of rice storage particularly paddy; the intermediate and/or petty trader mainly in milled rice; the big time rice farmer or co-operative society that may or may not own a mill,

but also performs the function of paddy storage, and finally the rice contractor who may be a money lender and rice mill owner also. It is pertinent to emphasize that these identified groups are not mutually exclusive as one can combine the functions of rice contractor, big time rice farmer and mill owner/operator all at the same time (Fig.5.6). They connect the rice farmer and consumer through interconnecting links, which in any case works to the disadvantage of both, as the two are prevented from interacting physically; thereby depriving the former of his gains while at the same time the price is increased for the latter.

The marketing system introduced or envisaged by the project authorities is aimed, in principle at least, at eliminating or reducing the above mentioned problem associated with the traditional marketing channels - and in the process increase the gains accruing to the farmers while at the same time, help to reduce the cost of rice to the consumers. They endeavour to achieve these dual objectives by buying from rice farmers their products at prices which guarantees a specific income over at least one year, irrespective of the vagaries of market system. Having bought paddy rice from farmers, the authorities shoulder the responsibilities of storage, preparation and distribution through a network of sales depots and agents. Consumers, both individuals and organisations, including governments buy directly from the projects. For instance, Japanese community in both Kaduna and Lagos are reported to get their supplies of special rice specie from Adarice Production Company. And also Anambra State Government buys a high proportion

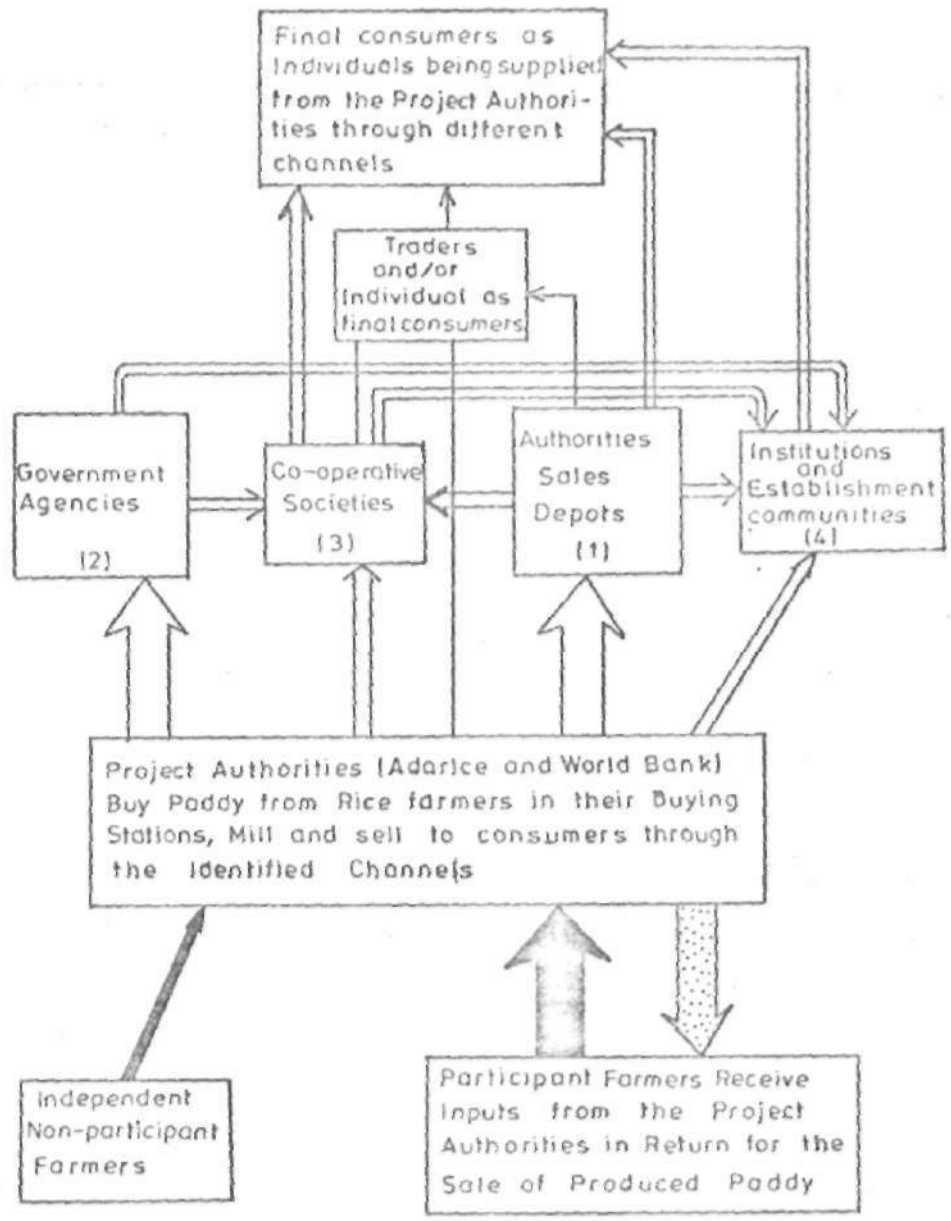
FIG. 5·6 TRADITIONAL RICE MARKETING LINK/SYSTEM BETWEEN PRODUCERS/FARMERS AND CONSUMERS



of the rice produced by Adarice Company for its ood for the People Programme (F.P.P.) under which the commodity is sold to individuals through the local government channels and co-operatives at prices lower than what obtains in the market. The same also applies to the World Bank -- it sells through the government, co-operatives, institutions and directly to individuals. In the process, a marketing system as shown in Fig. 5.7 emerges. Even though there are mediating bodies or organs between producers (farmers) and consumers in this system these are likely to be more amenable to feedback from both and to that extent violent price fluctuations are prevented to the mutual benefit of all.

Reference has earlier been made to differential in price for paddy rice between what it sells in the open market and what the authorities offer for it. This price differential, notwithstanding, most of the participants (55.5%) still think that the arrangement whereby the authorities buy their product, is a good one. However, 31.4% of the participants held a contrary view (Table 5.13(a). Table 5.13(b) shows the reasons why the marketing arrangement was considered good by some participants. Ready market comes first, followed by relief from storage problem, and preparation. Storage and preparation costs constitute an important aspect of the farmers' expenses and also a source of much inconvenience. Moreover, the aspect of ready market that the farmers have in mind may have to do with transportation costs to the markets which are worsened by bad transportation routes characteristic of most of the rural areas,

FIG. 5·7 CONCEPTUAL RICE MARKETING SYSTEM/CHANNELS USED BY PROJECT AUTHORITIES FOR DISTRIBUTION



Note: a) Black Flow Arrows indicate Paddy Flows while white ones indicate Milled Rice

b) Tinted Flow Arrow indicates Inputs Flow

c) Size of Flow Arrows and the numbers indicate relative importance of the Channels and Links in the System

Table 5.13

Participants Views on the Authorities Marketing System

(a)

Participants Opinion about the Marketing Arrangement

Opinion	No.	Percentage of Total
It is good	152	55.2
It is not good	86	31.4
No response	36	13.1
Total	274	100.0

(b)

Reasons Why Arrangement Was Considered Good (N = 152)

Reasons	No.	Percentage of Total
Ready market	51	33.6
No more problem of storage	49	32.2
Relief from preparation cost	28	18.4
No response	24	15.8
Total	152	100.0

(c)

Reasons For Considering the Arrangement Bad
N = 86

Reasons	Base No.	Number	Percentage of Total
Lower and fixed price	86	50	58.1
Delay in payment for sales	86	42	48.8
Non-consultation in price-Fixing	86	10	11.6
No response	86	7	8.1

Source: Fieldwork, 1981

and not necessarily that of absence of potential buyers. These reasons underscores the need not only for a marketing system which will take care of these costs for the benefit of the farmers but also for a much improved transportation system linking the producers in the rural areas with their markets. On Table 5.13(c)

are the reasons given by those who considered the marketing arrangement as bad. The most serious of the reasons was the inflexibility of price once fixed, and delay in payment. In fact, both the World Bank and Adarice Company had not, as of April, 1982, paid any of the Farmers for the sales they made between November and December 1981. Understandably, the farmers were worried as they felt handicapped in their future operations. While the marketing system being introduced by the authorities has the merit of preventing violent fluctuation in the price of the farmers' product, it has essentially the same feature with the traditional marketing system - the farmer is kept at the background as a passive participant. One would advocate for a marketing system in which the farmer is more involved in decision making at different stages especially in processing and price fixing.

5.6 Physical Infrastructure and Facilities

Among the important infrastructure and facilities needed for successful production activities are roads. These serve as means through which the much needed inputs are brought in to the farmers and their products sent to the market. The project authorities realised the importance of roads and therefore, they are trying to improve the existing ones or construct new ones. The area that has felt the impact of the projects most as far as roads are concerned is Adani in Uzo-Uwani where both Adarice and World Bank Projects are located. As a result of these projects, a ten kilometre road from the farm site to Adani town, where it joined a

trunk road from Nsukka to Benue State through Ogrugu, has been tarred. This road carries regular traffic of project officials, farmers and residents to and from the location. A traffic count at the bridge linking Adani town and the location over a period of three days showed that an average of 11 lorries, 20 small vehicles including private cars, taxis and pick-ups and 39 motor cycles ply the road daily. From the location, another road 25km long was constructed, linking the villages/towns of Omasi and Ifite-Ogwari which hitherto have almost been isolated from all vehicular means of transport except bicycle and motor-cycle - and even this was only limited to the dry season months. The road is now regularly maintained by grading and occasional surfacing with laterite thereby ensuring motor transportation between Adani and Ifite-Ogwari through the project settlement four times daily for up to nine months of the year from October to June. However, between July and September, the road becomes muddy and sticky as a result of heavy rain and the clayey nature of the soil, and therefore becomes virtually closed to all traffic except with bicycle or motor-cycle. At this period, only motorcyclists transport people from Adani to Ifite-Ogwari for between ₦3.00 to ₦4.00 instead of the usual 50k. The construction of the road has led to the expansion of the Bank's activities along it and at Ifite-Ogwari.

In other areas, the roads are seasonal ones motorable only during the dry season. However, the

coming of the projects has meant more regular maintainance which enhanced the accessibility to the locations and the people living around them for much longer period in a year. The effect of these roads built and maintained regularly or occasionally has been to increase the rate and volume of interaction of the people in the areas with the outside places like between Item and Abakaliki; Adani and Nsukka for Ifite-Ogwari and Omasi, and Aguata for Ogboji people. For Ufuma, it has shortened the distance between two neighbouring villages and opened up areas along the road for rain-fed cropping of other crops in areas through which they are built. In addition to these roads the lengths and impacts of which are summarised in (Appendix VII and Fig.5.8), the authorities also built farm roads within the farms through which farmers, farm machinery and inputs as well as products move in and out.

Other facilities apart from roads being provided are the rice mills, though these are not for the direct use by the farmers, Both Adarice and the World Bank have installed mills in their respective locational headquarters at Adani. Storage facilities in the form of houses for paddy, farm inputs like fertilisers have been built or are under construction in different locations at Adani, Ufuma, Ogboji, Ikem, Item as well as at subsidiary centres within these locational complexes. In Adani there is a well laid out settlement which by all standards can be said to be a town on its own right - there are well-built houses and laterite surfaced roads. The settlement has a school, and two

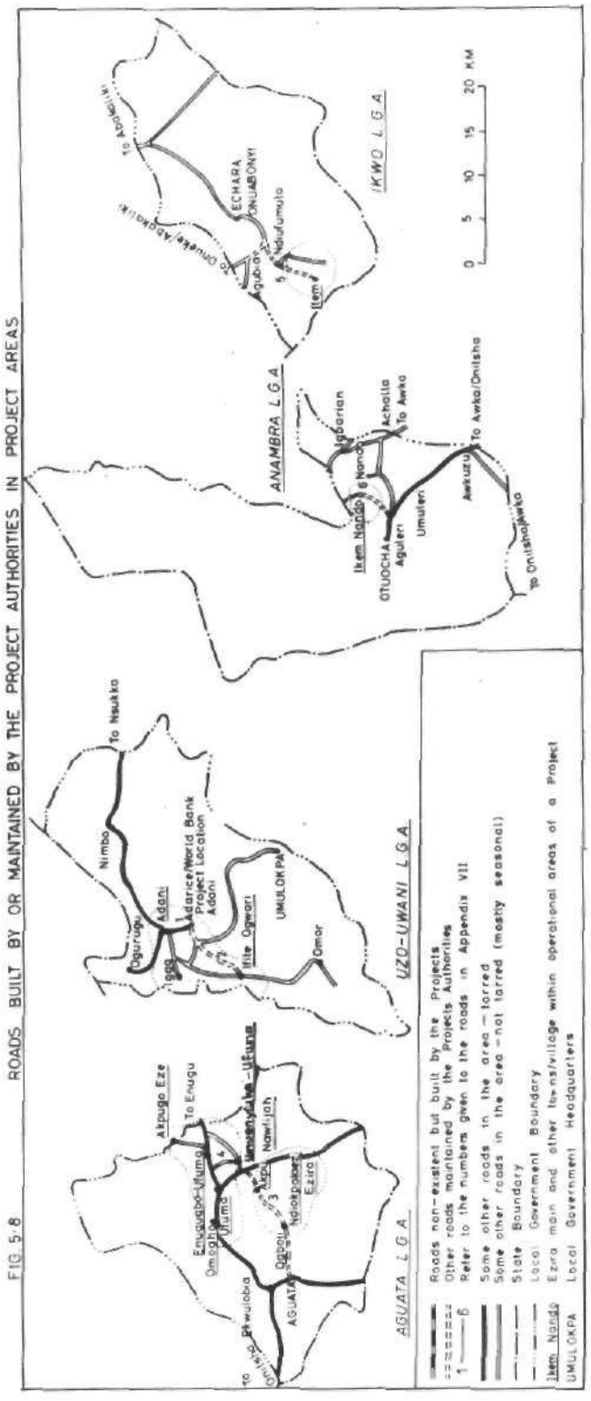

ROADS BUILT BY OR MAINTAINED BY THE PROJECT AUTHORITIES IN PROJECT AREAS
AGUATA L.G.A.
UZO-UWANI L.G.A.
ANAMBRA L.G.A.
IKWO L.G.A.
Nimbo
To Nsukka
Adani
Idarice/World Bank Project Location Adani
Ogwari
UMULOKPA
Omor
Akpuga Eze
To Enugu
Nawiyichie-Ufuma
Nawiji/Ch
Ndiokpaeze
Ezira
Ogbaku
AGUATA
To Awulobia
Otuocha
Ikem Nando
Nando
Achalla
To Awka
Awkuzu
To Awka/Onitsha
To Onitsha/Awka
Umulem
Aguleri
Echara Onuabonyi
Ikem
To Nsofumuto
To Abatete
To Onueke/Abagana
Roads non-existent but built by the Projects
Other roads maintained by the Projects Authorities
Refer to the numbers given to the roads in Appendix VII
Some other roads in the area — tarred
Some other roads in the area — not tarred (mostly seasonal)
State Boundary
Local Government Boundary
Ezira main and other towns/village within operational areas of a Project
Local Government Headquarters
0 5 10 15 20 KM

FIG. 5.8

main churches together with piped water as well as a market. There is also electricity, though this supplies light only to the part of the settlement inhabited by officials of the project authorities. None of the other projects have developed a different community identity like at Adani and the reason is due to the fact that Adani projects were built on the former Farm Settlement site originally conceived and built to be as much as possible a self-contained community.

5.7 Benefits And Problems

In this final section of the Chapter, the views and perceptions of the participants regarding the benefits and problems of the projects are discussed. This discussion is considered to be relevant because individuals as well as communities generally have their aspirations which they anticipate to be fulfilled by development projects. These aspirations at times dovetail into those of the projects but on the other hand they may run parallel to the projects objectives. However, whether such aspirations coincide or conflict with the projects, they nevertheless form the lens through which they are perceived and the criteria on which those associated with or affected by such project assess them. Another reason for this section rests on the argument of Barnett (1981, p.309) who rightly pointed out that evaluation of projects should go beyond investments and profits because according to him

> The ideas of investment and profit do not describe the social processes of production and consumption: instead they stand at the beginning and end of

> the production process and thus serve as numerical indices of the managerial success or failure of a project, rather than the success or failure of a project as experienced by those who live and work within it.

Participant were asked to indicate benefits they as individuals had derived or anticipate from the projects. Their responses shown on Table 5.14 showed that the most frequently mentioned benefit was increased yields they got from their crops. This was followed in that order by land development, better knowledge of farming (that is, cultural practices), supply of inputs, irrigation development and quick sale of products. However, six participants did not see any benefits that they derived from the projects while 21 did not give any response. These people must have been among those who might have sustained a loss of

Table 5.14

Anticipated or Derived Benefits From Projects by Participants

Benefits	Base No.	Number	Percentage of Base No.
Increased yield from farm	274	110	40.1
Developed land	274	95	34.7
Knowledge of Better ways of Rice Growing	274	93	33.9
Supply of inputs	274	87	31.8
Water supply for two croppings per year	274	43	15.7
Quick sale of product	274	38	13.9
No benefit	274	6	2.2
No response	274	21	7.7

Source: Field-work, 1981

either land or economic trees as a result of the projects that they found it difficult to appreciate any benefits as far as they were concerned.

They were also asked to indicate what they considered to be the benefits that had accrued to the community as a whole since the coming of the projects. Table 5.15 shows the answers given. It is significant to note that apart from the few benefits seen to have been

Table 5.15

Project Benefits to Community as Perceived by Participants

Benefits	Base No.	Number of Responses	Percentage of Base No.
Employment opportunities	274	66	24.1
Road improvement	274	64	23.4
Increased marketing (trading) opportunities	274	48	17.5
Enhanced land utility	274	38	13.9
House rentage	274	22	8.0
No benefit	274	13	4.7
No response	274	40	14.6

Source: Field Work, 1981

derived by the communities the number of those who do not even perceive such as benefits, was also few, being less than 25% in each case. About 5% or 13 of the respondents were positive that the communities had not derived any benefits whatsoever while 40 had no opinion. One can conclude from the response given to this question that a good number of the people did not perceive the

projects as beneficial to the whole community except in limited areas and to limited people. This view was strengthened when the list of problems claimed to have been experienced in, or posed to both individuals and communities, as shown below is taken intoconsideration.

On Table 5.16 is shown the problems considered most serious by the participants in the projects - these include inadequate supply of inputs and land, labour problems and lateness in land allocation and input supply.

Table 5.16

Problems Encountered by Participants in the Projects

Problem Type	Base No.	Number of Response	Percentage of Base
Insufficient inputs and land	274	189	69.0
Labour scarcity and cost	274	157	57.3
Delays in land allocation and input supply	274	124	45.3
Poor land preparation such as levelling	274	46	16.8
Irregular or non-supply of water	274	36	13.1
Lack of facilities like good road and health care	274	35	12.8
Inequity in land allocation	274	32	11.7
Bureaucratic delays/ corruption of official	274	31	11.3
Lower prices for product	274	10	3.6

Source: Fieldwork, 1981

Except the problem of labour and that of insufficient land to some extent, other problems enumerated by the farmers could be said to have arisen from or have to do with the project management. These problems bring to a sharp focus the extent of dependence on external forces to which the farmers have found themselves.

The problems for the community as perceived by the participants are summarised on Table 5.17. The most felt problem by the communities in the project areas was the loss of economic/cash crops and non-payment of compensation. Increased shortage of land

Table 5.17

Problems to the Community by the Projects

Type of Problem	Base No.	Number of Responses	Percentage of Base
Loss of economic trees and land/rent	274	190	69.3
Non-payment of compensation	274	177	64.6
Shortage of land for traditional crops	274	155	56.6
High cost of labour and food	274	123	45.9
Enforced planting of one crop	274	120	43.8
Preference for non-indigenes in land allocation	274	117	42.7
Non-maintainance of roads	274	113	41.2
Questionable characters among immigrants	274	98	35.8
No Response	274	7	2.6

Source: Fieldwork, 1981

and labour were also mentioned as problems that have been created for the communities by the projects. Significantly, the in-flow of migrants both labourers and farmers/workers appear to be causing some concern to some of the communities, especially with regards to what some indigenes regard as preference given to them in land allocation and the presence of undesirable elements among them

Like the problems mentioned by individuals, the above problems experienced by the communities can also be partly attributed to management lapses and existence of communication gap between the authorities concerned. This lack of communication has inevitably created a situation in which the participants and the communities are left in the dark to guess the intentions of the authorities and also to view the projects as not belonging to them and to which they owe no obligation other than to plant and harvest their rice crops. No doubt, such problems as exist can very much be ameliorated if there is a dialogue between the project authorities and the people concerned as such dialogue will lead to minimisation of areas of conflict and misunderstanding. The participants and the communities must be carried along in the process of development, they must be made to get involved not only peripherally as contributors of labour and takers of orders, but rather, the objective should be their total involvement at every stage and in every sphere of the projects. It is only in this way that a more meaningful development will be achieved because a real and lasting development is that brought about by the people concerned and not one ready-made for them.

CHAPTER VI

CONCLUSION

6.1 Restatement of Study Objectives and Hypotheses

The projects under study constitute an experimental stage in a policy of agricultural development through the use of irrigation in the State. Experiences gained in these small schemes are supposed to be taken into consideration in future and bigger projects. The nature and degree of the impacts of these projects have been discussed in the preceeding chapters. To keep the evaluation on course, it will be necessary to turn back to the objectives and hypotheses or assumptions stated at the beginning of this study. Essentially, the objective was to describe and account for the distribution of irrigation projects in Anambra State and subsequently analyse and assess the nature, degree and ramifications of their impact on agriculture, people and socio-economic millieux of the areas where they are located. Underlying the foregoing objective are the assumptions that, as modernising bridge-head within the areas where they are located, these projects must have brought about some innovations and created opportunities which have been adopted or exploited to a more or less degree depending on the socio-economic characteristics of the people; that there are also likely to be some negative side-effects of these projects whose incidence must not nave necessarily been shared relative to the gains derived by different groups within the society; and finally, that consequent upon the opportunities so created by these projects, a chain of linkages must have come into being within and between the areas of their locations as well as other places within the state. It is within the

context of the foregoing objectives and hypotheses that the summary of findings which follows is made. The summary follows the structure of the main body of the thesis-brief review of the physical and socio-cultural setting into and within which the projects operate, followed by findings on the impacts on the localities of their location and finally the findings with regards to linkages and institutional developments.

6.2 Summary of Findings

The projects which were initiated to increase the agricultural productivity of the state, through the introduction of improved inputs, better cultural practices and management, lay emphasis on rice production. The projects' locations were more likely to have been determined by other forces than that of climate per se as the State is relatively homogeneous climatically. Such forces include the consideration that since irrigation agriculture is in its pilot stage in the State it would be better to locate the projects in different areas so as to get more detailed information. More important factor in the determination of the project locations however, was the desire to ensure that the requirements of rice, the crop under cultivation, are met. These requirements include considerable amount of water and a fairly level or undulating topography. To ensure that optimum environmental requirements for the crops are obtained, individual projects were therefore sited within the river flood plains and inland swamps to take advantage of water as well as rich alluvial and loamy soils. These areas are also chosen out of the desire to utilise their relatively high agricultural potentials which are

considered to have been under exploited, at least as far as food production is concerned. Most of the areas where the projects are located are less densely populated relative to other parts of the State. The people are mainly farmers practising variants of subsistence agriculture woven around a combination of crops. In some of these areas rice formed part of such crop combination while in others, it is being introduced as an entirely new crop to compete with established ones. Associated with the agricultural system prevalent in these areas are age-old socio-cultural values and norms reflected in the pattern of land tenure, social, economic as well as production relationships. The introduction of a new crop in such environment raises some questions, which the study set out to find answers.

Impacts on the Locality

The analysis of the projects' impacts on the localities showed that they were both positive and negative effects. Findings of positive impacts include: Firstly, the growing acceptability of rice by the people, even in the areas where it is just introduced, as one of the farm crops in their agricultural system. This is reflected in the increase of both the number of farm family participants as well as the areas cultivated. While the former increased four-fold from 545 families in 1976 to 2,310 in 1980; the latter showed an increase of nearly 500% by growing from 421 hectares to 2,000 hectares within the same period. Further evidence of the acceptance of the crop as an integral farm crop by the people is the fact that as many as 52.2% of the sample

population, would give necessary facilities, prefer to concentrate on rice growing alone to the exclusion of other crops while 39% of them had actually got rice farms outside the ones they had in the projects. The main reason given by the people in these areas for taking to rice is the relative higher profitability of the crop as compared with others. As a result, apart from using rice as food staple, the people have also seen it as a veritable cash crop which has come in handy at a period when the traditional cash crop - the oil palm - is in a state of ruin owing to neglect and shortage of requisite labour.

Secondly, the projects have brought about some employment opportunities in which the people of the immediate localities turn to for extra cash income either as casual labour or permanent staff in both the projects' establishments and associated construction works. However, it was found that the type of employment readily available to the peoples of the project localities usually consist of the casual/seasonal labour as well as junior staff categories while the more permanent and important positions go to people from outside the areas. For instance, at Adani, Ogboji, Ufuma, Item and Ikem, the share of employment by the peoples of the immediate localities in the casual/labourer and junior categories of labour constituted 53%, 73%, 77%, 100% and 100% respectively. It is however pertinent to observe that compared to the population, the employment opportunity in the project is limited.

Thirdly, productivity of rice crop throughout the project areas was found to have increased to an

average of about 2.30 tonnes per hectare as against the estimated yield of under 2.0 tonnes for the States. It was found that two main groups of factors have influenced the quantity of rice production within the project areas. One group of factors can be referred to as factors or variables external to the participants. These are the location, size of holdings, and the amount of fertiliser used. Size of holdings reflected in production quantity because farmers with larger holdings as in Adani projects tended to have larger quantities of production. However, locational environment of the projects seemed to be a more significant factor because it contributes to the determination of the size of holdings individual farmers can hope to get having regard to the number of participants and the allocation policy of the authority. It also determines such other important factors as labour availability and the presence or otherwise of native/ indigeneous or local expertise in rice growing culture - hence, it was discovered that in spite of small holdings, Ogboji and Item farmers tended to have higher yields per hectare than farmers at Ufuma for instance and even those at Adani. In the former locations rice has been a part of the cropping system much longer than in Ufuma. Another aspect of location which, though not treated in the analysis, is relevant relates to the intrinsic qualities of specific locations in terms of mineral nutrients, soil quality and drainage. The third factor external to the farmer found to be positively related to rice production quantity was the amount of fertilizer used. It was found that farmers who used more fertilizer achieved higher production quantity. The significance

of these external factors with production quantity was found to be very high indeed - at .001 level.

The other significant factors that were discovered to influence production were referred to as those internal to the participants, and they include - income, education and migrant status. Their relationship with production quantity was found to be significant at .001, .05 and .05 respectively. Other internal factors like age and sex were found not to have any discernible influence on production. It was found that participants who were migrants or had higher educational attainment or income tended to produce more. It is believed that these internal factors of participants enable those who have them to get such important input as fertiliser and in addition they enhance their social standing thereby making it easier for them to communicate with and get from the authority officials what they need such as more land and other inputs. It was found that the above factors - amount of fertilizer use, migrant status, income, location and size of holding - accounted for 21%, 16%, 8%, 7%, 6% and 4% respectively of variation or differences in the quantity of rice production in the project areas.

Fourthly, the innovations and cultural practices introduced or promoted by the projects were found to be increasingly adopted by the participants. However, some observations or qualifications with regards to the rate of adoption are called for. First, the adoption rate for each of the six innovations and cultural

practices was found to be higher in the project farms than in farms outside the projects. This disparity in the magnitude of adoption by farmers of these innovations between their farms in and outside the projects was thought to be partly due to overt and covert pressure on them by officials to use them in the projects, partly because the farmers were perhaps not convinced of their utility, and partly due, perhaps to their unsuitability for other crops other than rice.

The second point found about innovation adoption in the project areas was that it greatly depended on certain factors inherent both in the participants and in the areas of operation. Of the six innovations - fertilizer, double weeding, transplanting tractor, herbicide, and insecticide - the first named three were the most wildly acceptable. Transplanting had complete adoption. The most important factors found to be of high significance in the adoption of these innovations were project location, size of farm holding in the project, income and migrant status. Size of project holding was significant on the adoption of fertilizer, tractor and herbicide, location and migrant status were found to be significant on the adoption of all the innovations except herbicide, and income was found to be significantly related to the adoption of fertilizer and double weeding. Age, number of wives and education of the participant as well as his engagement in other occupations were found to be significant factors in the adoption of fertilizer (for age and education), double weeding (number of wives) and engagement in other occupation (herbicide). Sex was the only factor

that was found not to be significant in the adoption or otherwise of any of the innovations.

Apart from the socio-economic and cultural variables as determining factors in the decision to adopt or otherwise of innovations, the third set of factors found to have influenced innovation adoption in the projects were related to the nature of the innovations and the extent of information regarding them For instance adoption rate was low with regards to tractor, herbicide and insecticide, the use of which depended very much on a third party - invariably project officials, who for bureaucratic reasons could not be available or willing to operate them for the farmers. Another thing about these innovations is that their supply was also entirely from the authority unlike fertilizer which could more easily be got in the open market. Also relevant was the fact that because of the personal traits of the farmers like low educational attainment they might not easily appreciate the need and value of some of the innovations and therefore regard them as unnecessary. This is to be a very important fact r because in those innovations which were not as complicated to use and whose utility they were able to appreciate more easily, even from their own traditional crops such as fertilizer double weeding and crop transplanting, adoption rate was relatively higher.

Closely associated with the above factor in determining adoption rate was the issue of project management or organisation. For instance, in the World Bank projects

the authorities had a policy of extending credit to farmers in form of inputs and services till after harvest, but in Adarice Production Company project, such credit was only available to the employees of the Company from whose pay the amount could be deducted without waiting for harvested crops. For non-employees, they had to pay cash for any input needed or services rendered. Doubtless, because of this policy difference between the project managing authorities adoption rate was found to be higher among participants in the World Bank projects than in Adarice Production Company.

Fifthly, the activities of the projects had led to the enhancement of the value of land not only within the operational areas under them but also outside. This enhanced value in turn had resulted in increased land transactions whereby the indigenes could sell their lands for much higher prices - in fact up to about ₦2,000.00. Associated with this rise in the sale of land was the prospect of renting out houses that hitherto had little or no opportunity cost.

While the foregoing are the main positive impacts on the immediate localities there were also negative ones. These include the loss of economic and cash crops/trees by many people in the areas. About 40% of the sample population reported the loss of crops ranging from as few as two trees to as many as 7,000 raffia palm trees. The loss was made more painful because only very few affected individuals were paid any compensation in spite of the very low values at which the crops were assessed. Apart from the loss the owners of these crops/trees sustained in terms of direct income, there was also

indirect loss not only to the owners but also to the communities with regards to employment, direct and indirect, which results from the exploitation of these trees.

In the areas where the projects are located, land tenure system prevalent was that of communal type with individual holding less emphasized. Individuals within the societies could easily get land for the purpose of farming or building by going through the traditional land-holding authority. The coming of the projects had introduced new elements into the existing traditional land-holding system. For instance large tracts of land belonging either to groups, individuals or communities are appropriated by the project authorities, and in the process the authority to manage allocate land and decide on what, and how to plant is taken away from the owners. The second element is that the right or access to land is no longer based on the traditional concept of ensuring that every member of the society has enough land to assure him of livelihood but rather on other considerations like money, education etc.

It was also found that as a result of the projects and the encouragement of rice, the farmers found themselves in a situation where they have not only to engage in intensive farm activities throughout the year but also even have to practice two cropping systems - the intercropping system of the traditional crops and mono-cropping of rice - at the same time. The immediate effect of this is that labour problems has become more complicated. The primary source of farm labour is the

family but it was found that no family was able to exploit to the limit the actual amount of its potential labour - and this at a time when more is expected from it. It was found that whereas an average family within the project areas has between seven and nine persons, its theoretical adult male labour equivalent is just about four. And even in practice, this can also be much lower because of other social and economic changes. Add to this insufficient farm labour from the family is also the decay of other traditional labour sources like co-operative labour exchange and voluntary labour. The inability of the traditional sources of labour to meet the demands of labour implies that farmers have to depend more on hired labour and indeed it was found that about 18% of the participants depended entirely on hired labour for their farm work while 77% of them indicated that they have had to employ labour in addition to what they could get from their families and only 4% said that their family labour was sufficient for their farm work.

Institutional Development And Regional Linkages

In the project areas, it was found that institutions capable of mobilising or fully involving the farmers are at best in their embryonic stage. For instance, the 29 co-operative societies in the project areas were all in the World Bank locations, because the workers were encouraged to form organisations of their own while Adarice Production Company, though not openly against such organisations, was not particularly anxious to help or ready to involve itself in their formation. Out of the existing 29 co-operatives as many as 19 were already

in existence before the projects, with membership some of whom were not involved in the projects. The remaining ten co-operatives were just being organised at the time of this study with the help of the World Bank. It was found that owing to poor development of this institution in the projects, it has not been possible to utilise it as management organ as envisaged.

Of the total number of 274 respondents, all but 17 or 6.2% indicated that they would have liked to get loans but for the absence of institutions through which they could get them at lower interest rate and less inconvenience. Only a few of the participants had actually used loans and almost all of them said that they got them from the traditional institutions - money lenders, friends, relations and thrift and related societies. What all these showed was that there was no formal institutions established by the authorities to perform this important function of helping farmers with cash credit facilities to tidy them over difficulties such as meeting the cost of labour. Admittedly, the World Bank has facilities through which farmers could get inputs, not only on credit but also at subsidized rates, while Adarice had such facility available only to its employees. While input credit facility is a welcome institution and no doubt, will go a long way to helping farmers, it is nevertheless necessary to supplement them with cash credit.

Both bodies in-charge of the project have marketing facilities which apart from taking the problem of transportation and storage off the shoulders of the farmers, also assure them of steady and guaranteed price

for a season. The farmers' income from their labours is thus less subjected to the unpredictable market forces dominated by innumerable middlemen.

In addition to the three institutions found to have been developed or were in the process of developing in the project areas, the authorities had also taken steps to construct not only farm roads but also improve and maintain existing ones. In that way, communication between communities of the project areas and those in other parts of the state has been kept open for much longer period in the year than was hitherto the case.

Earlier in this discussion it was noted that employment opportunities exist in the project areas. It was also found that the traditional labour supply sources were no longer capable of supplying farm-hands for the farms thus creating labour shortfall which has to be supplied from elsewhere. Moreover, in addition to prospects of either securing direct employment from the projects or hiring oneself out for extra cash, individuals, if they are so inclined could easily get land from the project authorities to cultivate rice without having to go to the traditional land-holding authorities. All these three factors together constitute a pull force which has set in motion the movement of people into these areas both as workers - permanent and casual - and migrant farmers. This in-migration of people in the project areas was found to be more pronounced at Adani and Ufuma locations than in others. People were drawn from different parts of the State and even beyond as

from Imo and Benue State. So the movement of people has thus established a link of human interaction between different parts of the State. In the project areas this influx of people, has not only triggered off, but also reinforced transactions as well as speculation in land deal.

The establishment of marketing institution outside the tranditional marketing channels for rice has also led to the emergence of marketing linkages between the project areas where rice is produced, bought, stored and processed, their marketing offices and distribution outlets in local government levels through-out the State as well as communities, institutions and individuals in and outside the State.

Before concluding this summary, attention has to be drawn to another finding which has to do with different rates at which the impacts of these projects affect individual locations. For instance, projects at Adani tend to have more pronounced impacts than other locations. More migrants, more land transactions as well as greater quantity of production and the consequent improved living conditions. The Adani locations are followed by those of Ufuma, Ogboji and Item and then Ikem. However, regarding rice yield per hectare, Item and Ogboji were found to have an edge over other

locations. The differences noted between the locations also include variations in the size of holdings within the projects. Whereas holdings in Adani are rarely below one hectare, holdings in other locations of over one hectare are rare. Also, observed is the existence of differences in the average annual income found to have been higher in Adani relative to other areas. These differences between locations are partly attributable to the personal traits or characteristics of participants, their social-cultural as well as economic millieux, and also the organisational differences of the managing bodies.

Personal traits of the participants which were found to have contributed to the differences in production and even in the size of holdings include education, income, migrant status as well as engagement in other occupation. These variables operate to produce differences in the identified factor through their influence on the rate of innovation adoption as well as the ability to relate with officials. Participants low in scale of the above variables were found to be more in Item, Ogboji and Ikem than in Ufuma and Adani. Socio-cultural and economic factors included such considerations as expertise in rice growing which come with long experience in rice farming as in Item, Ogboji and in Adani to some extent. This expertise among Item and Ogboji participants in particular was believed to have contributed to the relatively higher yield per hectare. It also explains why people from Item area were found in greater numbers as migrants both as labourers and farmers in other locations particularly in Ufuma where the indigenes are yet to take to rice

farming in such great numbers as in other areas. Due to the large number of people desirous of participating in the projects in areas where rice has become more entrenched as in Item and Ogboji, sizes of holdings were generally much smaller than in Ufuma where it is still a new crop. The organisational differences between the managing bodies affected other variables that produced the differences observed among locations through policies on such issues as provision of inputs on credit, loan facilities, and holding sizes. There are other factors such as transport facilities and inherent physical qualities of each location like soils and drainage which might have contributed their quota to the differences.

6.3 Implications of Findings

The impacts of the study summarised above have implications for the future agricultural development in the state in view of the fact that the present projects are pilot schemes meant to test the feasibility of irrigation agriculture. The implications are central to issues of how best to minimise constraints on agricultural production so as to achieve maximum efficiency and output. For instance, what is the best or most suitable organ or body to entrust the problem of agricultural production? How can individual farmers be involved in, and prepared for more active role in agricultural production organisation and management? Is it in the overall interest of the State, and indeed the country, to invest undue proportion of fund on one crop to the exclusion of others? How can a middle course be struck between the pursuit of development

and social justice and equity?

The first of the issues raised concerns alternative organisational unit for agricultural development best suited to the socio-cultural environment of the people. It was found in the study that differences of policy or approach exist between the two managing bodies of the projects on some important issues necessary for successful agricultural production like input provision, credit facilities, and farmers organisation. Adarice Production Company for instance tended to leave the farmers to fend for themselves in matters connected with input and credit, and it was not particularly anxious to organise or encourage farmers to organise themselves. The World Bank on the other hand, was trying not only to render some form of assistance in terms of input and credit, but also it actively encouraged farmers to get organised into co-operatives. The difference in policy no doubt arose from different role perception by the two bodies based on their individual objectives. For instance, the World Bank believed in helping farmers to increase their production through practical aids, like credit facilities, and better organisation, based on its envisioned ultimate takeover of the projects by them. But Adarice perceived its role as that of profit making that should not be encumbered by the problems and welfare of the farmers or allowed to be jeopardised by encouraging farmers' organisation.

Lower innovation adoption as well as rice yield per hectare observed in Adarice projects must have been partly caused by the Company's policy of not providing

credit facilities to its farmers except those of them who were its employees. Its perceived role also explains why it did not hesitate to destroy the crops of farmer-settlers within its operational area. It is not difficult to see that the role of and policy pursued by Adarice Company are causing some constraint on production maximisation and also limiting the category of farmers that could participate in this 'modern' farming in that people without enough capital resources of their own may find it difficult to cope with . One can even guess that the Company adopted its present attitude because of the knowledge that as a government sponsored company, it can always turn to it in time of difficulty for help. This is so because a really profit-oriented organisation would have devised better means of communication with the farmers that would help increase production through mutual understanding, discussion and solutions to common problems. The inherent implications of policy such as that of Adarice for future course of agricultural development, have to be borne in mind in view of recent calls from different quarters for governments and private companies to engage in direct agricultural production.

The second question relating to agricultural development for which the findings of this study has some implications has to do with the role the farmers are expected to play in the process. As was seen in the last paragraph, the farmers were left by Adarice to fend for themselves as far as inputs were concerned and would not want to actively support them to organise, but ironically, these very farmers are the ones to produce

some of the crops on which the company hopes to make profit. To Adarice Company therefore, the farmers are but instruments to be used for its own ends. The World Bank on the other hand, while supporting the farmers to organise, was approaching it from a paternalistic point of view. For instance, the project officials had to do the organisational work; had to appoint or select one person from each co-operative society to be trained as a tractor driver; and the farmers had to be persuaded to form co-operatives mainly for the purpose of enjoying government loans and other schemes and not necessarily to help them to be able to meet the challenges of agriculture boldly with the determination to find appropriate solutions. What was seen in the projects was either an open disregard of the role of farmers' organisation or a paternal approach, in which the authority proceeds to act or take decision on the presumption that such actions or decisions are necessarily in the best interest of the farmers.

The importance of establishing institutions and organs that are self generating and capable of carrying on with duties and functions of the projects long after the present managing authority must have gone needs no stressing. Such institutions and organs make a difference between the long-term success or failure of a project. It was these types of organisations that Barnett (1981, p.310) had in mind when distinguishing between:

> planning change - meaning planning for a transition from a preceeding state to a static ex post state; and planning for change - meaning that it is assumed

> that ex post state which follows the planned intervention will set up and sustain its own dynamic and impetus.

Planning for change will no doubt entail the organisation of people so that, in the case of agricultural development projects, they will not only just plant, harvest and sell crops but also take part in the actual planning and implementation of decisions relating to input supplies, credit distribution and recovery as well as in building and maintainance of farm infrastructures. In the present projects farmers were at best regarded as passive rather than active agents that should be taken as full partners in quest of solution to common problems.

The nature and course of future agricultural development and its ability to really meet the national aspirations will very much depend on the extent farm organisations and institutions are built on and with the very people who are to operate and use them and not necessarily for them. This will then ensure that development evolves from within, thereby guaranteeing its durability as well as its authenticity. In practical terms, planning for change with the objective of achieving for the State a viable agriculture, will mean that farmers should be helped to get organised in such a way as to be able to take decisions on major agricultural investments, take over the storage, processing and marketing of their products, as well as be in a position to generate funds for their programmes. Government and sponsoring bodies as far as possible should refrain from intruding or imposing themselves but rather confine themselves to advisory roles and to the provision of necessary physical, as well as legal frameworks.

The projects' main concern was to popularise the growing of rice and to some extent they are suceeding judging by the number of people anxious and ready to go into its production and the increasing area of land being devoted to it. It was also seen that while more people were more ready to adopt new innovations in rice crops, they were less enthusiastic to try these innovations in their other crops. Again from the proportion of rice consumed (only 7%) by the producers it was clear that it is not a very important item of their diet But the impression being created, albeit inadvertently by devoting all the projects to rice production, in spite of the fact that the areas can as well produce other crops, is that rice is more important than all others. In the relentless effort to produce rice resources of land, money and labour are diverted to the detriment of other crops. In the bargain is thrown the very danger of changing the peoples' dietary habit in favour of rice and to the exclusion of other traditional crops. The question that readily comes to mind regarding the sketched scenario is whether the State, and the whole country for that matter, will be able to satisfy the future demand for rice that it is gradually but steadily building up through its present policy? Another question that naturally follows is what happenes in the event of its inability to do so? One other relevant question is whether the use of the areas for rice production is the most efficient in terms of economic and social costs?

Until adequate answers are found to the above questions and similar ones, it will be advisable to pause and take stock with a view to charting an alternative course. This is particularly relevant in a situation like the one in Anambra State where potential irrigable land area relative to the total cultivable land area is small and where only very few farming households can be accommodated and therefore be able to benefit from the supply of inputs and other things. What will be in the long-run interest of all might be an agricultural development programme that simultaneously encourages equal attention to crops whether under irrigation or rain-fed conditions. This will prevent a situation from arising whereby a farmer is forced to buy his traditional staple food because of over dependence on one crop.

The issue brought to focus is that of how best to balance between development and social justice. The nation is in a desperate hurry to produce as much food as possible within its border to lessen her dependence on imported food. In the process, as in the projects under study, some people sustained losses in land and economic crops/trees. It was seen that a greater proportion of the people so affected were neither compensated adequately in cash nor did they receive farm holdings within the projects commensurate with what they lost. They definitely belong to a group Wallace (1980, p.4) referred to as "losers" who are victims of agricultural projects and modernisation. These losers are invariably

ignored or taken for granted among policy makers and informed opinion. For instance, one Salihu after reviewing the possible benefits to be derived from the Bakolori Dam Project in New Nigeria Newspaper (January, 17, 1981, p. 3) concluded by asserting that "the benefits of the projects are so glaring that I wonder whether it would have been justified to abandon it in the face of violent objections by farmers".

The question is not how to eliminate the chances of having some 'losers' in agricultural development projects. It is rather about the ways to ameliorate the attendant sufferings and glaring injustice. Apart from devising means of ensuring that the people affected by the destruction of trees are adequately compensated and early enough, there should also be a way of making sure that those whose lands are included in the projects get a fair share during land allocation. The problem that may likely arise is that they may not be in a position to farm it while there are others standing by the wings ready to cultivate as many hectares as they can. It is this type of problem that good organisation-planning for change - will be able to grapple with as it will enable disadvantaged in the society to be integrated into the main stream of the nation's development efforts to the greater good of all.

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APPENDIX I

Valuation List: Recommended Rate of Compensation For Selected Economic Crops/Plants

Crop or Plant		Mature (₦ per stand of crop/plant)	Immature	Seedling
Oil Palm	cultivated	7.00	3.50	1.50
	wild	3.00	1.50	-
Raffia palm (stand or clump)		8.00	3.00	-
Irvingia gabonensis (agbono tree = Igbo)		15.00	5.00	-
Oil Bean Tree		2.00	-	-
Coconut		7.00	3.50	1.50
Cocoa		3.00	1.50	0.50
Rubber	cultivated	5.00	2.50	1.00
	semi-wild	2.00	-	-
Breadfruit	(Ukwa - Igbo)	3.00	1.50	-
Star Apple	(Udara = Igbo)	3.00	1.00	-
Pterocarpus mildbraedii (Oha = Igbo)		3.00	1.00	-
Kola (Ọji Hausa = Igbo)		10.00	5.00	2.00
Native Pear (Dacyodes edulis) (Ube = Igbo)		7.00	2.00	-
Kola (Oji Igbo = Igbo) cola acuminata		3.00	2.50	-
Bitter Kola (Ugoro = Igbo)		2.00	1.00	-
Iroko		12.00	-	-
Mahagony: cotton Tree (Akpu = Igbo) Khaya ivorensis		12.00	-	-
Pine Apple	Cultivated	0.25	0.20	-
	wild	0.25	-	-
Plantain		0.50	0.25	-
Banana		0.50	0.25	-
Orange	Budded	9.00	4.50	2.00
	Unbudded	8.00	3.00	-
Indian Bamboo per clump		1.50	-	-

Appendix I (Contd)

Crop or Plant		Mature	Immature	Seedling
		(₦ per stand of crop/plant)		
Ukwa Igbo (Treculia Africana)		3.00	1.50	--
Mango	Budded	9.00	4.50	2.00
	Unbudded	7.00	2.00	-
Coffee		1.00	0.50	0.20
Cashew		1.00	0.50	0.20

Shrine - One big ram or ₦50.00, whichever is lower

Source: World Bank Headquarters Office, Enugu.

APPENDIX II

Specimen Lease Agreement Between Item Ikwo Community And the World Bank for the Project Land

Introduction: The Anambra-Imo States (World Bank) Rice Project jointly sponsored by the Federal Government, Anambra and Imo States and partly financed on a loan by the World Bank is primarily involved in the development of land for rice cultivation. The project, besides the development of land, improves existing access roads, constructs new farm roads necessary for evacuating the farm produce, constructs buildings for farm services, buying stations for the purchase of paddy and centralised processing centres.

The Project also provides the necessary inputs such as good seed, fertilisers and chemical and it also takes part in the training of farmers in modern cultural practices.

Communities, groups of owner farmers owning swamps and flat land where rice could be grown hand over their parcels of land to the Project on a Gentleman's Agreement. The Project develops the land and allocates extents varying from 1.25 hectares to 3 hectares to qualified farmers chosen from the community or owner farmers.

Qualified farmers allocated land are liable to pay the Project on a hectare basis for each cultivation. The undermentioned gentleman's agreement embodies besides the agreement of handing over the responsibilities of both the participating farmers and Anambra-Imo States (World Bank) Rice Project.

(2) Agreement: The undersigned, the land owners of the portion of land known and called Umunneato

Appendix II (Contd)

Irrigation Scheme Item-Ikwo of extent of 1,000 hectares for 99 years starting from 12/9/81.

I. The Anambra-Imo States (World Bank) Rice Project on the other hand agrees to:

(a) Develop the land

(b) Improve the existing access road and build new farm roads if required (Road to be laterite surfacing).

(c) Construct buildings for farm services such as stores, buying stations, etc.

(d) Repair and maintain completed irrigation works (Headquarters, Main Channel and Main Drainages only).

(e) Provide technical services for modernising the cultural operations.

(f) Provide required agricultural inputs such as good seeds, fertilisers and chemicals, etc.

(g) Pay compensation for economic trees on the said portion of land and to

(h) Deliver the said portion of land peacably to the land-lords at the expiration of the agreement.

The Project on completion of land development shall parcel the area developed into 1.25 hectares (if irrigation) and 1.5 hectares (if swamp) and allocate in the first instance to elligible farmers from the community or owners and if sufficient farmers are not available allocate to elligible farmers from the adjoining areas.

II. The owners in full understanding of the object of the development, the works to be done by the Project,

the services
/ to be rendered by the Project and the proposed allocation of the land in its extent, also agree as participating farmers to

(i) cultivate the area allocated with rice only.

(ii) Follow the instructions and advise given by project staff regarding cultural practices and dates.

(iii) Utilise seed recommended by the Project.

(iv) Maintain and repair field channels, field drainage and field bunds.

(v) Make available for purchase by the Project our harvest.

(vi) Pay the land development rate of ₦30.00 (irrigated) and ₦15.00 (swamp) per hectare for each cultivation.

III. We the undersigned, the landlords of the said portion of land hereby covenant with the Anambra-Imo States (World Bank) Rice Project that we will indemnify and keep indemnified the said Project against all claims and demands, actions and proceeding costs, damages and expenses whatsoever by any person or persons claiming any right or interest over or in the said land.

Signatories (1) _____

(2) _____

(3) _____

(4) _____

(5) _____

Source: World Bank Project Office, Item.

Appendix II (Contd)

Note:- The land where the project is located is jointly owned by three villages - Item Amagu, Obeagu Amagu, and Ndiagu Amagu and these three villages are collectively known as Umunneato of Amagu Ikwo - (hence, the full name of the project is Umunato Irrigation Scheme, Item-Ikwo).

APPENDIX III

Summary of Result of Two-Way Analysis of Four Variables: (PROAREA, OUTAREA, PROQTY AND FERTILIZER

Dependent and Independent variables (criteria and Factors)	Factor's Effects significant or not (Acceptable levels -.05, .01, .001)			Proportion of variation in Dependent Variable (criterion) explained by the Factors (%)		
	Acting alone Factor (a)	Acting alone Factor (b)	Factors interacting	Factor (a)	Factor (b)	Combined Factors (a + b)
PROAREA(1)						
1. By Location INCOME	.001	.001)	.074	41.0	18.5)	51.6
OUTAREA(2)						
2. By EDUCATION INCOME	.021	.006)	.058	9.6	19.4)	26.9
PROQTY(3)						
3. By LOCATION PRODUCTION AREA	.001	.181)	.584	7.3	6.8)	14.1
PROQTY By EDUCATION INCOME	.018	.007)	.208	5.8	10.2)	16.0
PROQTY BY INDIGENE FERTILIZ	.015	.001)	.001	1.7	22.1)	22.7
4. FERTILIZER BY AGE INCOME	.034	.110)	.11	3.24	2.56)	6.35
FERTILIZER By LOCATION INCOME	.009	.161)	.468	5.8	2.6)	8.4
FERTILIZER BY EDUCATION LOCATION	.13	.022)	.635	2.0	5.8)	6.8

Source: Fieldwork, 1981

/Contd...

Notes to APPENDIX III

Factor (a) refers to the first named independent variable.
Factor (b) refers to the second named independent variable.

(1) Size of Project Holding
(2) Size of Holding Outside Project
(3) Quantity of Rice Production

APPENDIX IV

Origin of Workers in Different World Bank Project Locations

ENUGU HEADQUARTERS

Place of Origin; State/Local Government Area	Category (cadre) of Workers/ Staff						Total No. of Staff/ Workers	
	Senior		Interm.& Junior		Casual/ Labourers			
	No	%	No	%	No.	%	No.	%
Imo State	14	32.6	25	23.6	-	-	39	26.2
Expatriates/ Foreign	5	16.6	-	-	-	-	5	3.4
Anambra State L.G.As.								
Nsukka	-	-	21	19.8	-	-	21	14.1
Udi	4	9.3	13	12.3	-	-	17	11.4
Aguata	7	16.3	8	7.5	-	-	15	10.1
Awgu	2	4.7	10	9.4	-	-	12	8.1
Njikoka	3	7.0	6	5.7	-	-	9	6.0
Ihiala	5	11.6	4	3.8	-	-	9	6.0
Ezeagu	1	2.3	6	5.7	-	-	7	4.7
Nkanu	-	-	7	6.6	-	-	7	4.7
Ezza	2	4.7	3	2.8	-	-	5	3.4
Uzo-Uwani	-	-	3	2.8	-	-	3	2.0
Summary Over Total ..	43	52.4	106	60.0	-	-	149	26.3

ADANI (WORLD BANK UZO-UWANI) LOCATION

Anambra State L.G.As.								
Adani Town/ Environs(1)	-	-	2	7.4	41	27.3	43	22.6
Uzo-Uwani(2)	-	-	12	44.4	38	25.3	50	26.3
Igbo-Eze	-	-	1	3.7	24	16.0	25	13.2
Igbo-Etiti	-	-	2	7.4	20	13.3	22	11.6
Udi	3	23.1	4	14.8	9	6.0	16	8.4
Nsukka	1	7.7	3	11.1	11	7.3	15	7.9
Anambra	3	23.1	1	3.7	4	2.7	8	4.2
Onitsha	4	30.8	2	7.4	-	-	6	3.2
Njikoka	2	15.4	-	-	3	2.0	5	2.6
Summary over Total ..	13	15.9	27	15.3	150	50.0	190	34.0

/Contd...

Appendix IV (Contd)

OGBOJI (WORLD BANK OGBOJI) LOCATION

Place of Origin: State/Local Govt. Area	Category(Cadre)of Workers/Staff						Total Number of Staff/Workers	
	Senior		Interm. & Junior		Casual/ Labourers			
	No.	%	No.	%	No.	%	No.	%
Ogboji Town/ Environs(1)	-	-	5	25.0	31	41.9	36	35.0
Aguata (2)	4	44.4	11	55.0	23	31.1	38	36.9
Njikoka	2	22.2	3	15.0	14	18.9	19	18.4
Onitsha	3	33.3	1	5.0	6	8.1	10	9.7
Summary Over Total	9	11.0	20	11.3	74	24.7	103	18.4

UFUMA (WORLD BANK ENUGWU-ABO UFUMA) LOCATION

Ufuma Town/ Environs(1)	3	43.9	4	44.4	19	63.3	26	56.5
Ikwo	2	28.6	1	11.1	5	16.3	8	17.4
Aguata(2)	-	-	2	22.2	4	13.3	6	13.0
Idemili	1	14.3	1	11.1	-	-	2	4.3
Oji River	-	-	-	-	2	6.7	2	4.3
Awka	1	14.3	-	-	-	-	1	2.2
Anambra	-	-	1	11.1	-	-	1	2.2
	7	8.5	9	5.1	30	10.0	46	8.2

ITEM (WORLD BANK ITEM) LOCATION

Item Town/ Environs(1)	-	-	2	25.0	20	71.4	22	52.4
Ikwo(2)	1	16.7	3	37.5	8	28.6	12	28.6
Aguata	3	50.0	-	-	-	-	3	7.1
Oji River	2	33.3	-	-	-	-	2	4.8
Udi	-	-	2	25.0	-	-	2	4.8
Nkanu	-	-	1	12.5	-	-	1	2.4
	6	7.3	8	4.5	28	9.3	42	7.5

/Contd...

Appendix IV (Contd)

IKEM (WORLD BANK IKEM) LOCATION

Place of Origin: State/Local Govt. Area	Category (Cadre) of Workers/Staff						Total No. of Staff/ Workers	
	Senior		Interm. & Junior		Casual/ Labourers			
	No.	%	No.	%	No.	%	No.	%
Ikem Town/ Environs(1)	-	-	4	57.1	13	72.2	17	58.6
Anambra(2)	3	75.0	2	28.6	5	27.8	10	34.5
Udi	1	25.0	1	14.3	-	-	2	6.9
	4	4.9	7	4.0	18	6.0	29	5.2
Grand Total	82	100.0	177	100.0	300	100.0	559	100.0

Source: Fieldwork, 1981.

(1) These are towns and/or villages in which the projects are located and the environs are taken to include all other villages/towns within a radius of about 5 kilometres over which a worker can trek or cycle daily from his/her home. Workers within the areas so identified are grouped differently from those from other towns/villages from the same Local Government Area.

(2) Other areas in the same local government area where project is located.

APPENDIX V

SPECIMEN APPLICATION FORM FOR THE PROPOSED LOAN FOR RICE CULTIVATION, 1981

APPLICATION FOR LOAN FOR RICE CULTIVATION

(Name of Co-operative Society)

The Manager,
Anambra/Imo State, World Bank Rice Project,
Enugu.

1. We, the undersigned, on behalf of the

---

hereby apply for a cash credit of ----------

---

to enable members of our co-operative society to cultivate rice in the Project Location in our area this cropping season which has already begun.

2. Members will utilize the money which will be on lent to them in cultivating their individual pluts that have been allocated to them. The allocation made to the members are shown on the list attached.

3. We also, on behalf of member of this co-operative society pledge to refund the loan after this seasons rice harvest.

Signed 1. ---------- 2. ----------

3. ----------

Source: World Bank Project Office, Adani.

APPENDIX VI

PROPOSALS FOR THE FORMATION OF CO-OPERATIVE SOCIETIES IN WORLD BANK PROJECT LOCATIONS

Anambra/Imo State W.B.R.P.,
Enugu.

20th March, 1981

The Project Manager,
(Name of Project Location)

It is the objective of the Project to see that farmers are organised into co-operatives and the intention in this letter is to give you guidelines as to what and how to go about it.

Between 40 and 60 members can be manageable for a co-operative society. This does not mean that already existing societies whose membership is more than 60 will either be reduced in number or broken into more societies. This idea is to make for easy management.

In this proposal, the work of this division or department of the Project is two dimensional:-

1) Promotional Work - This involves the organisation of co-operative societies in the various locations where the project is operating.
2) Educational Work - This is to be effected in general meetings, where members will be talked to about their duties and privileges to the society.

In locations where societies are in existence already, action will be limited to -

(a) Inspection duties
(b) Advisory duties.

Assignments: Having said all these, I shall now like each Farm Manager to go back to his location and do the following

(1) Prepare and supply the number of groups of

Appendix VI (Contd)

farmers participating in the project in each location.

(ii) Prepare the names of farmers in each group.

(iii) Supply the names of already registered co-operative societies and their location.

(iv) Fix date for meetings in each group/society

(v) Most importantly emphasize to the participating farmers that membership of societies is now compulsory since all facilities, benefits, amenities, including loans, will as a rule be channelled through the societies now to be formed or already registered.

Signed .....
Asst. Registrar, Co-operative Society
Anambra/Imo W.B.R.P.,
Enugu.

Source: World Bank Rice Project, Headquarters Office, Enugu.

APPENDIX VII

NATURE AND LENGTH OF ROADS BUILT OR MAINTAINED BY PROJECT AUTHORITIES

Project Area	Rd. No. as in Map	Length of Rd. in Kilometre	Pre-project Road condition/situation	Post-project Road condition/situation	Effect on the Area
Adani-location of Adarice and World Bank Projects.	1	10	All season but laterite surfaced road	Tarred	Regular traffic between the project location and Adani as well as surrounding areas
	2	25	More of food path used mainly by bicycles motor-cycles, though used occasionally by motor vehicles during dry season	Laterite surfaced and regularly graded and maintained by the World Bank	Provides regular motor transport service between Adani and Ifite-Ogwari for up to eight months Extension of rice cultivation along the road and within Ifite-Ogwari, and enhanced value of agricultural produce such as wine, rice and timber.
Ogboji World Bank location	3	33	seasonal road hardly used during the rainy season	Occasional grading and general maintainance	Provides a shorter and an alternative link between the northern and southern sections of Aguata. Also has contributed to diffusion of rice cultivation.

Appendix VII (Contd)

Project Area	Rd.No. as in Map	Length of Road in Kilo-metre	Pre-Project Rd. condition/ situation	Post-project Road con-dition/ situation	Effect on the Area
Ufuma World Bank	4	8	Non-existent	Built and maintained by the authority	Forms part of farm roads but also links two villages as alternative and shorter road-Extension of farming of rice and other crops
Item World Bank	5	22	seasonal road	Laterite surfaced and regularly maintained	Prolongs acces-sibility for up to eight months as well as transport between Agubia on other days other than a market day between Agubia and Item.
Ikem World Bank	6	6	Non-existent	Built and maintained by the authority	Part of farm road, attracts cultivation along its length.

Source: Fieldwork, 1981

APPENDIX VIII

QUESTIONNAIRE FOR THE PROJECTS'S OFFICIALS

A. BACKGROUND AND GENERAL INFOEMATION

1. Name of the official _____
2. Position held in the project _____
3. Name of the project _____
4. Body responsible for the project management_____

   _____
5. Year the project started?_____
6. How was the land for the project acquired?_____
7. Which of the following reasons contributed to the development of the area for the project? (Number in order of importance from 1 - 9)

   (a) To open up the area _____ (_____)

   (b) Voluntary offer of land to the government (___)

   (c) Already existing indigenous expertise with regards to the crop grown in the project _____ (_____)

   (d) The soil has chemical qualities necessary for the grown in the project _____ (_____)

   (e) The existence of unused expanse of land or swamp _____ (_____)

   (f) The topography facilitates easy levelling and proper drainage _____ (_____)

   (g) The existence of infrastructure like roads and other facilities _____ (_____)

   (h) To encourage the settlement of the area.. (_____)

   (i) Any other reason (explain)_____ (_____)
8. Was there any displacement of people by the project?

   Yes (____) No (_____).
9. How many people were involved if answer to Question 8 is 'yes'? _____
10. Did the project entail the destruction of economic or crop/tree_____ Yes (__) No (___)
11. If the answer to Question 10 is 'yes' what are the types of economic/tree crops were involved?

    (a)_____ (b) _____ (c) _____ (d) _____

12. What was the number of economic/tree crop?

(a)_____ (b)_____ (c)_____(d)_____

13. How many people were affected by the destruction of economic crops/trees?_____

14. Was compensation paid to the people whose economic/tree crops were destroyed? Yes (___) No (___)

15. How many people have so far benefitted from such compensation?_____

16. If compensation was paid, what was the total amount paid out to date?_____

17. If compensation has not been paid, what are the reasons? _____

_____

_____

19. How much has been spent on the project to date since it was started?_____

_____

B. FARM OPERATION - LABOUR, FARMERS AND CROPS

20. How many people are employed directly and on permanent basis on the project? _____

21. How many of these permanent members of staff are within (a) senior staff cadre_____
(b) Intermediate and Junior staff cadre_____?

22. From what towns and local government areas does the project draw its permanent staff?_____

_____

23. Does the project employ seasonal/casual labour? Yes (____) No (____).

24. What was the number of seasonal/casual labourers, if any?_____

25. From what towns and local government areas are these casual/seasonal labourers drawn?_____

_____

26. What type of seasonal/casual labourers does the project employ most? Men_____ Women_____ Children_____.

27. At what season are these seasonal/casual labourers needed most?_____

28. How much is paid a casual/seasonal labourer within each category? Men_____ Women_____ Children_____ per day?

29. Is this amount lower than that paid by the farmers Yes (____) No (_____).

30. Do you find it difficult to secure these labourers? Yes (____) No (_____).

31. If you do, what are the likely reasons for this_____

_____

32. What category of casual/seasonal labourers do you particularly find difficult to get?_____

33. What do you think makes this group of labourers difficult to secure?_____

_____

34. What is the hecterage presently under cultivation in the project?_____

35. Is this hecterage the possible maximum for the project? Yes (____) No(_____)

36. If 'No', why are you cultivating up to the maximum?

_____

37. Is the project authority engaged in direct crop production? Yes (____) No (_____).

38. If 'Yes', how many hectares is it presently cultivating?_____

39. If 'No', what are the reasons for its non-involvement in direct crop production?_____

40. What is the minimum _____ and maximum _____ hectares the farmers within the project are allocated?

41. What are the factors which determine the area a participating farmers is allocated?_____

_____

42. Are there conditions for participation as a farmer in the project?_____ Yes (___) No(___)

43. If 'Yes', what are the nature of such conditions?
_____

44. Are all the farmers in the project from the village/town within which the project is located?
Yes (____) No (_____)

45. If 'No', from what parts of the State do they come?_____
_____

46. What are the reasons for the decision by the project to concentrate on the promotion of rice growing?_____
_____

47. How many varieties of rice are grown in the project area? _____

48. What are the sources of these varieties?_____
_____

49. What is the average rice yield per hectare so far obtained in the project?_____

50. Is this average yield per hectare above the potential yield of the rice variety/ies being planted? Yes (____) No (_____).

51. If 'Yes', what are the factors responsible?_____
_____

52. If 'No', what do you think are the reasons for this?_____
_____

53. Is the authority engaged in any other farming activity within the project area?
Yes (_____) No (_____).

54. If 'yes' list such other activities _____
_____

55. If 'No', why is it that it does not?_____
_____

C. INFRASTRUCTURAL, INSTITUTIONAL AND IN-PUT FACILITIES

56. What farm in-puts and services does the project provide to the farmers
(a) _____(b)_____(c)_____
(d)_____(d)_____(f)_____
(g)_____(h)_____

57. How do the farmers pay for them?_____
_____

58. Does the authority insist on the farmers getting these inputs and services from the project?
Yes (____) No (____).

59. Does the project always have enough of the inputs in stock for the farmers' needs? Yes (___) No (___).

60. Which of the following types of technology/practice does the project emphasize? (Number then in order of emphasis priority 1 - 9)
Use of better and high yielding crop varieties (___)
Transplanting (___)
Timeliness in planting, harvesting and input application (___)
Constant weeding (at least twice) (___)
Proper tillage and ground levelling (___)
Application of fertiliser (___)
Use of chemicals for weed and pest control (___)
Training in the use of farm implements and input application methods (___)
Others (give details) (___)

61. Which of these methods are employed in persuading farmers to adopt new inputs and practices introduced in the project?
Extension staff (___) Progressive farmers (___)
Demonstration plots (___) Films (___)

62. What are the problems encountered in the project in trying to persuade the farmers to accept innovations_____
_____

63. Does the project advance any credit to farmers?
Yes (___) No (___)

64. If 'Yes' what form does this credit take?_____
_____

65. What are the conditions under which such credits are given?_____
_____

66. If the project gives cash credit, how many farmers benefitted from it in 1978_____ 1979_____ 1980_____

67. What was the total amount of such cash credit disbursed by the project in 1978_____ 1979_____ 1980_____?

68. What are the problems encountered by the project in its credit programme for the farmers?_____
_____

69. How does the project deal with such problems?_____
_____

70. If there is no credit facility for the farmers by the project what factors are responsible for the situation?_____

71. What role does the project play in the preparation and sale of products?_____
_____

72. Where or to whom does the project sell the products?_____

73. What quantity was sold to each organisation and place?_____

74. What quantity was sold in tonnes in 1978_____ 1979_____ 1980_____

75. Are there farmers' cooperatives/Unions? Yes(___) No (___).

76. If 'Yes' who organise them?
(a) The farmers themselves ____ (____)
(b) The project authority ____ (____)

77. If organised by the project, what year?_____

D. CONTRIBUTIONS, PROBLEMS, SOLUTIONS

78. Are there any facilities and services provided in the project which serve or benefit the neighbouring communities? Yes (____) No (____)

79. If 'Yes' name such facilities and services_____

_____

80. Are there new roads, bridges, culverts etc. built or maintained by the project? Yes (____) No (____)

81. If 'Yes' give details of length, its physical condition and cost _____

_____

82. Are there villages or communities hitherto isolated but which have been made accessible by road through the activities of the project?_____ Yes (___) No (____)

83. If 'Yes', name the villages/towns_____

_____

84. Which of these problems confront you and the farmers most? (Rank them in order of seriousness 1 - 13).

Scarcity and irregular supply of inputs (fertiliger, chemicals, etc.) ..... (___)

Difficulty in securing enough labour ... (___)

Breakdown of machinery owing to lack of spare parts ..... (___)

Lack of money for expansion, purchase of inputs, etc. .....(___)

Lack of market for the products .....(___)

Poor prices of the products .....(___)

High labour and input cost.....(___)

Lack or poor facilities for the preparation and storage of harvested crops.....(___)

Illiteracy of farmers with regards to carrying out instructions.....(___)

Poor communication and transport facilities.....(___)

Uncooperation or hostility from the villagers...(___)

Poor soil.....(___)

Others (explain).....(___)

85. What would you suggest as possible solutions to the problems mentioned above?.....

_____

_____

86. Have you noticed any change in the chemical properties of the soil and water in the project area? Yes (___) No (____).

89. If 'Yes' please give detail _____

_____

88. Has any new weed, insect, or bird hitherto unknown in the area been observed since the commencement of the project? Yes (___) No.(____)

89. If 'Yes' what are their names?
(a)_____(b)_____(c)_____

90. When were they first noticed? (a)_____(b)_____
(c)_____

91. What adverse effects do you think the project has on the economy and ways of life of the surrounding villages?_____

_____

92. If you have any other information of interest about your project, please state here _____

_____

APPENDIX IX

QUESTIONNAIRE FOR PARTICIPANT FARMERS

SECTION A: GENERAL INFORMATION

1. Name _____

2. Sex? (a) Male ..... (b) Female.....

3. Age? (a) 20 years and under.....
   (b) 21 - 40 years .....
   (c) 41 - 60 years .....
   (d) Over 60 years .....

4. Education? (a) No formal education (cannot read and write).....
   (b) Elementary education (not beyond elementary six).....
   (c) Secondary (grammar, teachers, technical, commercial) education.....
   (d) Post secondary (University, Polytechnic, College of Education etc.).....

5. How much do you think you earn in a year?
   (a) ₦500.00 and less.....(b) N501.00-₦1,000.00.....
   (c) ₦1,001.00-₦1500.00.....(d) ₦1501.00-₦2000.00.....
   (e) ₦2001.00-₦2500.00.....(f)₦2501.00 and over.....

6. Which of these means of mobility have you got?
   (a) A bicycle..... (b) A motorcycle.....
   (c) Pleasure/private car..... (d) Commercial vehicle. .....
   (e) None.....

7. Are you married? (a) Yes..... (b) No.....

8. If married, how many wives? (a) One.....
   (b) Two..... (c) More than two.....

9. How many children have you in all? (a) Boys.....
   (b) Girls.....

10. How many of these children are
    (a) 6 years and under..... (b) Between 7-14 years....
    (c) 15 yrs & over..... (d) Married already.....

11. Are you engaged in any other occupational activity other than farming? (a) Yes .....(b) No .....
12. If your answer is 'Yes' list such other activities
.....
.....
13. How many years have you participated in farming in the project?.....
14. Are you an indigene of the village/town where this project is sited? (a) Yes.....(b) No.....
15. If you are not, from which village/town do you come? Village/town..... in ..... L.G.A.

SECTION B: LAND-OWNERSHIP AND ACQUISITION BY FARMERS

16. How many plots are you cultivating?.....
17. What is the area of each plot?
(a).....(b) .....
(c) .....(d).....
(e) .....(f) .....
(g) .....(h).....
18. How did you get the land for cultivation in the project?
(a) You own land within the project area .....
(b) You leased land from the owners.....
(c) The land was allocated to you by the Project Authorities .....
19. If you leased land from the owners, how much did you pay for each plot? (a) ..... (b).....
(c)..... (d) ..... (f) .....
(g) .....(h) .....
20. If you were allocated the plots by the project authority did you pay aything for them? (a) Yes.....
(b) No .....

21. If you paid something for plots allocated by project authority, how much was paid for each of them?
(a) ..... (b) .....(c).....
(d)..... (f).....(g).....
(h).....

22. Were there any economic crop/tree destroyed in your land within the project area? (a) Yes .....
(b) No .....

23. If they were, what type of trees/crops were involved?
(a) ..... (b) ..... (c) .....
(d) .....(e) ..... (f).....

24. What was the number of each type of crop/tree destroyed? (a)..... (b).....(c).....
(d).....(e)..... (f).....

25. Were you paid any compensation for crops/trees destroyed? (a) Yes..... (b) No .....

26. If you were paid compensation, how much was the amount? .....

27. Have you got other rice plots outside the project areas? (a) Yes..... (b) No .....

28. If you have rice plots outside the project area, how many are they in number?.....

29. What is the area of each plot? (a) .....
(b) ..... (c) ..... (d).....

30. How did you get the land? (a) Personal land.....
(b) leased the land from the owners.....
(c) bought the land .....

31. If you either leased or bought land how much did you pay for the plots? (a) .....(b).....
(c)..... (d).....

SECTION C: LAND-USE PATTERN AND CROP YIELD

32. Did you farm in this area before the project came?
(a) Yes..... (b) .....

33. If you were farming here before the coming of the project, name the most prevalent crops grown.
(a) ..... (b).....(c).....(d).....

34. Do you think that the introduction of rice by the project authority is a good decision?
(a) Yes..... (b) No.....

35. If you think it is good decision, what are your reasons?.....
.....

36. On the other hand, what are your reasons if you think the decision is not good?.....
.....

37. Would you prefer to concentrate on rice growing or to combine rice growing with that of other crops prevalent in your area? (a) Yes.....
(b).....

38. If you prefer to concentrate on rice farming only, what are your reasons? .....
.....

39. If you would rather prefer growing both rice and other traditional crops, what are your reasons?.....
.....

40. Which do you consider more profitable or lucrative use of your piece of land within the project area
(a) using it for the cultivation/growing of traditional crops?.....
(b) using it for the cultivation of rice just introduced?.....

41. How much did you realise from your plot of land within the project area the last year you planted it before the coming of the project?.....

42. What work do you do in your project farm in any month of the year?

(a) January ..... (g) July .....
(b) February ..... (h) August .....
(c) March..... (i) September.....
(d) April..... (j) October.....
(e) May ..... (k) November.....
(f) June ..... (l) December.....

43. How many bags of rice did you produce in?

(a) 1978 - Wet season crop.....
Dry season crop.....

(b) 1979 - Wet season crop.....
Dry season crop.....

(c) 1980 - Wet season crop.....
Dry season crop.....

44. How many bags were sold out of the production in?

(a) 1978 - Wet season crop.....
Dry season crop.....

(b) 1979 - Wet season crop.....
Dry season crop.....

(c) 1980 - Wet season crop.....
Dry season crop.....

45. How many bags did you set aside for consumption in the whole year of (a) 1978.....
(b) 1979 ..... (c) 1980.....

46. Did you keep aside any rice for planting?

(a) Yes ..... (b) No .....

47. If your answer is 'yes', how many bags were set aside in? (a) 1978..... (b) 1979.....
(c) 1980.....

48. How much did you realise from the sale of rice in the whole year in?

(a) 1978..... (b) 1979..... (c)1980.....

SECTION D: USE OF INPUTS AND LABOUR

49. How many bags of fertilizer did you use in?
    (a) 1978..... (b) 1979.....
    (c) 1980 .....

50. What was the total cost of fertilizer you used in? (a) 1978..... (b) 1979.....
    (c) 1980.....

51. From which of these sources do you get fertilizer?
    (a) The project office.....
    (b) Ministry of Agriculture/Agro-service centre.....
    (c) Co-operative office.....
    (d) Private sources (market/trader).....

52. Which of the following problems do you encounter in trying to get fertilizer? (a) Transportation.....
    (b) Money..... (c) Timeliness.....
    (d) Insufficient quantity.....(e) Others.....

53. Which of these have you used in your farm in the project? (a) Insecticide.....(b) Herbicide.....
    (c) Tractor.....

54. From where do you get them?,.....
    .....

55. What problem do you have getting them?.....
    .....

56. How do you come to know about the use or application of the above inputs?
    (a) Through the project officials.....
    (b) From neighbour who knew about or was using it...
    (c) Information media-radio, books etc.....
    (d) Ministry extension staff.....
    (e) Other sources (church, market, social club etc.).....

57. Which of these inputs have you used in your farming before you became a participant in the project?
(a) Herbicide..... (b) Fertilizer.....
(c) Insecticide..... (d) Improved seed.....
(e) Tractor..... (f) Others (name).....

58. What were the reasons for your failure to use the ones you indicated you did not use.....
.....

59. Which of these inputs have you used in your farms other than those in the project? (a) Fertilizer.....
(b) Tractor..... (c) Herbicide.....
(d) Insecticide.....(e) Improved seed.....
(f) Others(name)..... (g) None.....

60. Why were you able to use the inputs you indicated in Question 59 above in your farms outside the project?.....
.....

61. What are your reasons for your inability to use the other inputs as indicated in Question 59 in your other farms?.....

62. How often do you weed your farm in the project?
(a) Once.....(b) Twice..... (c) Thrice.....

63. How often do you weed your farm outside the project?
(a) Once.....(b) Twice.....(c) Thrice.....

64. Which method do you adopt in planting your rice?
(a) By broadcast.....(b)By transplanting.....

65. Which type of labour do you mostly employ in your farm? (a) Family labour mostly.....
(b) Depend mostly on hired labour.....
(c) Both types of labour are equally in use.....

66. Which category of hired labour do you often employ?
    (a) Male..... (b) Female.....(c) Children.....
67. How many of each category did you employ last year?
(a) Male ..... (b) Female.....(c) Children.....
68. How much is a labourer within each category paid for a day's job?
    (a) Man.....(c) Woman.....(c) Child.....
69. What was the total amount you paid for labour in your project farm in the whole of
    (a) 1978..... (b) 1979..... (c) 1980.....
70. Which type of labour (male, female, children) do you normally prefer or emply for the following farm activities
    (a) Bush clearing..... (b) Land tillage.....
    (b) Transplanting..... (f) Bird-scaring.....
    (c) Weeding..... (g) Harvesting.....
    (d) Fertilizer and chemical application.....
71. Which farm activity requires labour most?.....
72. Do you have any problem in getting sufficient labour for your farm work? (a) Yes.....(b) No.....
73. If your answer to Question 72 is 'Yes' what are the nature of such problems?.....
74. What do you think are the causes of such problems?
    .....
75. If you hire labour, state 5 villages/towns in the State/country from which these labourers mostly came (list in order of importance).....
    .....
76. Do the present labour source differ from the sources of labour before the coming of the project?
    (a) Yes..... (b) No.....

77. If 'Yes', from where did labourers come before the coming of the project?.....

78. What do you think are the reasons for the change in the sources of labour since the inception of the project?.....

79. Have you ever got a loan for the operation of your farm in the project? (a) Yes.....(b) No.....

80. If your answer to Question 79 is 'Yes', how much loan did you get in? (a) 1978.....(b) 1979..... (c) 1980.....

81. Which of the following is/are the source/s of such loan? (a) Project.....(b) Bank.....
(b) Relations (wife, brother, etc.).....
(f) Co-operative/societies.....
(c) Friends.....(g) Government.....
(d) Moneylenders/traders.....
(h) Others (explain).....

82. How did you repay such loans?.....

83. What were the problems that you encounter with regards to loans?.....

84. What farm input/activity did you usually put the loan into?.....

85. If you had never got loans what were the reasons for not having done so?.....
.....

SECTION E: FACILITIES/INSTITUTIONS ETC.

86. Do you belong to any work exchange group? (a) Yes..... (b) No.....

87. How many are you in a group?.....

88. How often do you get your turn in a month.....

89. Does this work exchange group operate throughout the year? (a) Yes..... (b) No.....

90. What farm activity do you find it particularly useful?.....

91. Is a co-operative society/farmers' union in existence among farmers of the project?
(a) Yes ..... (b) No.....

92. If it exists, are you a member? (a) Yes.... (b) No....

93. Is it compulsory for every participant in the project to belong to the co-operative/farmers union (a) Yes..... (b) No.....

94. When did you become a member?.....

95. Who was responsible for the organisation of the co-operative society/farmers union?
(a) The farmers themselves..... (b) The Project Authority.....

96. What are the advantages or benefits you think you have derived by being a member of the co-operative/ farmers union in the project farm? .....
.....

97. Do you belong to a co-operative/farmers union outside the project farm? (a) Yes.....(b) No.....

98. Where do you prepare the crops after harvest?
(a) Cooperative mill.....
(b) Privately owned mill... .....

99. You sell your products to (a) The project.....
(b) The co-operative.....
(c) The traders in the market.....

100. Do you think that the arrangement whereby the project authority buys your products is a good one?
(a) Yes..... (b) No. .....

101. If your answer to Question 100 is 'No', what are your reasons for thinking so?.....
.....

102. Do you sell your rice in what form mostly?
(a) Milled form mostly.....
(b) Unmilled form mostly.....

103. Why do you choose to sell in unmilled form if your answer to Question 102 is (b).....
.....

104. Give 5 towns within and outside the state from which customers/traders come to buy your rice...
.....

SECTION F: PROBLEMS AND CONTRIBUTIONS

105. What in your opinion would you consider as the benefits of the project to
(a) You as a participant?.....
.....
(b) Businessmen/traders?.....
(c) The community where the project is sited?....
.....

106. On the other hand, what do you see or perceive as problems experienced or posed by the project to: (a) The participating farmers in the project?.....
(b) Farmers outside the project?.....
(c) The community in which the project is located?.....
.....

107. What can you suggest as solutions to the problems identified in?
(a) .....
(b).....
(c) .....

SECTION G: MIGRANT PARTICIPANTS

N.B.: This section of the questionnaire is only for those who answered to question 14 in Section A that they are not indigenes of the village/ town where the project is sited.

108. Are you in the project as :
(a) a full-time farmer.....
(b) a part-time farmer.....

109. How did you first get information about the existence of the project? (a) through a friend.....
(b) Relatives who live and/or work in the project.....
(c) News media such as radio, newspaper.....
(d) Lived in the area.....
(d) Others.....

110. Why did you move out of your village/town as a farmer?.....
.....

111. What were the factors that influenced your choice of this particular project area rather than another?.....

112. How long have you been in this project area?
.....

113. How much longer do you intend to live in the area?.....

114. Is your family living in the area with you?
(a) Yes..... (b) No.....

115. What is the occupation of the spouse?.....
.....

116. What are the children doing?.....
.....

117. Is the house you are living in here
(a) built/owned by you.....
(b) rented.....

118. If the house is built and owned by you, how did you acquire the land where you built it?....
.....

119. How much did you pay for the land so acquired?
.....

120. If the house is rented, how many rooms are there in all or are so rented?.....
.....

121. What are the total amount of rent paid for the room/rooms in a month?.....

122. How often did you visit your home village/town last year?.....

123. Any remittance to your people at home?..
(a) Yes..... (b) No.....

124. How regularly do you remit/send something to home people in a year?.....

125. What is the nature of such remittance
(a) Mostly money.....; (b) mostly farm products.....
(c) Both types most often.....

126. What was the total cash remittance to your home people in the past year?.....

127. What is the type of agricultural product you usually remit home? (a).....
(b)..... (c).....
(d).....

128. What was the quantity of those other types of remittances other than cash? (c).....
(b).....(c).....(d).....

129. Are there any problem that you encounter because you are not an indigene of the area?
(a) Yes..... (b) No.....

130. If your answer to Question 129 is 'yes' what are such problems? .....
.....
.....