TRADITION AND CHANGE IN IGBO FOOD CROP PRODUCTION SYSTEMS: A GEOGRAPHICAL APPRAISAL

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To my parents who died young but came back early enough to see me through life and reap the fruits of their labour.

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A NOTE ON ORTHOGRAPHY AND TONE MARKING

Official Orthography:

A study of vernacular viewpoint of Igbo agricultural systems involves the use of Igbo names and words. Some guideline is therefore provided to help the non-Igbo reader with their pronunciation. I have kept as close as possible to 'The Official Igbo Orthography' recommended by the Onwu Committee in 1961 and officially approved by the Government of the then Eastern Nigeria.

The Official Orthography makes use of 36 alphabets - a b gb ch d e f g gh gw h i ị j k kw kp l m n nw ny ṅ o ọ p r s sh t u ụ v w y z. The eight vowels - a, e, i, ị, o, ọ, u, ụ, are pronounced as indicated below:

Vowel	English Equivalent Pronunciation	Igbo word
a	hand	áka (hand)
e	let	édè (cocoyam)
i	feet	jí (yam)
ị	six	gị́ (you, singular)
o	low	ótù (one)
ọ	pot	ọ́kà (maize)
u	good	Úbè (pear)
ụ	put	ụ́nụ̀ (you, plural)

The consonants b, d, ch, e, f, g, h, j, k, l, m, n, p, r, s, t, v, w, y and z are mostly pronounced as in English. The others present some problems.

Tone Marking Procedure:

Igbo is essentially a tone language defined as a language "which makes use of lexically and syntactically significant pitch contrasts" (Nwachukwu, 1976, p.15). Three tone symbols have been used - high medium, low or downstep. Changes in the tone of vernacular names and words used have been marked to help the reader with pronunciation.

Thus:

Jí jì ńdụ̀ (Yam holds life)

Àla íbè (pledged land)

Àlá mmọ́ (spirit world)

Most Igbo words are also underlined except proper and place names.

TRADITION AND CHANGE IN IGBO FOOD CROP PRODUCTION SYSTEMS

A GEOGRAPHICAL APPRAISAL - Levi Chukwuemeka Uzozie

ABSTRACT

Few studies have been devoted exclusively to finding out how the Igbo food crop farmers operate, the patterns of production, the complex factors which affect their decisions, and how these change with time.

This study attempts to analyse food crop production systems amongst the Igbo-speaking peoples explaining emergent patterns and changes in terms of the farmers' perceptions of the operational environment. It is an attempt to look at the agricultural system from the point of view of the practitioners - a fundamental departure from past emphasis on explanations based primarily on physical and economic factors.

The introductory chapter provides the background to the study. Then follows a review of agricultural location theories and a plea for more adequate behavioural - models for analysing traditional agricultural systems. Chapter III examines the physical environment which provides matter and energy essential for agricultural operation. Chapter IV examines the genesis of the food production systems and the changes brought about by contact with Europe, Asia and the Americas. Chapter V focuses attention on the present day cultivators, their notions of classification of natural phenomena including crops, land tenure systems and their relationships with agriculture. The goal orientations of the farmers, elements and structural organizations of the farming systems are then examined in Chapter VI as preparation for Chapter VII which deals with the emergent crop production patterns and the changes that have occurred between 1964 and 1977. The next chapter analyses the factors affecting the choice of crops and establishes the paramount importance of certain socio-personal factors. Chapter IX uses case studies of actual family farms to demonstrate the temporal nature of farmers' perceptions of the various factors, how the perceptions are translated into actual decisions, and how the decisions in turn affect the farming landscape. In conclusion, the major findings of the study are stated along with their implications for planning and reorganising traditional food crop production systems.

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CHAPTER I

INTRODUCTION

Agriculture occupies a vital place in the economy of Nigeria. It offers employment to over 70% of the working population (Ministry of Economic Development, 1975 P.30) and until the discovery of oil in commercial quantities it provided over 56% of the gross domestic product and constituted some 80% of the country's exports. Food crops grown for consumption within the country constitute about 76% of the total agricultural production, yet very little has been done by way of research into the geography of their cultivation. Attention in the past has been focused primarily on export crops. By contrast, full-time agronomic research into the growing of the important indigenous staple diet, yams, was not started until 1956, the year in which a large text devoted to cocoa alone was published (Galletti, Baldwin and Dina, 1956). Even today the geographical distribution of the main subsistence crops, their varieties, methods of production and the factors affecting farmers' behaviour and choice of crops are not yet precisely understood. Consequently attempts at modernization are not often backed up with sound knowledge of what already exists. Work so far done has failed to account for the multiplicity of factors influencing agricultural land use, due to a preoccupation with standard economic principles.

Even more serious is the tendency to relegate the farmer to the background. His point of view is either not sought or is neglected in decisions involving his well-being. Undue emphasis is also laid on alien crops as opposed to indigenous annuals and perennial tree crops ideally adapted to the local environments (Okigbo, 1975 p.15-16, Coursey 1967, p.vii; 1976, p.1; 1976, p.29).

Coursey (1967, p.vii) gave three reasons for the long period of neglect of indigenous agricultural systems by research workers:

(i) some felt that as the crops grown were essentially foods for peasants they were not worthy of research efforts.

(ii) Western oriented and western-trained agricultural scientists claimed some indigenous staples were too difficult to study. It was argued that the 'profusion of cultivars,' many of which are yet unclassified and of highly localised distribution, created a problem of ensuring comparability of results.

(iii) Above all, methods of cultivation deeply rooted in indigenous thought and culture appeared strange to western-trained agricultural scientists, some of whom wished to see the systems of production changed without even understanding their function.

These so-called problems, notwithstanding "research in food crop," has become a vital issue in recent years (Okigbo, 1975, p.18; Winch, 1976, p.4, Flinn, 1976, p.1). The average Nigerian is now concerned about rising food prices

(Elechi, 1977, p.1). The prices of traditional food crops have continued to soar, in spite of the farm settlement schemes, 'back to the land campaigns' and Operation Feed the Nation. The table below shows the changes in the consumer food price indices for four towns between 1968 and April, 1977.

Consumer Food Price Indices 1968-1977

Base Year 1960 = 100

Year	Lagos	Ibadan	Enugu	Kaduna
1968	117	135	-	116
1969	138	149	-	138
1970	166	174	-	156
1971	208	234	250	194
1972	209	237	238	208
1973	211	245	260	224
1974	248	270	304	258
1975	354	347	389	376
1976	411	502	499	466
April 1977	506	551	524	490

Source : Fed. Office of Statistics Report on Food Prices, Various Issues.

It can be seen from these figures that prices almost quintupled in all the towns between 1968 and 1977. In fact for Enugu the price of yams increased threefold between June 1976 and June 1977 (Elechi, 1977, p.1). How does one explain these rises in food prices? Certainly there is more to it than general world inflation. Could it be that there is a conceptual gap between those who are charged with the responsibility of planning the agricultural economy and those who toil to feed the nation and act in conformity with their specific cultural backgrounding? If so, the gap needs to be narrowed considerably, if not completely closed through research aimed at understanding the problems of increasing food production as understood by the farmers. It is becoming increasingly clear that most development agencies in the country today are prisoners of alien development models which are in no way related to the agricultural needs of the people. According to Dore (1966, p.6) these agencies need "to put themselves inside the skin of the farmers brought up in different cultures from their own." There is the need to study the indigenous food crops, the spatial organization of the production systems, the processes that have given rise to the systems, and the farmers bases for decision making in the utilization of available natural resources.

Yam, the oldest staple in the coastal zone merits special study. Since it has been cultivated for so long, and because it may have been the crop around which agriculture developed in most of the rain forest belt, its study is likely to be especially profitable in terms of perceptual and cultural dimensions of agricultural decision making in traditionally oriented communities.

Moreover, increasing rural-urban migration, the growth in hectarage of export crops and the allegation that the yams are being displaced in many parts of the country by exotic crops makes such a study vitally important at this particular point in time. One may ask: what crops supplemented yams as the traditional staple? What crops are now competing with the yam? Where has it been displaced as the major food staple and what is the extent of the displacement? Why is it that in spite of the obvious environmental advantages which the new crops have over yams, they have not completely overtaken the yam in the agricultural landscape? The farmer who decides what to plant knows many of the answers.

OBJECTIVES:

This work therefore aims at analysing the traditional food production systems in an area where the yam has been a major staple, explaining patterns of production in terms of the farmers' perceptions of the physical, economic and socio-personal environments. It is an attempt to examine the agricultural system from the point of view of the practitioners. The actual functioning of the system, the significance and implications of this cultural viewpoint for planning agricultural development schemes will also be examined in some detail using case studies.

SPECIFIC AIMS:

1. To analyse the historical, physical, economic, socio-personal and perceptual environments in which a group of Nigerian farmers operate.
2. To map and explain the spatial variations in their traditional food crop production systems, the structural

organization of these systems and the changes taking place.

3. To provide explanations of the patterns and changes through the identification of those aspects of the historical, physical, economic and socio-personal environments which enter into farmers' agricultural decision making.
4. To assess the relative importance and interrelationships of the factors, especially in regard to the way farmers select crops and crop associations.
5. To demonstrate by means of case studies of actual family farms how these perceptions are translated into actual decisions as an aid to understanding the choice of food crops and how this choice in turn affects the farming landscape.

JUSTIFICATION OF STUDY:

Every year decisions are taken involving traditional food producers. The elitist model of agricultural research on which these decisions are based regards the farmers as 'passive educatees' (Mellor, 1971, p.6) who should essentially receive instructions from young, often inexperienced extension officers on what should be done. Knowledge seldom flows in the opposite direction. It is a basic hypothesis of this study that the routes by which these decisions are arrived at and the quality of these decisions can be improved by relevant information on indigenous environmental knowledge and how farmers work with, develop and utilize such knowledge.

Besides, small-holder peasant production may prove to be a passing phase in the longer term development of agriculture in this part of the humid tropics. Some day, the small-holder could be overwhelmed by technological changes and we may lose for ever vital knowledge of how these small-scale systems of production operated. Already some of this knowledge is irretrievable. This study, it is hoped, will help document and preserve some of this rich heritage of indigenous environmental and agro-technical knowledge for food crop production systems in Southern Nigeria. It will save posterity the uncertainty of archaeological excavations in an environment which preserves in the soil very little evidence of its farming systems.

AREA OF STUDY:

The area chosen is the area inhabited by the Igbo-speaking peoples around the Lower Niger (Fig.1.1), a vast territory where subsistence production has reached some of the highest intensities in the country. The common language with dialectal differences and broad similarities of social institutions makes it an ideal environment for someone born within the culture to investigate. The core of the area is one of the most densely populated parts of sub-Saharan Africa. In some locations this now exceeds 600 persons per Km^2. The existence of such a high density in a region with allegedly 'poor' and 'infertile' soils has puzzled many population geographers.

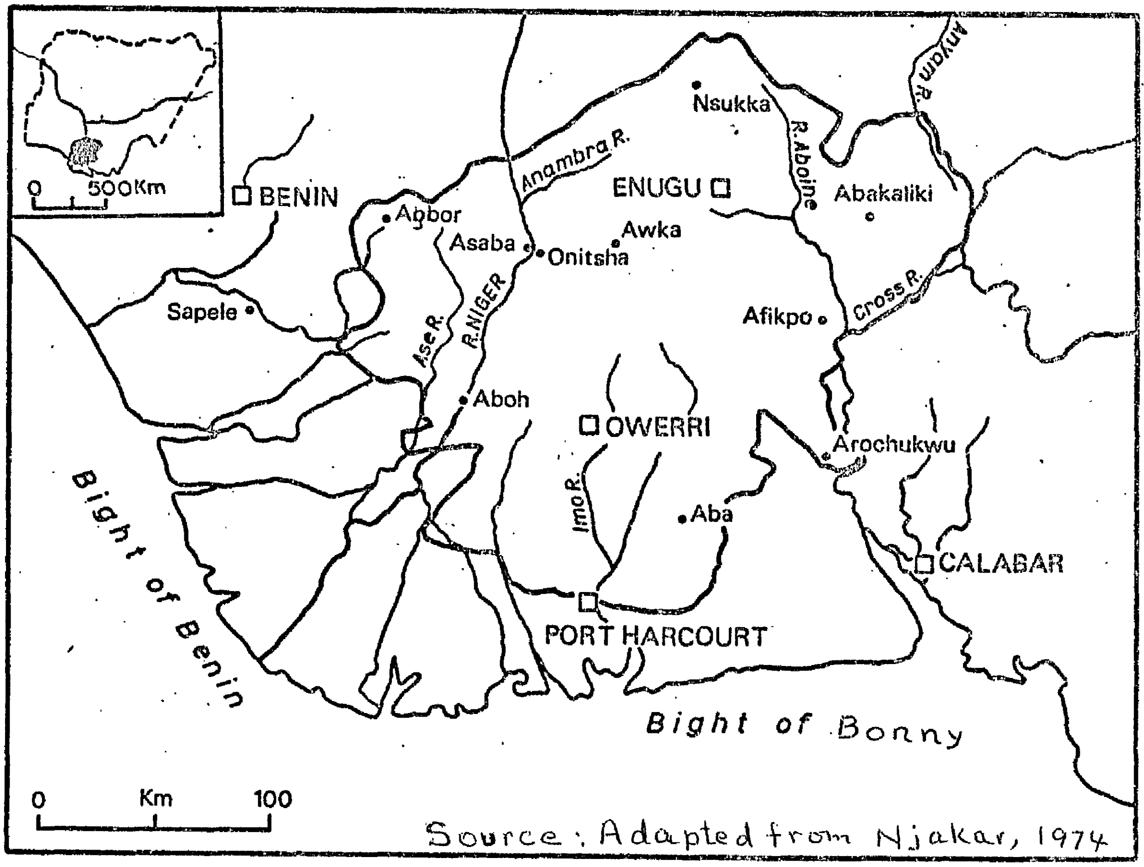


Fig. 1.1: Location of Igboland in Nigeria

METHODOLOGY AND SOURCES OF DATA:

McMaster (1962, p.ix-xi) has suggested three main approaches to a geographical study of subsistence agriculture - an ecological approach, a land utilization approach and a statistical approach. The first method is admirably suited to areas where the agricultural system and farmers' choice of farm land are related to vegetation climax and where it is possible to recognise indicator plants. In most parts of Igboland, vegetation climax is rarely allowed to re-establish itself due to constant cropping following increased pressure on the land. Moreover Igbo agriculture can no longer be described as merely subsistence as many farmers now grow their crops with an eye to a market. The choice of crops does not seem always to be related to the vegetation climax. Economic and socio-personal factors come into play. McMaster's first method therefore has certain limitations. The land utilization approach is equally limited by the sheer size of the region which covers 33,500 km^2. Other problems stem from lack of good quality air photographs showing field boundaries, transport costs and difficulties, and the objection of farmers to an extensive land use survey. The author spent five weeks in one village in 1964 in an attempt to collect land use data from 30 farmers.

The nature of the problem under investigation makes a combination of the three approaches more appropriate. Statistical data have been used to define the crop production regions. Case-study sample areas of varying ecological backgrounds have then been selected for more detailed examination to bring out the effects of local physical, economic and socio-personal factors on the production patterns.

SOURCES OF DATA:

Since statistical information forms an important component of the study, it is necessary to acquaint the reader with the types, quality and limitations of the data available. Statistical data relating to Igbo climate, population and agriculture are available at various Government offices in Enugu, Benin, Lagos, Owerri and Port Harcourt. These include:-

A. PRIMARY SOURCES:

I. Federal Offices of Statistics:

(a) Population Census 1953, 1963 and 1973.
The last two are highly controversial in view of allegations of large-scale inflation of figures throughout the country.

(b) Rural Economic Surveys 1950/51; 1959/60 - 1965/66; 1971/72 - 1975/76:
These surveys were designed to collect information on the structure and output of agriculture in the country. The relevant information available includes the number of agricultural holdings, size, age and sex of farming households, type of land tenure, acreage and production of principal

crops, number and type of livestock kept by the farming units.

II. Nigerian Meteorological Services

(i) Annual Summary of observations.

(ii) Notes on the rainfall, temperature and relative humidity.

III. Ministry of Agriculture:

(i) Crop and weather reports.

(ii) Soil Survey Reports.

(iii) Annual reports and specific monograph studies.

B. SECONDARY SOURCES:

I. Intelligence Reports 1930-1935:

These are a series of ethnographic surveys undertaken by professional ethnographers as well as by District Officers between 1930 and 1935. The aim was to provide information on the traditional laws, customs and administrative procedures as a basis for introducing reforms in administration during the colonial era. Many of these surveys contain vital information on the movements of clan groups, their agricultural practices and crops grown some forty-seven years ago. In some respects, a number of the reports are highly suspect. Some were written by professional anthropologists such as Meek and

Jeffries; others by Cadets and Assistant District Officers. A number of 'traditional authorities' interviewed attempted to interpret tradition to their own advantage in the political domain, but as far as the food habits and agricultural practices of the people are concerned there is a fair chance that the information is authentic.

II. Ministry of Economic Planning and Information:

(i) Digest of statistics.

(ii) National Development Plans.

III. F. A. O. Reports on Agricultural Development in Nigeria 1965 - 1980.

LIMITATIONS OF STATISTICAL DATA SOURCES:

One obvious defect of the country's agricultural statistics concerns the difficulty of making a reliable comparison on a yearly basis of hectarage and production figures. The following analysis of the organization of the survey in former Eastern Nigeria helps to illustrate the problems involved in making comparisons:

(i) In the 1950/51 sample census, no actual measurements of fields were made. An opinion survey in which Agricultural Officers were asked to estimate hectarage and production figures was used. This limits its use in statistical analysis. A release from the Federal Office of Statistics (1952) claims that a properly conducted census would spark off a crisis in the region; however other information obtained from the same office suggests that the main reason was lack of sufficient trained personnel to carry out a census simultaneously in all parts of the country. The fact that the Eastern Region was again omitted in the 1955-1958 censuses seems to lend support to this latter view.

(ii) In 1959/60 and 1960/61, thirty farmers were studied in each of 28 villages but the coastal swamps were omitted.

(iii) In the 1961/62 sample survey, only 15 villages were studied. Once again the coastal swamps were omitted.

(iv) The 1962/63 survey covered 28 villages including three from the coastal swamps.

(v) During the 1963/64 - 1966/67 surveys the sample villages were increased to 48 but the stratification was changed.

(vi) The period between 1967 and 1970 was covered by the Civil War. There was therefore no survey in the war-affected zone.

(vii) Before the 1971/72 - 1973/74 agricultural sample census the pre-war region was divided into three states - East Central State, South Eastern State and Rivers State. Ninety villages were surveyed in each State giving a total of 270 villages for each agricultural year.

(viii) The 1974/75 and 1975/76 Agricultural sample censuses and subsequent ones differ from the earlier surveys in many respects. More farmers were studied. Each of the three states was divided into 150 strata. Each stratum was then subdivided into Enumeration Areas (EAs) in such a way that each EA contained approximately 5,000 people. From each stratum, two EAs were selected. Finally 10 farming households were randomly picked from each EA for the study, giving a total of 3,000 households per state or 9,000 for the former Eastern Nigeria (Fed. Office of Stat. 1976; Des Raj, 1972). Fig. 1.2 shows the location of some of the villages surveyed in relation to the soil groups.

One important merit of these later censuses is that there was greater rigour in both the organization and field measurements. Prismatic compasses and survey chains were used as opposed to earlier systems of pacing and compassing (Fed. Office of Statistics, 1974, p.5-8). There was also much more comprehensive coverage.

The samples were small initially and increased as more trained personnel became available. Other sources of error include the use of controversial population figures to raise the village hectarage and production to provincial figures. There are also problems arising from concealment of plots by suspicious farmers and the inadequacies of pacing and compassing irregularly shaped fields. All these suggest that the sampling errors are likely to be high, especially for the earlier surveys (Fed. Office of Statistics, 1961 Table 10). This is not however an insurmountable problem in a study which focuses attention on areal distribution and comparison. Most of the crops are grown as

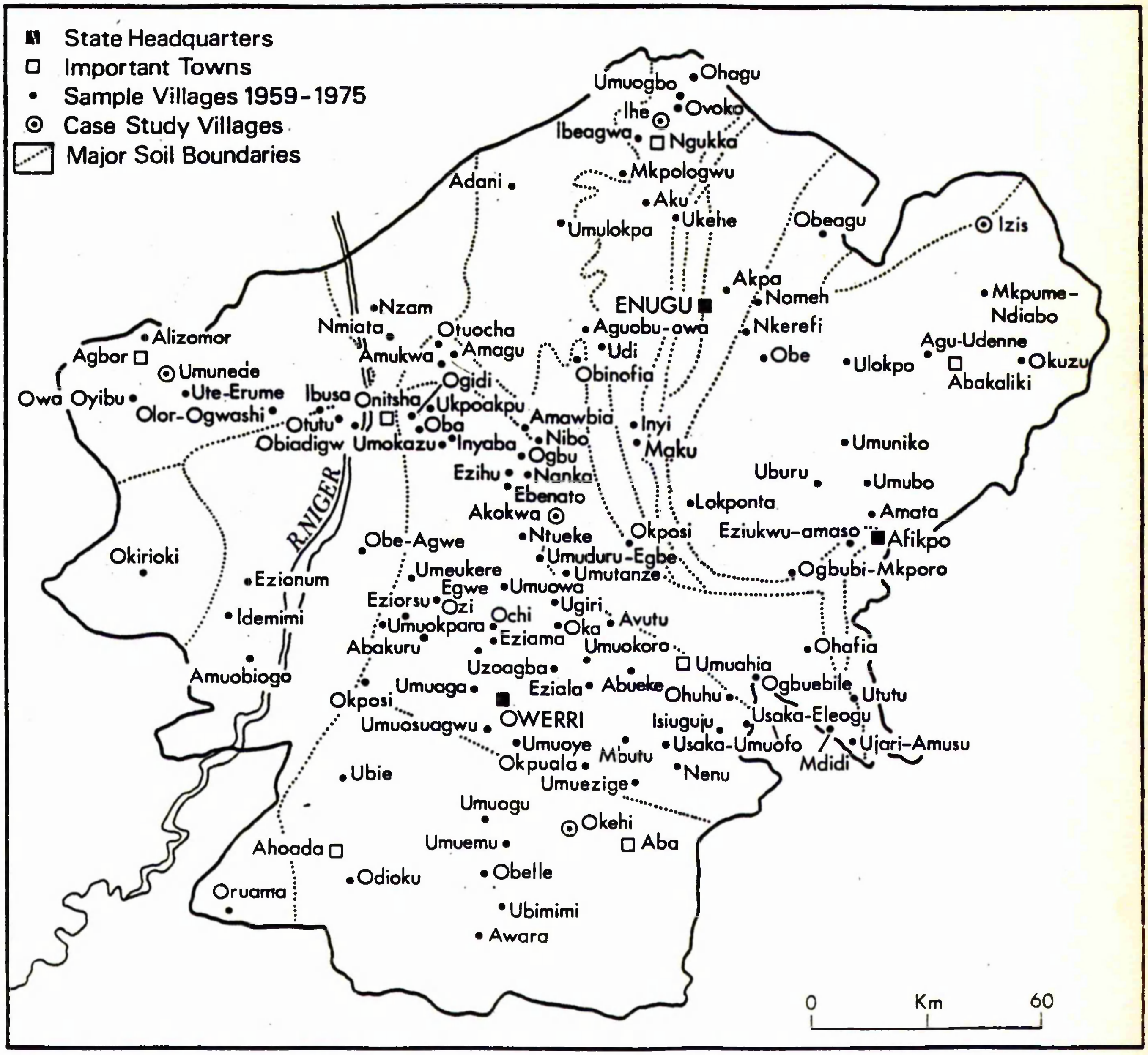


Fig.1.2:Distribution of Sample Villages 1959-1977

(Several sources)

mixtures, and any underestimation or overestimation of hectarage is most likely to be distributed among all the crops in the mixture so that in the final analysis the ratios of hectarage reported at the village level will not differ significantly from the true position. Coppock (1964, p.69) feels that in spite of these limitations, the data could still be used qualitatively and quantitatively to indicate the importance of different crops and classes of livestock in the agricultural system.

In this study therefore the actual village figures and not the provincial or district figures are treated as point samples from which percentages can be calculated. The data for pre-Civil War and post-Civil War village surveys were analysed and maps drawn to show the production patterns. It is hoped that a comparison of the two maps will give some indication of the interesting changes that have taken place during this critical period.

The Author as a Participant Observer:

Perhaps the my greatest source of information on Igbo traditional food crop production systems relates to the author's personal observations and experience of the systems right from his early childhood to the present day. The determination to study the systems are in fact the direct result of these two factors - personal experience and personal observation. Appendix I is designed to give the reader an insight into this very important primary source of information. It recalls some of his early encounters with the agricultural systems as a practical farmer, an innovator as well as an interested observer of the drama that has been unfolding on the agricultural landscape following contact with western education. In fact he considers himself as living between the old and new worlds of the Igbo, the peak period of the great conflict between western and traditional values and the period of rapid environmental deterioration following a population explosion and abandonment of traditional values and norms.

Experiences during these years have convinced the author more than ever that any meaningful research on the ways of improving traditional agriculture must necessarily start with a detailed study and understanding of the present systems through observation, and discussion with the farmers concerned.

VILLAGE CASE STUDY:

In order to gain up-to-date, first-hand knowledge of the characteristics of the farms, the factors now being considered by the farmers in food crop production and changes taking place, field-work was carried out in five villages located in different ecological zones. Table 1.2. shows the locational characteristics of the villages:

Table 1.2: Main Locational Features of Sample Villages
(several sources)

Characteristics	Akokwa	Umunede	Ihe	Izii	Okehi
Latitude	5^{o} 25'N	7^{o} 9'N	6^{o} 52'N	6^{o} 7'N	5^{o} 8'N
Longitude	7^{o} 6'E	6^{o} 19'E	7^{o} 55'E	8^{o} 4'E	7^{o} 8'E
Nearest Town	Orlu	Agbor	Nsukka	Abakaliki	Aba
Administrative Division	Ide-Ato	Ika	Nsukka	Abakaliki	Etche
Population Density per km^2	400-500	50-100	200-300	100-200	100-200
Soil	Deep porous red from sandy deposits	Deep porous brown - reddish brown from sandy deposits	Deep porous red from sandy deposits	Hydromorphic	Deep porous from sandy deposits
Rainful (mm)	2000-2300	1800-2000	1500-1800	1800-2000	3000-3500
Vegetation	Oil Palm bush	Savanna	Oil Palm and Irvingia bush	Savanna	Lowland Rain Forest
Principal Crop	Cassava Cocoyam Yam	Cassava Yam Maize	Cassava Cocoyam Yam	Yam Cassava Rice	Cassava Yam Maize
Length of Fallow in Years	0-1	3-5	0-1	4-6	3-4
Surplus Crops	None	Yams Cassava	None	Yams Cassava Rice	Cassava Yams

During the pilot survey, a combination of three approaches to the study of environmental perception of agricultural landscapes was used. These include observation, listening and asking questions. Meetings were arranged with the farmers through the chiefs and local leaders to explain the purpose of the study. A list of those prepared to co-operate was also drawn up. Through group discussions, debates on the state of food production in the villages, information on the dimensions which the farmers use to assign meaning to their agriculture was gathered. On the basis of this information, the structured questionnaires were drawn up. These fall into three main categories. The first (Appendix II), was aimed at getting general information about the farmers, and includes estimates of their age, number of children, number of wives and dependants and agricultural titles held. The second sought general information on the farm itself - wild, semi-wild and protected plants used as food; length of fallow; sources of labour; field crops grown and their ownership (Appendix III). The third was designed to assess the importance of certain factors affecting the choice of crops and the area allocated to them (Appendix IV).

During the actual village survey, the implements used in farmwork and the arrangement of crops in the fields were observed. Selected farms were also mapped in detail by means of chaining and compassing. Informal discussions were held with the farmers and this provided useful information on certain aspects of the food crop economy which could not be systematically observed and which even the most ambitious questionnaire could have omitted. These include the farmers' past circumstances, his beliefs, feelings and attitudes. A combination of formal and informal interviews therefore ensured that the strands linking the variables involved in agricultural decision making are exposed, enabling meaningful and valid interpretation of the farmers' actions to be made.

Problems of Village Data Collection and some Solutions:

Data collection at village level proved to be very challenging. Three unique methodological problems presented themselves and the ways of dealing with them need to be documented, at least for the benefit of future research workers in similar cultural settings

In spite of the time spent in explaining the aims of the survey to the farmers, some of them were still suspicious. They could not reconcile some of the questions posed to them during the pilot survey with the object of the survey. Some of the answers were too obvious to an average Igbo man to require information from a second party. For example, when one farmer from Ihe Nsukka was asked in the course of a Triad Sorting test to state the ways in which any two of yams, cocoyams and cassava were similar to each other and different from the third. He replied, "Now I know you are using this survey as a cover for something else. You are an Igbo man. You have been eating yams, cassava and cocoyams since you were born. Is that a lie? Now you want me to tell you the difference between yams, cassava and cocoyam. Yam is yam, cocoyam is cocoyam and cassava is cassava. Write it down. That is my answer."

During the interviews it was discovered that some farmers were hesitant to give direct information on the number of children they had. They tended to evade the question and it was necessary to remind them before they answered, and that very reluctantly. One farmer however summoned up courage and indicated that such questions were embarrassing, pointing out that in traditional Igbo society it is not usual for parents 'to say openly' the number of children they have for fear that the 'Giver' might take some of them back. In subsequent interviews, therefore, the information was elicited through indirect questioning. For example - "Oh, I find you have one of your children in here. Where are the rest?" "Your children do not seem to be in. Where are they?" Such indirect questions save the farmer the difficult task of saying openly the exact number of children he has, though they confront the researcher with a minor arithmetical problem.

The final problem involved the recording of what the farmers said during interviews. Again it was observed that some farmers were worried whenever replies to questions were recorded on paper. Apparently, in one of the villages (Akwu, Akokwa) there has been abuse or misuse of the ability to read and write. Agreements for land pledges are known to have been falsified and illiterate farmers asked to append their thumbprints to such documents to be used against them later. One farmer in the neighbouring village is known to have lost a major area of farmland to his literate brother-in-law in this way, and it has taken several years of court action to recover the land. In the circumstances it was decided to record most of the interviews on tape. Apparently none of the farmers objected to this practice.

Problems of Reliability and Validity of Farmers' Statements:

The questions may well be asked - to what extent do farmers' statements reflect what they actually do? How does one ensure that farmers are telling the truth? These problems were tackled in two ways. First, since much depends on the personal relationship between the researcher and the respondent, the author established a friendly rapport with the farmers to minimise the possibility of their telling lies just to get rid of him. On arrival at the farmhouse he first asked about the welfare of the members of the family, played with the children where possible and allowed the traditional 'Kola-breaking' ceremony to take its full course before discussing the real reason for his visit. This procedure was found to be very time consuming but was compensated by the collection of valid data. He also accepted whatever food and drink was offered to him to inspire confidence and win the respect of the farmers.

Secondly, interviews were arranged in such a way that it was possible for two or three farmers to argue among themselves on certain issues affecting agriculture. In this way each interview acted as a partial cross-check to the other.

On several occasions village meetings covered a number of issues. In each case certain important points emerged from the large number of irrelevant details often given.

CONCLUSION:

It is obvious from the foregoing discussion that attempts at improving food production among the Igbo-speaking peoples need to be buttressed by a sound knowledge of the existing systems of production and the environment, both physical and perceptual, on which they are based. No one methodological approach to the quest for this knowledge is in itself very satisfactory. Similarly no one source of information can reveal the many ramifications of the systems.

This study therefore selects from the many complementary approaches and data sources those judged to be appropriate, taking into account the nature of the problem under examination, the aims of the research and the peculiar circumstances of the area of study.

Bearing all these in mind, let us now turn to the next chapter which examines the theoretical foundations of the study.

CHAPTER II

THEORETICAL CONSIDERATIONS

Need for Theories and Models of Agricultural Decision Making:

The factors which influence agricultural decision making are many, varied and often contradictory. Consequently any reasonable and satisfactory explanation of location patterns require some theoretical orientation to serve as a sieve through which the multiplicity of facts related to the enterprise may be sorted out and classified. A good theory of agricultural decision making should establish order out of what often appears to be a random and chaotic occurrence. Without theoretical direction facts may remain a hopeless jumble.

Ricardo and Von Thünen Models:

The earliest attempt at theory construction in agricultural geography can be traced to the early part of the 19th century when David Ricardo attempted to explain the reasons for the high cost of grains in Europe (Ricardo, 1817). Ricardo introduced the concept of economic rent which has remained a key notion in the most deterministic of agricultural location theories and models of later years. Economic rent in agricultural terms may be defined as the return which can be realised from cropping a plot of land over and above the return from cropping a plot of equal area but located at the margin of production. Using this concept, Ricardo explains the high cost of grains in terms of the high value of suitable agricultural land for grain cultivation. His model is therefore an attempt to determine patterns of agricultural land use from extremely limited assumptions.

Another early attempt at theory construction was made by Heinrich von Thünen (1826), who managed an estate at Tellow in East Prussia in the early nineteenth century. Von Thünen's conceptual framework resembles and was influenced by Ricardo's. But unlike Ricardo, von Thünen was primarily concerned with the analysis and description of the patterns of farming landscape that would develop around an urban market centre if all the factors influencing agriculture, (except transport cost), were held constant. In his initial formulation, Von Thünen made a number of assumptions -

1. a uniform physical environment.
2. settlers who are commercially oriented and desirous of maximising their profit.
3. only one means of transporting produce to a single city acting as the market.
4. transport cost proportional to the distance from the farm to the centre of the city.

He then proceeded to examine the patterns of land use that would develop and concluded that the intensity of farming would decrease as one moves away from the city centre because of the constraint imposed by the cost of transport. Land use would also be arranged in concentric zones around the city. The location of the outermost boundary of each production zone relative to the market would be determined by transport cost since farmers would stop production at the point where the cost of production equalled net return from each enterprise. Von Thünen then relaxed some of his simplifying assumptions by introducing

(i) a subsidiary city to serve as a secondary market centre,

(ii) variations in the physical environment or the physical character of the plain, and

(iii) another means of transport, thereby bringing the model a step nearer to reality.

In a way, Von Thünen's model has a behavioural component, being concerned with the way in which man would organise his agricultural land use under certain assumptions concerning profit maximisation.

In spite of the early lead given by Ricardo and Von Thunen, theory development and model construction lagged behind data collection activities until the turn of the present century.

Morgan and Munton (1971, p.1) explain the situation in terms of geographers' obsessions with explanation based entirely on the study of the physical environment as expressed in soil, climate and slope. They suggest also that the problems of reconciling the different sets of variables involved in agricultural decision making with a single body of theory might have discouraged the development of models and laws. Harvey (1966, p.361) ascribes this long period of neglect to the fact that geographers were more concerned with finding unique causes for specific events, and found theoretical structures too abstract.

A resurgence of interest in theory from the 1950's onwards is shown by the flood of articles and texts by both geographers and economists which were devoted wholly or partly to the discussion of agricultural location theories and models (Dunn, Jr., 1954; Garrison and Marble, 1957; Grotewold, 1959; Chisholm, 1962; Johnson, 1962; Gould, 1963; Birch, 1963; Wolpert, 1964; Harvey, 1966; Hall and Wartenberg, 1966; Pred,1967; Dunn, 1967; Hägerstrand, 1952; Henshall, 1965, 1967; Gregor, 1970; Found, 1971; Van Der Vliet, 1974; Cadwallader, 1975; Ilbery, 1975; Jansen, 1976; Ilbery, 1977).

It is worth noting that von Thünen's ideas dominated most of the early attempts at development of theories. Though spatial manifestations of his agricultural zones have been confirmed in a wide range of environmental conditions, including West Africa (Jonasson, 1925, p.277; Buchanan and Hurwitz, 1951, p.236; Chisholm, 1962, p.50; Hunter, 1967, p.341; Gregor, 1970, p.59; Floyd, 1965, p.52 and Ene, 1972), real world deviations from the theoretical patterns have equally been reported (Gregor, 1963, p.61; Durand, Jr. 1964, p.9-33). Surprisingly too, there have been reports of reversals of the normal intensity gradient (Grotewold, 1959, p.346; Sinclair, (1967, p.72-87).

Such large-scale discrepancies between observed and theoretical patterns raise the question as to whether the Von Thünen model could be regarded or classified as a general theory of agricultural behaviour in space. It also paved the way for further search for a more general theory that would consider not just the influence of distance but also other variables affecting agricultural decision making. The search resulted in the construction and testing of models which help assess the effect of changes in any one independent variable, even when the relationships between the variables seem very complex, as illustrated below.

Game Theory:

The problems arising from the conditions of uncertainty and risk under which real world farmers make agricultural decisions led to an interest in the use of game theory, first developed by Von Neumann and Morgenstern (1944) in the analysis of agricultural decision making. The basic problem arises because of the assumption in normative economic models that complete information is available to the farmer, when in fact most real world farmers make their decisions in the face of risks or uncertainty. They often do not know the weather and market conditions. At times they are even faced with entirely new situations. As Tarrant has rightly pointed out, in such situations "the extent to which the farmers' decisions can be described as rational can be judged by the extent to which they can guess accurately the expected weather conditions and on that basis weigh all the possible alternatives before taking a decision" (Tarrant, 1975, p.37).

Game theoretical applications work on the notion that it is not only possible to calculate the probability of future weather conditions, given past meteorological data, but also that it is possible to ascertain which of the alternative crops open to the farmer will it be rational to choose under given climatic circumstances. Gould's study of decision making among peasant farmers in northern Ghana with variable climatic conditions demonstrates the use of this model in the African tropics (Gould, 1963). The application in agricultural economies where farmers are assumed to operate under conditions of uncertain market prices is provided by Agrawal and Heady (1968).

Criticisms of Earlier Models:

Two basic assumptions of von Thünen's model and any other models based on it have come under fire in recent years and the objections raised are all relevant to the theme of this study and need to be discussed here. These assumptions are:

1. That each decision maker has complete information on all the factors affecting his agricultural operations.
2. That each operator makes a rational decision to maximise profit on the basis of this complete information.

Scholars now question the logic of the 'economic man' assumption. Some dispute the notion that maximisation is always the desired objective. Some entrepreneurs may aim to maximise other goals like comfort and leisure rather than profit (Morgan and Munton, 1971, p.31). Others wonder why the economic man is not plagued with the imperfection of knowledge and other frailities of the real world decision maker (Pred,1967,p.6).

The use of Game Theory to circumvent the problem has also come under fire. One critic stigmatised it as a "cold-blooded, deterministic solution to the problem of explaining reactions to a state of risk" (Tarrant, 1974, p.43). In Tarrant's view, the game theorists have applied the model wrongly as the environment cannot strictly be regarded as a player. The farmer can act rationally but it is meaningless to assume that the environment is in any sense an actor. The weather is 'unmotivated,' not knowing or caring whether it is the loser or winner.

Other critics argue that man generally lacks the mental power which enabled Gould's farmers to make the complicated calculations involved in Game Theory, weigh all the alternatives or possibilities before taking a decision (Harvey, 1966; Simon, 1959; Pred, 1967 and Wolpert, 1964). Simon in particular described the mental power of the economic man as "preposterous omniscient rationality" (Simon, 1957, p.xxiii) and has proposed bounded rationality as a more suitable substitute. He and his associates dismiss the perfect knowledge concept because it is a fundamental departure from reality. They argue that knowledge is something that can only be acquired through search or experience. It is not given freely as has been wrongly assumed by game theoreticians (March and Simon, 1958 p.141).

In a similar vein, Tarrant wonders why a farmer who grows crops, often without prior information on yields and market prices at harvest, could be regarded as acting on the basis of complete information (Tarrant, 1974, p.37)

Need for a "More Behavioural" Behavioural Model.

It is clear that explanations of agricultural land use patterns based purely on the analysis of the physical environment are no longer acceptable as few geographers now subscribe to crude environmentalism (Downs, 1970, p.65). It is equally clear that von Thünen's normative economic model and all other models based on it are saddled with questionable assumptions which limit their use in the analysis and explanation of behaviour and actual events in space (cf Rushton 1969, p.392). As partial equilibrium models, they fail to account for patterns subject to rapid changes over time in spite of Harvey's rather timid suggestion that a dynamic von Thünen model could be developed to take care of such situations (Harvey, 1966, p.368). The assumption by more recent theorists that changes, say, in demand, technology and transport costs would automatically be accompanied by an adjustment in land use systems, though possible, appears in practice to prove too narrow and deterministic. In fact Myrdal (1957, p.12-13) has drawn our attention to the general dangers of using static equilibrium models in explaining dynamic situations. He points out that the factors operating in dynamic situations are so different from those under static conditions that it would be unwise to associate the two.

One other defect of normative economic models which limits their use in the analysis of decision making in agriculture is their tendency to aggregate individuals and then analyse land use as though agriculture were a single industry. Except perhaps in the Soviet Union where the government rigorously controls production, the patterns of agricultural land use are often the result of a large number of individual and group decisions.

Normative models are full of assumptions which, when removed, make an analysis invalid. They do however enable us to gain insight into the problems under investigation but seldom lead to a complete answer. At best we get a series of partial answers mainly because so few variables are actually allowed to vary. Most of them do not take into account non economic factors which in traditional societies may have overriding influence on decision making. In many instances the non economic factors combine in various ways to give character to an agricultural landscape. According to Harvey (1966, p.370), these factors "range from chance events in some remote historical period to current decisions made for understandable but non economic reasons." Normative economic models are too simplistic to deal with such an array of variables, many of which cannot be reduced to financial dimensions.

There is therefore the need to think in terms of concepts and models which enable us to transcend the inadequacies and inconsistencies of earlier models and deal more effectively with the vast array of factors encountered by real world farmers in their decision making.

The link which has developed over the past few years between research workers in psychology, anthropology, sociology and geography holds great promise in this respect. In fact the acceptance of Simon's concepts of "bounded rationality" and "satisficer" and the rejection of omniscient rationality are already yielding good dividends. Geographers are now using a "more behavioural" behaviourial approach to explanation of spatial patterns (e.g. Van Der Vliet, 1974, Ilbery, 1975 and 1977).

In this new approach, attempts are made to explain spatial patterns by first identifying the behavioural postulates which operate at the level of the individual decision makers. The rationale for this approach is that human behaviour in space exhibits certain regularities which do not vary very much with differences in spatial structures. Rushton (1969, p.392) argued that a more logical route to an explanation of behaviour in space is to identify these basic behavioural tendencies and seek explanations through them instead of trying to explain behaviour in terms of the environment in which it occurs. A combination of this notion and Simon's satisficer concept forms the corner-stone of real behavioural explanation. The behavioural approach has been advocated and widely used by researchers in the field of agricultural geography with fruitful results (Wolpert, 1964; Cadwallader, 1975, Van Der Vliet, 1974; Ilbery, 1975 and 1977.

Behavioural Models of Agricultural Decision Making Among Traditional African Societies.

The need for an approach couched in more behavioural terms has been established. The remainder of this chapter will attempt to outline one such approach, incorporating the idea of non optimal behaviour, imperfect knowledge, socially dictated constraints and other psychological variables hitherto neglected. The idea of circular cumulative behavioural processes and economic and social instability which act as disruptive forces will also be examined.

In this context a traditional society is defined as a group of people whose thoughts concepts and actions are deeply rooted in the past. They do not part readily with this heritage. Often there is resistance to changes in the old ways of doing things. Decision making may be defined as the cognitive process of choosing from among many alternatives and as pointed out by Hodder and Lee (1974, p.25), underpins economic activity. In the case of crop land use choices, the alternatives are root crops grains, suckers and some fruit trees. A major task now is to evolve a model which helps us to analyse how the farmer chooses from the alternatives open to him and how the choice influences the emergent land use pattern.

A Conceptual Model of Decision Making in Traditional Agriculture:

Consider a farming landscape, say in the humid tropical zone of Africa. This landscape is occupied by village settlements, each with a traditional headman. The settlements are composed of farming units of families varying in size, composition and internal hierarchy as well as social status. Again each family unit has a headman, usually an adult male, who is the senior decision maker.

We assume that the inhabitants need to grow a number of roots, suckers, vegetables, some tree crops and grains for subsistence, with a little surplus for sale to an urban market to satisfy other family needs. In other words, their agricultural behaviour is "satisficing." The factors which influence any farmer's crop choice and production systems, can be divided into three broad categories, namely:

(i) perception of the physical environment.

(ii) perception of the cultural (including economic) environment.

(iii) perception of self - a difficult yet important concept, especially with respect to a traditional society. His decisions and their spatial expression are a synthesis of or compromise between all these factors.

It is postulated that while the traditional farmer relies heavily on the physical environment for his survival, and his actions are linked to environmental and other events, he does not simply sit down and take dictation from the environment. His major concern is to channel the resources latent in the environment to fulfil his social obligations, especially the provision of culturally defined essentials of life, including food and shelter. His choice of crops and production systems would not be based so much upon the raw physical environment but rather on the environment as perceived (Downs, 1970, p.65-108; Sonnenfeld, 1972, p.244-251, Saarinen, 1976, p.xi).

The need for the essentials of life should result in a search within the environment for the means of satisfying these needs. The search is limited to only that part of the environment which in the decision maker's subjective judgement leads to, or could lead to, the satisfaction of wants or the solution of a problem. He cannot search the totality of the geographic environment because he is not aware of its many ramifications. To him some sections do not exist at all. The portion of the geographic environment within which the search takes place is in part determined by the culture and technology at his disposal.

The method of search, the amount of information received by perceptual receptors, and the nature of the image of the real world are likely to be functionally related to cultural backgrounds, particularly shared beliefs and the body of knowledge of the group to which the decision maker belongs. The latter has been variously referred to as ethnoecology, folk science or ethnoscience (Knight 1974, pp.1-2).

Ethnoscience is a label applied to the whole range of technical, biological and environmental knowledge available to a particular group or traditional society. According to Knight (1974, p.4), the accumulation and dissemination of these shared environmental beliefs and rules for productive activities are critical for the development and maintenance of complex agricultural systems. Ethnoscience often confers cohesion to a group and underlies all traditional agricultural systems. The survival of any such systems depends to a large extent on its ethno-scientific base and the rigour with which it is preserved. Ethnoscience not only helps the individual within the group to evaluate the environment in terms of satisfying human wants but also helps to determine lines of action to be taken. Any action leaves its imprint on the environment. Once completed, results of such an action feed back into the ethnoscientific body of knowledge and new control measures are developed on the basis of this feed back to ensure some form of continuity of the ecological system.

Thus in the model outlined in Fig.2.1, the objective environment represents the total environment in which the cultivator lives. It incorporates the perceptual operational and behavioural environments of Sonnenfeld (1972, p.244). Part of this environment affects agriculture, but the farmer is not necessarily aware of it and reacts to only the behavioural component of the geographic environment . The type of information sought in the environment is linked to the group's culture through the ethnoscientific body of knowledge. For example, if the group is nomadic and pastoral, the best developed body of environmental information would relate to water and pasture. Information on the character of the environment reaches the searchers perceptual receptors in the form of messages. The receptors decode the messages on the basis of the value system of the group. Usually there is lack of correspondence between the encoded and

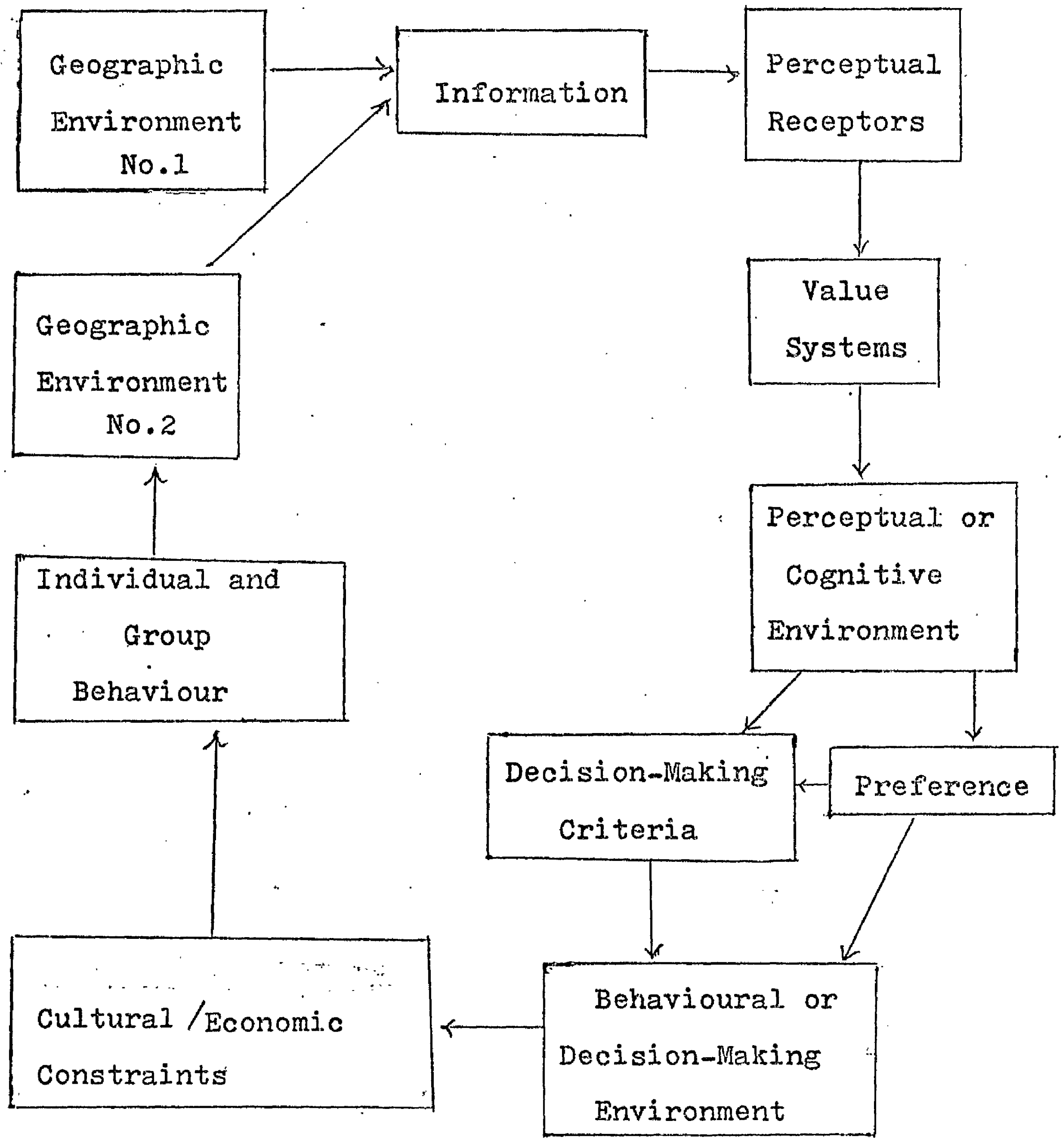


Fig.2.1: A Conceptual Model of Decision-Making in Traditional Societies

decoded messages. Psychologists explain the discrepancy in terms of the presence in the individual of certain organs which distort the incoming message. The organs may be regarded as psychological filters which act as pattern seeking functions (Kirk, 1963, p.366; Downs, 1970, p.88)

The important point is that the decoded messages are stored as cognitive constructs. The accumulation and storage of the constructs result in a large body of knowledge in the form of shared beliefs of the group. Kirk refers to this as a behavioural environment defined as "a psycho-physical field in which phenomena facts are arranged in patterns of structures (Gestalten) and acquire value in a cultural context (Kirk, 1963, p.366). Richards (1974, p.8) makes the important point that this field constitutes not only a store of information "but also as a means of expressing that complex abstraction we refer to as a way of life." Informal and formal agricultural education of the individual group in most traditional societies is carried out within the framework of this culturally defined cognitive framework.

The value system of the group, supernatural beliefs, sanctions and agricultural rituals are all functionally related to the group's cognitive structures. In this way the environmental ethnoscience and its practical outcome, are both passed on from one generation to another as cultural 'artifacts'. Some religious rituals for example serve the function of timing agricultural resource utilization while social sanctions ensure the continued operation of the productive system. A typical example of the latter among the Igbo is the prohibition of the eating of seed yams which are meant for planting. Another example is the sanction against the eating of new yams before the performance of the religious ceremony which allows people to start eating the new crop.

Individual idiosyncracies, discovery of new technology and diffusion of new knowledge may tend to change the overall cognitive pattern, yet the sanctions, rituals, supernatural beliefs and classificatory systems such as those used for land, soil and plants will tend to impose a degree of continuity on cognitive structures. These structures underlie most productive activities and, as Knight (1974, p.14) points out, are usually characterized by bounded rationality.

Among crop-producing societies we would expect crop preferences to be determined by a framework deriving from the group's ethnoscience modified by personal taste, personality and utility. Together they form the decision making criteria incorporated in the model.

Farmers' subjective views on foods prepared from crops depend on these modifying factors, but it would not be necessary to expect correspondence between crop preference based on, say, taste or yield and actual cultivation of it, because of constraints introduced by yet another set of variables as, for example, availability of suitable labour force within the family or ease of hiring one, availability of suitable environment for the crop within his area of authority as delimited by the group, his financial disposition, health, size and composition of the family and a host of other factors not directly related to the physical or economic environment. Even the physical character of a crop, e.g. its storage qualities, ability to mature during strategic seasons, and ability to sustain labour during hard work would be relevant in decision making. As an illustration, communities relying almost entirely on human labour would prefer energy giving or starchy foods to proteins in spite of contrary advice from nutritionists.

It is most likely then that crops which mature during periods of general scarcity or add significantly to the taste of the staples, feature in the agricultural system irrespective of yields. Their position would be strengthened if they lent themselves to mixed cropping along with the major staples. In such circumstances economic aspects of the choice are difficult to evaluate as labour requirements may approach zero. Hectarage strength may be low but the system cannot function efficiently without them.

Crops associated with social prestige, title taking and religious ceremonies involving the group would be cultivated in spite of low returns per unit area. Similarly, old established crops associated with ancestors and whose methods of cultivation are best understood might still feature in the agricultural system long after environmental and other conditions have changed in favour of alien crops.

Problems of obtaining planting materials normally in short supply for some traditional crops may reduce hectarages to the barest minimum. On the other hand, survival of a functionally adapted institutional framework, for example, land tenure for cultivating such crops undoubtedly favours such old established crops and tends to keep the areas cultivated more extensive than might otherwise be expected.

If in this hypothetical society there exists a clear-cut division of labour and crops between the adult males and females, the acreage of crops would tend to relate to the sex composition of the family, particularly to the size of the adult labour force. The larger the proportion of non productive elements in the family, the greater the problem of feeding it on culturally acceptable food items and the more the tendency to rely on less demanding and culturally inferior foods. The older members of the group, because of their loyalty and longer association with the past, would be more traditional oriented than the younger elements, tending to prefer and cultivate food crops grown by their ancestors. This traditionalism may not be limited to food crop choice only but may extend to methods of production.

Problem of Aggregating Individuals:

So far, theories have been advanced to explain behaviour in space in terms of a cognitive image or conceptions which individuals have of their space. One basic assumption in the model needs clarification. It assumes that at any time t, the geographic distributions of crops and patterns of land use in any place are aggregate manifestations of individual decisions made on the basis of perceptions of physical, economic and cultural environments. Now that it has been established that maps of the real world vary from individual to individual, (Kirk, 1963, p.365; Brookfield, 1969, p.51; Hudson, 1975, p.159; Gould and White, 1974, p. 51), to what extent can one equate aggregate behaviour in space with the aggregate of the behaviour of individuals within the group?

Some authorities hold the view that behaviour process for individuals does not extend to the group and that it is dangerous to explain aggregate behaviour by simply grouping information on individual behaviour (English and Mayfield, 1972, p.214). The fact remains that individual decision makers, particularly in traditional societies, are not self-contained individuals. Their levels of aspiration are tied up with the group's and set by norms and values obtaining within the group. There is little room for large-scale individual variations or deviations, especially where a central body controls the chief means of production through, say, communal land tenure. In fact in such situations, all decision makers do not take part in all the stages of the perception process. Searching the geographic environment and cognition are done by the elders within the framework of cultural value systems. Other individuals only feature in the final stage of the perception and decision making processes. An aggregate approach is therefore justified.

However, the complications introduced by variations in the personal character of individuals do suggest that studies of behaviour in space conducted at the aggregate level will tend to mask the contribution of the non average individual. Hence there is a need to examine the problem at the micro and macro levels.

Time Dimension - Effects of Past Decisions and increase in the number of Decision Makers.

It is now widely agreed among behavioural scientists that the relationship between man and his environment involves a two-way interraction.. Man influences the environment through, say, his agriculture and the environment as perceived influences man. Implicit in this statement is the fact that every decisional act leaves a mark, however imperceptible, on the environment. By implication therefore the number of actors or people who take decisions about the land and execute them is very important in the interpretation of the emergent pattern at any time.

For some time now the true relationship between population growth and food production has been a subject of prolonged debate. The debate is centred around the question: which of the two variables depends on the other? Malthus (1798) in his analysis regards population growth as being dependent on food production. His basic assumption is that the supply of food to man is inelastic and this lack of elasticity governs the growth rate of human population. He then proceeds to examine the way in which changes in food production affect the demographic situation.

Boserup (1965, P.11) adopts an entirely different approach from that of Malthus and his followers. She believes that it is more realistic to assume a causal connection which operates in the opposite direction and flatly rejects the idea that increases in the rate of population growth in the underdeveloped countries, especially between 1918 and 1955, are explicable in terms of increased food production. Boserup argues that in areas of low population density, food can always be produced with little imput of labour per unit of output and with very little capital investment because very long fallow helps to restore soil fertility. With the increase in population density and frequency of cultivation, the fertility of the soil can no longer be preserved by means of fallow, since reduction in fallow length is synonymous with reduction in fertility. In such circumstances it becomes necessary to introduce other systems requiring a much larger agricultural labour force. In conclusion she states: "By the gradual change from systems where each cultivated plot is matched by twenty similar plots under fallow to systems where no fallow is necessary, the population within a given area can double several times without having to face either starvation or lack of employment opportunities in agriculture" (Boserup, 1965, p.117).

One important point which Boserup omitted completely is that the response to declining soil fertility may not be expressed merely in terms of changing the method of production. Making changes in what is actually produced cannot be ruled out and, depending on circumstances, may well be the immediate reaction. If this happens, the population may still eke out a living based on the cultivation of a less demanding crop while the fertility continues to deteriorate. A stage could therefore be reached when neither the changes in the production system nor the crops grown is adequate to maintain a balance between population and land resource, and the Mathusian phenomenon characterized by hunger and migration rears its head.

It seems reasonable to accept, at least for the humid tropics of Africa, that the Boserup hypothesis is more appropriate for the analysis and explanation of changes in rural land use and the relationship between population growth and agricultural resources. It follows that in traditional societies with very little input in the form of fertilizers, and with rapidly increasing population, modification of the soil environment is bound to be considerable. Therefore the simple model outlined earlier is incomplete without the time dimension which allows the number of decision makers to increase with time. Since opportunities for employment outside agriculture are limited, the greater proportion of the increase will be employed in agriculture, thus increasing the rate at which changes occur in the soil environment and the need for a fresh cognition and evaluation of its potentialities for the production of certain crops under certain management practices.

Since every decisional act is capable of altering the environment in a remarkable way, the environment at time t will differ significantly from that at time t+1. To make the model dynamic, provision is made so that in the second cycle of cognition process, the cultivator is looking not at the original environment but at an environment modified by his previous acts, whether rational or irrational. Since all the original elements are no longer present, we may regard this as an entirely different environment, and this will affect his subsequent evaluation, preference, decision and behaviour.

The Hypotheses:

Among the Igbo-speaking peoples of Southern Nigeria it is believed that the factors outlined above are crucial to a clear understanding of the agricultural system and the problem of man-land dynamics. It is therefore hypothesized that the choice of crops and crop associations, the area allocated to each crop, and the methods of production are a function of the farmer's image of:

1. The ecological environment.
2. Himself.
3. The size and composition of his family.
4. Labour force at his disposal.
5. Physical and nutritional characteristics of the crops.
6. Utility value of the produce.
7. Experience and link with the past.
8. Prestige associated with the crops.
9. Market demand.
10. His financial disposition.
11. Transport costs.
12. Land tenure systems.
13. Personal preferences.

It is also hypothesized that the traditional farmer, being the key decision maker, is in a better position to say which of the above hypothetical factors really affects his decisions than the professional agricultural scientists. The latter tend "to see environmental problems and solutions in terms of their professional role," and their views might be further narrowed to the principal concern of the agency that employs them (Saarinen, 1976, p.157). In contrast, the traditional farmer who wears the shoe knows where it pinches. He is better able to state the ways in which the factors influence his decisions and their relative importance. In fact, he is a professional in his own right and throughout this study his professional knowledge will be tapped in an attempt to explain his agricultural behaviour in space.

CHAPTER III

OUTSIDERS' VIEW OF THE ENVIRONMENT IN WHICH THE IGBO LIVE AND WORK

A. Two Complementary Views of the Environment.

The Igbo, like any other rural societies in Africa, are rooted within and heavily dependent upon the environment for their survival. In Knight's view,(1974,p.1) "The environment provides matter and energy essential for survival and a major human task is the channelling of these environmental resources to provide physiologically, and culturally defined requisites for life." Plant growth depends to a large extent on the nature of the physical environment. Williams and Joseph (1973, p.1) have in fact criticized agricultural studies which either take environmental factors for granted or describe them in broad terms. They argue that much can be learnt from a full treatment of the environment and its use in the explanation of agricultural phenomena. Consequently any meaningful understanding, explanation and evaluation of the Igbo farmer's agricultural decisions require among other things, a sound knowledge of the physical environment in which the decisions are made. For purposes of planning, two aspects of this knowledge need always to be considered - the physical environment as perceived by the farmer and the same physical environment as understood by experts.

The former may be equated with the physical aspects of Sonnenfeld's "behavioural environment" or that part of the operational environment which the farmer is aware of and reacts to (Sonnenfeld, 1972, p.244) It represents an insider's view of the physical components of the "operational environment." According to Whyte, this subjective and often personalized view "is characterized by familiarity, long experience and inability to effect rapid changes," (Whyte, 1977, p.11). The latter represents a more formalized and rigorous view, usually by outsiders, of the physical environment in which the farmer operates. Usually this view dominates all development plans and tends to oppose the traditional viewpoint and its resistance to rapid change. Alternatively, it may be viewed as a frame of reference against which a social scientist not born or brought up in the culture under examination, can measure, evaluate, and at times comprehend, some aspects of traditional reactions to particular environments often through a series of back translations into his own culture; for no matter the level of understanding of traditional farmers' perceptions, the outsider can never hope to think or reason as he does.

The inadequacy of explanations based essentially on environmental determinism stems from the implied assumption that the two perceptions correspond with one another. The author believes that they differ greatly and that for purposes of planning for development, should always be considered complementary.

In this chapter, an attempt will be made to analyse the physical environment of Igboland from the point of view of the trained environmental scientist.

Particular attention will be paid to the geological structures (which in the main control the physical features and soil), the climate, vegetation and soil. In the less technically advanced food economies, such as we have in Igboland, one often finds broad similarities in terms of agricultural practices in areas with similar soils, vegetation and climate. It is therefore necessary to analyse the distributions of these features if we are to appreciate the extent to which they influence the broad patterns of crop production.

B. Geology.

Throughout Igboland, Basement Complex crystalline rocks form the bedrock overlain by varying depths of marine and alluvial deposits dating from Cretaceous to a more recent age (Fig.3.1). Generally speaking, the sedimentation process occurred in a south-west to north-east direction. Most of the materials were derived from the subaerial denudation of the Cameroon massifs. Consequently the age of the rocks increases along a south-west to north-east axis. The sediments were later folded, giving rise to anticlinal warping along a line joining Okigwi and Abakaliki. The anticline is flanked on the west and east by the Niger-Anambra and Cross River synclines respectively. The tectonic movement associated with synclines and anticlines occurred around the Turonian period (Orajaka, 1974, p.5).

The rocks of Igboland may be divided into five

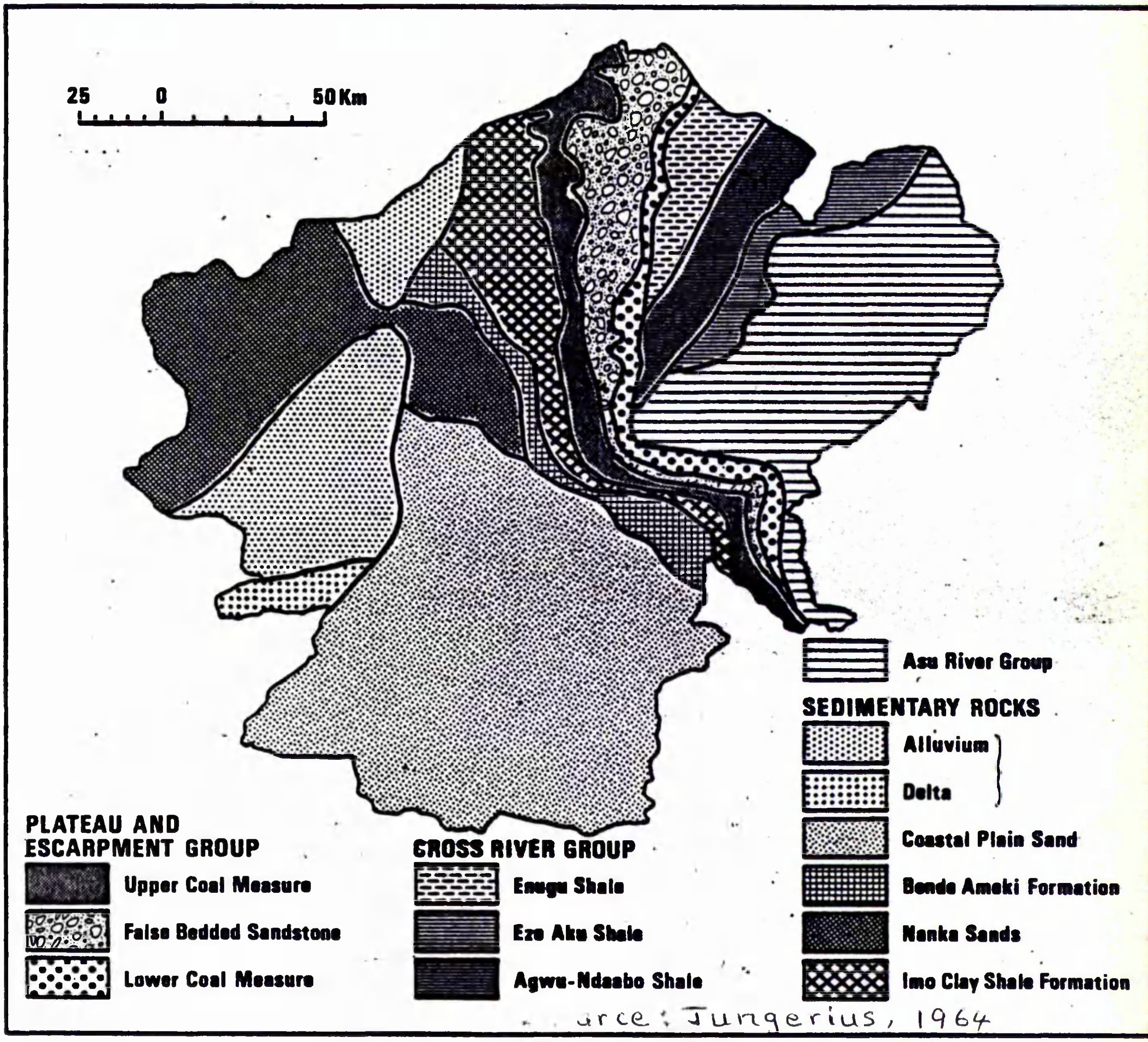


Fig. 3.1: Major Geological Formations

Source: S. O. Orajaka, 1974

main groups:

(a) Alluvium.

Alluvium is the dominant rock formation along the Niger, Lower Anambra and Ase rivers. It consists of coarse sands, gravels, silt clay shales and some decomposed fossil vegetation brought down by the rivers. The Niger alone brings down vast amounts of materials annually in the form of a suspended load which provides the materials for building the 12,800 square kilometre delta lying south of Aboh. The 16 kilometre-wide river terrace north of Aboh is replenished annually with alluvium which forms the foundation for the huge early eating yams grown along the Niger Anambra basin.

The farmers recognize the annual flood as the principal source of both fertility and fish. At Umueze Anam it is called "Iji," the regulator of agricultural operations, as we shall see later. The decrease in the floodable area following the completion of the Kainji Dam and drought in the Catchment area has been a source of anxiety to the farmers. According to the farmers at Umueze, low flooding has not only affected the productivity of their soil but has also increased the disastrous effects of drought on the yam. According to reports from the village, fishing which complements yam cultivation is also adversely affected. In the past, the entire triangular piece of land between the Niger and Anambra rivers used to be flooded, making it possible for big fishes to swim up the river. When the floods receded the fishes were trapped in numerous ponds where they became easy prey. Today, according to the farmers, only low lying areas are flooded with far reaching consequences for agriculture and fishing.

(b) Coastal Plain Sands.

By far the most extensive geological formation in Igboland is the Coastal Plain Sands. This sedimentary formation, occupying about 50% of the total area of Western Igbo and 34% of Eastern Igbo respectively, dates from the pleistocene to oligocene eras. In both parts of Igboland, it is composed of coarse to medium fine unconsolidated sands with some clay bands, all of which lie unconformably above the Bende Ameki Sands. The rock is highly permeable, hence there are only few perennial streams, namely, the Imo, Otammiri Aba, Kwa and Cross Rivers in the east and Ase in the west.

(c) Bende Ameki Sands.

Rocks of this formation are exposed between mile 73 and 87 along the eastern railway line, especially near Ameki (Orajaka, 1974, p.7). They are tertiary in origin. The Niger trouch divides this area into two, one lying east and the other west. The two however approach each other at Onitsha and Asaba where they touch the Niger river, thus dividing it into a northern and a southern basin. Sandstone with some laterite gravels dominate the north. Further south, especially between Ogwashi-Ukwu and Asaba, lignite and shaley limestone occur locally. The southern member of the series lying east of the Niger is known as Nanka Sands because of its occurrence over a wide area in Nanka, a town in Aguata division where it has developed into one of the most spectacular gullies in the Anambra State. As in the Coastal Plain Sands, streams are few, due to high permeability (Simpson 1954, p.31).

(d) Imo Shale.

The Imo Shale group, consisting mainly of impervious tertiary clay shales, has its widest area in the north-western part of the region. Like the Bende Ameki group, it is split into a western and an eastern component by the Niger trough. The impervious nature of the tertiary clays however results in high run-off and many streams.

(e) Coal Measures or Plateau and Escarpment Group.

Included in this category are the upper coal Measures, False Bedded Sandstones and Lower Coal Measures. The main difference between them lies in their sand and clay contents. The older Lower Coal Measure, otherwise known as the Mamu Formation, occurs mainly along the Mamu river basin. False Bedded Sandstones containing thick friable and unsorted materials are exposed at Nkpologwu in Nsukka Division. It is the most sandy of the three rock types but the boundaries between them are not very clearly defined. The Upper Coal Measures occur in a belt about 15 km. wide west of the Nsukka - Udi plateau. About the latitude of Okigwi the belt suddenly swings east and south-east into Arochukwu. It consists mainly of sandstone and shales. The round, flat-topped or conical hills characteristic of Nsukka Division resulted from differential erosion of this rock structure. We shall see their influence on agricultural land use later.

It is important to note that the Coal Measures have no equivalent in Igbo areas west of the Niger. To this geological group of the cretaceous age, south-eastern Nigeria owes its most impressive physiographic feature - the Nsukka - Okigwi - Arochukwu plateau and escarpment.

(f) The Cross River Group.

The broad belt of Igbo territory lying east of the plateau and escarpment is characterized by a succession of impervious shales - Eze Aku shale, Asu River Shale and Agate - Awgu Shale groups of rocks. There are also some islands of basaltic igneous intrusions commonly found south of Afikpo. Here can be found the heaviest soils in the region. Settlement on these heavy soils was not possible until the introduction of iron tools. Today the region is noted for yam and rice production.

C. Physical Features.

The physiography corresponds fairly closely with the main geological formations and is dominated by plains, lowlands and low plateaux. (Fig. 3.2) The landscapes west of the Niger trough are far less diversified than their eastern counterparts. The land rises gradually from the coastal plain sands northwards to the Asaba plateau, scarcely 150 metres above sea-level.

East of the Niger the land rises gradually to the Awka-Orlu uplands, then descends to the Imo basin and rises again towards the north-east until it is interrupted by the Nsukka-Okigwi-Arochukwu plateau and escarpment. The descent into the Cross River basin from the scarp face is very steep, but the rise eastwards into the Obudu plateau is very gentle.

Six major physiographic regions may be identified: the Coastal Plain Sands, Delta and River Plains, Awka Orlu Uplands, Asaba Plateau, Nsukka-Okigwi-Arochukwu Cuesta and Cross River Plain. We may now analyse the essential features of these regions.

(a) Coastal Plain Sands.

These plains, which seldom rise beyond 120 metres above sea-level, are by far the largest single physiographic unit in Igboland. They are composed mainly of pleistocene-oligocene sands. The monotonous low relief is broken by the southern extensions of the Asaba plateau and Awka Orlu

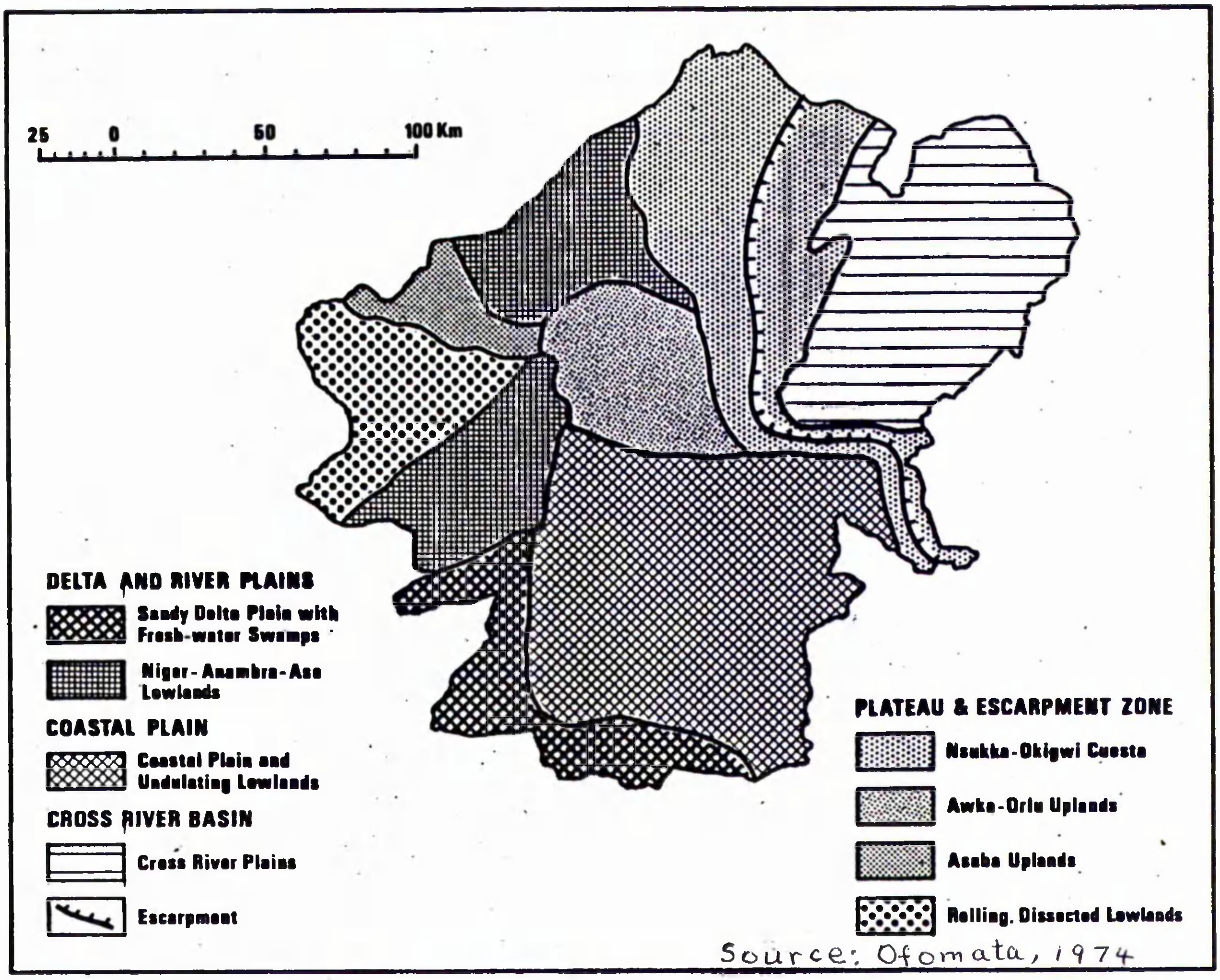


Fig. 3.2: Major Landforms

uplands and by the Orogbodo, Ase, Niger Urashi, Otammiri, Imo and Cross rivers which have cut fairly shallow valleys through the massive sandy deposits. Occasionally, the underlying clays and shales are exposed at the valley bottoms as along the upper Urashi between Nkwerre-Opiegbe and Isiekenesi, giving rise to pockets of very productive soils now intensively farmed by the land hungry Igbo. The deep green and robust yam crops at these valley bottoms often contrast remarkably with those on the valley slopes and interfluves.

(b) Delta and River Plain.

The delta portion of this region lies south of Aboh, some 240 kilometres from the coast. Here the creeks and lagoons frequently inundated by saline mud are agriculturally negative. The remaining part of the region north of Aboh, dominated by the Ase, Niger and Anambra flood plains, is inundated when the rivers are in flood. The vast amount of alluvium brought down by the rivers has built up one of the most fertile, yet most sparsely settled plains in the region. Along the Niger flood plain, settlements are limited to the elongated levees. We shall see later how the contrasting environmental conditions prevailing in the river plain and the delta subregions are mirrored in the life-style of the indigenous inhabitants.

(c) Awka-Orlu Uplands.

This upland owes its origin to differential erosion of the sandstone and shales in the Bende-Ameki geological formations. The boundary between the upland and the coastal plain sands may be taken as the 120 metres contour line. From here the land rises to a little over 360 metres above sea-level in the area around Ekwuluobia. Generally, low relief with deep incised valleys predominates.

The upland is traversed in a north-south direction by the Dikenafia-Awka ridge which forms the watershed between the Urashi, Njaba and Idemmili flowing westwards into the Niger, and the Imo and Upper Mamu tributaries flowing down the eastern scarp face. It is believed that proto-Igbo agricultural colonizations began on the sandy soils characteristic of these ridges and gradually moved downhill following a population increase and declining productivity of the acid sands.

(d) Nsukka-Okigwi-Arochukwu Cuesta.

Three parallel landform units - Upper Cross river plain, plateau and escarpment, unite to produce this impressive physiographic region. The Cuesta reaches its maximum width about the latitude of Nsukka, where it measures about 72 km. From here it decreases progressively to less than 24 km. near Awgu. The scarp topography corresponds with the outcrops of false-bedded sandstone and lower coal measures. The entire land form slopes steeply eastwards into the Cross River basin and gently westwards into the Niger-Anambra trough. The northern sector however is dominated by dry valleys and residual hills of various shapes. Within the area, Ofomata distinguishes five broad types - conical, rounded, flat-topped, cuesta-like and elongated ridges, often bordered by dry valleys developed on the sandstone rocks (Ofomata, 1974,p.37). Therefore in terms of rock structure, land forms and drainage, the three units forming the cuesta differ significantly, and no less different are the perceptions and agricultural decisions of the people occupying them.

(e) Asaba Plateau.

The Asaba plateau resembles the Udi plateau in both drainage and land form characteristics, being developed on similar geological structures. They share common features such as low relief, high permeability, and easily worked soils which attracted early agricultural settlements.

(f) Cross River Plain.

The Cross River plain is part of a much larger topographic unit known as the Cross River basin which includes substantial areas in the Republic of the Cameroons, Benue State, Anambra State, Cross River and Imo States. The vast undulating lowland forming the plain is slightly tilted towards the south-east. The Igbo sector is drained by the Aboine, Asu and the Okpanku rivers, all of which flow into the Cross River.

D. Climate.

Igboland lies between latitude 4° and 8° north of the equator. Consequently equatorial and subtropical climatic conditions predominate. Temperature never falls below the optimum for plant growth. The greatest climatic elements influencing crop production include rainfall, temperature and sunlight which affects photosynthesis. The account of climate given here is presented in summary form as we shall be returning to it in the discussion of crops and their distribution.

(a) Quality of Available Climatic Data and Areal Density of Climatic Stations.

It is however necessary to acquaint the reader with the quality of the climatic data available. As late as 1962, the Meteorological Service of Nigeria maintained a total of 44 rain guages in the region (Nigerian Meteorological Service, 1962). Two (Enugu and Port Harcourt) were synoptic stations manned by full-time professional observers who made hourly observations of temperature, humidity, pressure, rainfall, sunshine, wind velocities and evaporation. Six were agricultural stations manned by part-time observers who took readings of temperature, humidity, evaporation, wind direction and soil temperature twice a day. The rest were climatological stations manned by part-time observers making instrumental observations of temperature and humidity once or twice a week.

One difficulty connected with the use of the climatic data is that the areal spread or density of the stations is not really adequate. Forty-four climatological stations scattered over an area of 40,448 square kilometres give an average density of one station per 919 square kilometres, which is not adequate for establishing the main characteristics of the climate. In addition, several schools, colleges and hospitals send monthly records to the Meteorological Office but since they are not long-established, and since no records are taken during holidays, they cannot be relied upon. In one particular instance no records of rainfall were taken for over 5 months because according to the observer, the rain guage was lost in a riot. Above all, there are no records for the Civil War period 1967 - 1970.

All maps based on these data must therefore be regarded as provisional. This is particularly true of the rainfall variability map.

(b) Temperature.

As a result of the latitudinal location of the region, the sun's rays are almost vertical all the year round, giving high intensity of solar radiation. The quantity actually reaching the growing plants on the ground may however be limited by the thick cloud cover characteristic of the area. The difference between hours of daylight and darkness is negligible, being generally less than one hour. Mean temperature also varies very little, except on the

Nsukka plateau. The difference between the northern and southern parts of the region is minimal as can be seen in Table 3.1 below.

Station	Location	Altitude in metres above M.S.L.	Mean Annual temp. recorded (°C)	Highest temp. recorded (°C)	Lowest temp. recorded (°C)
Nsukka	6° 51'	40	30	36.0	15.8
Enugu	6° 27'	23	31	37.2	16.6
Port Harcourt	4° 46'	1.5	30.5	35	16.6

(Various Sources)

The table shows that extreme minimum temperatures are above 15°C. Mean monthly temperatures are lowest between July and August, due to the cooling effect of the heavy rains, but throughout the year temperatures are such that crops will grow if there is sufficient water. Temperature is not a limiting factor in food crop production in any part of the region provided there is adequate rainfall, but its influence is felt in the timing of the daily operations in the farm. At sunrise, the temperature may just be in the twenties but it soon rises to well over 30°C between 1 and 2 p.m. Igbo farmers are familiar with insolation problems, particularly the adverse effects of high temperature on their agriculture, and have devised various ways of dealing with it (see pages 189-192)

(c) Air Mass, Wind Direction and Velocity.

Wind velocity needs consideration because of its influence on such crops as bananas, maize and plantains. As a climatic factor, wind direction influences the rainfall of a region. Two principal air currents affect the region - a north-east and a south-west current. The former is very dry and usually imports fine dust from the Sahara, resulting in cloudless but hazy weather. The south-westerly air current is laden with moisture and when it dominates the region, gives cloudy weather with frequent thunderstorms. The line of demarcation between these two contrasting air masses called the Intertropical Convergence Zone (I T C Z) oscillates seasonally north and south across West Africa (Fig. 3.3).

The I T C Z is seldom far south of the region. This is confirmed by the frequency of surface wind direction at Enugu, where 66% of the annual total winds comes from the south, south-west and west and only 10% from the north, north east and east.

Though I. T C Z does not lie south of Enugu regularly, it does however oscillate occasionally much further south, and when this happens, the continental air mass invades the whole region and the effect may be felt as far south as Port Harcourt. The continental air mass brings in the Harmattan which the Igbo recognize as an important element in their agriculture (see pages 194 - 195). The season begins around November and ends in February and is associated with dry weather and fierce winds.

One other feature of the climate of importance in agriculture is the passage of line squalls at the beginning and end of the rainy season. Line squalls are thunderstorms with associated squalls which move across West Africa from east to west at about 30 knots, blowing down bananas, plantain and maize plants. It is believed they originate from the Cameroon mountains. [Their approximate location on the ground is shown in Fig. 3.3]. The timing of the farming operations is such that the maize plants are just a few feet high during the first period of the line squalls. At such an age, the maize plants can grow up again after they have been blown down. The bananas, mainly planted on refuse heaps on the compound land, suffer most, especially if trees are not sufficiently dense to act as wind breaks.

(d) Mean Annual Rainfall.

Rainfall is the greatest single element influencing agriculture in the region. Its incidence and seasonal distribution affects the timing of farming operations while the choice of crops relates to its amount, variability and reliability. It therefore deserves special treatment.

Fig. 3.4 shows the mean annual rainfall of Igboland. The pattern depicted here reveals the marked influence of proximity to the sea, direction of the prevailing wind and local relief features. Generally the mean annual rainfall decreases from about 2560 mm. in the south-west to under 1772 mm. in the north (Nsukka 1734, Ahoada 2559). The whole of the coastal plain sands, Awka-Orlu uplands and greater proportion of Nsukka-Okigwi Cuesta

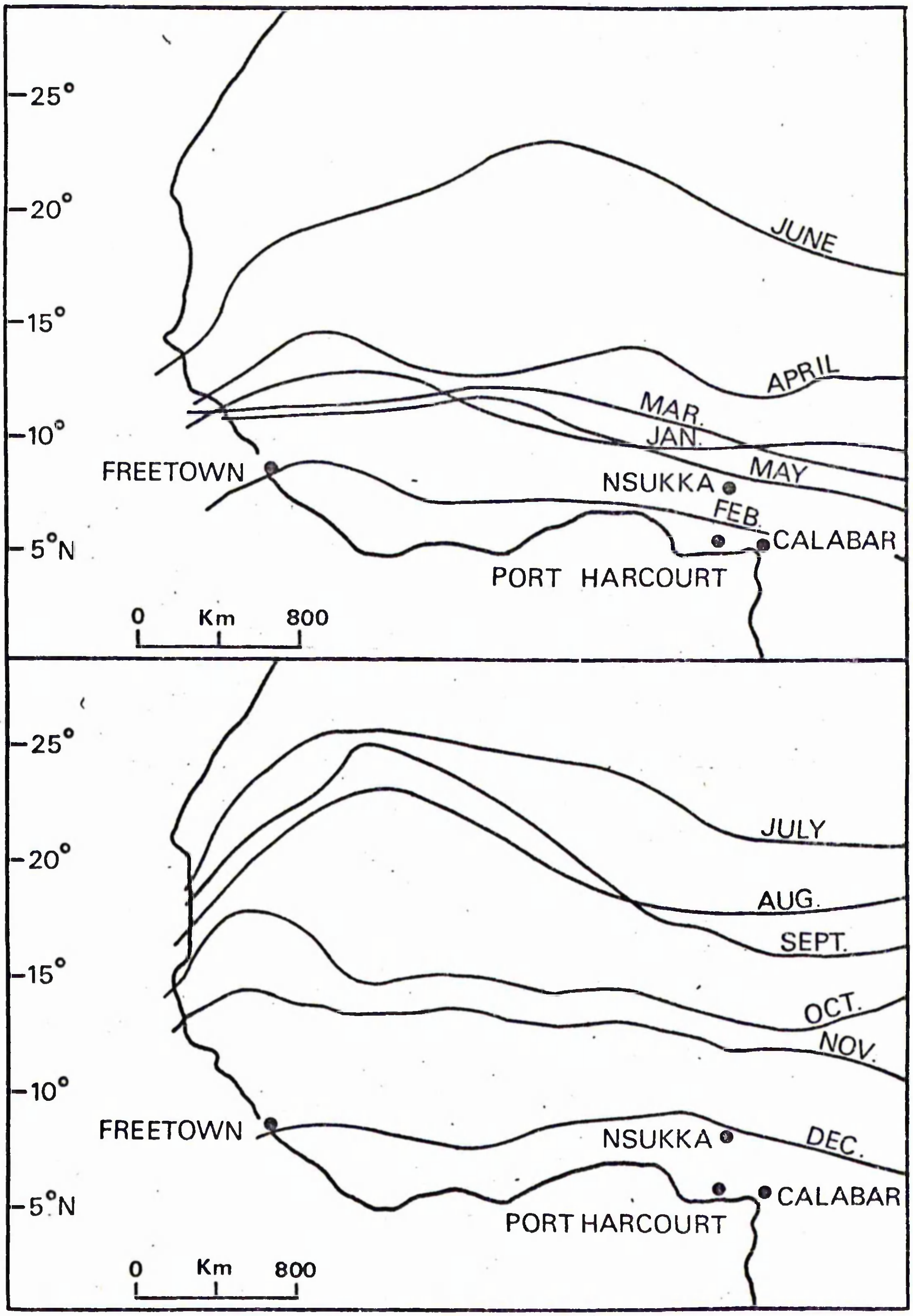


Fig. 3.3: Mean Positions of I.T.C.Z.

(Various sources)

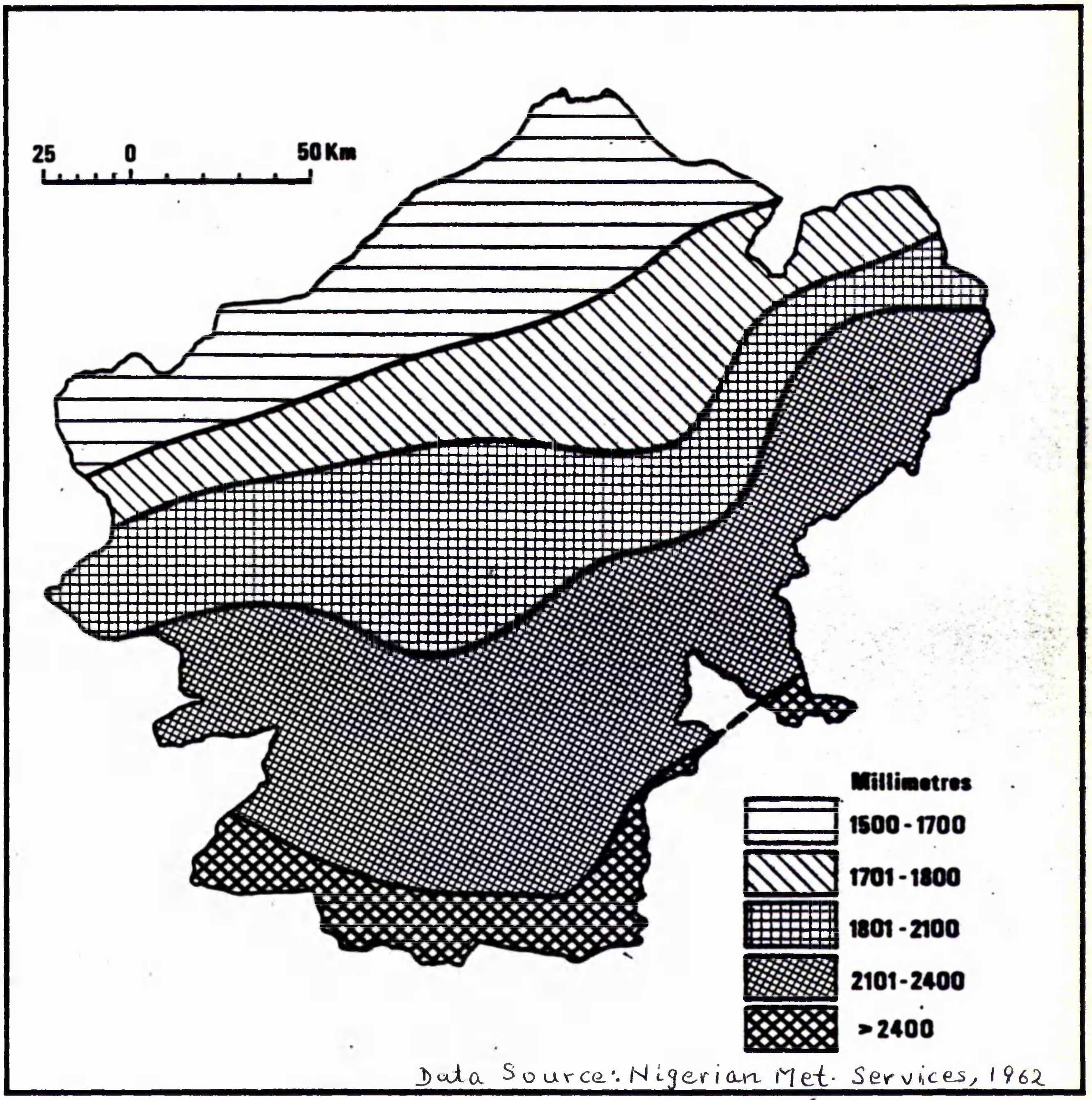


Fig. 3.4: Mean Annual Rainfall

and Cross river basin enjoy an annual rainfall of between 1772 and 2531 mm. The driest part of the region lies in the Adada basin. The effect of rainfall on crop choice will be evident during the discussion of crop distribution.

Mean annual rainfall totals are of little value in traditional agriculture. The seasonal distribution which determines the timing of the farming operations and the length of the growing season is more significant. In Nigeria as a whole one finds a clear-cut division of the year into a wet season and a dry season with the rains concentrated in about one half of the year. The seasonal distribution of mean monthly rainfall indicated by the histograms for representative meteorological stations brings this point into focus (cf.Fig.5.3).The rainfall is typical of equatorial regimes of double maxima, but less marked than in Western Nigeria. Towards the north in Abakaliki, Onitsha and Agbor, the two peaks tend to a single maximum. The first peak occurs mainly in June-July and the second in September, the two being separated by the "August break."

The concentration of some 1772 mm. of rainfall in the six months between April and October has an adverse effect on agriculture. Not only are the crops beaten down by the violent storms but also the freely draining soils characteristic of much of the region are heavily leached under very intensive farming. The draining initiates gaping gullies on the less porous soils of the Nsukka-Okigwi plateau. Randall (1940,p.21), Grove (1951, p.291), Carter (1958, p.100), Floyd (1965,p.33), Ofomata (1964, p.289; 1965, p.45; 1974, p.43) and Imevbore (1972, p.10) have called attention to the phenomenon of spectacular gully erosion found particularly around Nanka and Agulu in Aguata Division. Ofomata who has studied the phenomenon in great depth recognizes "violent showers" as the active initiating agents (Ofomata 1974, p.43).

Fig. 3.5 shows the length of the dry season defined by the number of months with average monthly rainfall below 60 mm. Isopleths run approximately S.W. - N.E. following the patterns of mean annual rainfall. The length of the dry season varies from less than two months in the south (Port Harcourt 2 months) to over 5 months in the Anambra-Niger trough and Nsukka plateau to the north.

(e) <u>Rainfall Variability and Reliability</u>.

Mean annual totals and averages of rainfall do not tell us anything about its reliability at any given station. The extremes and deviations from the means affect growing plants more than the annual totals. Fig.3.6 is an attempt to show the variability of annual rainfall through the coefficient of variability (C V) defined thus:

as $C\ V = \frac{\sigma}{M}(100)$ and $\sigma = \sqrt{\frac{\Sigma d_n^2}{N}}$ where

C V = Coefficient of variability.

σ = Standard deviation.

M = The mean value of annual rainfall totals.

d = Deviation from the mean.

N = Number of observations upon which the mean is calculated.

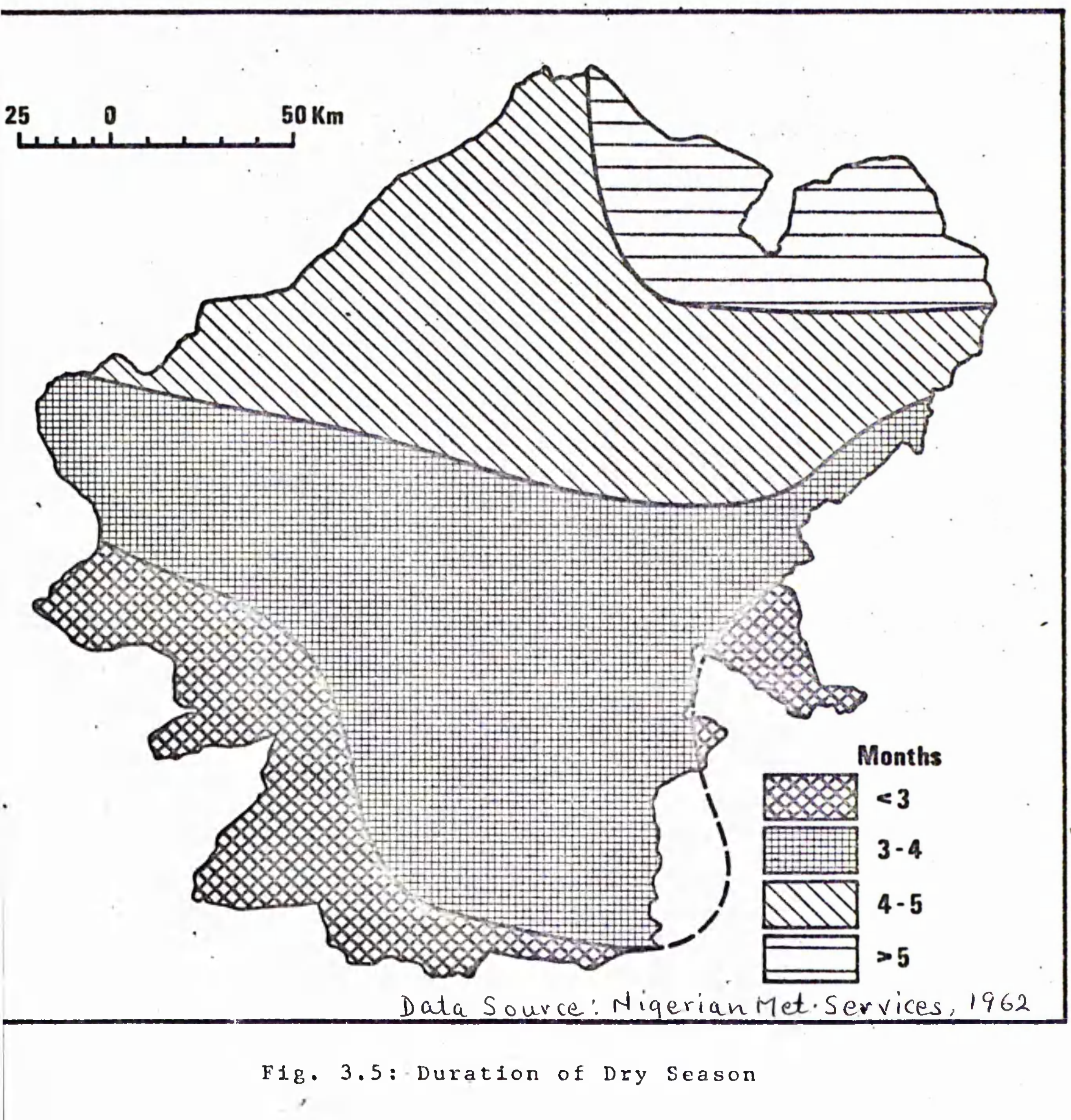


Fig. 3.5: Duration of Dry Season

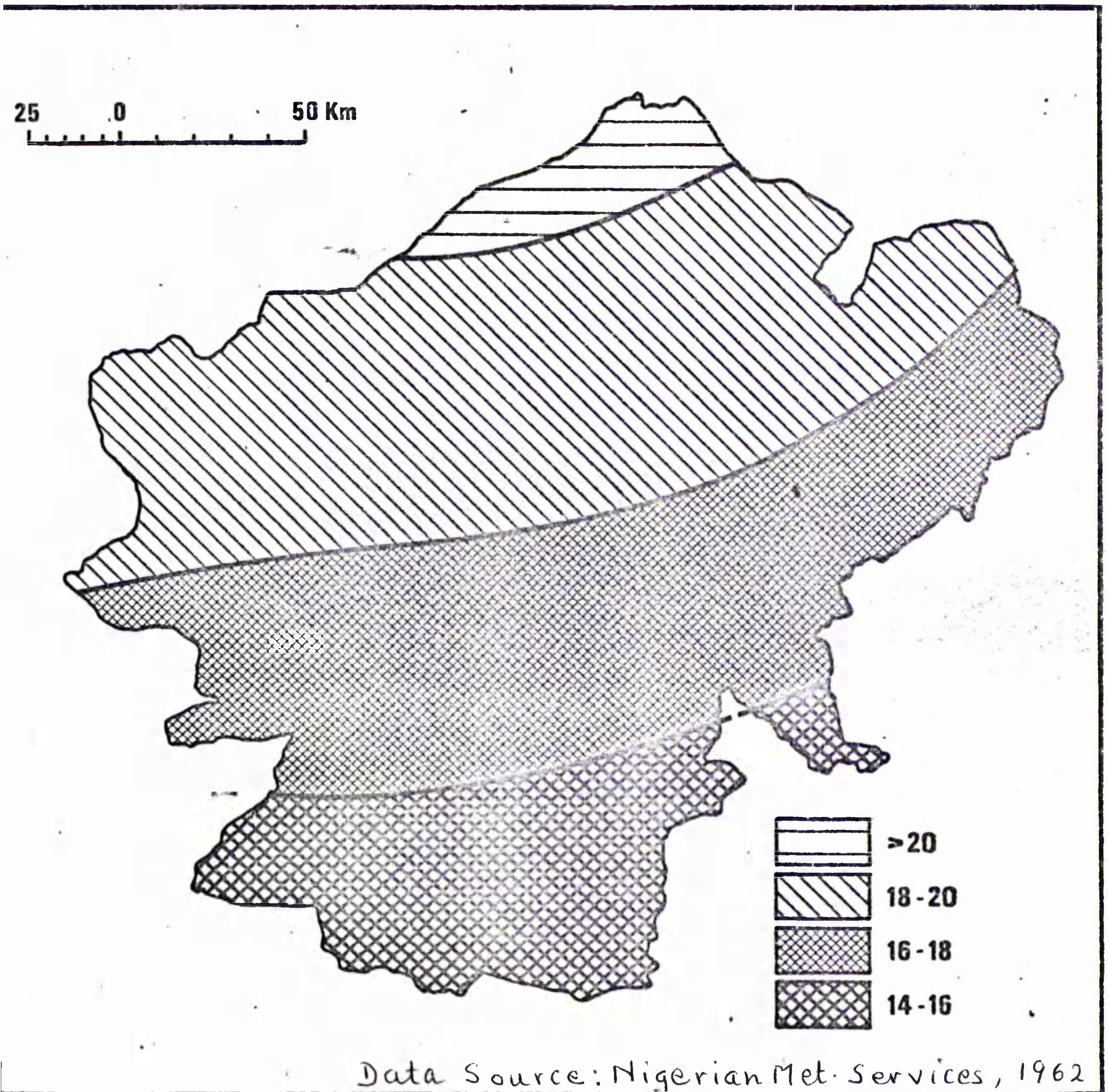


Fig. 3.6: Rainfall Variability Coefficient

The map indicated that C V values tend to follow the trend lines of the isohyets, and areas with low average annual totals also tend to have high variability coefficients. It can be seen that the Nsukka uplands and Adada basin with low annual totals also have the highest coefficient of variability (23%). This compares with figures of less than 15% in the south-west and south-east.

Perhaps no account of rainfall variability and reliability in any part of sub-saharan Africa can be considered complete without mentioning the phenomenon of drought. Historical and geographical literature abound on the subject (see for example Ajayi, 1962; cf. High et al, 1973; Grove, 1973; Bradley, 1973; Mortimore, 1973; Winstanley, 1973 and 1974; O'Keefe and Wisner, 1975; Oguntoyinbo and Richards, 1977 and 1978). Winstanley provides explanations for the phenomenon on a global scale while Oguntoyinbo and Richards used rainfall data to summarise the main features for Nigeria. They point out that drought occurred very frequently in the past and that some of the very severe ones were accompanied by famine. It would appear that 1915-1950 was marked by lower rainfall totals than the average for the region culminating in the widespread drought of 1931-1950. The period between 1951 and 1970 was characterised by alternate wet and dry years but from 1971 onwards there has been considerable reduction in the amount of rainfall with far reaching implications for agriculture especially in the sahelian zone (Bradley 1973). One important effect of drought on Igbo agriculture in the 1940's was the change over in many places from yams to cassava following the failure of the former crop.

E. Vegetation.

One reason often given (though not by Igbo farmers themselves) for the displacement of yams by cassava in parts of southern Nigeria is shortage of wood stakes. This immediately raises the question of vegetation cover and its ability to supply woody stems. Moreover, field investigations reveal that the traditional farmers practising rotational bush fallowing are guided in their choice of agricultural land by the character of vegetation growth. Vegetation determines when a particular piece of fallow land is ready for cultivation, especially in areas of very low man/land ratio. To the traditional farmer, it is a measure of soil fertility (see pages 168 and 169). for any particular crop. Bearing all this in mind, the vegetation of the area should now be considered.

The vegetation of any region results from a combination of a number of factors such as climate, topography, soil conditions, ground water supply and biotic influences including the activities of man and plants themselves. In Igboland climate is undoubtedly the predominant control and exerts its influence through the mean annual rainfall and the duration of the rainy season already discussed. These two factors help to determine the climax vegetation and whether the dominant plant species should be forest or savanna.

As an area that has witnessed human habitation for centuries, little of the primeval vegetation remains today. However from present day vestigial remains and the climatic conditions, one can conclude that the character of the vegetation was in the main climatically determined. Local factors such as the low-lying water-logged soils of the coastal districts, the hydromorphism of soils derived from impervious shales and the incidence of dry season fires also affected the vegetation.

The present-day vegetation of Igboland can be divided into three main groups - fresh water swamp, low-land rain forest and secondary growth rain forect. (Fig. 3.7).

(a) Freshwater Swamp Forest.

This vegetation type, limited to the Niger-Anambra-Ase trough, consists of a mixture of trees, shrubs, lianas, swamp lilies and grasses. The major economic tree species include the raphia palm which yields materials for mats, baskets, piassava fibre and wine. Other species include *Khaya* species capable of providing excellent timber but whose exploitation is hindered by transportation difficulties.

(b) Lowland Rain Forest.

The lowland rain forest is the most extensive vegetation zone in the region today and must have covered a much wider area in the past including northern Igbo territory, now classified as derived savanna. According to Keay (1949, p.45) the former northern limit of the forest is marked by a line joining all stations with at

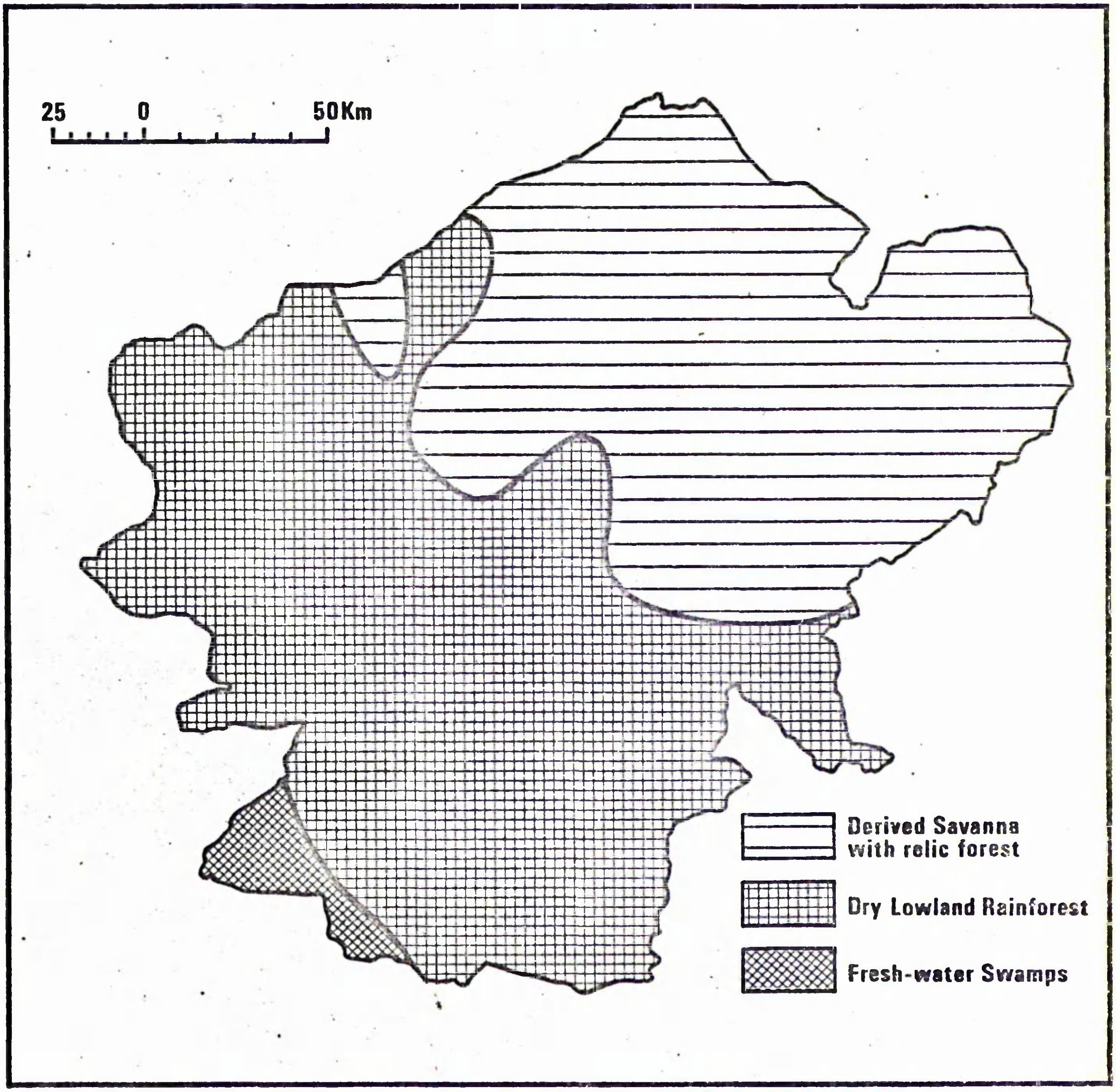


Fig. 3.7: Vegetation

(After R.W.J. Keay, 1949)

least 1265 mm. mean annual rainfall and lowest mean monthly relative humidity at 9 a.m. of not less than 70%. If we accept this definition, then places like Enugu in the north with relative humidity at 9 a.m. of about 75%, and 1797 mm. mean annual rainfall must have been covered by rain forest vegetation. It is therefore probable that the entire area now occupied by the Igbo-speaking peoples were once covered by rain forest vegetation.

Within the broad belt of rain forest we can distinguish subtypes - unmodified rain forest, oil palm bush and derived savanna or secondary growth rain forest. Unmodified rain forests are limited in distribution. A few isolated patches occur in Asa and Egbema districts, and Aboh division especially west of the Ase river.

The forests can always be identified by their stratified vegetation. Tall smooth-barked mahogany trees with heights ranging from 36-55 metres and over form the highest tier. The species include <u>Khaya ivorensis</u>, <u>Khaya anthotheca</u>, <u>Tripolochiton scheroxylon</u> and <u>Chlorophora exelsa</u>. The second stratum of trees is 15-36 metres high. The third layer comprises woody climbers and parasitic plants all struggling for sunlight. The lowest layer is characterized by single stemmed young mahogany, herbs and smaller climbers. There is therefore a great profusion of species.

In the overcrowded parts of Igbo heartland and the more densely populated parts of Isele-Ukwu, Ogwashi Ukwu and Agbor, very little, if any, of the primeval forest survives to this day. Much of the vegetation is of secondary growth. Maps of Nigeria drawn by the Federal

Surveys in 1949 show extensive areas of former Owerri Province, Ika, Aboh and Asaba divisions as forests, but many of them have long since disappeared with the pressure of population and demand for farmland. In the densely settled parts of Okigwi and Orlu divisions nothing remains of the forest except around the shrines of idols, and even these have recently been attacked by "land hungry" peoples and no amount of demonstration by women worshippers can stop them. In Umuokpara village, Akokwa, the last surviving remnants of genuine forest dedicated to "Afo" goddess was cleared in 1977 for building a Technical College. In this case however there was no opposition. The village donated the forest for prestige purposes.

The process of clearing the high forest for agriculture and leaving behind young oil palm trees and other economic trees has given rise to a characteristic man-made vegetation called 'Oil Palm Bush' in which the oil palm is the dominant tree species. Much of southern Ika, Owerri, Ngwa, Orlu, Okigwi, Aguata and Njikoka divisions fall within the oil palm bush but the density and contribution of the oil palm to the tree species vary considerably. West of the Niger there is keen competition between rubber and the oil palm as economic tree crops.

(c) Derived Savanna.

When secondary growth forest is frequently cut and burnt, the soil is impoverished and the vegetation deteriorates progressively from rain forest through woodland of fire resistant scrubby trees and grasses to derived savanna in which tall grasses become dominant. This is precisely how most of the rain forest in the Igbo speaking areas appear to have disappeared, giving rise to derived savanna vegetation of Andropogon species (Guinea grass), Imperata cylindrica (spear grass), Pennisetum purpureum (elephant grass) and the most recent invader and colonizer Chromolaena odorata L. (formerly Eupatorium odoratum) (Siam weed).

Derived savanna vegetation is characteristic of the northern half of Asaba division. Towards the Niger, elephant grass appears to be more dominant than the other two grass species. The most extensive belt of open grassland is centred on the Udi Plateau, especially on the deep porous red sandy soils. Similar vegetation covers much of Nsukka-Awgu plateau including the broad belt lying between Mamu river and Nsukka-Awgu escarpment to the east. Throughout the region there is considerable variation in the character of the derived savanna vegetation depending on the intensity of human settlement, slope, soil type and associated drainage conditions. In recent years however the more aggressive Siam weed has spread so rapidly, even in areas formerly dominated by elephant and spear grasses, that it has become the dominant herb. Among the Orlu Igbo, it is called "Osoroigurubeluo" because it is believed to have been introduced by the migratory locust in the 1940's when the last invasion occurred.

F. Soils.

The soil, broadly speaking, is that layer of the earth's crust on which plants grow. Hence, any study seeking to explain the spatial distribution of any group of plant species must take into account the nature of the soil. Moreover it has been alleged that the change-over from yams to cassava in various parts of the region is mainly the result of declining productivity of the soil for the former crop (Ekandem, 1962, p.1).

It must be pointed out that the soils of the region have not been systematically surveyed. Work is still in progress on a reconnaissance survey of scattered areas, usually those earmarked for development. The account which follows, together with the map, is based mainly on two reports.

One was prepared by Jungarius of the Soil Survey Unit at Umudike and made available to me originally by Dr. B.N. Floyd of the Department of Geography, University of Durham. This has now been published and covers the Igbo territory east of the Niger (Jungarius, 1964). The second document prepared by Baker and his associates as part of the F.A.O. 1965 Land Use Survey (Baker et al, 1965) provides information on the area west of the Niger.

In an area such as Igboland where climatic conditions are fairly uniform, the geology or nature of the parent materials, the slope of the land and the stages reached in weathering and transportation processes are of immense importance in determining the detailed characteristics of soil profile. This basic fact has been recognized by Vine (1949) who has published a provisional soil map of Nigeria based on the solid geology. A comparison of the soil and geological maps of Igboland (Figs. 3.8 and 3.1) helps to bring out this relationship. There are altogether six geological formations. The soil map shows four main types differentiated on the basis of morphology and degree of profile development and later subdivided into six mapping units according to the character of the subsoil or the colour of the surface. Each of the mapping units contains many soil groups but only the dominant groups are shown. Note that the disturbing effects of weathering, slopes and drainage conditions have resulted in a lack of perfect concurrence between the soil and geological boundaries. Bearing this in mind, we now turn to a brief description of the major soil groups.

(a) Lithosols.

Soils of this type are generally shallow and stony. The areal coverage is very small, being limited to the steep slopes of the cuesta, crystalline granites, gneisses, sandy and clay shales. Erosion impedes proper profile development so that the soils are mainly immature. Such soils occur over a narrow belt, less than 10 km. wide on the steep slopes of Nsukka-Okigwi-Arochukwu escarpment. It is the dominant soil of Maku and north-western Awgu. The parent material is very close to the surface and often

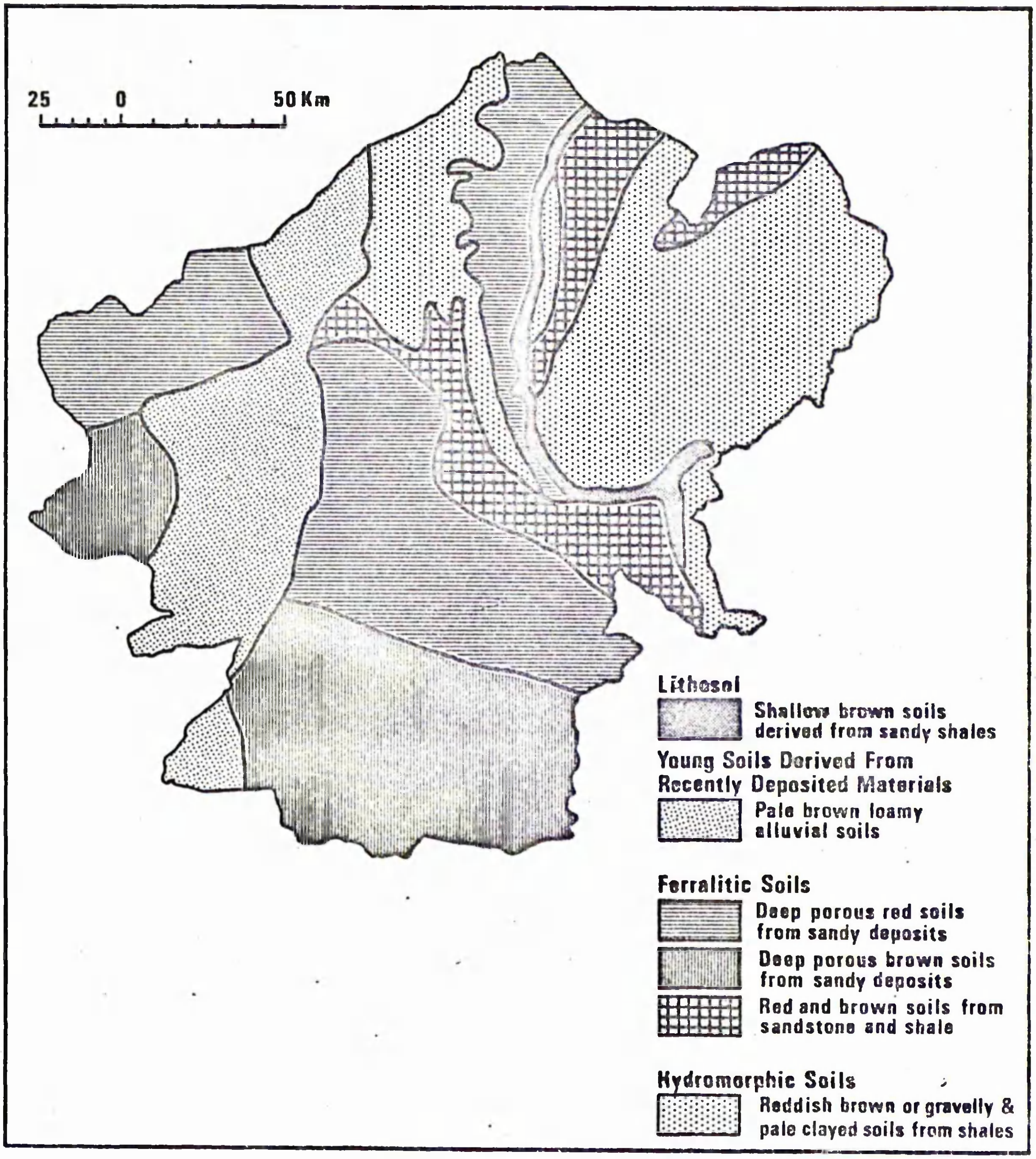


Fig. 3.8: Major Soil Groups

(After P.D. Jungerius, 1964)

the soil contains abundant fragments of weathered rock. This together with steep slopes limits their exploitation except on the Maku region where ingenious networks of terracing have resulted in a very intensive form of agriculture producing yams and tomatoes (Floyd,1964, 91-108). In recent years there has been a significant shift from tomatoes to cocoyams (Richards, 1978, Personal Communication).

(b) Fresh Water Swamp Soils.

These are young soils derived from recently deposited materials. They cover the extensive flood plains of the Niger-Ase and discontinuous tracts along the Cross River. After each annual flood, fresh materials are added to form these pale brown loamy soils. At Igbaku, the soil has very dark clay over alluvium derived from clay shales. Here the subsoil displays some brown mottling. In both the Igbaku and Oruma series, internal drainage is impeded by high water table and the clayey nature of the soil. Flooding during the rainy season produces potential sites for wet rice cultivation. At the moment only restricted areas in Anambra basin have been exploited for this purpose. Most of the extensive fresh water and raphia swamp soils still lie under forest cover. This is particularly true of the vast Niger-Ase flood plain of Aboh division in Bendel State.

(c) Ferralitic Soils.

The ferralitic group of soils characterized by low natural fertility covers the rest of western Igbo outside the alluvial areas and the whole of the densely populated eastern Igbo area. Three subtypes have been differentiated, namely:

(i) Deep Porous Red Soils Derived From Sandy Deposits.

This is the dominant soil group in the northern half of Ika, the higher slopes of Nsukka-Udi Plateau, much of Awka-Orlu uplands, northern Ngwa and Oratta clan areas. The topsoil contains a small quantity of organic materials. Lower down the profile, coarse sandy soil grades into coarse sandy clays.

(ii) Deep Porous Brown Soils Derived From Sandy Deposits.

The major difference between this group and the red soils is the colour. They are both developed on sedimentary rocks, mostly unconsolidated sands and sand-stone and in similar topographic environments. They are both deep (often exceeding 6 metres) and homogeneous, consisting of sand and clay. The clay content increases with depth but there is little change in the soil texture below 1 - 1.2 metres.

The differences in colour are explicable in terms of climate. Red soils predominate over the drier north and yellow members in the wetter south. The boundary between them is not very sharply defined due to the gradual decrease in rainfall towards the north. A comparison of Figs. 3.6 and 3.10 seems to suggest that deep porous yellow soils require at least 2,500 mm. of rainfall for proper development.

The names "acid sands" or "Benin Sands" often used to describe these soils may well be misleading. They tend to give one the impression that the soils are more sandy and by implication more unproductive than they are in reality. Very often the topsoil exhibits sandy loam or sandy clay and, in the case of isolated pockets on the Nsukka plateau, red clay which provides ideal conditions for the growth of most foodcrops. Further south, in spite of the excessive leaching, these soils support the highest density of rural population in sub-saharan Africa.

(iii) Red and Brown Soils Derived from Sandstone and Shales.

The soil is developed on a mixture of shale and sandy deposits. In the upland areas the topsoil is brownish and sandy but on the lower slopes, shale outcrops and poor draining dark reddish brown topsoils predominate. Further down the valley bottoms the topsoils consist of transported pale brown sandy soils. The sandy members of this soil group are generally poorer in plant nutrients and less retentive of moisture than their shale counterparts.

(iv) Hydromorphic Soils.

The main features of these reddish brown gravelly and pale clay soils are their seasonal waterlogging as a result of the underlying impervious shales. Nevertheless, Vine feels that many of the soils shown as hydromorphic in the area west of Nsukka-Udi plateau are not hydromorphic at the moment but may have been formed in the past under hydromorphic conditions (Vine. Personal Communication). Hydromorphic soils are best developed on the extensive fine-grained sedimentary shales covering the undulating to nearby level plains west of the Cross River.

The detailed character of the soils differs with topography. The low ridges, intermediate hills and wide shallow valley bottoms tend to develop characteristic forms. On the uplands, a topsoil of brownish yellow to greyish-brown clay loam merges imperceptibly into a light grey and red mottled substratum at depths of 0.6 - 1.2 metres. A variant of this with iron pans dominates the edge of the uplands and summits of low ridges especially those on which the stripping of fine earth materials exposes the underlying ironstone concretions. The drainage characteristics are much better and resemble those of ferrallitic soils but differ from them in being of higher natural fertility. However, in comparison with the loamy soils on the upland, they are low in fertility. The third catenary sequence of hill wash materials occupies the bottoms of the broad, often waterlogged, valleys. Swamp sandy loam or clay loam soils develop with grey mottling below the dark humose topsoil.

G. Soil Erosion and Soil Fertility.

The foregoing account of the physical environment would be incomplete without a discussion of soil erosion and soil fertility, two interrelated phenomena which play important roles in the agricultural geography of Igboland. Soil erosion results in the loss of agricultural land and a decrease in the fertility and has attracted the attention of many scientists (Randall, 1940, p.21; Grove, 1951, p.291; Carter, 1958, p.100; Floyd, 1965, p.33; 1969, p.111 and Ofomata (1964, p.289; 1965, p.45 and 1974, p.43).

Ofomata who has written most widely on the subject lists the degree of vegetal cover, topography, lithology, man and climate (particularly rainfall intensity) as the main factors responsible for the phenomenon. Fig. 3.9 shows the degree of soil erosion in the region. A comparison of this map with Fig. 3.2 brings out the close connection between relief and the degree of erosion. Areas of high relief and steep slopes tend to coincide with areas of accelerated gully erosion. The worst affected areas lie on the plateau and escarpment zone, particularly in the areas around Agulu, Nanka and Oko villages in Aguata division.

In terms of fertility, the point should be made that a soil is not necessarily fertile or infertile on account of its parent material alone. The ease with which the nutrient contents are made available to the plant in question is of paramount importance. Soil fertility does not only depend on the crop we are considering but also on a host of other factors such as climate, vegetation, geological origin, and chemical contents of the parent materials. The degree of weathering and profile develop-

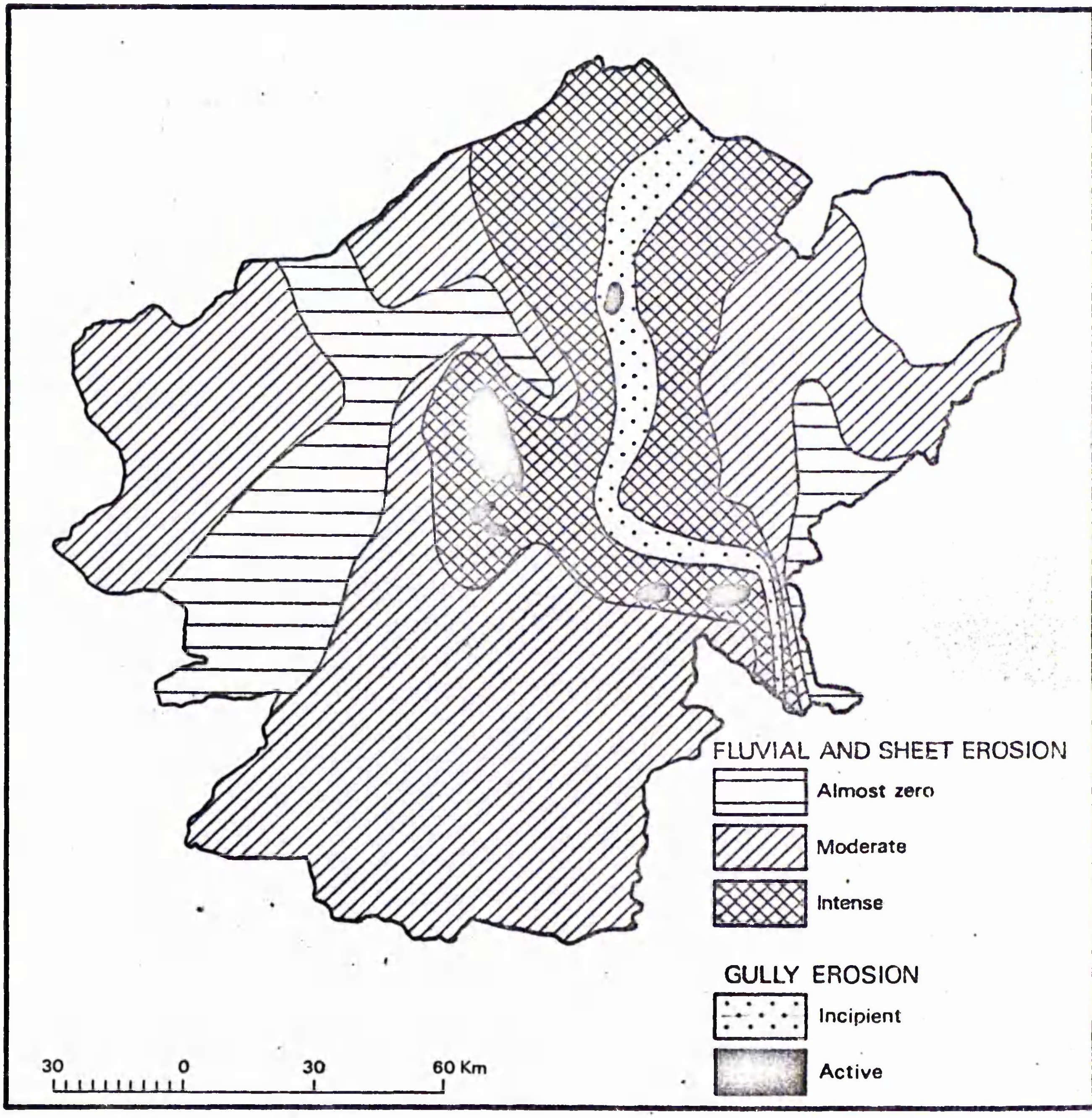


Fig. 3.9: Types of Soil Erosion

(After G. E. K. Ofomata, 1974)

ment, the drainage conditions, the farming systems and cropping patterns, to mention a few, are additional important considerations. All these appear to have operated in varying ways to produce the present pattern of soil fertility in the region.

It has often been wondered why the so-called acid sands characteristic of the greater part of the region with their allegedly low fertility maintains the highest population density in sub-saharan Africa (Udo, 1964, p.328). Perhaps such speculations are guided by the present nutrient status of these soils. The fact remains that soil fertility is a dynamic feature depending among other things on management. As Obihara and his associates rightly point out, man is capable of controlling soil fertility (Obihara et al, 1964, p.25).

What then is soil fertility? Apart from air, sunlight and water, plants require to take varying quantities of certain elements through the roots in the form of solution. Some like iron, boron, manganese, copper, zinc, chlorine, and molybdenum, collectively referred to as micro-nutrients, are taken in minute traces. Others like nitrogen, phosphorus, potassium, calcium, sulphur, magnesium, collectively known as macro-nutrients, are vitally important to the growing plants. In addition the plant requires organic matter or humus, but the ease with which the macro and micro-nutrients are made available to the growing plant determines its fertility status. Thus a a soil may be fertile for yams but not for cocoyam. This will be reflected in the yields if all other factors affecting yields can be kept constant. Under "subsistence" or "near subsistence" agriculture, the farmer's choice of land for any particular crop is partly bound to be affected by the amount of harvest he expects from a particular soil under a particular field crop. The one which gives the highest return per acre will normally, but not always, be preferred. Any study of the place of different subsistence food crops cannot afford to neglect this fact.

The section dealing with soil gives us an insight into the natural fertility of each soil group. The hydromorphic soils covering much of Abakaliki and Enugu provinces have somewhat higher natural fertility than the "acid sands." The deep porous sandy soils, though rich in free irons, consist of quartz and koalinite which do not swell when wet and so tend to conserve their nutrients. This is particularly true of the soils on the overcrowded tracts of land between the lower Niger and the Cross River where Vine and Weston have reported very low soil fertility. (Vine and Weston, 1954, p.1049).

Site Selection for National Accelerated Food Production Project.

To conclude this section, let us relate the theoretical discussion of soil fertility and soil erosion to the official food production policy in Igboland as spelt out in the National Accelerated Food Production Project (I I T A, 1977). Of all the food crops currently grown in the region east of the Niger, the only one scheduled for the area is cassava. There is no mention of either yams, cocoyams or even maize in the document and no really adequate reasons adduced for their exclusion.

The document contains two maps (Figs. 29 and 30 reproduced here as Fig. 3.10) showing the areas chosen for the programme. It is asserted that these areas coincide with the zones where, according to the Federal Office of Statistics, there is the highest concentration of cassava production in 1976. The reference in support of this assertion is dated 1972. It is also the case that all but one of the four areas chosen in Anambra State are located in areas with accelerated gully erosion (cf. Fig. 3.9) including the bad lands of Udi, the Awgu and Enugu scarp faces. In short, the programme appears to rest on unsupported and questionable environmental and locational judgements. Would the traditional farmer have taken such decisions? Could they have excluded yams, cocoyams and maize in such a programme? To prepare our minds for answers to these vital questions, we shall examine in the next chapter the genesis of Igbo food crop production system, and the links which the present day crops have with the past.

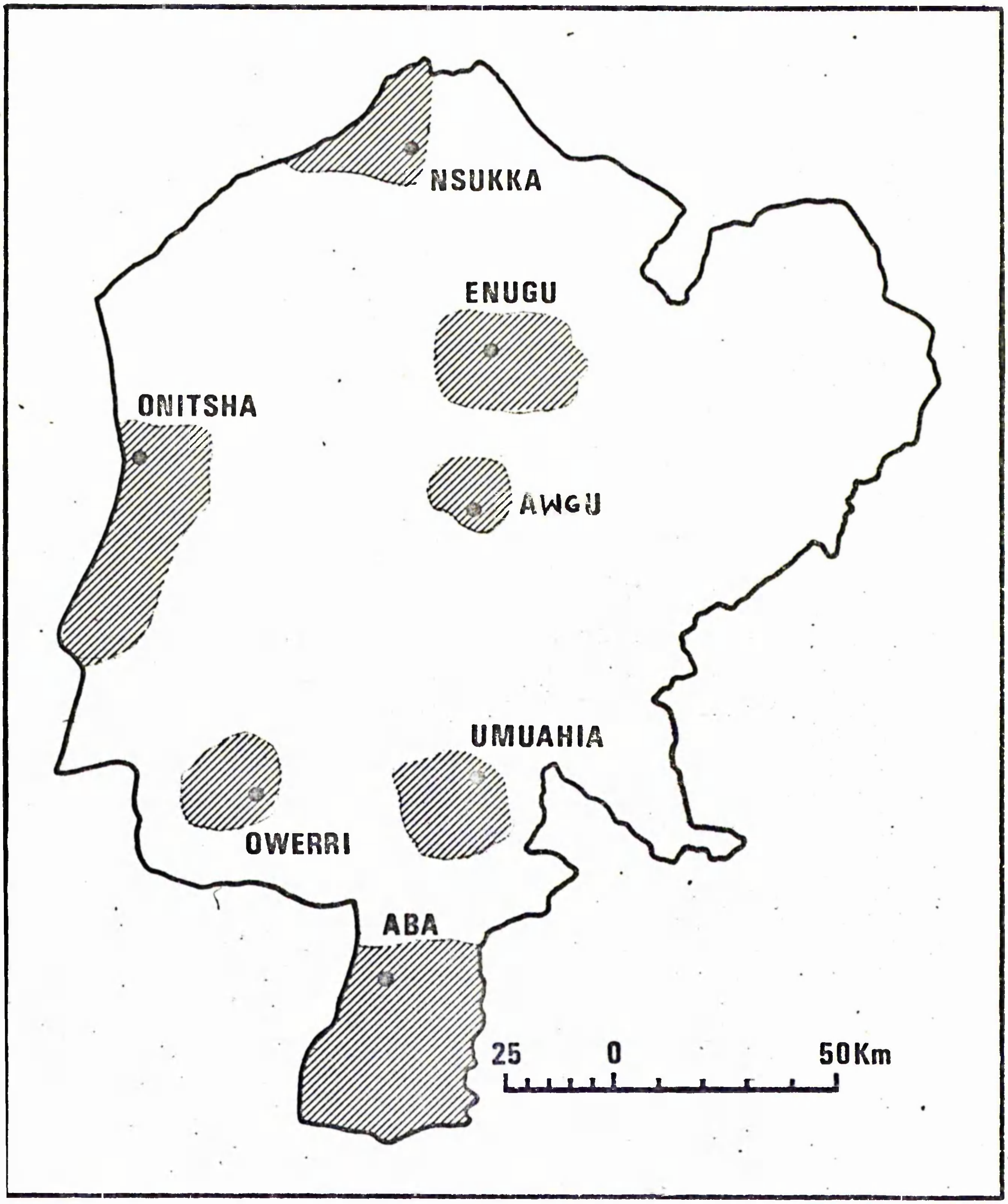


Fig.3.10: Areas Selected for Cassava Programme

(Based on IITA, 1977)

CHAPTER IV

IGBO PRE-COLONIAL AGRICULTURE, THE IMPORTANCE OF INDIGENOUS FOOD CROPS AND THE ARRIVAL AND SPREAD OF EXOTIC CROPS

> "As concrete and contemporary as the agricultural landscape is, it is impossible to view it without something of a historical perspective - its development, its still shifting patterns and its hints of future alterations have attracted a wide range of Scholars," (Gregor, 1970, p.94)

Introduction.

In the chapter on theoretical background, it was stated that farmers' crop preference and agricultural behaviour relate to their cultural background. This background was invoked to explain loyalty to old-established crops and resistance to rapid change. The Igbo people are a case in point. Certainly, knowledge of the agricultural history of the people is vital to a clear understanding of their present-day agricultural decision making processes.

One would like to know what crops the ancestors were growing or using, when they were acquired, the order in which they were acquired, where they were first grown, how they were cultivated and ritualised in the culture of the group. It would also be interesting to find out what new crops were introduced into the system as a result of cultural intercourse with South-East Asia, the Americas and Europe, when they were introduced, the routes taken, how such new cultures spread and the factors, physical and socio-economic, which either hindered or speeded up their diffusion.

In this chapter therefore an attempt will be made to probe some of these aspects of Igbo agricultural history believed to have profound influence on present day agricultural decision making. The account is based on a wide variety of sources including :

1. Oral traditions.
2. Records kept by early European traders and missionaries who visited Igboland and neighbouring territories.
3. Intelligence Reports by District Officers.
4. Ethnographic Surveys.
5. Archaeological data.
6. Secondary sources on the Igbo and their neighbours.

The first question may well be - who are the Igbo?

A. Genesis of the Igbo and Their Agriculture.

I. Who are the Igbo?

The Igbo have no written records. Consequently it has been extremely difficult to locate accurately their place of origin (Forde and Jones, 1950, p.11; Jeffreys, 1951, p.2; Obi, 1963, p.13; Ishichei, 1973, p.20; 1976, p.3; Njakar, 1974, p.16). Some have speculated about a point of possible origin further north and east in Africa.

The first of these speculations is attributed to

Basden (1938, p.411-423) and is based on a detailed comparison of some old Igbo customs and laws with Mosaic laws. Basden found some striking similarities between them e.g. Law of Sanctuary. On the basis of these similarities, he concluded that the Igbo had some connection with the people of the Old Testament or the Semitic Race possibly in Egypt. He attributed their migration to various waves of invasion coming mainly from the north east.

The question naturally arises as to whether the similarities could have arisen by chance. Meek (1937, p.5) thinks they could have arisen as a result of cultural diffusion and objected to any attempt to associate the two groups together on the basis of such similarities. In spite of this objection, later writers (Jeffreys, 1951, p.2; Federal Government of Nigeria, 1960, p.13) have not only maintained that such a link exists but have gone all out to regard the Igbo as the "lost tribe of Israel - Egyptians who preferred the sun-draped Africa to the vicissitudes of a nebulous Canaan," (Federal Government of Nigeria, 1960, p.13; Njakar, 1974, p.17).

Basden's hypothesis has not been substantiated. On the contrary, archaeological and linguistic evidence suggest that the Igbo have been occupying much of their present territories 'from the dawn of human history' (Ishichei, 1973, p.19).

II. Genesis of Igbo Agriculture.

(i) Diffusion versus Indigenous Development.

Until quite recently the existence of an indigenous food crop agriculture in the forest zone of West

Africa prior to the arrival of Asiatic crop plants was given little consideration. This stems from the belief that man could not have penetrated the forest prior to the introduction of iron tools about 2,500 years B.C. (Clark, 1962, p.211 and 1964, p.161). As late as 1962, Clark advanced the thesis that West African agriculture was the result of diffusion from the planting heartland in Asia. According to this thesis, cultural diffusion from Asia introduced grain crop agriculture to the hunter-gatherer inhabitants of the forest-savanna region of West Africa via Egypt and the Sudan. Thereafter, the hunter-gatherers adopted vegetative agriculture based on yams in preference to grains.

Writing about the same time, Murdock advanced an alternative thesis which credited the Mande peoples living in the headwaters of the Niger with the earliest domestication of a number of crops including the guinea yam. From this centre, the culture diffused eastwards to Nigeria. But Murdock was never really clear about the origin of yam cultivation because later on he went on to say that the yam and oil palm "were presumably brought under cultivation originally on the coast rather than in the interior" (Murdock, 1959, p.245).

The question may be asked - why did the Sudanic peoples have to wait for the arrival of grain culture before developing vegeculture? Why was it necessary to abandon grain crop economy in favour of vegeculture? Baker has in fact questioned the idea of a Mande origin for West African agriculture. He contended that since cultivated and wild forms of kola nuts and yams occur in West Africa, they cannot be held to contribute any evidence in favour of the Mande origin. He summarised his argument thus ".... it does seem that there is great botanical evidence of a long agricultural history in Africa and that the peoples of the Sudan zone were among the leaders in African agricultural development. However, there does not appear to be any strong botanical support for the localization of this pioneering effort in the Nuclear Mande area." (Baker, 1962, p.229).

In contrast, Sauer ascribed the domestication of the guinea yam to a West African centre located in the present state of Ghane once again suggesting a diffusion eastwards into Igboland (Sauer, 1952, p.34). Similarly, Burkill (1939) admitted a West African centre of domestication for the guinea yams but went on to propose an eastern heart as opposed to western hearts of Murdock and Sauer. To quote Burkill, "To the African himself is entirely due the invention of Dioscorea cayenensis as a crop plant" (Burkill, 1939, p.383). He then gave a graphic account of proto-type agriculture involving the digging up of wild roots, replanting the heads and revisiting after some time. It is interesting to note that this method is still adopted in the harvesting of a particular variety of the yellow yam locally known as ji oyibere and considered to be one of the oldest varieties in Igboland (cf.. Chapter VI). It is the predominant method of harvesting early eating yams and in the time of emergency, wild ancestors of the yams still found in the surviving remnants of the forests.

If we accept Burkill's view, then the cradle of yam domestication lies at some unspecified place in the forest margins of the zone stretching from Ghana through the Republic of Benin to Central African Republic. Waitt (Personal Communication) who worked for many years on yams in Nigeria seemed to favour the northern Congo origin.

Other Africanists for example Portères (1962), Willet (1971), Ozanne (1971), Harris (1967, 1969 and 1972), Coursey (1972), Harlan, 1971, Harlan et al (1976) and Okigbo (1974, 1976) support the principle of the thesis that there was a development of indigenous agriculture based on wild yams in the forest zone of West Africa before the arrival of grain crop economy and the use of iron implements. Porteres and Harlan share the view that the domestication took place not just in one centre but in many local centres. Okigbo believes that the domestication of roots, tubers and edible vegetables was preceded by the protection and utilization of many perennial fruit trees and vegetables which were eaten raw prior to the discovery of fire. Many of these are still eaten especially by the rural communities and are important sources of protein, and vitamins but have been neglected in research efforts, (Okigbo, 1974, p.1). (cf.Chapter 6).

Harris however is of the opinion that the domestication of vegetatively propagated crops such as yams was indigenous but not as dramatic as those involving grain crops. The domestication of grains was perhaps a sudden change following changes in the climate while vegeculture was a gradual process involving forest, savanna fishing communities. Coursey provides us with the stages through which the process must have passed before reaching the present advanced state (Coursey 1977, p.204-206).

(ii) Evidence of Indigenous Development of Agriculture based on Yams.

There is now strong evidence to suggest that the ancestors of the present Igbo people took part in this pioneering effort. Recent archaeological evidence indicates the presence of permanent settlement in Igbo-land before 3,000 years B.C. (Hartle, 1967, p.136; Shaw, 1972, p.5; Ishichei, 1976, p.3). Ancient pottery, hoes, knives and pestles estimated to be about 5,000 years old have been excavated at Afikpo, Ibeagwa and Nsukka. Similar excavations of a burial chamber, a store house and an ordinary pit at Igbo Ukwu also yielded bronze products of some antiquity. These include bronze bells, elephant tusks, elephant heads, ram heads, crickets, beetles, praying mantis, pottery beads, bones, shell belts, sword hilts and snakes swallowing frogs and eggs all dating from the 9th century A.D. These are artifacts of an ancient culture of considerable technological sophistication.

The hoes, knives, pestles and eggs in particular point to a long agricultural history. Hoes and knives are still basic farming implements among the Igbo peasantry. The beetle may have been yam beetle (Heteroligus meles Billb formerly <u>Heteroligus claudius</u> Klug), suggesting that the yam beetle menace had reached a point of concern. The eggs probably came from domestic poultry often invaded by dangerous snakes for their precious eggs.

Igbo oral traditions also suggest that the proto-Igbo were hunter-gatherers who later settled down to agriculture after the domestication of their staple food crop, yams. The events leading to the change is graphically illustrated by an old man at Nri:

> "<u>Cúku</u> (God) gave them (Ezenri and Ezedama) each a piece of yam; yams were at that time unknown to man, for human beings walked in the bush like animals. After eating his portion, Ezedama went to ask for more. <u>Cúku</u> gave him another piece and instructed Ezedama to tell Ezenri to send his eldest son and daughter. The Ezenri sent them and <u>Cúku</u> told them to bring a big pot, which he sent back again. The Ezenri was to plant this pot wherever he chose and no one was to look into the pot for twelve days; when they looked in and saw yams growing, they went to <u>Cúku</u> and told him and <u>Cúku</u> said, "plant them, put sticks and lift up the runners." (Northcote W. Thomas, 1913, p.50).

Izii oral traditions speak of a search in the bush by their starving ancestors during which a number of wild yams were discovered eaten and later domesticated (Ishichei, 1976, p.7). An old man at Ezangbo village of Abakaliki recalled in these words how a particular variety of white yam popularly known as <u>Òpóke̅</u> was brought under cultivation in recent years.

> "In those days (no date but believed to be after the coming of the white man), there was famine all over our land. Our people had nothing to eat. Someone during a hunting expedition had discovered the roots of wild ancestors of <u>òpókē</u> very close to the surface of the ground, dug them up with a stick and took them home. First he roasted some and gave to his dog. The dog ate and did not die. He concluded that it was not poisonous and roasted the remainder for the family. Later, the discovery was communicated to the

> other members of the community and within a few days, the countryside was combed for Òpòkē first to satisfy the immediate hunger and later for planting. Today it is our best yam. (Nwankwo, 1964, Personal Interview).

<u>Role of Hunger and Uncertainty in the Domestication Process</u>.

It is important to note that each account stressed hunger as the driving force in the domestication process. The last account indicated an ingenious method of ascertaining the toxic content of the foodstuffs through experimentation with the hunting dog. Possibly similar situations of hunger, uncertainty, trial and error gave the proto-Igbo their indigenous food plants like yams, fluted pumpkin, African spinach (<u>Amaranthus viridis var hybridus</u>), African breadfruit (<u>Treculia africana</u>), African mango (<u>Irvingia gabonensis</u>), red silk cotton (<u>Ceiba pentandra</u>) pumpkin (<u>Cucurbit pepo</u>), okro (<u>Hibiscus esculentus</u>), yam bean (<u>Sphenostylis stenocarpa</u>), African star apple (<u>Chrosophyllum albidum</u>), African pear (<u>Dacuyodes edulis</u>), oil bean (<u>Pentaclethra macrophylla</u>), West African black pepper (<u>Piper guineense</u>), white melon (<u>Cucumeropsis edulis</u>) and oil palm (<u>Elaeis guineensis</u>) before the advent of the Asian food complex. The Igbo names for the tree crops, the parts used (i.e. whether leaves, roots or stems) together with the modes of exploitation are analysed in Table 6.3 of Chapter VI. In many parts of Igboland, the wild ancestors of these food plants including yams are still eaten especially during periods of stress. Such was the case in the early fourties when food was very scarce as a result of the second world war and the drought which swept through the country thus reducing the yields of most crops especially yams (Oguntoyinbo & Richards, 1977, p.116-117).

Again during the Nigerian Civil War (1967-1970) all sorts of novel roots leaves and wild animals were widely eaten to reduce the death toll from 'kwashiokor.' Among the vegetables eaten are the leaves of cassava, cocoyam, red silk cotton, siam weed (Chromolaena odorata) and the young shoots from elephant grass (Pennisetum pupureum). Siam weed being a new weed in Igboland (post 1940) was first eaten during the Civil War illustrating the influence of famine on the trial of new ideas. The interesting thing is that cassava leaves were also eaten for the first time during the Civil War whereas in Sierra Leone it has long been the chief leafy vegetable very highly cherished by Creole and indigenous population alike. Wild ancestors of the guinea yams Dioscorea abyssinica and Diosorea minutiflora were also dug out from the surviving bushes and forests and eaten as food.

Over-exploitation and Use of Protective Sanctions.

As the people increased in number, the need for protecting the wild food plants from over-exploitation arose in the form of symbiotic relationship in which the people evolved a series of rules or sanctions to protect the new "life giver," (The Igbo have a saying, Jí jì ńdù meaning yams hold life) during the period of growth. Such protection in fact was the beginning of the domestication process. The rules were then ritualised as in many other societies where the yams are extensively grown just to ensure that there are no defaulters. Among the Igbo, the following sanctions survive:

(i) Yam theft is considered a criminal offence. In the past it was punishable by death.

(ii) It is considered an abomination to uproot growing yam no matter where it is growing. Even today, non agricultural work like building of new roads through farms must wait until the yams are harvested.

(iii) Eating of seed yams is considered an antisocial act. Only large tubers are considered good for consumption. The seed yams are for planting.

(iv) Entry into a yam plot with naked light is prohibited. Some old men still observe this rule. It is explained that if one did, he would see the tendrils growing which is considered a bad omen. Yam shoots and tendrils are believed to grow only at night.

(v) Among some societies e.g. Anam, women are not allowed to make mounds for planting yams.

(vi) Eating of new yam before the New Yam Festival is performed is considered to be in bad taste. In fact some old men prohibit the cooking of yams in their house before the ceremonies are performed. Others do not mind but would not eat the food themselves.

The general belief is that the crop would be "offended" and refuse to give good yields if anyone broke the rules. Within recent memory these rules were rigorously enforced. However the erosion of tribal customs by contact with Europeans and Christianity have tended to work against strict observance of some of the rules often to the anger and displeasure of the more traditional old men.

The Courseys (1971) put forth two hypotheses to explain the most widespread of these sanctions - prohibition of the eating of new yams before the performance of the New Yam Festival. They suggest that the wild ancestors of the west African species were toxic and the immature ones were even more toxic. The New Yam Festival was therefore designed to tell the group the time when the toxic content has reached a level which the body could tolerate. The second hypothesis links the festival with the need to protect the plant from anxious and hungry people during the period of growth. The festival marked the earliest date during which harvest could take place without impairing the normal growth of the plant. In both cases strict observation or adherence to the time was achieved through ritualization of the sanctions. The order from Cuku (God) that people should not look into the pot containing the yams confirms the existence of such protective sanctions among the early Igbo cultivators and at the same time lends support to the Courseys' hypotheses.

The process of domestication was also speeded up by increase in human numbers aided probably by dessication of the forest-savanna fringes. One such dry period took place about 11,000 B.P. (van Zinderen Bakker, 1976) and has been linked with the domestication process (Coursey 1977, p.204-205). Increase in human number resulted in more intensive exploitation of the wild plant species and further modification of the environment creating more favourable ecological environments for the wild species near settlements. Unused and sprouting yams surviving in clearings and middens changed their form through mutations. To this day the farmers at Akokwa believe that the bitter or cluster yam reverts to its wild and very toxic form if it is not attended to for two-three years. They therefore ensure that the species is dug out annually, some tubers removed for consumption and the remainder including the head replanted. Tubers dug out after more than two years planting are as a rule not eaten. They are thrown away and the heads replanted. The farmers explained that such tubers build up poison which cannot be killed by prolonged boiling. This empirical knowledge of the growth habits of the plant certainly aided the domestication process. As population grew, the process changed from simple protection of the wild food plants in the bushes and near homes to overt act of removing them to more favourable locations such as disturbed grounds near live trees to serve as stakes.

Domestication and Antiquity of the Bitter and Yellow Yam Varieties.

It is most likely that the domestication of two varieties of yam grown in Igbo heartland and believed to be the oldest domesticates in the area began with protection in the form of removing the wild tubers to disturbed grounds near live trees. They are the bitter or cluster yams and a variety of the yellow yam locally known as _ji òyibere_ or _ji òku_ (meaning yam for entertainment of large number of guests). Their wild ancestors can still be identified in the surviving forests and bushes.

Removal to favourable locations enabled the different varieties to crossbreed giving rise to more improved species. Probably the crossbreeding of _Dioscorea minutiflora_ and _Dioscorea abyssinica_ reported by Burkill occurred when the two species were brought close together in favourable locations. The hybrid nearer the _minutiflora_ with yellow tubers and thorny stems became the yellow guinea yam while those resembling the _abyssinica_ with white tubers became the white guinea yam (Burkill, 1960, Waitt, 1963).

It is pertinent to note that bitter and 'Oyibere' varieties of the yellow yams are still grown in Akokwa only on disturbed grounds near live trees within the compound land. This can be interpreted as a possible survival from the early days of domestication. These two yam varieties are seldom grown in the open field. Their life cycle is from one live tree to the other. All the farmer does is to dig out part of or the entire root system, select the part he wants to eat, cut them off and replant the rest including the head on the same spot adding dried leaves as manure and eventually covering the mound with heavy grass mulch. The yams are seldom taken to the barn as the white yams are. When the shoots appear, they are led on to the live tree by means of ropes but very often they get to the big tree through the medium of a smaller live tree deliberately planted on the mound to guide the shoots. Some such yams have been known to be growing on one such spot near live trees for over thirty years and continue to be harvested annually.

The antiquity of ji oyibere and bitter or cluster yams in Igbo heartland is indicated by the fact that they are often reserved for festive occasions and are more prized than the other varieties in spite of the fact that they do not lend themselves to easy pounding. In fact they are not pounded at all. They feature very much during child naming, marriage, burial and Ozo title taking ceremonies. A particular variety of ji oku is known as Nze aso ('not avoided by Nze' or 'eaten by Nze'), a clear evidence of its superiority. Nze is the name for any wealthy man who holds 'Ozo title.' Nze commands great respect and authority in traditional societies, is always expected to speak the truth and does not feed on culturally inferior food items such as cassava and cocoyams. Therefore the statement that a particular yam variety is not avoided by Nze suggests that it must be of very high quality.

The bitter yam variety especially that grown on the Awka-Orlu uplands, has the most elaborate preparation technique of all the yams, a clear evidence of its high toxic content. Thus:

(i) It is boiled for a very long period often exceeding three hours depending on the heat intensity.

(ii) Boiling takes place in a pot lined at the top and bottom with leaves in such a way that the yam sits on a cushion of leaves.

(iii) Boiling takes place usually in the evenings and the yam is left overnight and is never eaten hot or the day it is boiled.

(iv) It requires special sauce (Ǹchā) which contains a lot of potash and plenty of palm oil.

(v) Consumers usually call the yam by its name before consumption, especially if they are not quite sure of the age of the tubers. They simply say Ǹkóhū (the name for bitter yam that has not been harvested the previous year) and proceed with the meal. It is believed that "calling" the yam by its name removes the possibility of dying after consumption as a result of toxic reaction. This elaborate preparation is still adopted by the more traditional Igbo in the heartland but the name ǹkóhū is not often pronounced before consumption.

The antiquity of the cluster yam in other parts of West Africa may be further indicated by this story from Ibn Battuta (1352 A.D.), who fell ill after eating a porridge prepared from what is believed to be the bitter yam.

> "Ten days after our arrival we ate a porridge made from a root resembling colocasia and called al-qufi which they prefer to all other dishes. We all fell ill - there were six of us - and one of our number died. For my part, I went to morning prayer and fainted there." (Lewicki, 1974, p.49)

On the basis of available oral traditions, one may then surmise that the domestication of yams was not all that dramatic or even mysterious. It was the result of many years of gradual search and learning processes. Before the Proto-Igbo reached the northern part of their present homeland, they had reached an advanced stage of hunting and gathering during which wild species of yams and other edible plants were collected. Undoubtedly, they had developed some kind of wooden or stone implements for digging out wild roots. Wild yams usually protect themselves from depredation by developing a dense network of thorny roots and it is difficult to imagine the proto-Igbo excavating the edible parts underneath without the help of such implements.

Archaeological evidence also suggest that by 3,000 B.C. the group had advanced from the simple art of protecting and exploiting wild edible root plants through socio-religious sanctions to a stage in which some of the wild species were overtly removed to favourable locations and at times grown on specially prepared grounds. The special preparation probably was no more than digging the ground with sticks up to a few millimetres, throwing in sprouted roots and covering up.

Surviving techniques used by some old men in the preparation of the ground before planting can be used to reconstruct the stages through which the system has passed. In the early 40's preparation of the burned field for planting involved two distinct methods or stages now used by few old men in the Awka-Orlu Uplands. Thus:

Stage I : The old man opens the ground to a depth of about 15 cm. with a simple straight digging stick fitted with short triangular iron blade. The holes are often arranged in straight lines. As each hole is dug a child carrying yams in a basket throws in one.

Stage II : Soon after the yams are removed from each of the holes in turn and a mound is built over each up to a height of some 25 cm. The yam seed is then positioned on the mound at an angle of about 45° with the head facing the direction of movement. The mound building is then continued until the yam is buried up to a depth of about 8 cm. The farmer then moves on to the next hole and the process continued.

The lone old man who still uses this cultivation technique at Akokwa explained that the aim of digging the hole before making the mound was to 'soften' the soil for the young yam tuber that would develop in it. He went on to explain that every farmer in the village employed the technique some sixty years ago but now _Ázì_ (a derisive word for present generation) cannot appreciate the value. They farm anyhow they like and have tended to ruin our soil. It is not difficult to see that Stage I was a proto-type form of planting among the Igbo living on the sandy heartland.

Movement into Southern Forest Zone.

There is now almost unanimous agreement that the Igbo once inhabited an area in Nigeria located further north than their present homeland. Ishichei (1976, p.5) thinks they once occupied an area around the Niger confluence but admits that they have been living in much of present day Igboland for the past 5,000 years. She located their original homeland in the drier northern savanna zone stretching from Anambra valley eastwards through Nsukka plateau and escarpment zone to the Cross River plain. Archaeological excavations at Ibeagwa (Nsukka) and Afikpo all located in the area yielded stone age implements including axes and pottery of great antiquity (Hartle, 1966, p.13; 1969, p.35) and together with oral traditions especially of Umueri peoples lend support to an early cradle in the northern part of Igboland.

It is not however quite clear why the people moved further south into the more humid forest belt. The theory which links the migration with waves of invasion from the north east has already been discussed (Cf. p.115).

A second theory sees the Igbo as part of an outward migration from the interior of West Africa following the desiccation which set in about 5,000 B.C. and which resulted in the partial drying up of the Lake Chad as reported by van Zinderen Bakker (1976). van Zinderen Bakker postulates that about this time there was a shift in climatic belt southwards. With increasing desiccation of the savanna-forest fringe, the group was forced to move further south where similar ecological conditions prevailed.

A third theory links the movement with the acquisition of iron implements which enabled the proto-Igbo to attack the forested lands to the south. According to this theory the Igbo were either Nok or acquired the culture through contact. By 500 B.C. the culture had reached the forest-savanna fringe by diffusion from North Africa. We noted earlier (Chapter III) that by 500 B.C. the Igbo were already taking part in the great trans-saharan trade as shown by archaeological finds at Igbo Ukwu and Nsukka. It was suggested that the copper used in the bronze discoveries originated from North Africa. However Fagg believes Nok iron culture to be independent of the North African centre but certainly reached Igboland by diffusion (Ishichei, 1974, p.21;).

Whatever the origin of the iron culture that eventually reached the Igbo-speaking peoples, it is clear that by 1000 A.D. they had advanced in culture and under the leadership of Nri Awka developed farming implements made of iron which enabled them to attack the forests and woodlands to the south.

Of the five iron implements used in farming in the region today, the axe and matchet appear to have been very important in the assault of the forests. The Igbo living in forested zones now rank them as the most important tools. The hoe became very important much later with deterioration of the soil environment and the need to consolidate the remaining fertility over a small area on the mound. Their greatest importance occurred still much later with the assault of the heavy clay lands to the east and the need to build high mounds for purposes of drainage. Iron digging sticks played the least possible roles in the struggle to tame the forest environment. Even today the use of iron digging stick either for planting or harvesting is not widespread (Chapter 6). The older farmers object to their use in harvesting arguing that it bruises the yam tubers. This indicates that the domestication of the yam may predate the arrival of iron culture. The argument is that if the people knew about iron implements before they discovered the use of the wild yams as food, such implements would be used in harvesting the crop both in the wild and cultivated forms. Since iron implements are not widely used, and among old men prohibited, they may post date the enoblement of the yam as a food crop.

Attractions of the easily worked sandy Uplands.

The earliest settlements were however limited to the freely draining easily worked acidic soils especially those on the Awka-Orlu Uplands and the Nsukka Okigwi Cuesta. Oral traditions of the Igbo now living in the downlands of Niger, Cross River and Ase basins speak of migration from the uplands (Forde and Jones, 1950; Ishichei 1976). Areas of secondary migration and settlement generally have sparse population in contrast with the source region characterised by overcrowding. A comparison of the soil and population density maps (See Figs. 3.8 and 5.2) brings out the visual correlation between the distribution of easily worked soils population density and therefore older settlements. This relationship is further illustrated by the history of the migration and settlement of Nri-Agu

Ukwu people believed to have introduced intrusive iron culture into Igboland from the north (Ishichei, 1976, p.29). Oral tradition of the Nri speaks of original migration from the north. On arrival at Nri, they found no villages or settlements in the neighbourhood. The area was open woodland which they named "Agu Ukwu" meaning "the great woodlands," (Jeffreys 1956, p.121). Such open woodland developed on sandy soils was ideal for their agriculture with the technology at their disposal then. The Nri peoples are known to have introduced iron working into Igboland and these implements must have consisted of simple iron matchets and hoes. Farmers must have found clearing of woodlands and forests located on the sandy uplands easier than those on the wetter and clayey lowlands. There is usually very little undergrowth in the former and the dry leaves littering the ground can always be fired to kill any climbers. This contrasts very much with the tussocky and wet alluvial soils to the east and west avoided at least initially by the migrants.

One cannot however dismiss the possibility that the choice of the sandy uplands and avoidance of the well watered clayey and alluvial soils of the valley bottoms were also guided by defence needs. River valley settlements easily fall prey to waterborne invasion. The suggestion that valley bottoms were also unhealthy being infested with such diseases as elephantiasis, malaria and sleeping sickness cannot be ruled out too but it would appear that the most important factor was the ease of working the loose sandy soils. It is important to note that most of the older settlements are located on such soils.

A classic example of the rationale for the choice of the uplands is provided by Akokwa, Uzii and Aro-Ndizuogu located in Orlu division. The oral traditions of the Akokwa and Uzii peoples speak of migration into their present locations from the north. The two groups settled on the Niger-Imo watershed avoiding the often waterlogged yet more productive soils on the Imo clay shale to the east. When the Aro arrived from Aro-Chukwu, they were allowed to settle in these waterlogged valley bottoms not wanted or rather avoided by Uzii and Akokwa. Asked why he thought the area was avoided Muoneke replies,

> "N̄nā áyi hà áchōghi n̄giridi úkwū na n̄giridi ākā yá na àhū́ kpakiri kpakiri nwa n̄dū ńtà."

> "Our ancestors did not want an environment that developed elephantiasis and rough skin due to bites from sand flies"
> (John Muoneke, Akwu Akokwa).

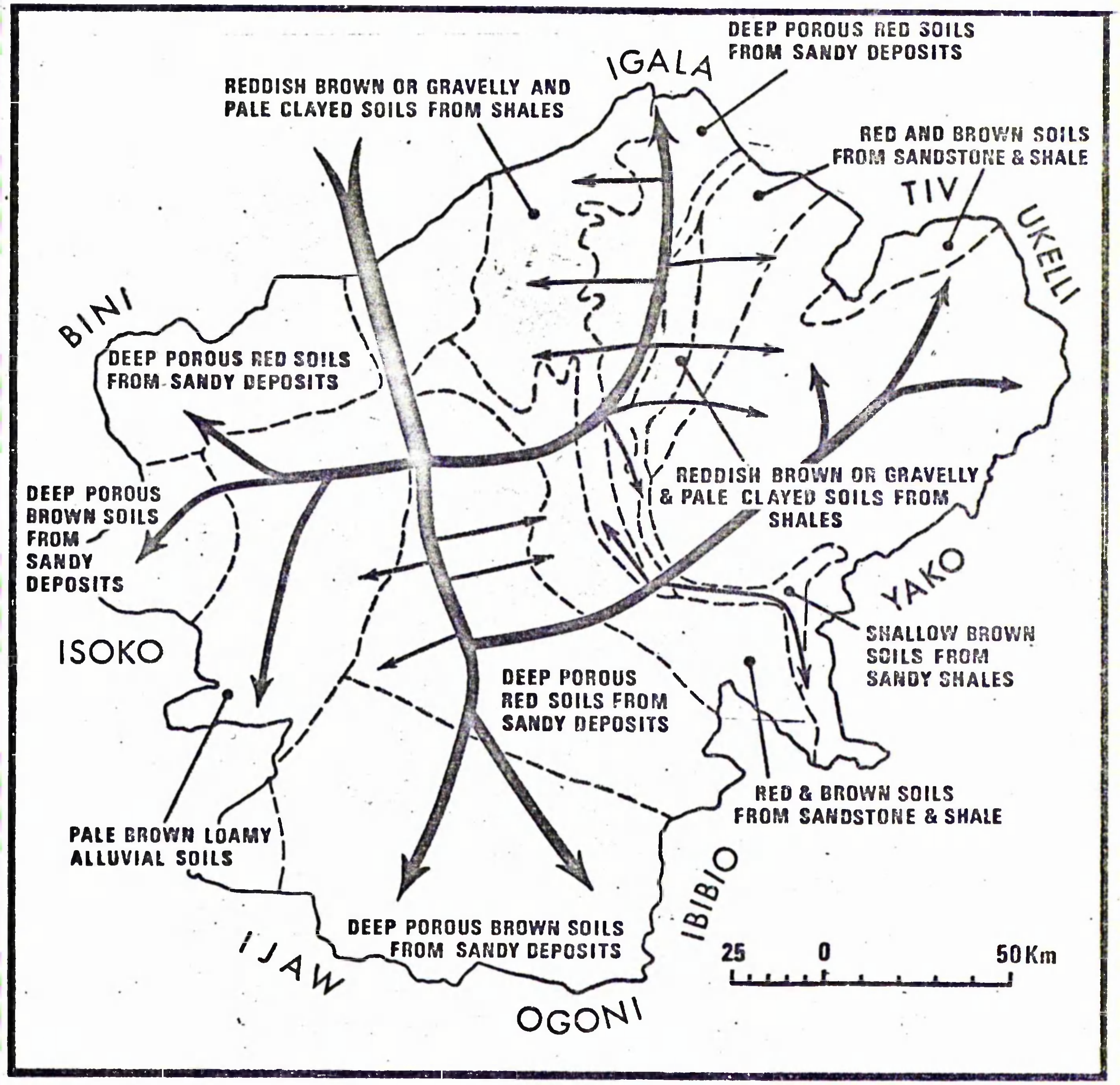
It is interesting to note that Uzii and Akokwa farmers now rent land on an annual basis from Aro-Ndizuogu people for growing their yams.

Outside the areas inhabited by the Olo peoples who claim not to be Igbo,settlements are seldom founded along valley bottoms in spite of the need often felt for drinking water especially during the dry season (Udo,1963,p.85). The choice of settlements are more related to the agricultural needs, religious and supernatural beliefs of the people than to the need for drinking water. Thick forests and water courses are believed to be inhabited by ancestral spirits and must therefore be preserved and worshipped. Reprisals could go to any intruder. Even today streams and some relics of the once extensive primaeval forests are worshipped. In Mbanasa and Aguata Local Government areas of Orlu and Awka divisions, most periodic markets and streams derive their names from local deities who are thought to own the water and the markets.

From a possible nucleus of initial settlement around Nri, selected because of the ease of working the soil, a group of Igbo farmers moved westwards to become Northern Ika, Kwale and Western Riverain Igbo (Forde and Jones, 1950). Once again their distribution west of the Niger appears to coincide with the distribution of easily worked sandy soils as suggested by population density map. Older centres in this part of the country usually have higher population density. (See Population Distribution Map). Another group struck east into what is now known as Nsukka - Udi - Okigwi Cuesta. The last group headed southwards into Aguata, Orlu and Owerri local government areas, linking up with the eastern group around Okigwi. Together they form the people of the Igbo Heartland.

Downhill Movement into the Lowlands.

Further increase in population and resultant deterioration of the productive capacity of the heartland gave rise to downhill movement in all directions but especially into the once neglected Imo, Anambra, Niger, Orashi, Aboine Ase and Cross River troughs. Figs. 4.1 (a)



g.4.1(a) Lines of movement of the Igbo in relation to soil groups

(Based on several sources)

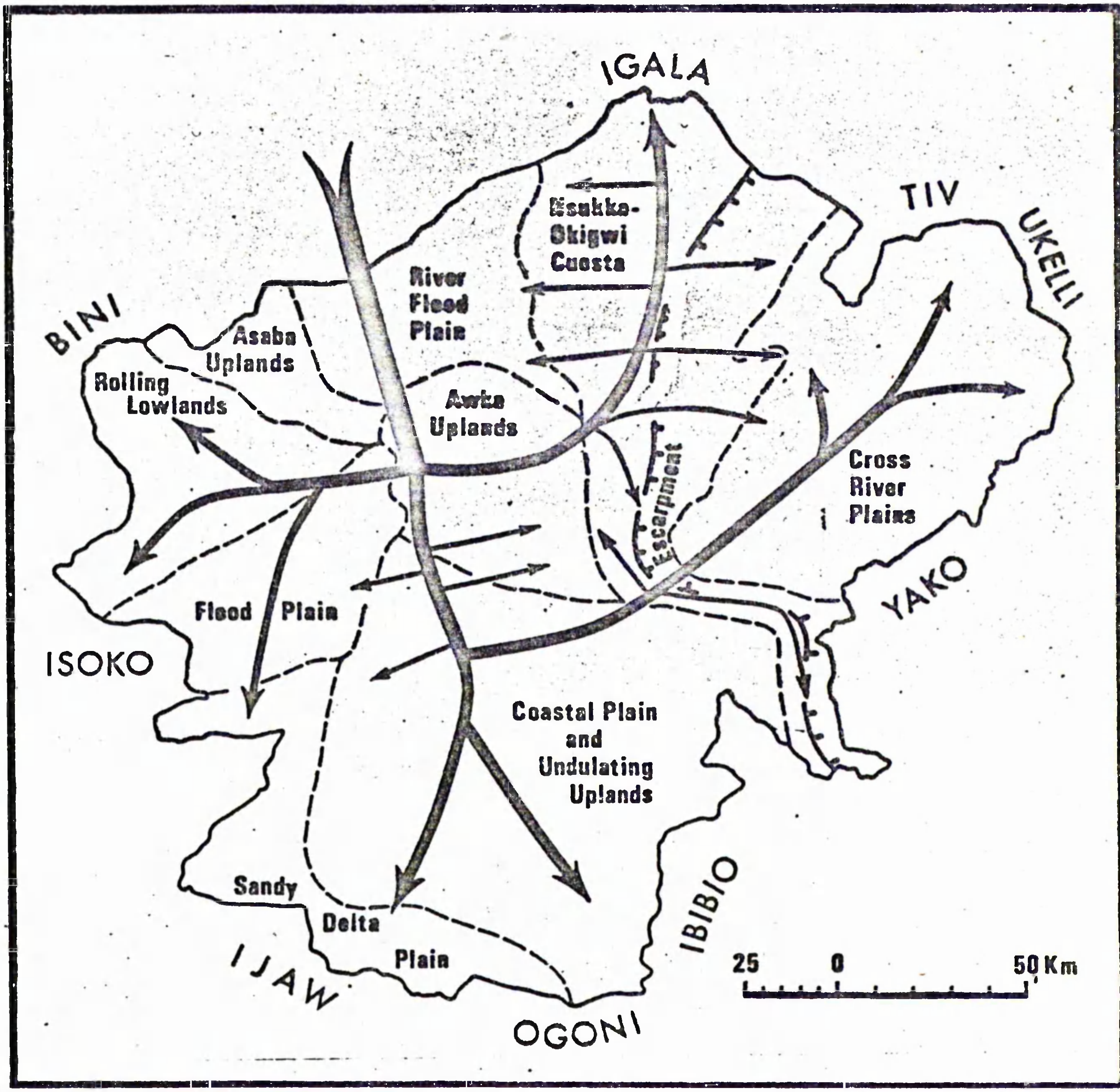


Fig.4.1(b): Lines of movement of the Igbo in Relation to Landform Units

(Based on several sources)

and 4.1 (b) try to relate the lines of movement of the people as reconstructed from their oral history to the land forms and soil characteristics of the territory. It will be observed that the proto-Igbo first settled on the uplands and later moved down into the lowlands. Thus, there was movement out of Orlu-Owerri axis east into lower Imo and beyond to form the Ngwa and Ohuhu groups with the Ohuhu restricted west of the bank and the Ngwa east. Further east the Ngwa met and intermingled with the Ibibio peoples (Forde and Jones, 1950, p.44). A southern component of the migration from Awka-Orlu Upland founded Etche and Ikwerre though the latter now claim not to be Igbo in spite of their language affinity. One group headed north east into Afikpo and much further into Abakaliki to form the Ezikwo group made up of Izii,Ezaa and Ikwo subgroups. Collectively they are nicknamed Ògụ̃ Ûkwú because of the large size of their hoes. (See Chapter 6,p .231) where the size of the hoe is related to soil type).

Fig. 4.2 shows the distribution of the major clan groups differentiated primarily on the basis of their dialects and sub-cultural affinities. The division follows those of Talbot (1932), Leonard (1906), Forde and Jones (1950). Before the arrival of the English, the village groups making up the clans were semi-autonomous. The unifying factors were broad similarities of culture. Internally the group varied widely in terms of dialects even to the extent of not understanding one another at times. In 1974/75, the people occupied 38 administrative divisions within five states (Fig.4.3).

It can be seen from the map that the Awka Igbo

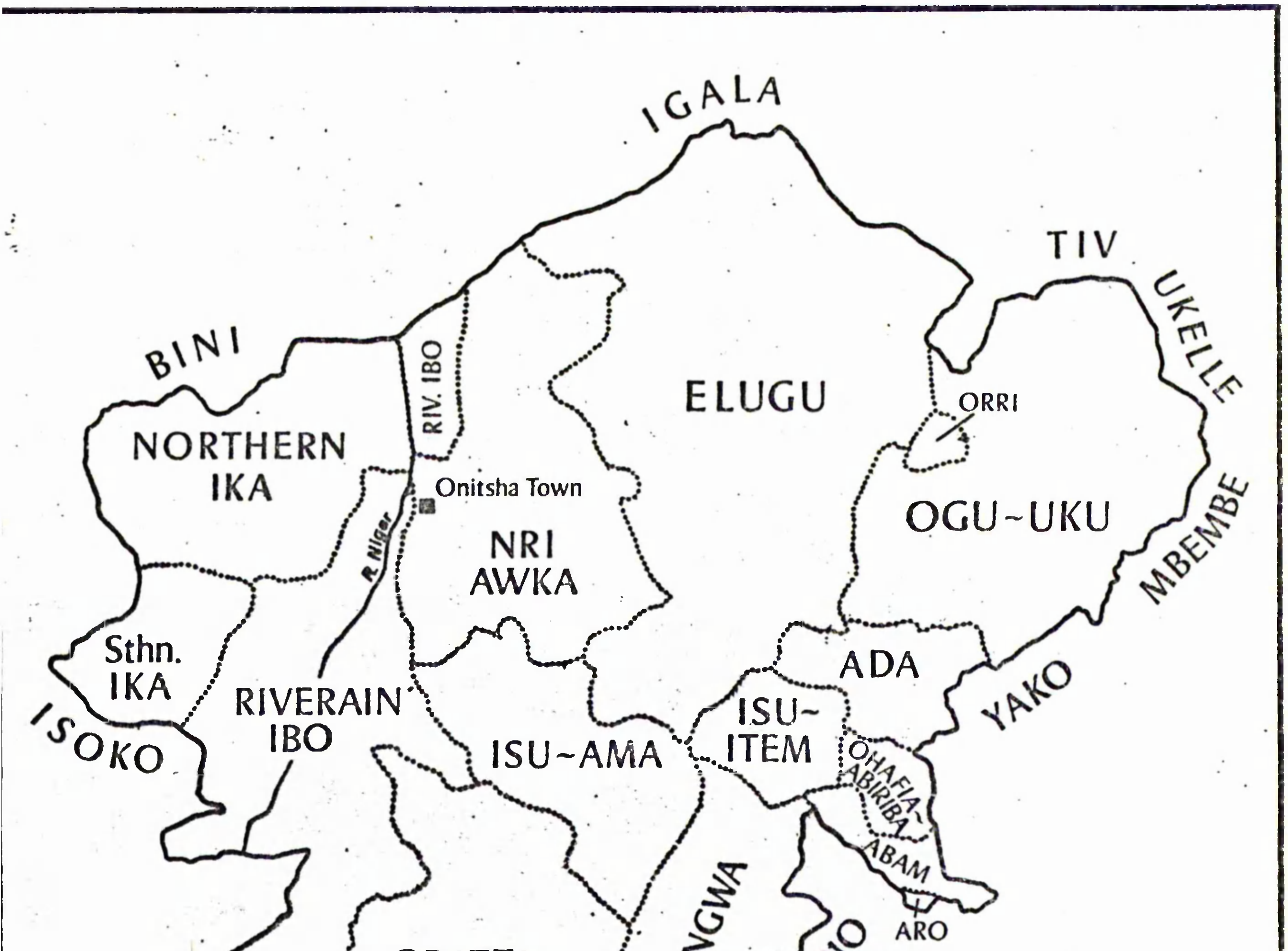


Fig. 4.2: Distribution of Major Igbo Subgroups

(Adapted from D. Forde & G. I. Jones 1950)

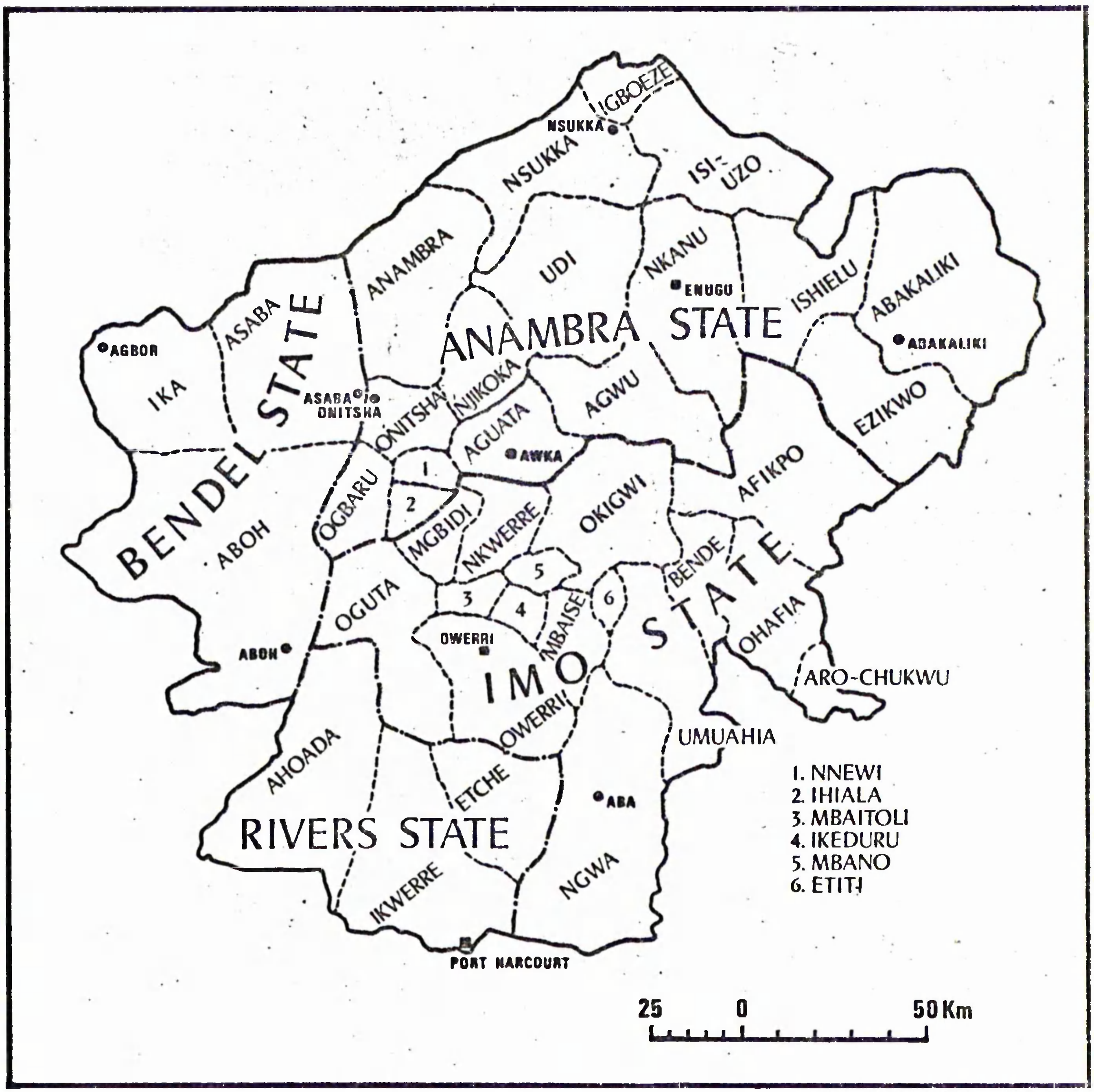


Fig. 4.3: Administrative Division, 1974/75

(Several sources)

occupy the original centre of dispersion of the ancestors of most of the other Igbo groups. Among them can be found the most advanced iron working technology, an elaborate system of agriculture and socio-religious rituals connected with the cultivation of the ancestral crop, yams.

By virtue of their geographical location, the Ika Igbo received cultural influences from Benin to the West. Southern Ika is in fact an admixture of descendants from the original Igbo settlers and their Benin conquerors. Similarly, the Riverain Igbo who prefer to be called Olo to reflect their water location, include elements of Bini, Igala and Ijaw, with Ijaw being more pronounced in the south while Igala dominates the north (Meek, 1930 p. 7-14).
The northern half of Igboland including the riverain areas received Igala influence mainly through military conquest by the ruling Atta while the south was still controlled from Nri-Awka. Before the arrival of Europeans in Igboland, all the clan groups had one thing in common - agriculture based on the cultivation of yams mainly for subsistence and the exploitation of wild oil palm trees, oil bean trees, African breadfruit and a number of other wild and semi wild leafy vegetables.

Importance of Yams in Pre-Colonial Agriculture.

Looking at the crop-plants of the Igbo today, one would observe that they were mainly imported from elsewhere and as late as the 16th century. Pineapples, pawpaw, guava, sweet potatoes and groundnuts were introduced from the Americas. Maize was brought in from South America. Cassava followed in the early 17th century first to Angola and much later to the guinea coast (Jones, 1959, p. 72-77). Asian rice (Oryza sativa), cocoyam and bananas found their way in from the east. Melons, oranges and lemons were introduced from Portugal. From North and North-East Africa we got our cowpea (Vicia sp.) and sesame (Sesamum radiatum). Madeira supplied sugar cane.

The question now arises as to what the population found in Igboland by the early Europeans were eating before the introductions were made. Of the cereals, there were just a few like guinea corn and pearl millet but these were limited to the drier north-western corner where they were grown in small quantities. Bambara groundnuts (Voandøzeia subterranea), which originated in the Adamawa Highlands are similar in distribution to the guinea corn. Of the vegetables we have the fluted pumpkin which is never really eaten alone but in conjunction with some other starchy staples. Other fruit trees like African breadfruit, African pear, the oil bean plants are so very limited in distribution that one wonders whether they could have supported the dense population.

Most records kept by the early Europeans who visited the coast of Eastern Nigeria stressed the importance of yams in the export and food crop economy of the hinterland peoples. One such record - the earliest to survive the Esmeraldo de Situ Orbis, was written about 1508 by Pereira. The record contains this interesting remark on the trade of the Rio Real :

> "They (the Aro, vide infra) come from a hundred leagues or more up this river bringing yams in large quantities, they also bring slaves, cows goats and sheep. Sheep they call "Bozy." They sell all this to the natives of the village for salt and our ships buy these things for copper bracelets which are greatly prices more than those of brass; for eight or ten bracelets you can obtain one slave" (Jones, 1958, p.43-44.

Unfortunately Pereira gave no indication of the names of the people involved. Jones feels that he was referring to the Kalabari, Bonny, Andoni or even Okrika peoples who according to him were traditional suppliers of yams (Jones, 1958, p.34). Jones seems to have ignored the distance component of the statement - the people may have come from some considerable distance inland. On the other hand, Portuguese estimates of distances inland are unlikely to be accurate as they were rarely allowed free access into the interior. Though no part of Igboland lies more than 100 leagues inland from the coast, if Pereira's suppliers came from some distance, it is unlikely that they would have been Kalabari, Ogoni, Bonny or even Okrika as these groups of people today live very close to the coast.

Further evidence is provided by Dapper's Description de l'Afrique written about 1688. Dapper made it clear that neither the slaves nor the main commercial crops and animals originated from the immediate hinterland but were handed over in a chain series of transactions from much further inland (Jones, 1958, p.37). By this time bananas had entered the trade and may well have originated from the coastal peoples who now grow the crop in commercial quantities.

In his own description of the trade on the Rio Real about 1682, John Barbot included corn (Zea mays) which was missing in the earlier accounts (Jones, 1958,p.40). Barbot's brother who visited New Calabar seven years later described the trade thus:

> "The price of provision and wood was also regulated. Sixty King's yams, one bar; one hundred and sixty slave yams, one bar; for 500,000 yams to be delivered to us. A butt of water, two rings, for the length of wood, seven bars which is dear but they were to deliver it ready cut into our boat. For a goat, one bar; a cow, ten or eight bars according to the bigness. A hog, two bars; a calf, eight bars; a jar of palm oil, one bar and a quarter"(Jones, 1958, p.43-54).

The same report went on to say that after a week of bargaining, the prices of slaves were fixed at 13 bars for a male and nine for a female. It also stated that the staple food of the people was yams boiled with fish and palm oil.

Olauda Equiano, who was born in Igboland about 1745 and later kidnapped and sold into slavery about the age of eleven, gives us a first-hand account of the environment and agriculture in the territory in the middle of the 18th century. In his autobiography he states :

> "Our land is uncommonly rich and fruitful, and produces all kinds of vegetables in great abundance. We have plenty of Indian corn, and vast quantities of cotton and tobacco. Our pine-apples grow without culture; they are about the size of the largest sugarloaf and finely flavoured. We have also spices of different kinds, particularly pepper, and a variety of delicious fruits which I have never seen in Europe, together with yams of various kinds and honey in abundance."
> (Equiano, ed. Edwards, 1967, p. 7).

Equiano went on to describe the people's devotion to food crop agriculture pointing out that men, women and children were all involved in the production process - "We are all habituated to labour from our earliest years. Everyone contributes something to the common stock and as we are unacquainted to idleness, we have no beggars." (Equiano, ed. Edwards, 1967, p. 7-8). He stressed that only the very young, and very old were exempted from farm work and that the gap between the rich and the poor was small. From his description of Igbo cooking, we gather that by the 18th century, the main dishes were prepared from plantains, yams, cocoyams, beans, and corn. The stews often prepared from some of the crops were flavoured with pepper and other spices. As Ishichei rightly points out, "everything about ones childhood is surrounded by a golden glow" (Ishichei, 1976, p. 27). However, Equiano's account shows that neither cassava nor rice has entered the food crop economy of the Igbo by the middle of the 18th century.

Baikie's account of his exploration up the Niger in 1854 mentioned the Igbo people as eating yams, corn, rice, bananas, plantains, coconuts, palm oil, fowls, sheep goats, bullocks and vegetables (Baikie, 1856, p.316-317). Occasionally dogs and rats also featured in the diet. This report cleared the doubt created by the earlier ones on the possible origins of the food crops used for provisioning the slave ships. Baikie located them at Ogobendo (Bende). Bende slave depot supplied palm oil and other provisions to New Calabar, Bonny, Andoni and other neighbouring villages (Baikie, 1856, p.309).

Possibly the people reported as coming down were the Aro but from our present knowledge about their economy, it is most unlikely that they produced the yams as they were not primarily good farmers (Ngwogu, 1964, p.30). Probably the yams originated from neighbouring settlements like Ututu and further afield like Awgu, Ufuma, Achala, Afikpo and Abakaliki all of which lie within the Aro 'empire' as delimited by Ngwogu (1964, Fig.1). Achala in particular has been proverbially noted for the production of huge yams.

The Yam as an Export Crop.

Slaves and yams, the principal export commodities of the Rio Real until the early part of the 19th century, originated mainly from Igboland. It is possible to quantify the value of the annual export of yams from the Rio Real about the time of James Barbot's visit in 1699. The trade currency then was the 'bar.' According to Adams and Bold, a bar was worth 2/6 (Jones, 1958, p.93). The capacity of vessels were reckoned in slaves. The 'Albion' belonging to James Barbot had a capacity for 500 slaves. Generally the British slave vessels were reported to be carrying between 300 and 500 slaves depending on the size. Thomas Tobin's 'Molly' was allowed 439 slaves but we have no reason to believe that the ship captains kept strictly to the registered tonnage. Like taxi and lorry drivers in Nigeria today, they could overload the vessel. James Barbot for example managed to pack 648 slaves into a 500-slave vessel (Jones, 1958, p.94). It might not therefore be far from the maximum to assume average capacities at greater than 500 slaves per vessel.

Taking Jones lower estimate of 15,000 as the number of slaves exported annually from the Rio Real (Jones, 1958, p.90) gives the equivalent of 30 slave ships crossing the Atlantic to the Americas from the Rio Real annually. One such vessel required 500,000 yams as provision. If we also assume that half of them were 'slave yams' and the other half 'kings yams,' we then arrive at an annual export of 15,000,000 yams valued at £2,100. This was substantial revenue in the 17th century.

It is evident from these accounts that the guinea yam culture was well established in Igboland at the time of European penetration of the Guinea Coast. Associated with the crop are yam bean (Sphenostylis stenocarpus), fluted pumpkin (Telfairia occidentalis), Kola trees (Cola nitida), African pear (Dacryodes edulis), African breadfruit (Treculia africana), oil bean trees (Pentaclethra macrophylla), raffia palms (Pandanus spp.) and oil palm trees (Elaeis guineensis).

Yams were the staple food crop. The nucleus of the present-day dense population of Igbo heartland was supported almost entirely by yams especially the white and yellow varieties, at a time when the soils were more productive and when people devoted much of their energy to agriculture. The high productivity was the result of much longer fallow and better farming techniques (See Chapter 6). Old men and women in these areas still remember quite clearly good years gone by when their soils yielded three corn cobs on one stand and huge yams weighing upwards of 20 kg. Here in the core of Igboland we have the most intensive and advanced form of traditional agriculture employing various methods including heavy application of farmyard manure, and mulch to increase productivity. Their cultivation technique is much more varied than elsewhere and bears the impress of a long history (Chapter 6). It is here argued that these techniques developed in response to the deteriorating environment. Furthermore the yam barns are more complicated than those observed elsewhere and also bear the impress of a long history. Yam rituals are still religiously observed.

Introduction and spread of Exotic Food Crops.

Igboland has witnessed several waves of diffusion of alien food crops coming mainly from the south. Cocoyams and plantains arrived much earlier than the cassava and possibly reached Igboland from south-east Asia via East Africa, Cape route, Fernando Po and Calabar. The southern extremities of the region being hot and wet for the greater part of the year were admirably suited to both crops. The spread of cocoyam (*Colocasia esculenta*) northwards into the yam belt proceeded at a much faster rate than plantains being more tolerant of drought. Another good reason for the rapid spread was the relative ease with which it could be integrated into yam culture. The crop was usually grown on previous year's yam plot after which the land was allowed to rest for some 4 - 15 years. It could also be pounded alone or mixed with yams to give foo foo.

Cassava and maize, both new world crops are late comers. The actual routes taken into the region by maize are still controversial. Probably it entered from the north via Spain and Egypt and also from the south by way of the offshore islands of Sao-Tome, Principe and Fernando Po. Maize lends itself to easy planting by the side of the mounds and was therefore quickly adopted. There is no doubt that its shorter growing periods of around 90 days which enabled it to give a crop during the hungry season before the main harvest, must have influenced the farmers' choice.

Undoubtedly, cassava was originally introduced by the Portuguese about the 17th century but very little is known about the slow spread inland in subsequent centuries of the numerous varieties now grown. There are however some speculations on the possible routes taken by a few varieties and the offshore islands of Sao-Tome, Principe and Fernando Po can be regarded as the nurseries through which many varieties entered Igboland. The widespread adoption of cassava is in fact a very recent phenomenon. A sweet variety popularly known as Pányā undoubtedly entered through Pányā the old name for Fernando Po. It is believed that this particular variety was first introduced by labourers returning from the Spanish Island in 1940. Later in 1944 the Ministry of Agriculture imported the same species from Zaire under the name 'Congo' (Ekandem, 1962, p.6).

The spread of cassava inland from the coast was very slow prior to 1780. Johnston (1958) argued that maize spread more rapidly than cassava in Africa because it was easier to transport the grains than cassava cuttings. On the other hand Jones attached greater importance to cultural factors. He contended that the introduction of manioc required the receiver to adopt what he chose to call 'manioc complex' which included knowledge of the traditional methods of preparation. According to him, cassava was not important in the diet of the people until it was reintroduced by ex-slaves returning from Brazil from 1780 onwards. These Brazilians brought with them not only manioc roots but also the traditional methods of preparing manioc meals and tapioca (Jones, 1959, p.78-79).

Field investigations in Igboland seem to support Jones' view. Many of the early varieties grown contain prussic acid which is poisonous if taken in sufficient quantity and so needs to be removed before consumption. It appears from information gathered from old men and women in the study area that the bitter and very toxic type known as Igbo agba, literally translated, 'not planted by the Igbo' was the first variety to be introduced into many parts of Igboland.

Oral tradition from Aguata and Mbanasa clan groups suggests that the people were treating the cassava as a form of yam, hence they gave it the name <u>jí akpu</u> or <u>jí akwū</u> which means either (1) 'Yam resembling cotton

tree' or (2) 'Yam producing only bunches like <u>ákpụ jì</u>.
In both cases the association with the characteristics of the traditional staple, yam is very clear. As a result of this mistaken association, many accidents involving both livestock and man did occur after eating cassava. An old woman from Uga in Aguata division reported that in the early years of its introduction, <u>Ìgbò ágba</u> claimed many lives because of bad handling. Another old man interviewed in the same town when asked how often he ate cassava, snapped, "cassava! the day you see me eat cassava, my son, you can be sure I want to die. I hated cassava the day my goat died." He then proceeded to explain how some 54 years ago, a neighbour's wife had fermented cassava in a pot and how his goat broke into the compound, drank the water from the pot and died shortly after with distended stomach. In fact it has become the practice in the area to ask anybody with protruding stomach by way of a jest whether he or she had eaten <u>Ìgbo ágba</u>. In most of the villages there are instances of old men who would not take cassava in any form but would not object to either their wives or children preparing it for themselves. One may think that an element of prestige is involved in all these cases but many of them argued that they felt ill after a manioc meal.

The frequent contact between the coastal peoples and the interior of Igboland dating from the early days of the slave trade may have helped the spread of cassava inland. The knowledge is likely to have passed from the Ibibio, Efik and Ogoni peoples in the south to the Igbo, Ekoi and far beyond. The main link between the interior and the coast were the Aro traders. It has been suggested that they played an important role in the spread of cassava. Ekandem (1962) notes that they took Ìwápànyá to Okigwi and possibly other parts of their settlements. Awka blacksmiths and itinerant doctors are also associated with the spread of the new food crop. It is reported that Ìgbo ágba was introduced into Aguata by Awka blacksmiths returning from Umudioka in Owerri local government area (Information from Mrs. Okpala). Among others, warrant chiefs, court messengers and warring factions who had gone to Aro-Chukwu before 1901 for consultation with the oracle were also instrumental in the diffusion process. Ekandem (1964) reported that school teachers at Ahoada, Bonny and Oron are known to have taken some cassava stems from these areas to their homes further inland but gave no date for the event.

The point has been made earlier (p.150) that large scale adoption of cassava as a food crop in Igboland is a feature of recent years. In Abakaliki, Northern Nsukka and Lower Anambra divisions, cassava was not widely grown until the early 40's. Three related factors appear to explain the change of attitude to the crop - drought, failure of yam harvest and famine. The famine which occurred in the war years reaching a peak in 1943, and locally known as Ùgali Ágha - 'War-time famine' was not so much the result of the war as the effect of drought which swept through the country between 1930 and 1950 (Richards and Oguntoyinbo, 1977, p.114-126). The drought led to widespread failure of yams, the traditional staple. Faced with the problem of starvation the farmers began not only to plant cassava but also to eat the roots in strange ways. The author recalls that in the peak of the famine in 1943 a fast growing less toxic and early maturing variety locally known as ȍkótȍrógbō was in great demand in his village and in fact throughout the division. His parents were 'milking' this variety just as they 'milked' yams. Òkótòrógbō plants lined walled compounds inside and outside and as one plant was uprooted, the stems were cut and replanted on the same spot. Famine drove many families to eat the harvest in rather strange ways. Normally they should have allowed the roots to ferment for at least two days before boiling and pounding. Instead, they were grated, turned into pulp, mixed with plenty of oil, then fried like 'àkārā balls' and finally eaten same day (nobody eats cassava in this way in the village today).

The mechanism of diffusion of cassava among the people in any village was quite simple. The market place, "burial, naming, and initiation ceremonies" were forums for the dissemination of new information and knowledge. Besides, a new crop on a neighbour's plot was often a curio~~u~~sity. A farmer was reported to have stolen a high-yielding variety from a neighbour's farm and was fined twenty pounds, an incident which resulted in this variety being called Óhupòn (an Igbo word for twenty pounds) Jones, 1959, p.99). Unfortunately neither the place nor the date of the incident can be ascertained from the report.

From the foregoing account it is reasonable to believe that the Igbo were among the early domesticators of yams in West Africa. The processes initially involved simple collection of wild species later on changing to ritual protection and finally overt attempts at cultivation. They were also early commercial exporters of the crop. The invasion of the forest zone was made possible by the acquisition of iron working technology. Initially the farmers may have been confined to the easily worked acid soils, diffusing later into the lowland areas of heavy soils as iron technology improved. Yams played important roles throughout the early history of the group not only as chief staple but also a major export crop.

European contact brought in a number of crops notably maize, rice, groundnuts, sweet potatoes, tobacco and cassava as well as many fruits e.g. mangoes, oranges, pineapples, pawpaw, bananas and plantains. The overall effect was to increase the number, variety and volume of foodcrops grown in the area. The importation of matchets made of iron armed the farmer with more effective tools for the assault on the forest especially those located on the heavier soils of the valley bottoms replacing them with man-made oil palm bush (Morgan, 1959, p.48-64).

From the latter part of the 19th century onwards, cassava and some of the other exotic crops notably rice, maize, cocoyam and plantains have consistently pushed their frontiers at the expense of the indigenous staple, but have not succeeded in displacing it completely. We shall now examine the nature of the perceptual environment through which they have passed in order to ascertain the extent of their involvement in the change and as an aid to the understanding of the present-day patterns.

CHAPTER V

CULTURAL NOTIONS ENVIRONMENTAL KNOWLEDGE AND CLASSIFICATORY SYSTEMS

Introduction

It was argued in Chapter II that a traditional farmer's crop decisions relate to his ethnoscience. It was also suggested in Chapter IV that Igbo farmers' choice between indigenous and exotic crops have some connections with their cultural notions and knowledge of the environments. This chapter therefore discusses their concepts and beliefs about the land on which they live and the crops which they grow. It probes a wide range of technical, biological and environmental knowledge which helps the group to maintain a complex agricultural system noting the changes taking place, reasons for the change, and how the changes in turn affect the internal working of the system. Particular attention is paid to their notions of classification of natural phenomena, their land tenure systems and the interrelationships that exist between them.

Cultural Notions.

Cultural notions as used here embraces the whole range of ideas and beliefs which people have about their environment and which enable them to live in and work with the environment. It has a time dimension and under normal circumstances should adjust to changing environmental conditions.

One point must be stressed right away - trained agricultural scientists charged with the responsibility of developing packages aimed at increasing the output of food crops in the developing economies often base their recommendations on an objective analysis of the physical environment alone. In most cases the basis for the selection of crops to be improved, of the sites for implementing such improvements are judged solely according to biological and economic criteria. The cassava programme cited in Chapter III appears to be a case in point. In contrast, the traditional farmer who is expected to adopt such innovation or packages considers a broader range of the environmental setting including physical, socio-cultural, supernatural and religious aspects. Agricultural behaviour often reflects the groups beliefs about life generally, their local idiosyncrasies and relationship to land resource.

(i) Concepts of Land.

The Igbo concept of land (Àla, àle, àni,), is deeply rooted in religion. Àla (land) is a goddess, the source of life, of fertility, prosperity and food. She is also the final repository for all human beings after death. Àla keeps constant watch over all the activities of men and ensures that people behave in accordance with prescribed traditional norms. Wicked people could be recalled before they ran their full life cycle. Acts or events such as stealing yams, homicide, poisoning, death through kwashiokor or falling from a yam barn were in the past regarded as abominable acts against Ala (ǹsó àla) and must be purged by making sacrifices to her (Mr. Umeakuike of Uga, Personal Communication).

Ala is also the resting place of all ancestral spirits who though dead maintain contact with their progenitors and fight for them or protect their interest in the spirit world (àlá m̀mọ́). Reincarnation is a special form of this interraction in which a dead ancestor, friend, or well-wisher may with permission of ala allow himself to be born into a family he admires. All the living are therefore reincarnations of the dead. Thus when an Igbo man names his son Àla Kwē (if àla permits) or Àla Áhàchiē (Ala has replaced my departed loved one), he is referring to the supernatural power of Àla.

More important for agricultural development is the belief arising from the above concept of reincarnation that all the land belongs to the group, dead or alive, born and unborn. In fact one old man interviewed at Umueze Anam put the issue most succinctly. When asked whether people own land individually in his village replied:

"Mmadū. ánaghì ēnwé àla, Ọbụ̀ ála nwe m̀madụ"

"Man does not own land, rather land owns man.

All these concepts about land are reflected in people's attitude to what in the western world is often regarded simply as a resource to be developed. To the Igbo traditional farmer, land is not just an agricultural resource. She is a deity which has allowed herself to be used for the benefit of man and must be treated with reverence. Therefore at the commencement of every farming season, Ala must be appeased by making sacrifices. To part with land requires more than mere monetary transactions. The implication for agricultural development will be examined later in this Chapter but first let us look at how the Igbo classifies his land and the relevance of this classification to the agricultural systems.

Land Classification Systems.

Meek (1937, p.100) classified all lands in Igboland into four broad categories:

(i) Sacred or taboo lands.
(ii) Virgin forest.
(iii) Farmland.
(iv) Individual holdings.

Later he regrouped them into two categories:

(i) Houseland.
(ii) Farmland (Meek, 1957, p.132).

Following Meek, Chubb (1961, p.12) recognised again two broad categories:

(i) Compound land (ànì úǹò, ánì m̀bū̀bō̄). - used mainly by women as gardens.
(ii) Farmland (àni agu, àla úbì) which he later subdivided into wasteland, common land, family land, personal land and freehold land on the basis of ownership.

It will be seen that these two classifications have their uses. At least they convey some idea of their ownership and location in space with respect to the settlements. As agricultural classifications of land, they have obvious limitations. The terms used do not immediately convey ideas about their agricultural value or productive capacity. The Igbo in fact have no general land classificatory system. They use many depending on the objective. The claim often made that the land may be classified under "compound" and "farm" is simply an attempt to emphasize the importance of one or two of the many criteria in common use. Some of the terms used are misleading. A typical example is "farmland." The fact is that all the land whether farmed or not, whether forest or grass, distant or near is potential farmland.

Generally speaking the Igbo, classify their land according to the following criteria - thus:

(i) Geographical location.
(ii) Vegetation cover.
(iii) Soil or rock structure or parent material.
(iv) Colour of the soil.
(v) Use or suitability for crops.
(vi) Drainage characteristic.
(vii) Ownership or tenure.

Overlapping occurs and at times two or more criteria will be used simultaneously. The important point to note is that most of the terms used have ecological connotations which enable the traditional cultivator to infer the suitability of the land in question for the growing of certain crops. In other words many of the terms convey definite meaning about the productive potential of the land. We may now examine the classifications to see the extent to which they achieve this objective.

(i) Geographical Location.

Here the word used refers to the geographical location of the piece of land relative to the village settlement or courtyard. Examples include :

Ikpā or Agū.

The expression is often used to describe distant lands separating two large settlements. In the past these covered vast areas of what is now overcrowded Igboland. They were mainly unsettled hunting grounds which also served as distant farmlands. On the basis of the type of vegetation cover encountered during the hunting expeditions, the Igbo was able to infer the productive capacity of these distant farmlands.

Ala Mbubō or Ala Ulo.

Refers to the land immediately surrounding the courtyard. The vegetation is often dominated by grass with stands of economic trees such as the oil palm, bananas, breadfruit, oil bean trees, Irvingia species, Kola and coconuts. As a result of its proximity to the farm houses, ala ulo receives practically all the farmyard manure and is intensively cropped.

Àla Ògwugwúru (Mud Pit Land)

Is a small piece of land located on an old mud pit from where the mud for building houses and compound walls were removed. When the building is completed and occupied, the sweeping from the courtyard and leaves from oil palm fronds are thrown in to reclaim it. Often it turns out to be more fertile than the surrounding farmland on account of this and is devoted to the growing of either early eating yams or bananas. Àlá Ògwugwúru is in fact part and parcel of Àlá Mbúbò but differs from the rest of Àlá Mbúbò because it is man-made and serves specific purposes.

(ii) Vegetation Cover.

Like most African cultivators, the Igbo recognise their fields by the character of the shrubs, grasses and herbs growing on them. The value of the land or its productive capacity depends on these ecological factors. The vegetation cover is an indication of its ability to produce one or more of his crops (Schlippe, 1956, p.37). The value of vegetation criteria to the Igbo is that it gives members of the group an idea of the productive capacity of the land concerned. The four types discussed below will help to clarify this point.

Àhagba (Aciao bateri land): Àhagba is a woody plant now used as cover crop to restore soil fertility. It also yields valuable firewood and yam stakes. When an Igbo speaks of planting on 'Àhagba' he really means to say he planted on a piece of land in which 'Àhagba' is the dominant plant species.

Mkpokiri or Ìkpó. Mkpokiri refers to a near climax grass vegetation cover and the land on which it occurs. The term suggests to the average Igbo that the land has reached a high level of nutrient status and so is ready for clearing.

Àla Mkpodu. Mkpodu is a mushroom shaped woody plant scarcely two metres tall with tough leaves and roots that decay very slowly. The growth is always associated with soils with poor plant nutrient status and in the past, when man land ratios were more favourable, such areas were avoided. Today many of them have been reclaimed through the planting of Ahagba especially in Aguata division.

Àla Átà (Speargrass land). This is often regarded as being of low nutrient status and very difficult to work since the deep rooted speargrass poses problem of weeding. Besides the grass often shoots its way through yam tubers. Ala ata is just one of the many types differentiated on the basis of the type of grass vegetation cover. Others include Àlá Àchara, àla ahiara and àlá ùramejulà. Before the full scale invasion of Igboland by Siam weed, these were the dominant grass vegetation on the Awka-Orlu uplands. The last two mentioned are associated with a reasonable measure of soil fertility.

Àlá Ùfé (Shady land). The Igbo differentiate between compound land in which there are many economic trees and those with few stands which do not effectively impede insolation. Àlá ufe refers to the former category a clear evidence that they are aware of sunlight problem. Since many economic trees are part of the food production system, they are not always lopped but cultural practices vary with species and clan groups. Where annual crops which tolerate shade are planted the productivity of the land can be measure in terms of the harvest from the tree crops as well as root crops. Groups who adopt this method are said to be "eating the land in tree crops" (ìrí àla na úfè).

(iii) Soil Structure and Parent Materials.

In this domain, the names give an indication of either the nature of the parent materials or the drainage characteristics/structure of the soil thus:

Àla Úrò (Clay land). Refers to fine grained poorly draining clay soils noted for being sticky and difficult to work during the rainy season. Consequently, the association of any soil with the name suggests that planting should start early before the arrival of the heavy rains or else the soil becomes very heavy, sticky and difficult to work. It also suggests that mounds should be high to improve the drainage condition especially for yams. In fact, high mounds are common features of farms on clay lands in the territory. The farmers in Abakaliki with the highest mounds explained that the huge hemispherical mounds help to keep the crop above flood level and check decay.

Àla Ájata (Gravelly land). As the name suggests, gravel predominates. The name implies a reasonable measure of productive potential for yams but greater difficulty of mound construction especially before the heavy rains arrive. Unlike clay soils, planting has to be delayed until the arrival of the heavy rains. The farmers are aware of the problem of heat associated with gravelly soils. Yam seeds tend to decay if planted before the arrival of the rains.

Àlá Okwute (Stony land). Here, large angular stones and real outcrop of rocks may occur. This type of land is considered very productive for yams provided the soil is deep enough to take the tubers. Like gravelly lands they are easily heated and planting is often delayed until the arrival of the rains.

Àla Uzuzu (Sandy soil). Is usually very easy to work and does not require high mounds. Some western Igbo groups do not make mounds on them at all.

(iv) Colour.

In terms of colour, the Igbo, especially those west of the Niger, recognize two basic types - Àni óchà (white soil) and àni ojī (black soil). The former is considered less productive but easier to work. Soil colour in fact has given a name to a town known as Àni Óchà located in Asaba division.

(v) Drainage and Vegetation.

These two factors have been combined to differentiate a particular land type known as Ùde. Ùde has no equivalent in English and refers to a piece of poorly draining clay land located at the valley bottoms along water courses and in which the dominant tree species is the raffia palm.

(vi) Use or Suitability for Certain Crops.

The best use to which a piece of land may be put is used as a basis for classification by the Igbo farmer. Thus he speaks of:

Ájoòhīa, Óhia ojò ('bad bush') in which sacrifices, disused charms, sleeping materials, pots, baskets and other implements used by people who 'died bad deaths' were thrown. Alternatively the 'bad bush' could be the actual burial places for such people including smallpox victims. Sometimes twins were thrown in too. In the past, especially before the coming of Christianity in the middle of the 19th century, 'bad bushes' were strictly avoided for fear of contracting deadly diseases, like smallpox, leprosy or even encountering spirits.

The attack on 'bad bushes' must have started in the second half of the 19th century. By the 1930's it had reached an advanced state. From Meek (1934,p.101) we get the impression that as a result of congestion and land hunger, people had started to clear and cultivate some bad bush areas. According to traditional beliefs, if anybody had the boldness to clear and cultivate a portion of 'bad bush' for more than two agricultural years without reprisal from the spirits, that portion automatically ceased to be 'bad bush' and henceforth would belong to him. Information from an old man at Uga on the Awka-Orlu Uplands confirmed that most of the bad bushes in the town disappeared through gradual encroachment, especially by Christians who were eager to demonstrate the superiority of their God over local spirits. He however admitted that there were also bold non-Christians who specialised in the art of clearing bad bushes (Ị́gbọ̀ ohia), a term normally used for the clearing of primaeval forests only. The author recollects that one such 'bad bush' which he used to dread on his way to school in 1940 disappeared finally in 1963 and his own father cleared a thick idol forest in Umuobom village in 1940.

Àla Ēdē (Cocoyam land), Ála ji (Yam land)
Àla ji Akpụ̀ (Cassava land). These terms do not refer to the actual crops growing on the land at

the time but to those for which the land is best suited judged from the drainage condition and vegetation. The Igbo have good knowledge of the environmental requirements of their main food crops. Generally speaking a piece of land with a dense cover of oil palm, kola, and <u>Irvingia species</u> are said to be good for cocoyam. To grow yams on them requires considerable lopping. In the case of kola trees and <u>Irvingia sp</u>. this is not allowed and a crop adapted to the particular vegetation type has to be grown.

(vii) <u>Ownership or Control System</u>.

This criterion has been most popular among scholars and Government Agencies apparently because of the relative ease of collecting information on distribution. Strictly speaking, and in view of what has been said earlier (Page 159) about Igbo Concept of Land, land classification according to ownership or control is not traditionally Igbo. This is shown by the fact that of the two major categories often differentiated - communal and individual holdings, the latter has no simple equivalent in Igbo language. Communal or better still, kindred or family land, is known as <u>Àla Úmùnna</u> or <u>Àla Oha</u>. As a product of increase in population density and monetised economy, individual holdings have no such simple names. To refer to individual land in Igbo one has to describe it.

It may be argued that <u>Óhia Arusi</u>, <u>Óhia Ágbāra</u> or <u>Ófia alūsi</u> (idol forest) refers to a category of land differentiated on the basis of ownership or control. The names suggest control by the idol and his chief priest but in fact this is more apparent than real. Idol forests still belong to the group in whose territory the idol is situated. The physical control therefore rests with the people. To this day, the priests cannot take unilateral decisions affecting such forests.

In the past, all the land was held by the village or lineage groups within the village. Individuals had the right to farm any plot with permission from the chiefs or elders but they could not exchange it for money and in fact there was no need for such transactions as land was plentiful. Today, especially in the densely populated parts of the region, much of what was kindred land has passed into private hands. The association of these areas with high population density suggests that the change occurred as a result of population pressure and the increasing problems of control by one central authority.

Ezangbo village with a population density of about 156 per square kilometre in 1952 provides a typical example of the operation of communal land tenure system and the beginning of the breakdown of the system. Fourteen years ago when the author first visited the village for research purposes all the farm land was held on a kindred and exogamous family basis. The elders in each group decided which section of the land should be farmed in any one year. Luxuriance of vegetation cover was the chief indicator. By then the group were not returning to a piece of land until after a minimum of seven years.

The method of acquiring farmland was quite simple. On an appointed day the adult males lined up along the paths leading to the farmland and the elders assigned to each and every one of them a piece of land on which to farm that particular year. Grasses were knotted at intervals along the path to indicate that a particular stretch had been allocated to someone. Some of the allottees cleared a few square metres away from the path in addition to tying the grasses. Inland from the pathway, the low shrubs dotting the monotonous grass vegetation cover indicated the boundaries between plots.

A visit to the village in 1977 revealed a number of changes. The length of fallow has decreased from seven to four years and there are signs that further reduction is inevitable with increase in population. In fact in some of the surrounding villages, it has become necessary for young men to make special presents to the elders to solicit for more land. It has also become necessary for everyone to be present when land is being allocated to campaign for a better deal.

One implication of communal tenure is that the initial assessment of the soil environment is done not by all the farmers but by the elders. Individual perception is limited to plots already assigned. If the elders decide that a piece of land 7 km. away should be farmed, the whole family plants on that piece. To ensure that everyone conforms the few head of dwarf cattle (muturu) still reared on a communal basis are let loose on the remaining farmland. Compound and farm land dichotomy is therefore not a feature of Ezamgbo area. It is however interesting to note that under such a system of tenure, the distance a farmer covers in order to harvest what he cooks for breakfast may be as much as 5 kilometres depending on the location of the group's farm.

Similar traditional tenure, with annual redistribution, operates among the Okehi people of Etche clan. A slightly modified form was observed among the Olo peoples of Umueze Anam. The entire population numbering 3,175 in 1952 lives on a narrow and elongated sandy levee about 277 metres long situated just south of the confluence of the Anambra and Ezechi rivers. Fishing and yam cultivation are the primary occupations of the people. The fertility of the soil is replenished annually by the flood and there is no need for fallow. This is the greatest single factor responsible for the peculiar system of communal tenure prevailing.

The system allows any member of the community to clear any piece of land to grow any annual crops, provided that piece was not cropped by another farmer the previous year. In other words, any plot cleared belongs to the farmer for as long as he does not leave it under fallow for more than one year. The land lying at the angle between the two rivers used to be an exception. During my first period of study in the village in 1964, it was set aside as garden land for the older members of the village. Here they raised their first crop of the year particularly maize, yams, okro and vegetables. Cassava was strictly forbidden on the grounds that it exhausts the soil and does not mature early enough to allow the planting of other crops. My visit in 1977 revealed a slight change from the above situation. The ban on young men had been lifted following encroachment by their northern neighbours and the need to secure the land permanently for the group.

In the whole of Mbanasa clan, of Orlu division, Aguata and Mnewi divisions located in the overcrowded parts of Igboland, individual tenure predominates. Communal tenure is now a thing of the past, all land having long since passed into private hands, except that Idol forests survive in degraded form.

Further north in Owerre-Obukpa, Nsukka division, different tenurial systems apply to the different land use zones. On the densely settled plateau tops, all the farmland is in private hands. The distant farmlands and the grass covered residual hills on the western flank of the plateau are controlled by the head of each family who often holds an Òzíoko title. They have right to negotiate the sale of such lands.

In Adani on the Anambra river basin land could not be sold at all. The idea of permanent alienation of land was unknown as recently as 1961 (Chubb, 1961), but today the village is dotted with survey pillars following the successful introduction of rice as a commercial crop and the migration into the area of a large number of land hungry groups from the uplands to the east and south-east. West of the Niger, the introduction of rubber in the early 40's had a similar effect on Aboh. Prior to the war time rubber boom, the land was controlled by the various communities and permanent alienation was unknown. There was in fact a vast area of unused forest and the length of fallow used to be more than 15 years (Baker et al, 1965, p.139). In response to the rubber boom, prominent indigenes and strangers from Warri and Sapele leased vast areas of farmland for rubber and in fact were partly responsible for the shortage of yams, the chief staple in 1945 (Chubb, 1961, p.38).

The point must be made that in all the villages where land is said to be individually owned, the farmer is forbidden by local custom to dispose of his plots as he likes. He is still considered to hold the land in trust for the past, present and future generations under what is generally referred to as the usufruct system. Outright sale of farmland to stranger elements is viewed with dismay by the land owning group. Pledging is often preferred as pledged land can always be redeemed.

Where a farmer finds that he must of necessity sell his piece of land, he is bound by custom to consult members of the inner family or kindred group, and only when none of them is capable of buying the land, will it be sold to an outsider. For prestige reasons most families persuade wealthy traders among them to buy the land. The slaughter of a goat usually presented by the buyer during a ceremony known as <u>Ìwá ala ǹnú,</u> signifies that the land has been sold and cannot be redeemed. Akokwa people however allow redemption only on the payment of twice the cost provided the buyer agrees to let go the land.

On a man's death, his farmland is apportioned out among his sons with the eldest taking a lion's share and reserving the right to occupy the walled compound. Among the matrilinial Afikpo, Unwana, Edda, Amaseri and Enna clan groups in Afikpo division and the Ohafia in Bende division (Nsugbe, 1974, p.18) the land would be shared among four groups of people, thus:

(i) His maternal brothers whether by same father or not and in order of seniority.

(ii) His maternal sisters in order of seniority.

(iii) His eldest maternal sister's male and female children.

(iv) His sons, who can only share that portion of the land inherited from their grandfather or carved out of an uncultivated area by their father (Chubb, 1961, p.22).

Outside these Igbo groups, a widow has right to the land only through her sons but again there are differences from one location to the other. If she has only daughters at the husband's death, the custom requires the husband's property, including the wife, to pass on automatically to the eldest brother or next of kin who then is expected to assume the responsibility of caring for the deceased brother's family. More often than not the caretaker uses the property for the benefit of his own family. This partly explains why people in these areas tend to value male rather than female children in spite of the bride price which the latter brings into the family.

The regional variations in land tenure systems have been discussed in some detail because they throw some light on yet another aspect of our traditional agriculture, namely, very intensive cultivation of small or fragmented often widely scattered holdings on the one hand and on the other an extensive use of large holdings with lack of any conscious move at improvement. Both have some bearing on the cropping patterns and the productivity of the farmers. The former is confined mainly to the overcrowded Igbo heartland where farmlands are individually held and the latter to areas of where sparse population still makes communal tenure possible.

The fact remains that communal tenure with an annual redistribution of farmland among the adult males tends to reduce the hectarage under women's crops in areas where inheritance is patrilinial since they cannot always get separate plots. The system ensures that each adult male cultivates a large plot of land annually but the size again is limited by what the central authority feel should be his requirement but the chances of perfect coincidence between need and actual allocation are remote. People have been known to get more land than they require while others have much less.

Under communal tenure, land as a factor of production is traditionally regarded as a means of satisfying the needs of the land owning group at or near subsistence level and not so much as a source of marketable surplus. An enterprising farmer cannot readily expand the size of his operation nor can he think in terms of long-term improvement of the land as a means of increasing production, as the elders, if not everybody in the community, have to be convinced of the desirability of such a project.

One clear example which complicated issues during my field work in 1964 will help to clarify this point. In that particular year the Onitsha Yam Traders Association realising that the earliest yams reaching their markets were produced in Anam decided to give a loan to the farmers at Umuze to enable them increase their output. The loan was to be interest-free. First the village chief and councillors were contacted and they gave their approval but when the issue was raised in the village meeting, it was turned down. Some saw in it a treacherous attempt by the chief and councillors to sell their land to foreigners. Others believed that the traders were sent by the government to ascertain their incomes as a prelude to increasing their taxes. Since my visit to the village was barely three months after this incident, I was numbered among the spies.

Individual ownership of farmland with subdivision of a man's holdings among his heirs at his death poses some problems too. It is clear the system results in small and at times uneconomic holdings. The farmer clings to these small holdings under very intensive management but uses very little manure on plots located very far from the court-yard. Artificial fertilizers are seldom used and since the length of fallow is very short too, the soil progressively deteriorates until even cassava can no longer give a good yield. In fact the position in some areas is such that the farmers cannot produce enough food for their subsistence even if they concentrate all their efforts on the growing of cassava alone. They "have lived near the margin of subsistence and hunger for much of their lives" (Harrison Church, 1970, p.454). One old man in Northern Ngwa summarised the situation thus:

> "My son, I wish God could hear me speak.
> We who have remained behind to till the soil
> are the brave. The weak ones have migrated
> to the towns and only come back to laugh at
> us.
>
> In the farm we look more like mad men,
> We labour in the intense heat of the sun
> But in the end produce very little.
> Our staple food now is cassava but we
> do not produce enough to last three
> months of the year."

The extent to which the recent decree which vests all the land in the state can change such a situation remains to be seen.

(viii) Method of Acquisition.

This criterion derives from (vii) above but differs from it because the main focus of attention is on how particular holdings were acquired. Like (vii), however, the criterion has become popular among government agencies seeking general information on land tenure systems.

Method of acquisition was used in categorising all farm holdings surveyed during the rural economic surveys on which this study is based. All plots cultivated by a sample family during the years of survey were categorised under four broad headings - inherited, allocated by family head, purchased, rented, (Federal Office of Statistics, Lagos, 1973, p.1-3; 1974, p.27). Where a farmer was just squatting on a piece of communal land or acquired his land as a gift, these were also indicated. Unfortunately, there was no specific mention of pledging which is an important element in Igbo land tenure system.

Fig. 5.1 shows the results of analysing the data for 1974/75 and 1975/76 surveys. The size of the circles are proportional to the hectarage cultivated by an average household. The subdivisions refer to the proportions of the total area acquired by the various methods.

The patterns that emerge are very interesting and rewarding of the efforts put in extracting the data directly from the files in the Federal Office of Statistics. The map shows considerable variation in the hectarage cultivated annually by the different Igbo subgroups. A visual correlation with Fig. 5.2 showing the rural population density brings out the relationship between on the one hand, population density and on the other, land tenure systems and size of operational holdings. Average area cropped per household per annum varies with population density and ranges from 0.19 hectare in the heartlands to well over 2 hectares in the extreme north east.

Generally speaking, areas of secondary migrations have much higher figures. Ogu-Uku peoples of Abakaliki division record the highest hectarage. Ika division comes second. The two divisions correspond with areas where communal land tenure systems still persist. Nearly all the plots cultivated were allocated by the

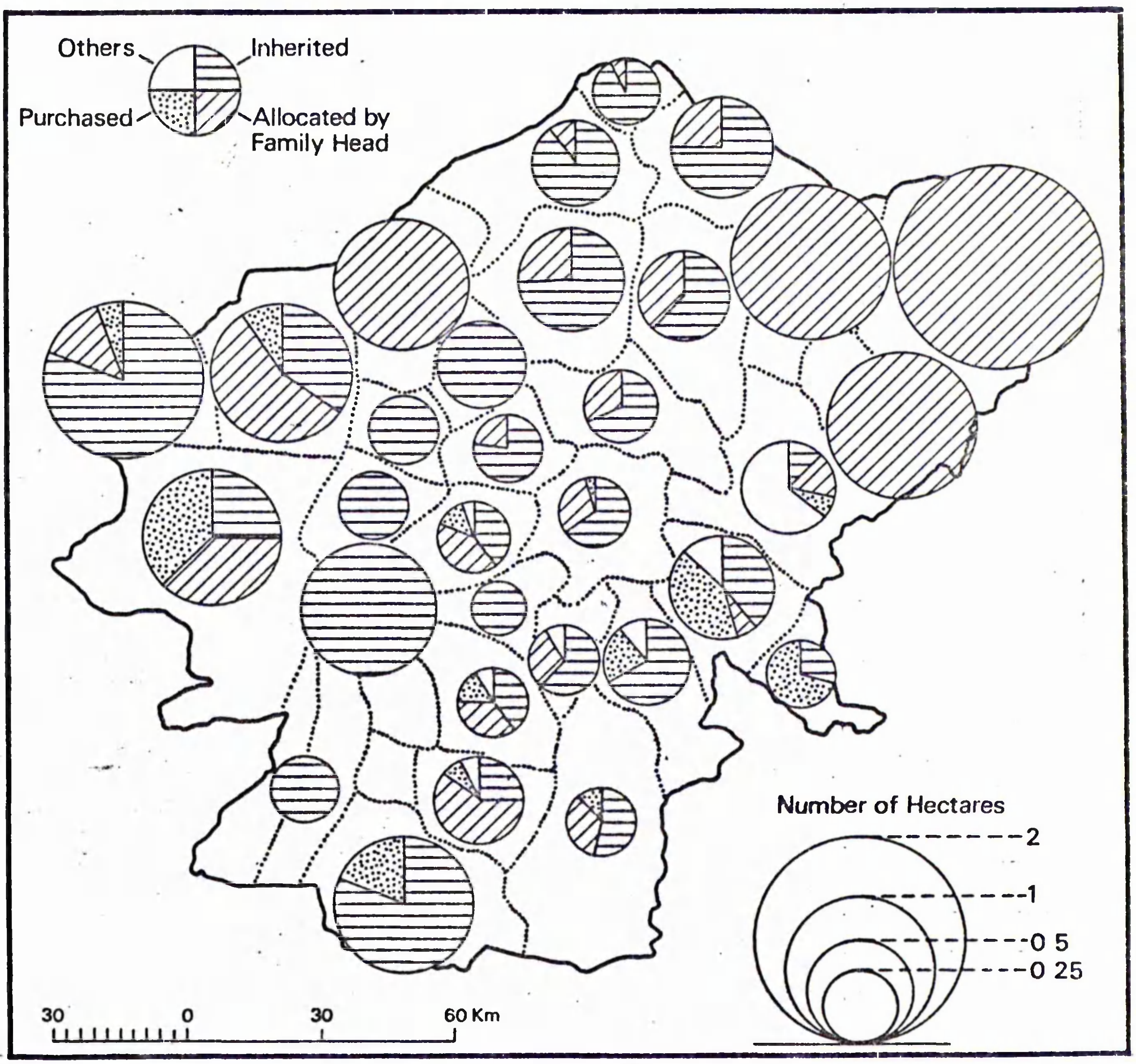


Fig. 5.1: Size of Cultivated Area per Farmer and Proportion under each Tenural System of Acquisition

Source: Rural Economic Survey, 1974/75

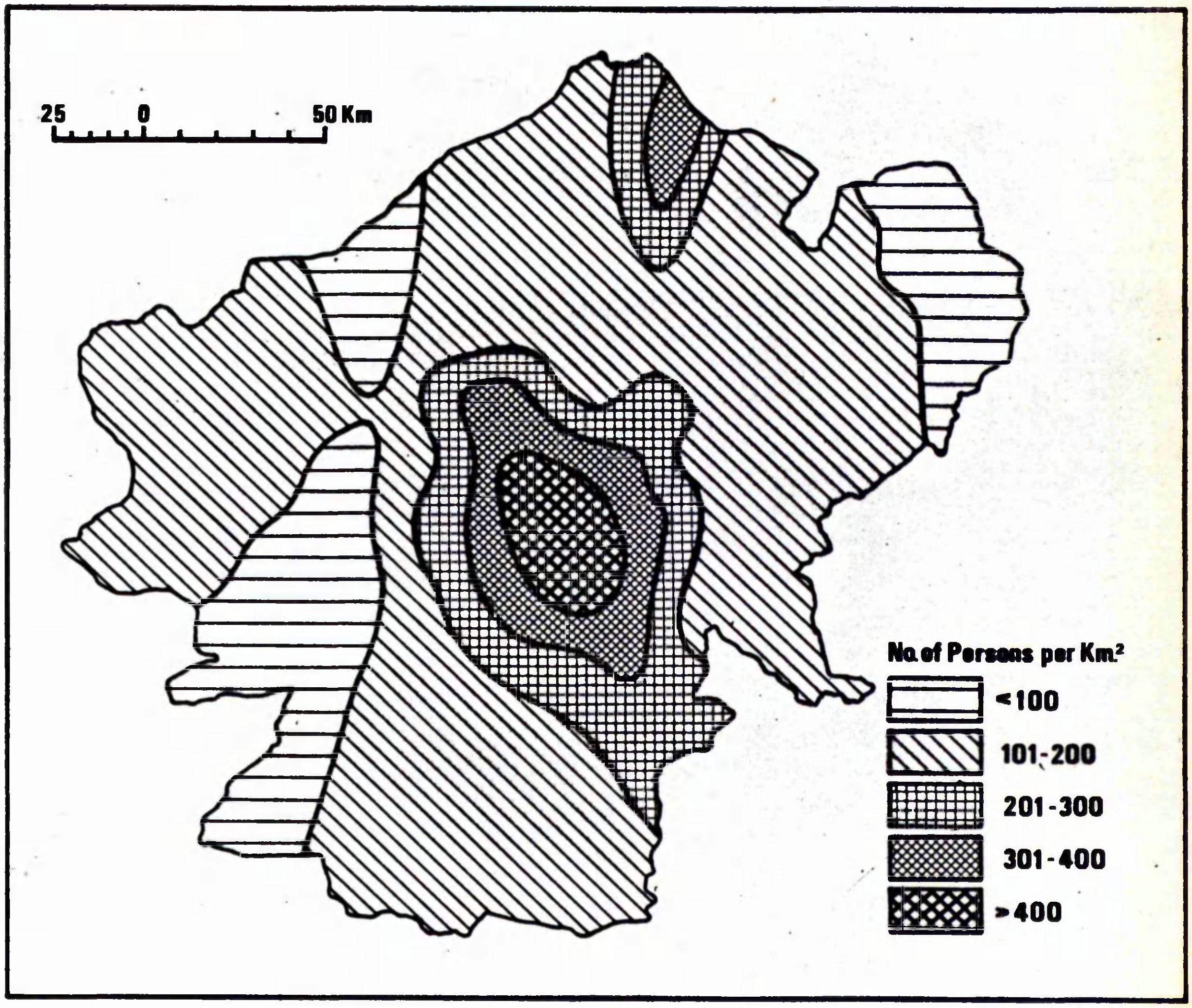


Fig. 5.2: Rural Population Density 1963

Data Source: Federal Nigeria Census Office, 1963 family heads. This contrasts with the situation in Igbo heartland, Nsukka plateau and isolated areas in Aro-Chukwu division, where the greater proportion of the land was either inherited or purchased. The high percentage of purchased land in the less densely populated Southern Ika or Aboh division is certainly explicable in terms of commercial production of rubber.

In agricultural terms, classification of land on the basis of method of acquisition conveys some definite notion of how any piece of land so classified can be used. For example one may plant any crop including perennials on an inherited plot but often not on parcels allocated annually by the family head, rented or pledged.

Classification of Crops.

The Igbo knowledge of their crops and crop varieties, their qualities and productive capabilities are reflected in the categories and names they apply to them. They know each crop and crop variety by name. At times the names reflect taste, soil requirements or tolerance and places or origin. Apparently no research has been devoted to a detailed study of Igbo crop taxonomic systems even by those who are now seeking to improve the agricultural systems. The Federal Root Crop Research Centre at Umudike is still compiling a list of traditional crops from all over the country for the purpose of hybridization with a view to evolving disease resistant and high yielding strains. It must be stressed that the

Igbo themselves have no unified classificatory system for crops. Crop names vary from one location to the other a situation which presents problems of identification. In this section therefore the terminology appropriate to the basic root crops - yams, cassava and cocoyams - will be discussed as illustration of the richness of Igbo crop taxonomic systems and how this in turn influences crop choice among the group.

A wide range of yam varieties are grown in the territory but the most popular are the white and yellow varieties. Consequently their differentiation is very detailed as shown in Table 5.2. The classification of cassava is not as sophisticated as that of yams which is not surprising. The crop is exotic and in some villages just beginning to be important in the agricultural system. The terms used to describe the range of varieties cultivated refer to their yielding abilities, method of preparation, physical appearance and possible centre of origin or diffusion and use as food by large families. The varieties of cocoyams grown are surprisingly few. Consequently their classification is very simple. (Table 5.4).

The relative importance of farmer's knowledge of the characteristic tastes, yielding ability, soil requirements and growth habits of the crops in deciding choice of crops and crop associations is not very easy to ascertain. It seems reasonable to argue that for crops like yams requiring about 25% of the previous years harvest

TABLE 5.2 Yam Varieties

Name	Botanical Species	Major Characteristics as reported by Farmers/Comments.
Ji Òyibere	D. cayenensis	Thick thorny stem with deep green colour. Always planted near live trees. Does not grow by cutting the sett.
Jí Okō	D. cayenensis	Related to Oyibere but is not confined to area around live trees.
Ǹze Ásō	D. cayenensis	The name means not avoided by Ozō Title holders. Nze Aso is very tasty and makes good stew. Often used in entertainment of visitors. Takes longer to mature.
Jí Òku	D. cayenensis	Ōku in Igbo means entertainment of guests during a feast. The name suggests its high yield and suitability for entertainment.
Jí Ànụnụ or Jí Nkịtị	White Yam D. rotundata	Nkiti means ordinary. Jí Ñkịtị is the lowest priced of the yams but gives good yield even on very poor soils. In the past was food for the poorer group. Keeps longer than most white yam.
Òkéwa àla	White Yam D. rotundata	Is a variety of Jí Ñkịtị but unlike Nkiti has hairy tubers and thrives on most poor soils. 'Okéwàla' means 'soil breaker.' It is claimed that no matter how dry the soil may be, Okewàla will break through it to develop its tuber. The farmers at Uga pointed to the wide cracks appearing on yam mounds to prove their claim.

Name	Botanical Species	Major Characteristics as reported by Farmers/ Comments.
Jí Ọcha	D. rotundata	White yam. Very tasty and requires rich loam soil for proper growth, unlike ṅkiti. Preferred to Ànụnụ.
Jí Èkpe	D.rotundata	Greenish yellow stem with a lot of thorns at the base. Tubers often small and elongated. Very tasty. Requires rich loam alluvial soil.
Àdákā or Àgạ	D. rotundata	Premier early eating Yam. Planted mainly on compound lands. Requires tall stakes. Produces huge yams for display during ceremonies and feasts. Makes good yam stew.
Àdákā Okokọọdù or Nwópoke	D. rotundata	Name means "Àdákā with broad tail." Differs from ordinary Àdákā in tapering towards the head. Nwopoke refers to the fast and robust growth of this variety originated in Abakaliki.
Nwámbè Ọhià	D. rotundata	The tortoise is regarded as a stunted animal. Mbe óhia means wild tortoise. The name refers to the size and shape of the yam. It is never elongated.
Àbana or Mbụla	D. alata	Water yam. Very watery so eaten mainly when it has 'dried' a bit and during period of scarcity. Not very popular. Women's yam. Requires rich black soil. Does better on soil with abundant wood ash.

Source: Fieldwork

Name	Botanical Species	Major Characteristics as reported by Farmerss/Comments.
Adu	D. bulbifera	Women's crop. Grown in Ahagha land along with yams. Not important these days.
Ọna or Ụna	D. trifida	Some are highly toxic. Have been known to kill especially if not 'turned' (turning refers to the process of digging up the yam removing some tubers and replanting the remainder). Planted near live trees. Require manuring. Usually eaten during festive occasions but with plenty of oil. Late maturing.
Ji Ohia	D.abyssinica	Wild ancestor of the cultivated species. Found in relatively undisturbed forest. Deep green leaves. Thick stems with spines. Wild tubers difficult to harvest due to protection by thorns. Tubers elongated and also thorny. harvested during period of hunger and starvation.

Source: Fieldwork

TABLE 5.3 : Varieties of Cassava

Name	Major Characteristics Reported by Farmers/Comments.
Abụrụ́ ērie or Abụ́rụ́āsuọ	'Harvest and eat.' or 'harvest amd pound.' May or may not be fermented. Often has red stalk and red inner coating of the roots. Can be eaten raw.
Ákaocha	'White hand.' Stalk is white.
Akaogologo	'Long hand,' roots very elongated.
Ákauhie	'Yellow hand.' Has yellowish stalk.

Name	Major Characteristics Reported by Farmers/Comments.
Akpubuji	'Cassava that is yam.' Very good quality cassava. When pounded is white as yam.
Chukwuemeka	(My namesake!). Means thank God, an expression of great relief brought about by the acquisition of the crop. Very high yielding.
Congo	Suggesting introduction from the Congo. High yielding.
Panya or Iwa Panya	Suggesting introduction from the Spanish Island of Fernando Po. High yielding.
Edumazunnwa	"One who helps me feed my child well."
Dumzuonwa	'Help me feed my child.'
Ewueri	'Not eaten by goats.' Leaves very toxic.
Ighoagba	'Not planted by the Igbo.' Very toxic. Water from fermentation kills goats outright.
Eze Akpu	'King of Cassava.' High yielding.
Nne Otimkpu	'Mother of the crier.' High yielding.
Nwangworo	'The cripple.' Has a stunted growth but gives good yield.
Ofulumtie mkpu	"One who shouts on seeing me." Refers to the high yield.

Name	Major Characteristics Reported by Farmers/Comments.
Ohu Pọṅ	'One Pound.' It is reported a farmer was fined one pound for stealing the variety from a neighbour. Very high yielding.
Ọ̀kọ́tọ̀rọ́gbọ̄ or Ọ̀lọrọ ọ́hụrụ	'New comer.' Early maturing.
Ọ̀rīnandụ	'Eaten raw.'
Ọzụ̀rụm	'It is enough for me.' High yielding.

Source: Fieldwork

TABLE 5.4 Cocoyam Varieties.

Name	Botanical Name	Major Characteristics Reported by Farmers/Comments.
Édè Ékò	Xanthosoma sagittifolia	Requires heavy manuring. Daughter corms can be roasted on fire for consumption.
Ākíṛị́	Colocasia esculenta	Yields very small daughter corms. If well manured gives good yield. Does not require deep planting.
Nwáīne	Colocasia esculenta	White leaves. Highly elongated and reddish corm. Produces a lot of slimmy substance when peeled. Not very popular.
Ọ̀pá	Colocasia esculenta	Thick green leaves. Produces heavy parent corm and few daughters. Heavy manuring necessary.

Name	Botanical Name	Major Characteristics Reported by Farmers/Comments.
Kòchúọ̀m or Ógụtà	Colocasia esculenta	Ọlọrọ ọhụrụ (new comer). The full name is Kòchúọ̀m ma m̀búchuō gi (Even if you plant more than I do, I will have greater yield than you). The cocoyam is very high yielding. Probably came in through Oguta.
Édēbèkèé or Édèóyìbó	Xanthosoma sagittifolia	Named after Dr. Baikie, the first Englishman to penetrate Igboland. To date a common Igbo name for any European is Nwabekee meaning 'the son of Baikie.' Among the Ijaw, they are called Beke. Edebekee was probably introduced about the time of Dr. Baikie's visit. Oyibo is another Igbo name for European.

Source: Fieldwork

as 'seed' what the farmer plants would depend on his ability to save enough of his favourite varieties or his ability to buy them from the local markets. Poor financial disposition may force him to fall back on inferior but high yielding varieties.

In the case of cassava in which the non-edible stems serve as planting materials, the farmer is most likely to grow the variety which meets his taste. Moreover the traditional practice of walking into neighbours farms and cutting cassava stems ensures abundant supply of planting materials.

Awareness of and responses to Adverse Effects of High Mid-day.

Temperatures Igbo farming communities are aware of the adverse effects of high mid-day temperatures to young plants and working parties and have devised various ways of dealing with it. As a result of this phenomenon, the working day is usually divided into two periods, one in the morning and the other in the evening with a short break for rest and lunch under tree shade or temporary huts during the intense heat. For the same reason, people who walk over 7 km. to their distant farmlands usually start around 4.30 a.m. so as to get to the farms just before dawn and utilize the cool weather of the early hours of the morning. An old man at Abakaliki explained that the people are aware of the debilitating effects of mid-day heat, hence they schedule the Ìkúkọ̀ or 'Yam Mound Making' competition to take place at night just before dawn. (cf. Chapter 6, p. 218).

My fieldwork revealed that mulching and capping of yam mounds very common in Igboland, are a reaction to situations of high temperature. Mulching involves covering the mound with dry grasses or fresh leaves which act as insulation. Palm fronds, sweepings from the compound, oil bean, and banana leaves provide excellent materials for mulching. The difference between mulching and capping is that of degree. In capping the top of the mound only is covered. Often the scanty covering is held in position by a hoe load of soil or a block of laterite. In addition to mulching, the farmers living on the sandy soils of the Awka-Orlu uplands which heat up very quickly, tie pineapple and other leaves round the base of the young yam shoot thus insulating it from the heat from surrounding soil.

An informant at Akokwa on the upland explained that the primary purpose of mulching is to protect the early yams planted before the rains from the intense heat of the sun, but that the practice protects the yams from weeds in addition to supplying much needed"food." He went further to explain that he had devised a way of mulching his early eating yams so heavily with palm fronds that weeds cannot grow and the plot can be cultivated every year with no noticeable decline in productivity. The wife however complainted that the heavy mulch was not a selective "weed killer" since it also affected her maize and okro crops.

Other practices found on the Awka-Orlu uplands and resulting from farmers knowledge of the effects of high temperature involves the planting of cocoyam and the use of cut and uncut yam tubers as planting materials. Generally, the yam planted could be either a whole tuber or cut ones. Collectively, they are referred to as "seed yams" or "yam seeds," but the Igbo differentiate between m̀kpúru jí (small and uncut yam seeds), áwa jí (cut tubers) and Ákpụ̀ jí (second growth from "milked" yams.)

The size of whole tubers planted varies with season and decreases with the approach of the rainy season. The farmers explained that larger tubers do not give good yield if planted towards the end of the rainy season as the 'seeds' may not have enough heat and time to 'shrink' and 'die,' a condition judged to be very necessary for proper growth or regeneration. During fieldwork a farmer at Umuchu dug out a yam seed that could not 'decay' and therefore not produce good tubers simply because it was planted too late for its size. According to the farmer, m̀mírì èjúgò āla áfo (the rain has already filled the stomach of the land). In other words the rains were already too much when the planting took place. In contrast, cut "yam seeds" are not planted before the rains start especially on the acid sands of Orlu division or else decay starts from the cut wounds under the intense heat of the sun. For similar reasons, the planting of cocoyams is usually delayed until May/June.

Concepts and Belief about Rainfall and Drought.

It must be stressed that the average Igbo does not measure rainfall, temperature and humidity with conventional scientific instruments. To him, instrumentation does not exist beyond his physiological feelings and the responses of his native herbs, grasses and trees to variations in weather conditions through the year. As a product of an entirely different culture, his beliefs, perceptions and scales of measurement and classificatory systems differ from those of trained environmental scientists. To him, rainfall is the gift from God (Ígwè) who lives in the skies and rules the heavens. 'Àla' the earth Goddess is subordinate to Ígwè who out of his love for 'Àla' gives rain but can be specially requested to withhold or give it by rain makers (Díbìammīrī or Òhàmmīrī). The Igbo like other African groups e.g. the Nyakyusa (Wilson 1959, p.114) believe that the rain makers have the power to bring down the rain at any time of the year including the dry season. Powerful rain makers are ascribed the power of ruining burial and marriage ceremonies (Uchendu, 1965, p.97).

Drought is therefore not a natural phenomenon but the product of a conspiracy between a vicious and powerful rain maker and the Igwe. During the 1972 drought the author's house was nearly attacked by angry village women because it was alleged that he paid the local rain maker to withhold the rain while he was constructing a water tank. As late as 1975 the same group of women undertook to marry a wife for the most powerful rain maker simply because it was alleged that he withheld the rain during a new yam festival.

Failure to bring down the rain when required is always explained in terms of the intervention of a more powerful rain maker outside the town or village. The farmers interviewed at Ukehe reported they have had very dry conditions this way almost once in every five years and this constitutes a great threat to their crops especially yams and maize. They stressed that cassava is better able to withstand prolonged drought than either crop.

Drought has become so prevalent in recent years that a group of farmers interviewed at Umueze Anam ranked it first among the problems facing their agriculture. They also observed that the phenomenon is always associated with high incidence of yam beetle attack. The effect of drought on yam cultivation has been confirmed by Oyolu who observed that the yield of yams and maize are adversely affected by fluctuations in the amount of rainfall particularly if it occurs during the critical growth phases which for yams is between the 14th and 20th weeks and for maize between the 4th and the 8th weeks (Oyolu, 1961, p.43).

Igbo Agricultural Year.

Igbo agricultural year is divided into two broad seasons - Ùdúmmìri (wet season) and Ōkochi (dry season). Each of these can be subdivided into shorter seasons giving a total of five seasons namely Àdidammiri, Ūdúmmìrí, Ókochì jì, Ùdúmmìri ajà and Úgụ̀rụ.

Ọkọchi lasts from about November to February and corresponds with the period when the tropical continental airmass invades the territory. The peak of this season which is usually cool and very dry is called Úgụ̀rụ.

The dry weather conditions associated with "Úgụ̀rụ" is believed to lead to increased leaf fall, higher soil fertility and consequent high crop yield. The ferrocious winds are supposed to blow away diseases that plague crops. Therefore, the longer the Harmattan lasts, the higher the expectation of crop yield. In fact to refer to a person as Úgụ̀rụ implies an element of cleverness, versatility and precision.

This popular song of Akokwa people during the season illustrates the significance and importance attached to the harmattan wind:

"Úgụ̀rụ́ àwụrụ sókwe ǹné gí ō-ō
Ụgụ̀rụ́ àwụrụ sókwe ǹna gị́ ō-ō

Ụgụ̀rụ āwụrụ ébụ̀ghị mā árịa ádighị m̀ma

Úgụ̀rụ kpọ́kwa gị́ ị̀ke m̄kpọ̄-ō Ụ́gụ̀rụ"

Translated literarily the song is saying:

"Úgùru follow your mother o-o,

Úgùru follow your father o-o

No Úgùru no good harvest

Let Úgùru dry your buttock, Úgùru"

The song used to be very popular among children as they went from one cassava plant to the other collecting insects such as grasshopper and mantis. The clearing of swamps and dense forests is usually done during the cool but dry harmattan season to take full advantage of the desiccating effect of the wind. In fact harmattan winds are noted for the drying and cracking of lips.

Àdidammiri has no equivalent in conventional terminology and should not be confused with rainfall which the term suggests as no actual rainfall is involved. Àdidammiri is an Igbo expression describing the humid conditions which precede the first rain. It derives from physiological feeling of the higher humidity of the Maritime Airmass in contrast with the dry conditions prevailing in the harmattan airmass. The season is characterised by hot afternoons cool and refreshing evenings and nights followed by abundant dew formation. As a transitional season it does not last long, often less than a month but it is a sure sign that the first rain is in sight and people should be prepared to fire the fields.

Ùdúmmiri or wet season lasts from April/May to October depending on location with a short break in

August called _Ókochì Jí Oko_ or simply _Ókochí Ji_ (Uchendu, 1965, p.2). The name derives from its beneficial effects on white yams which do not do well under very prolonged wet conditions. The late rains following _Ókochì Jí Okō_ is known as _m̀miri ája_ because of its association with puddling mud in preparation for house building during the dry season.

Farming operations throughout the year are mainly controlled by the rainfall and resultant seasons. Fig. 5.3 is an attempt to translate the theoretical concepts of mean monthly rainfall and associated seasons into agricultural realities. Since Fig. 5.3 is highly generalised, Fig. 5.4 has been included to show in greater detail the relationships between the phenomena using Akokwa on the Awka-Orlu Uplands as an example. The figures are based on mean annual rainfall supplied by the Meteorological service, Lagos; records of clearing, planting, weeding and harvesting collected on the field supplemented with materials collected from Annual Reports and Crop and Weather Reports of field observers during the Rural Economic Surveys.

It will be noted that over the northern half of the region, December, January and February are relatively dry. This has a tremendous effect on agriculture. Clearing of yam plots starts much earlier in the south than in the north and this affects the whole farming operations. At Joinkrama clearing starts in December, at Umudike further north in February but at Abakaliki and Ogoja, in January. The uneven gradation is certainly explicable in terms of

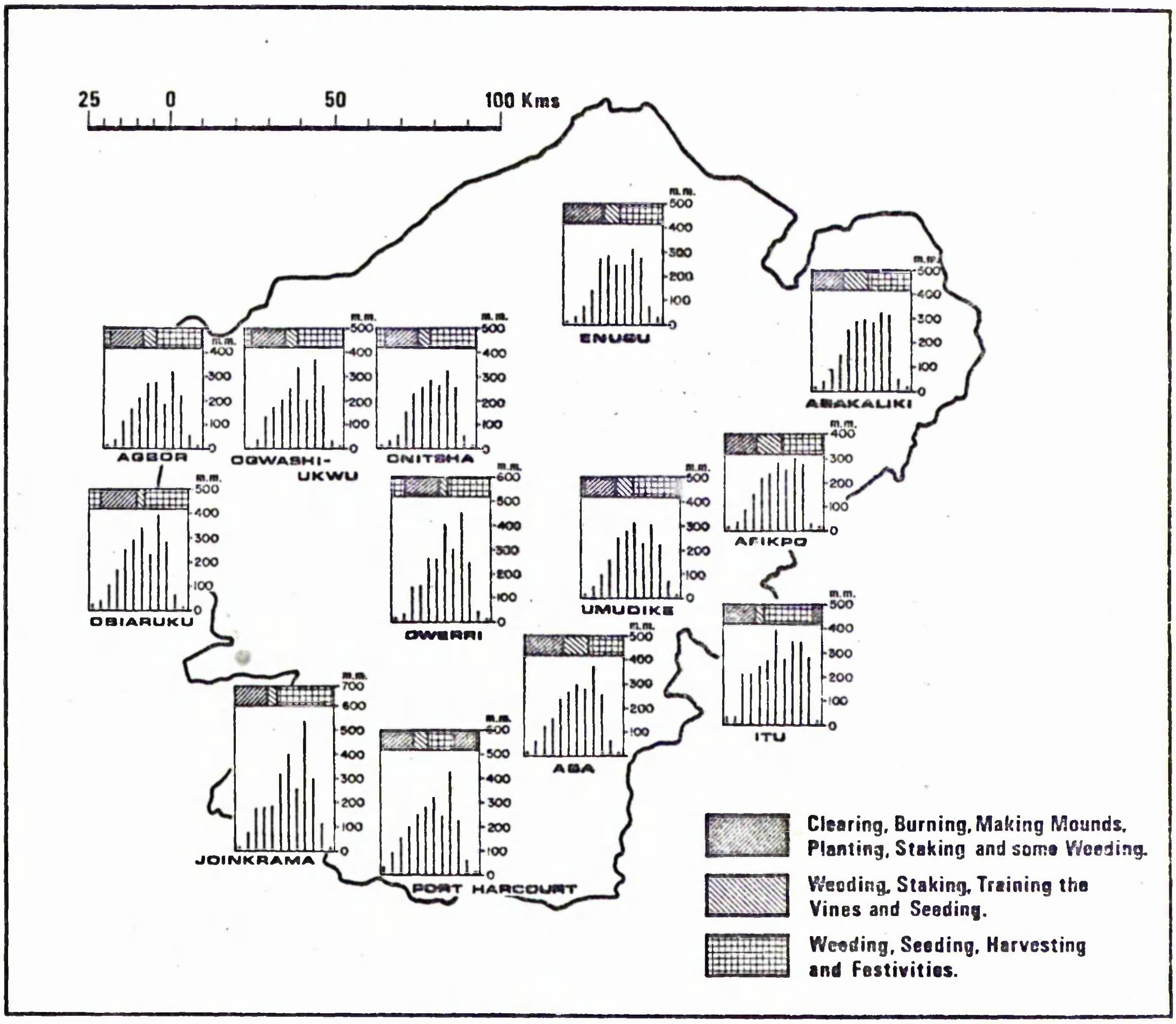
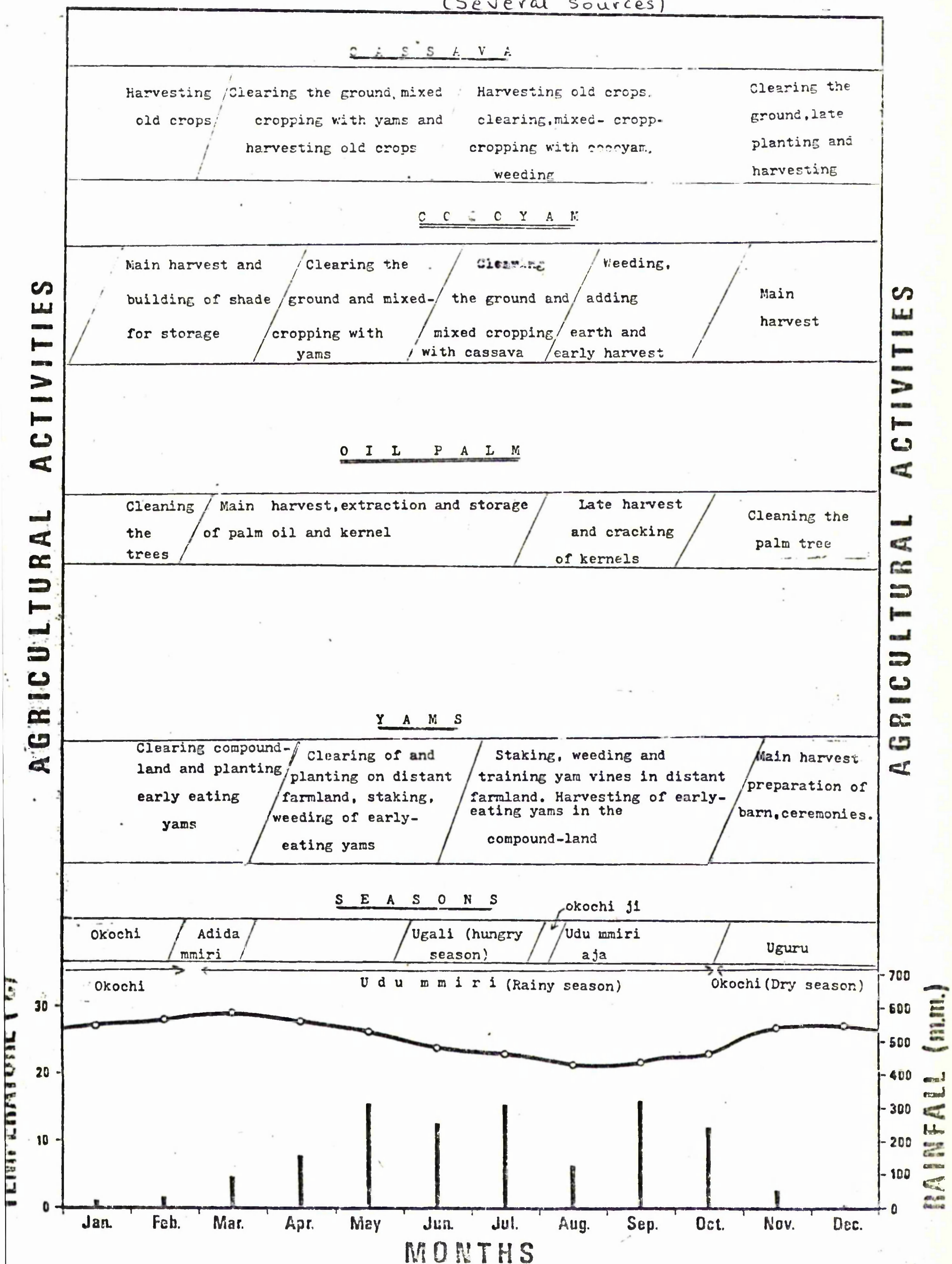


Fig. 5.3: Yam Planting and Harvesting in Relation to Mean Monthly Rainfall (Several Sources)

Fig.5.4:Relationship Between Rainfall Seasons and Agricultural Activities at Akokwa (Several Sources)



soil differences. The farmers on the hydromorphic soils of Abakaliki and parts of Afikpo prefer to work the heavy clay soils on the lowlands before the rains so that they do not get very sticky. Planting on the adjoining upland soils usually follows much later in February and March. As one of the farmers explained, "if you plant on the hills in January, all the yams will decay."

In contrast, planting on the baked sandy soils of Nsukka-Okigwi plateau, Asaba plateau and Awka-Orlu uplands has to be delayed until the rains come in March or April or else the yams will decay. Early yams could be planted on the compound land under very heavy mulching, but since the labour involved in breaking the soil and mulching is considerable few early eating or hunger breaking yams are usually planted before March. The peak period of planting is usually April - May, but the reader should note that Igbo reckon in lunar months. The agricultural year begins in March and all the months or rather 'moons' are named serially. March is the first 'moon' of the year and September, the last.

CONCLUSION

It has been shown in this chapter that the Igbo concepts and notions about land, his premier resource, are deeply rooted in religion and the past. These concepts and notions may sound primitive and unscientific but as Richards has pointed out, they serve the important function of protecting the community and its land from degradation by selfish interests (Richards, 1975, p.105). These concepts and notions still control the mode of administration and exploitation especially in the sparsely populated areas. In the densely settled zones the system of control has altered in response to population pressure and the tendency is for the concepts and notions to persist in modified forms.

The various systems used in classifying the land, crops and seasons have practical utility which tends to override all other considerations. They have ecological and agricultural connections which enable the members of the group to make inferences. In terms of land and soil, they convey some ideas about the productive and use potentials. The taxonomic systems used for crops convey definite information about their origins, taste, yield potentials and use. Above all, the classificatory systems for the seasons are designed to guide the various agricultural operations. They determine when each of the land and soil types should be worked, the best time to plant the various crops, the mixture to be adopted and the timing of the other farm operations such as weeding, training vines, and harvesting.

The Igbo, therefore, have expert knowledge of their land, crops and the climatic environment in which they live and work. The systems of classification for these phenomena are closely interrelated and their knowledge is vital in any sympathetic understanding of the agricultural systems to be examined in the next chapter.

CHAPTER VI

TRADITIONALISM IN IGBO AGRICULTURAL SYSTEMS

INTRODUCTION:

This Chapter will examine the traditional agricultural systems of the Igbo against the background of the physical, historical and perceptual backgrounds already discussed in Chapters III, IV and V. Here agricultural systems of an ethnographic unit may be defined as "the customary pattern of behaviour followed by the individual members of the ethnographic unit in the realm of agricultural technology, which results in typical sets of (1) Land utilization in space (Patterns of field types on their ecological backgrounds; (2) Of land utilization in time (pseudo-rotations); (3) of seasonal distribution of labour; (4) of seasonal distribution of nutrition and other needs." (de Schlippe, 1956, p.238.

Special consideration will be given to the regional variations and changing character of some aspects of the systems such as motives behind farming, associated food plants and production systems, implements used, structural organization especially institutional arrangements for procuring labour, methods and sequence of planting. The roles of the two sexes, animals, indigenous wild and some wild crop plants in the system and the changes taking place will also be examined.

A. GOAL ORIENTATION OF IGBO AGRICULTURE:

Like most other African groups, the ancestors of the present Igbo groups built their culture from the ground up using agriculture geared towards food production as the base. The aim was essentially to produce enough food for ones family with some surplus to entertain friends and convert into titles such as Ózo and Éze jì (Yam King) (cf. Pages 365-368). Agriculture served as a link between the groups and the environment in which they lived and exploited. It also linked them to their great ancestors in the spirit world (Alammo) through a series of rituals performed at the beginning and end of the farming seasons.

Before the advent of the Europeans in the 16th century and the establishment of political authority by the British in the early part of the 20th century, the social and political status of people as well as their prestige was measured in terms of agricultural output and the ability to feed ones family and have some surplus converted into the titles mentioned above. In pursuance of the above goals, the proto-Igbo did not count the cost. In fact there was no real financial calculation. Labour was either not paid for at all or paid for in kind which involved the presentation of yam seeds and heavy pounded yam foo foo and palm wine at the end of the day's work. As late as the 1940's, good entertainment was sufficient to attract labourers to a successful yam farmer.

Present-day Igbo farmers are still traditional in outlook with regard to food production. There is as yet not much break with the past in terms of the main purpose of farming. The results from my interviews with the farmers show that the primary objective of farming is to produce enough food for the immediate family and thereby command respect from friends and neighbours. As one of the interviewers put it, "Àhú nwa ògaranyā nàkwá bùsíbùsí" - "The sons and daughters of a rich man always look well fed." This suggests that one can often infer the status of a man by looking at the physique of those who feed from his wives'kitchens.

As in the past, cost and return analysis has not become the vital issue. Though some elements of commercialization have been injected into the food crop economy following contact with Europe, this has not changed the main motive behind farming. Even so the extent to which commercial elements have entered the economy varies among the various subgroups. Usually it takes the form of growing a little more than is necessary for subsistence. The surplus may be sold to buy clothing, pay school fees or even perform wider social functions like payment of local poll tax and bride price. Alternatively it could be used to take a title. However all these are but secondary to the primary objective - the production of enough food for the family. This is always a major concern but has now been compounded by the drain of the meagre subsistence production into towns to feed the constantly growing non-agricultural populations. The fact that the "urbanites" have the cash to buy the foodstuffs at inflated prices lures the farmers to sell more than the normal surplus of subsistence. In the case of yams, many farmers are known to have sold more than the normal surplus and fallen back on their reserves for seed to avoid starvation.

B. Role of Livestock

Food crop husbandary so dominates the agricultural landscape that animals seldom come into play. Though an average family keeps 10 - 15 birds and 2 - 6 goats, their contribution to the food economy and share of agricultural labour input are comparatively small. High incidence of diseases, especially trypanosomiasis, fowl pox and fowl typhoid, limits large scale production of livestock. The few cattle kept in the northern half of the region belong to muturu or dwarf humpless species, which are resistant to trypanosomiasis and so well adapted to the forest zone. The most important livestock are chickens, goats, sheep and pigs.

Throughout Igboland, chickens are reared free range and very little attempt is made to feed them. Among the Ezaa, all the cattle are grazed in common by herd-boys who depend on yam farmers for their faily food supply. Variations occur in the husbandary practices for the other animals. For example, among the Ika and Arochukwu Igbo, goats are still reared free range but in the heartlands and Nsukka uplands, they are mainly stall fed on palm leaves and grasses to produce farmyard manure.

It should be noted, however, that the traditional Igbo farmer looks upon livestock as a strategic reserve for cash. They are not often eaten except on festive occasions. They are not fully integrated with crop production. Even in the heartland, they are not always used in systematic production of manure to enrich the soil.

C. ELEMENTS AND STRUCTURAL ORGANIZATION OF THE SYSTEM.

Traditionally the task of protecting the family from the dangers arising from hunger and starvation rests with the man and his wife or in the case of polygynous family, on the man and his wives with the man taking the overall responsibility. With family security as the overriding influence, there is no real crop specialization. Each family tries to grow a little of everything needed for subsistence except where the environment imposes its veto on a number of crops. This partly explains why over a wide area in the region people grow almost the same type of foodcrops in spite of low average returns per unit area in some locations. Generally speaking, root crops, grains and suckers provide the bulk of the starch, while vegetables and oil palm supply the greater part of the proteins, fats and vitamins. Over much of the region the oil palm is the traditional cash tree crop. Nevertheless the entire land use system is currently beginning to change in response to the changing environmental, demographic, economic and socio-cultural circumstances of the area as we shall see in the remaining part of this chapter.

(a) Changing Roles of Male and Female Members of the Family.

Traditionally there is some form of sex specialization in crop production. Men usually grow and own yams and it is their duty to provide the family needs of this food crop. They also tend the palm groves and tap wine from either the stems (Òro, Àkpó) or from the flowers (ǹkwuelú, ǹgwo). To this day, women in Anam are not allowed to make mounds and plant yams under threat of heavy fine from their men folk . It is believed that the decline in the yields of the crop in recent years is the result of female participation in the planting process contrary to the tradition of the elders. Throughout Igbo-land it is considered abominable for women to climb and harvest either the oil palm or the Kola tree.

Women grow and own other crops such as cassava, maize and melons, but many a time plant these on the man's yam plots. There is usually an acceptable or permissible density of the woman's crop under the mixture and in any case she is not allowed to choke the man's yams with her crops. Generally speaking the number of the woman's crop per mound varies with the size of the mound. For example, at Akokwa two maize seeds, a cassava cutting, two okro seeds and one or two melon are considered a reasonable intercrop on a yam mound 26 cm in diameter but tradition requires that they must be planted lower down the mound. The only exception is the melon which may be planted on the top of the mound.

In the precolonial era when the yam was the main staple, we would expect its hectarage to be the highest. The introduction of less demanding crops like cocoyam, cassava and maize and their association with women brought about a change not only in the relative importance of the indigenous staples but also those of the two sexes as far as the supply of the family food requirements is concerned. The women now become the breadwinners.

There are however exceptions to this general rule. In Abakaliki where demographic and ecological conditions still favour large scale cultivation of yams as the chief staple and where the women plant and own the water yam variety, the men are still the chief breadwinners. Also in Nsukka and Umunede, men seldom allow their wives to engage in arduous tasks in the farm. They neither weed nor help clear the plots. At Umunede, their role is limited to sowing seeds like okro, maize, melons and when these are ready for harvest, help in the processing. Some however help in the transportation of yam stakes to the farm. Nsukka women do not handle the hoe at all. They tend to leave farm work to the men. Consequently the task of feeding the family has always rested on the men many of whom are alleged to die young as a result.

Abakaliki women are economically more dependent on their men for the daily family rations than their counterparts in the densely populated Igbo heartland. Traditionally they do not own land and since yams have for long been the staple food, they look upon the men for household supply. There is no clear cut division of labour among the sexes. Men and women take part in clearing the yam plots. Since the mounds must be very high and hoes used are very heavy, women, as a rule do not take part in mound making. This partly explains the fact that they do not usually have separate plots for cassava like most women in the Orlu uplands. Their main task during the farming season is to prepare food for the family and assist in positioning the yam seeds on the mounds ready for planting by the men. Usually man's white yams occupy the top of the mounds and the women's few water yams, cassava, maize and some cocoyams are planted lower down. The hectarage under yams always exceeds that of cassava because the women do not bother to plant cassava on all the yam plots.

This contrasts with the position in the densely populated parts of Awka and Orlu uplands. Here the women are the breadwinners. The women's cassava provides the family's staple food. Tradition allows her to plant her own crops on the man's yam plot. She could even clear the land and make mounds for her own yam, cocoyam and cassava. The land tenure system is so flexible that she can easily get separate land on an annual cropping basis from the husband, his brothers or even the husband's relatives and friends. In cases of extreme shortage of land in the matrimonial family, she could appeal to her parental brothers for help. The soils of the uplands are freely draining and loose allowing her to make mounds with small hoes. Alternatively she could hire labour to work on her plots with the sales from palm oil, palm kernels and cassava.

Among the matrilinial Ohafia, and Abam, the women have always been the breadwinners. In the latter part of the 19th century when inter-group warfare was very common the men were mainly mercenaries and were mostly abroad head-hunting. Today they are mainly trading leaving farmwork in the hands of women. In fact, it is often said that the most hard-working Igbo woman lives in Ohafia and that the men have been very unkind to have allowed their women to toil so much in the farm (Nsugbe, 1974, p.21).

The point must be made that it is not easy to generalise on the roles played by both sexes in the realm of agriculture due to variations in traditional attitudes to women, variations in the agricultural environment and dynamic nature of the relationship between the two sexes. The role of women varies from that of almost idle Nsukka housewife who neither makes mounds nor takes real active part in the clearing and weeding processes, to that of the energetic Ohafia, Awka, Orlu and Owerri women who not only do most of the weeding but also help the men in the making of mounds. In Abakaliki, Ishielu, Ezikwo areas, the sheer size of the mounds constructed, and the hoes often used, makes it almost impossible for the women to participate in mound construction. In contrast the women from Anam who live on the loose alluvial soils of the Niger are barred from mound making by traditional beliefs, mores and sanctions.

Prior to the introduction of cassava and cocoyam into the region, yams were the traditional staple and entire families depended mainly on the men for their daily supply. The arrival of the alien crops and their consequent adoption as major staples as well as women's crops in the overcrowded heartland placed the burden of feeding the families on the women with the men now playing subsidiary roles. In the outlying areas of Abakaliki, Ika and Aboh divisions where the yam is still regarded as a major staple, the task of feeding the families still rests on the men with the women playing subsidiary roles.

(b) Changing Concepts of and Sources of Labour:

Food production among traditional Igbo societies is tied up with other aspects of the people's culture. The production system relates to the other systems like kingship, political and religious systems. We have seen how the land tenure systems are deliberately made flexible enough to allow the use of the land on an annual basis to produce abundant annual food crops. Similar institutional frameworks in the past allowed easy access to labour. Some 40 - 50 years ago, farm labour was not a problem to food production. The disruption of the system in recent years as a result of the introduction of western education, the migration of ablebodied men and women to town and alien concept of wage labour, has dealt a major blow to the indigenous food crop production system.

Some 40 years ago, the following five broad sources of farm labour were available to enterprising farmers:

(i) Immediate and extended family (Nwanna and Ogo).
(ii) Ákwụọ álaa (pay and go).
(iii) Árụò álaa (work and go).
(iv) Ínwuò Ọ́rụ̀, Ùghala Ọ́rù or Ùghuò Ọ́rù (Labour exchange).

(v) Ìkuko (Cultivation contest).

We may now examine each source in some detail in order to demonstrate how the whole system worked.

(i) Immediate and Extended Family Labour:

In the Igbo agricultural system, all hands were needed to save the family and group from starvation. Men, women, children, unmarried and divorced sisters were looked upon as sources of free labour. The sources were not therefore limited to ones immediate family but extended even beyond the immediate family circle to include the most distant relatives who are to this day referred to as 'brothers' or 'sisters' (Mwánnè). Sons and daughters-in-law added to the variety of sources and in the choice of potential wives or husbands for sons and daughters, ability to do manual work was one of the major considerations by parents from both sides.

As among the Ikale farmers of south western Nigeria (Richards, 1977, p.122), children, the most important outcome of marriage, accompanied their parents to the farms at an early age and were taught certain agricultural skills and the dignity of labour. They learnt the correct use of the basic farm implements including the climbing rope (etc.) the various hoes (ógù) and matchets (mmà). They also learnt the correct postures for the different farm operations and management techniques for the different crops.

Abakaliki, one of the most backward part of Igboland,[1] provides a typical example of how the system

1. Backward by Western standards.

functioned in the past. Prior to 1963, when the County Council passed a law making it obligatory for parents to send at least half of the children of school age to school, most of them accompanied their parents to the farm each day. The fact that after 1963 most parents did not exceed this 50% quota shows the importance they attach to traditional education based on farming. The boys were given some mounds on which to plant their own yams. Some were apprenticed to successful farmers. While learning the art, they maintained separate plots.

Harvests from the boys' plots were tied separately in the man's barn and only the spoilt and bruised yams from boys' plots were consumed. Usually all the good yams were replanted the following year. In this way the stock continued to grow so that at the end of the five year apprenticeship the boys would have many yams to take home in addition to those presented to them by their masters. In short the Abakaliki farmer paid and still pays much attention to the training of young and future food producers. As one of them put it, "we train them to farm just as you train school children to read and write." Here lies the basis for their opposition to western type of education and apparent backwardness. The average Abakaliki farmer sees western oriented education as a threat to the survival of their age old agricultural system. Teachers are known to have been attacked with matchets and killed during the campaign for more school children.

To decrease the dependence on outside sources of labour, most Igbo men married more than one wife and produced as many children as possible. Sons-in-law were expected to work for their parents-in-law free of charge once in a while either alone or in the company of friends arranged by them. Failure to help in this way could strain the relationship between the two families.

(ii) Ákwuò álaa (Pay and Go):

As the name suggests a man in financial difficulties approached a wealthy farmer for a loan and promised to work in his farm free of charge once, twice or three times in an Igbo week of four days until the debt was paid. The amount varied with the lenders share of the weekly labour. In the 1940's a loan of £10 could result in the sale of a day's labour per Igbo week per agricultural year (March - October). Work usually began during the first 'moon' of the year (March) and ended immediately after the last weeding of yam plots in October. In effect the man's labour was equated with just the interest on the loan and many are known to have worked for over ten years before the debts were paid.

(iii) Áruō Álaa (Work and Go):

In Áruo āla the labourer sells one or two days of his weekly labour for a stipulated amount payable in bulk cash or in kind in the form of "yam sticks" - he is free to go after working for one agricultural year hence the term "work and go." In this particular case, his labour was equated with the total sum borrowed (cash and or kind) together with an annual interest on it. In the 1940's £2 - £3.20 was considered adequate for one day a week labour under this system which proved very popular among debtors. In fact only in extreme circumstances such as the need for money to pay bride price did people go in for "Akwuo alaa."

(iv) Ūghuò Órù, Ínwò Órù or Ughala Órù:

Ūghuò Órù refers to a system in which a group of farmers of similar sex enter into moral agreement to exchange their labour in rotation. It is often organised during the peak of the farming season. The group works on members plots in turn until the first round is completed. After this they decide whether or not to admit new members or drop less energetic and inefficient old ones before starting on a second round.

Úghuò órù, according to my informants, has a number of advantages. First the system enables the farmer to complete within a short period work which, working alone could have taken him several days. In mound making, the group works in competition and do more work per day than all of them working individually on their separate plots. This is achieved in the attempt to ensure that they each retain their columns of mounds or Ìgba jí. To lose ones mound column to an age mate is considered very humiliating and energetic young men who gain such columns always become superstars in the society.

A brief discussion of how the system operates will help throw more light on the concept of Úghuō órù and associated phenomena particularly 'losing ones mound column' (Ìnara mmádù Ígba jì). Exchange labour is mainly used on large plots and the group works in perfect competition. On arrival at the burned field, the group divides it into small rectangular plots by means of ridges which will ensure that water does not flow indiscriminately across the farm. Once this is completed, the competition starts:

Fig. 6.2.[(i) - (viii)] illustrate the sequence of events in a competition involving A, B and C, and in which A feels quite confident of winning and may be regarded as the chief contender for the days event thus:

(i) Shows the burned field after clearing unburnt vegetable matter.

(ii) The field is divided into rectangular or squarish sub-plots of about 50 square metres by means of ridges. The division serves two purposes - checking erosion and giving the competitors the impression that they have not got a very long way to go. Once they enter a sub-plot the tendency is to work straight to the end or the next ridge before looking up.

(iii) A, the contender opens the competition by taking the first column. From now on he sets the pace for the competition followed by B and C in that order of decreasing energy for work.

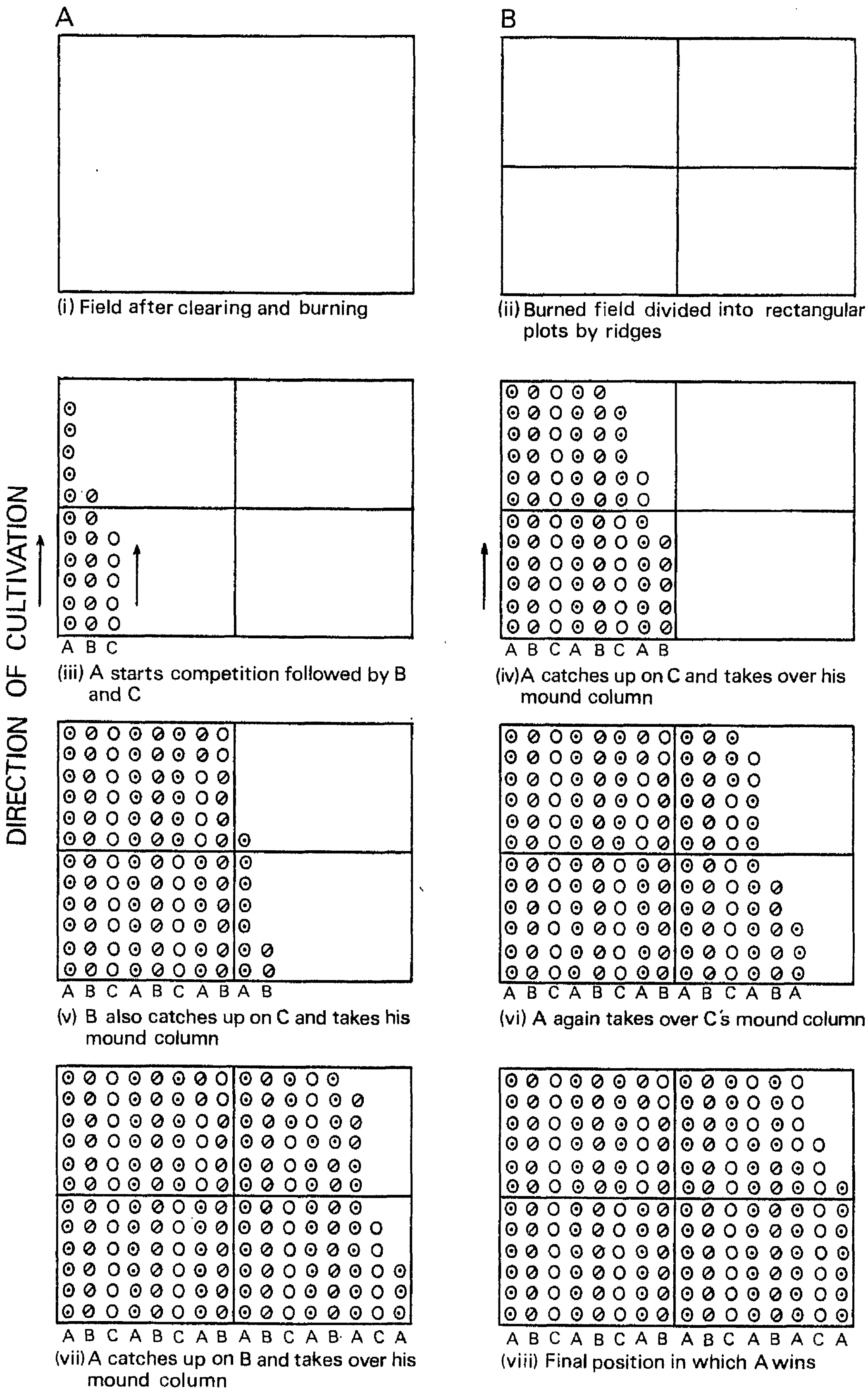


Fig. 6.1: Stages in Ughuo Oru Mound Making Competition

Source: Fieldwork

(iv) A, got to the last ridge twice and walked back to the base line to start a third column. Halfway in this third round he catches up on C, and takes over his mound column. C, moves back into A's position and would be much disturbed by the loss of his mound column. B, now follows C, very closely.

(v) B, also catches up on C, and takes over his mound column in his third round.

(vi) A, again takes over C's mound column and is now in hot pursuit of B.

(vii) Eventually A, catches up on B, and takes his column.

(viii) Closing round or final position in which A, is the overall winner, followed by B, and C, in that order.

It is important to note that at the end of the competition A, made 84 mounds, B, 60 and C, only 48. C, therefore risks the chance of being dropped out in the next round of exchange labour depending of course on how often he loses his 'mound column' in the competitions. On the other hand A, would be in great demand as an exchange partner by other groups. With ten or more people engaged in this type of competition giving at least 10 columns of mounds per round, even the most extensive family field would be covered in a day. Besides it is always a great day watching this type of traditional agricultural sport.

(v) <u>ÌKUKO</u>:

Before the exposure of the Igbo to monetised economy, it was considered bad taste to ask for money in return for a day's labour in the farm. It was customary for the housewife to give food to children calling at the house to "collect fire" if such children met the family eating. Adults could join even without previous invitation. Under such conditions the Igbo were ashamed to ask for money in return for a day's labour. The argument was that since food was not only for the family but for anybody present when it is ready for consumption, one had no moral right to demand money for labour involved in its production. Most successful yam farmers therefore were using free labour organized by the elders to boost food production for the group. All the farmer needed was to meet the elders in the village, present to them palm wine, kola and a "head" or two of tobacco and request for such labour.

On the receipt of the verbal application the elders fixed a day when all the able bodied men in the village would work in competition on the man's yam plot. In effect Ìkuko is another ingenious way of introducing an element of sport into agriculture and utilizing it to boost food production for the group. All able bodied men from within and outside the village were welcome to take part in the competition which in Abakaliki was usually staged between three and seven o'clock in the morning. It was explained that the purpose of staging it before dawn was to avoid the debilitating effect of mid-day high temperatures characteristic of this zone especially between February and April.

Women did the cooking. Old men acted as judges, prompters and ensured that the mounds were of the right size.

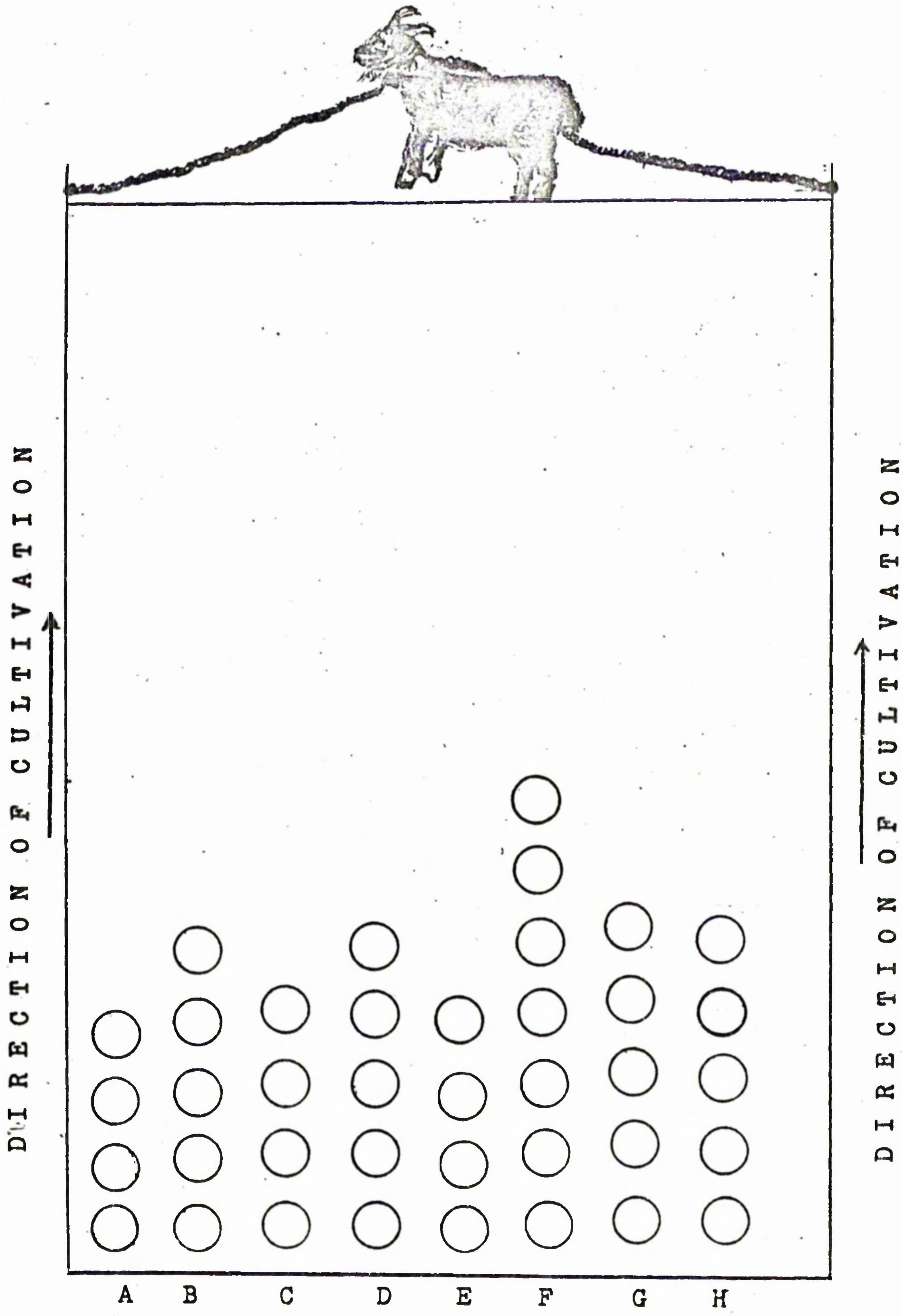


Fig. 6.2:Ikuko Cultivation Contest in Abakaliki
(Diagramatic illustration. Note that F stands
a good chance of winning the contest). Source: Fieldwork

Any small mounds were quickly levelled to the ground and the competitor was expected to start all over again. At about three o'clock in the morning of the appointed day, the beating of a drum summoned all the competitors to the site. The field was lit by burning rubbish in the absence of moonlight. The competitors lined up along one end of the burned field and at the signal from the elders started building the mounds as shown in Fig. 6.3. Ìkuko is in effect a straight race. The first to get to the end, grabbed the rope holding the goat and was declared the winner. He was entitled to the head of the goat whenever it was slaughtered but his host or any other admirer could also give him a daughter to marry free of bride price. When one realises that mounds on the hydromorphic soils of Abakaliki can be as high as 1.5 metres with a base diameter of about 3.8 m, and a competitor could make 30-40 such mounds to win the contest, one can then appreciate the seriousness of the sports involved in Ìkuko. Many young men are known to have broken down for days after the competition.

(vi) Changing Concepts and Sources of Labour and Effects on Agriculture.

It is however sad to note that many of these sources of free labour are no longer available to the farmers on whom the nation depends for the supply of the basic staple food crops. It is becoming extremely difficult if not impossible for some members of the immediate and extended family groups to give their labour free of charge. Elders have lost control of the young men who provided the labour during Ìkuko. Brothers-in-law seldom work for their parents-in-law. In fact many parents do not count on them any more. They tend to prefer the young men living in towns and who will from time to time help financially to energetic farmers who stay at home.

Table 6.1 shows the % number of farmers using particular sources of labour:

TABLE 6.1. % Number of Farmers Using Particular Sources of Labour.

Source of Labour	Izii	Okehi	Akokwa	Ihe	Umunede
Ákwụọ álaa	-	-	-	-	-
Árụo álaa	-	-	4	-	-
Úghò Óṛu	14	9	8	6	11
Îkụkò	-	-	-	-	-
Óṛu ègó	15	32	7	11	24
Wives	59	75	86	79	82
Children	38	55	61	68	54
Son/brother-in-law	17	2	5	8	4
Other relatives	42	21	3	8	16

Source: Fieldwork

It is interesting to note that none of the farmers interviewed made use of Ákwụọ álaa and Ìkụko. Only one farmer employed labour on Árụo álaa basis at ₦30 or approximately £15 for the agricultural year but the labourer was an old man of about fifty five who according to my informant was being helped rather than helping. The percentage of farmers using 'Ughuo oru' varies from 6% at Ihe to 14% at Izii and mainly for mound making, harvesting of yams and preparation of yam barn.

The farmers in Okehi, Umunede and Izii with abundant farm land tend to employ more paid labour than their counterparts at Akokwa and Ihe. Most of the farmers interviewed at Akokwa complained that the cost of labour in terms of food and drinks used in entertaining the labourers was prohibitive and this more than actual cash payment tended to militate against frequent use of paid labour. Besides, farms in this area are so small (cf. Fig. 5.1) that the farmers can often make do with the family labour force. Asked whether he used paid labour in the farm, one of the farmers replied "What is the use paying a man N 2 to work for me and spending almost the whole day preparing what he will eat and drink. It pays me to use the time to do the work myself."

A common source of labour is the immediate family especially the housewife. Table 6.2 shows that many of the farmers are married. There are however differences between the villages in terms of marital status and number of wives per farmer. Izii, with the highest number of young farmers returns the highest percentage of bachelors (21%). About 41% of the farmers at Umunede and 44% of those at Okehi are married to more than one wife. The maximum number of wives observed among the interviewees is three. Nine out of the 27 farmers interviewed at Ihe had three wives each.

TABLE 6.2: % of Farmers in Different Marriage Groups (1976/77)

Village	Bachelors	Married with one wife	Married with two wives	Married with three wives
Akokwa	5	67	23	5
Ihe	9	59	23	9
Izii	21	55	18	6
Ikehi	4	52	41	3
Umunede	9	50	41	-

Source; field work

TABLE 6.3; Size of Families, 1976/77

Size Group	Okehi	Umunede	Ihe-Obukpa	Akokwa	Izzi
Less than 2	3	2	4	1	11
2 - 4	8	7	12	8	8
5 - 7	12	7	5	10	4
8 - 10	3	5	1	5	4
11 - 13	1	1	0	4	2
Greater than 13	0	0	0	1	0
Average size of family	6	6	8	7	5

Source; field work

The distribution of family potential labour force according to size groups is shown in Table 6.3. The average number of people making up the household once again varies considerably. Families tend to be larger in the densely populated villages of Akokwa and Ihe with averages of 7 and 8 respectively. Table 6.4 shows that family composition also varies and in some cases includes mother-in-law.

TABLE 6.4; Possible Composition of Family and Sources of Labour Force.

Possible Family Composition	Akokwa	Ihe	Izii	Okehi	Umunede
Man	+	+	+	+	+
Wife/wives	+	+	+	+	+
Children	+	+	+	+	+
Brother	+	+	+	+	+
Sister	+	+	+	+	+
Daughter-in-law	+	+	+		+
Mother	+	+	+	+	+
Mother-in-law		+			
Uncle's wife	+				
Uncle's son	+	+	+		+
Brother-in-law	+	+		+	
Uncle		+	+		
Maid					+
Friend's son	+	+	+	+	
Friend's daughter			+		

Source: Field work

All the members of the families were not in during the surveys. Some of the children were away either in secondary schools or in towns as hawkers, truck pushers, petty traders and apprentices and were not included in the table since their contribution to the family labour force is negligible. Children living in the villages were usually helping their parents and elder brothers in farm work but because many of them now attend primary schools during the morning hours and tend to play in the evenings, their contribution is small.

There are however differences between the densely populated uplands and the lowlands of Abakaliki in terms of the regularity of school attendance and therefore their contribution to the family labour force. Parents in Abakaliki still regard their children whether at school or not as important sources of labour. In fact until the introduction of free Primary education in 1976 only 20% of children of school age were actually sent to school (Nwokocha, 1974, p.27; Onyejemeni, 1977, p.5). Now the tendency is to withdraw them for a month or two during the peak of the farming season.

Generally speaking, school children in Izii are more helpful in farm work than their counterparts at Akokwa. This is not however reflected in Table 6.1 which shows that only 38% of the farmers were using child labour in the farm. The fact remains that most of the farmers in Izii are still young men often without wives and children (Table 6.5). Their mothers , younger brothers and sisters often help them, hence the high proportion of "other relatives".

TABLE 6.5: Age Group of Farmers in Five Villages, 1976/77

Age Group	Okehi		Umunede		Umueze		Ihe		Izii		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
35	6	22	7	32	6	27	3	11	7	24	29	23
35-44	7	26	4	18	4	18	12	42	9	31	36	28
45-54	6	22	3	14	5	23	7	25	9	31	30	23
55-64	7	26	4	18	6	27	3	11	2	7	22	17
64	1	4	4	18	1	5	3	11	2	7	11	9
Total	27	100	22	100	22	100	28	100	29	100	128	100

Source: Field work

At Akokwa such young men often end up in towns, leaving farm work to old men and women. Even older children who are no longer at school and who cannot get employment or trading apprenticeship in the towns, remain at home either doing petty trading, sewing or truck pushing in the urban village. Their contribution to food production is negligible yet the farmer and his wife owe it as a duty to feed them.

To conclude this section, one may state on the basis of information gathered from the farmers that traditional Igbo system of agriculture had certain built-in institutionalised means of securing free and abundant supply of labour to boost food production. The introduction of the western type of education which meant that children go to schools in the mornings and play in the evening has deprived the system of an important source of labour and at the same time increased the number of non-productive mouths to be fed. Those who pass out grow up to despise farmwork and cannot even perform some of the simple farm operations.

The establishment of 20th century urban aggregations and the movement of able-bodied young men and women who provided the cream of the labour force into these centres leave behind old men and women who are often too weak and spent to cope with certain operations in the farms.

The radical change in the value systems of the group has had an adverse effect on agriculture generally. People's wealth, prestige and political authority are now judged not so much in terms of the size of their barns as in the past but in terms of raw cash and demonstration of affluence. The recent oil boom has had the effect of directing people's attention to acquisition of wealth in the form of cash. Parents no longer want young able-bodied men who can help in farm work as suitors for their daughters. This virtue is now taken over by ability to donate cash. Finally the introduction of the concept of wage labour in farming especially within the past 40 - 50 years has made it difficult for farmers to get free labour. The overall effect has been decline in the amount of food produced in the region.

(c) FALLOW SYSTEMS

In Chapter IV it was indicated that farming in Igbo heartland has undergone a change from shifting cultivation through forest fallow, bush and grass fallows to almost continuous cultivation. The process of change appears to have been accelerated by three main sets of events:

(i) Drift of population southwards into the territory in the remote past to swell the existing population (Helleiner, 1966, p.3).

(ii) Natural rapid increase in population consequent upon fall in mortality rates due to improved medical services.

(iii) The commercialization of the oil palm and rubber and increase in the area occupied by these crops.

The first two factors led to demand for more food and more frequent cropping. The last factor helped to modify the ecological environment and reduce the area available for the growth of a number of crops and consequent intensification of productive efforts elsewhere.

As far back as 1933 Faulkner and Mackie (Faulkner and Mackie, 1933, p.44) drew our attention to the deteriorating ecological conditions in Onitsha and Owerri provinces with densities between 156 and 195 per square kilometre. They pointed out that the system of shifting cultivation had already broken down and that crop yields were very poor. They further observed that the farmers in the areas were still using shifting cultivation because they knew no better alternatives. It is however, inconceivable that very poor yields and shifting cultivation as we understand the term today could co-exist in same environment. There is certainly some element of confusion in terminology. Faulkner and Mackie have used shifting cultivation to describe a system more approximately referred to as either forest, bush or grass fallowing. The important point here is that shifting cultivation changed into more frequent cultivation.

Grove observed that the population density of 117 per square kilometre attained in some areas in the fourties might well have been the maximum the land could comfortably support under the system since the communities in these areas were already suffering from acute land shortage and resultant degradation of the soils (Grove, 1951, p.21)

It is clear therefore that Igboland passed the stage of shifting cultivation several decades ago. Various categories of fallow depending on population density and distance of the land from village settlements predominate in many parts of the region. In Okehi, Abakaliki and Umunede with favourable man-land ratios, the length of fallow often exceeds three years. Occasionally farmers clear degraded forests fallow which has rested for more than seven years. They explained that their choice of land for cropping is still guided by the character of the vegetation cover. In Abakaliki a combination of drainage condition of the soil and vegetal cover often suggests whether emphasis should be on yams, rice or both crops.

On the more crowded uplands of Nsukka and Akokwa, the type of fallow varies between the compound land and more distant farmlands. Dense growth of oil palm, kola trees and Irvingia spp. on the compound land give rise to grass vegetation and grass fallowing in which grasses and a few shrubs are cleared. Nearer the homestead, there is in fact no fallow and the system approaches continuous cultivation.

New crops go into the soil as soon as the old ones are harvested and the fertility is maintained by heavy application of farm yard manure.

The use of the character of the ground vegetation in the choice of agricultural land in these areas has diminished. It is no longer a matter of choosing the land to suit the crop as much as choosing the crop to suit the land using the vegetal cover as an index. For example the farmers in Ihe with a dense cover of cash tree crops which are traditionally not lopped during planting, explained that they grow mainly cocoyam and water yam because they are very tolerant of shade. Even cassava cannot compete with cocoyam in such an environment.

(d) Agricultural implements or tools.

The farm implements have not changed very much. They are essentially traditional tools with minor modifications. In an economy in which the family group produces much of what it consumes, every household has a complete set of farm implements and members of the family are trained in their correct use as prescribed by the culture of the people. Often there is a rigid order and posture in the use of such implements. Inability on the part of any individual to use the tools correctly is considered unfortunate and deplorable.

Table 6.2 lists the main farm implements used by the Igbo in the representative villages. It is necessary to point out that there is no sharp distinction between farming tools and normal tools used by the household for other purposes. As an example, the knife may be used for cutting yams before planting, for the preparation of climbing ropes and ropes for training yam vines as well as normal household use. It is also necessary to observe that the basic farm implements - cutlas, knives, digging stick, baskets, and hoes run through the list in all the villages. Some however are more frequently used than others.

With few exceptions, the type and make of tools are related to the ecological environments of the villages particularly the soils. Thus the Àgbala planting stick and large bladed hoes (ọ̀gu úku) are peculiar to Abakaliki and Afikpo where the heavy hydromorphic soils require the construction of high hemispherical mounds. In planting on such mounds the "Ogu uku" peoples invented the Agbala a sword-shaped implement which helps the farmer to plant his yams with minimum waste of time and energy. Basically it uses the lever principle. First the farmer drives the Àgbala into the mound with both hands at an angle with the vertical. Next he applies a vertical force at the free end of the stick with the right hand. This operation immediately raises the earth on the upper side of the stick thus creating a space below. With the left hand, he picks up a "yam seed" already left on the mound and slips it in between the stick and the earth beneath. On withdrawing the stick, the earth falls back into position and the seed yam is buried at the required depth. The whole operation takes a few seconds.

In contrast the farmers on the very loose sandy soils of Umunede in Ika Igbo use small bladed hoes and wooden digging stick. Here the yams are planted either on small mounds or sometimes without mounding at all. Digging sticks, and medium bladed hoes feature on the more gravelly and stonny soils of Nsukka - Okigwi plateau and escarpment zone.

The farmers in the older settlements in and around Akokwa, located in the Igbo heartland where many of the tools evolved, use a much wider variety of traditional tools and provided useful information on the possible evolution of some of the tools. Three types of digging stick have been identified in the villages (Table 6.6). Of these, the most commonly used are the all-wood variety. It is very popular among the older farmers who argued that it does not bruise the yams as much as the other two. An old man who has never owned an iron digging stick explained that the all-wood digging stick is the oldest and traditional digging stick of the ancestors. The other varieties are transformation of the prototype all-wood digging stick. He suggested that digging sticks with iron tips came into being when as a result of declining productivity of the sandy soils, the farmers moved down into Achara and Umualaoma (formerly Isuokpu) where they encountered gravelly and stony soils as well as heavy clay which when hard damaged wooden sticks. The digging stick with iron tip was the answer to this particular technological problem. One can therefore imagine a gradual transition from this simple wooden form through the wooden form with iron tip to the

TABLE 6.6: Farming Implements in Use in Sample Villages
(Source: Fieldwork)

Farm Implements	Villages A	B	C	D	E	F
Cutlas (m̀mā)	*	*	*	*	*	*
Large bladed hoe (òguúku)				*		
Medium bladed hoe (ọ̀gụ)	*	*	*		*	
Small bladed hoe (ọ̀gụ ǹtā) (weeding hoe)	*			*		*
Climbing rope (ètē)	*	*		*	*	*
Single handled (ǹkọ) or ikeagwù		*				
Double handled (ǹkọ) or (ikeagwù)		*				
Wooden digging stick (m̀bazu)	*	*	*	*	*	*
Wooden digging stick (with iron tip) (m̀bazu ígwè)	*	*		*	*	
Wooden digging stick with triangular iron blade (ùbē, ntutu)		*				
Axe (ónyikè)	*	*	*	*	*	*
Planting stick (àgbala)				*		
Staking stick (m̀múmà)	*	*	*		*	*
Baskets (àbo) or (ǹkāta)	*	*	*	*	*	*
Knives (m̀mā jì)	*	*	*	*	*	*

A = Okeki
B = Akokwa
C = Umueze Anam
D = Izii
E = Ihe
F = Umunede

more sophisticated and heavy all-iron type.

The use of Ubè for opening the ground before making yam moulds with the hoe is fast dying out on the upland. This digging stick with triangular shaped iron tip is certainly an improvement on the ordinary digging stick and according to my informants may have been a major planting stick before the invention of the crooked hoe. Today it is used by a few old men to dig holes in the soil before making mounds. It was explained the aim behind such an operation is to "soften" the grounds for the young yam tubers that will develop in them.

Another important difference between farmers in the core areas and the periphery of Igboland is shown in the implements used for weeding yam plots. Whereas farmers in Etche Ohafia, Ikwerre and much of Owerri districts weed their plots with small bladed hoes, their counterparts in the older settlements on the Awke Orlu uplands use a peculiar type of tool called Nko or Ikeagwù (never tired). Of the two varieties - double and single-headed, the latter is more popular. The name ikeagwù suggests the ease with which weeding can be accomplished with the tool.

Throughout Igboland, the most important and versatile implement is the short handle hoe which can be used for a variety of operations including clearing of 'nkpokiri or grass vegetation, making mounds, adding soil to cocoyam (iyi edè) and harvesting a number of roots like cassava and cocoyam. The axe is fast becoming more of a household tool for breaking fire wood and less of farm implement because there are few non-economic trees requiring ringing and felling with the axe. Most have long since disappeared from this ecological zone leaving smaller trees which can conveniently be cleared with the matchet.

An important point to note is that the farming implements in use in the region have not changed much in recent years. They are still simple tools admirably adapted to local conditions. The rapid increase in population has not given rise to any appreciable changes in the implements used by the farmers on whom the population depends for their livelihood yet one wonders whether the use of tractors and other power driven machinery currently being advocated will ever be a suitable substitute for these tested traditional tools. Use of tractors will necessitate the removal of stumps and deep-rooted perennial plant species which help to restore ecological balance by bringing up leached plant food to the surface. Besides some of the farms are too small and fragmented to make tractorization economic without consolidation of holdings.

(e). TECHNIQUES OF CLEARING THE LAND:

The techniques of clearing the land and the implements used vary from one location to the other depending on the prevailing ecological conditions. In Okehi, Abakaliki, Umueze, Anam and Umunede with much longer fallow length and so denser vegetal growth, the cutlass is the main implement for clearing. Fire as a tool in agriculture also becomes important. In Akokwa and The hoes are used on the compound gardens and cutlasses on the outer farmland. The treatment of economic trees differs among the various Igbo groups. While the Ngwa lops the oil palm almost to the last frond to let in sunlight for his food crops, those on the Awka-Orlu uplands and Nsukka plateau allow much foliage on economic trees and instead plant crops adapted to growing under shades as explained earlier (P.169). Throughout Igboland the Kola tree is seldom lopped due to its religious connections. Branches reaching the ground are often raised and then supported with bamboo sticks. There is therefore a strong association between Kola tree groves and the planting of cocoyam.

The time of planting has been touched upon in the section dealing with agricultural calendar (P.195). It may be necessary to recall here that five main factors appear to be important to the farmers in this regard. They explain variations in the time and sequence of planting in terms of:

(i) Seasonality of rainfall.

(ii) Seasonality of flood (Anambra).

(iii) Variations in drainage condition of the soil.

(iv) The need to provide family with crops early in the year.

(v) The growth characteristics of the crops themselves.

(f) <u>Methods of planting</u>.

Considerable variation occurs in the method of preparing the ground for planting. The staple food crops are planted on the flat and on mounds, ridges, furrows and beds of varying sizes and shapes depending on the crops.

Yams and cassava the staple over much of the territory are planted on the flat, on ridges and mounds. The actual method used depends on the drainage condition of the soil which in the main controls the size of the mound. Planting on the flat is very common in Egbema and Agbor or Ika divisions. After clearing the plot and burning the rubbish, the farmer opens the ground with a small bladed hoe, throws in the yam seed and covers it up again. The reason for the localization of this method of planting is partly environmental and partly historical. In an area where the soil is composed of loose sands, and where the mean annual rainfall exceeds 2,000 mm, mounds are easily levelled up by the rains and the yams will be exposed on the surface. But how then does one explain the fact that the Izombe people living in a similar environment make no mounds while the Egbema does? Why is it that west of Okpanam on the Asaba Agbor road, planting on mounds suddenly gives way to planting on the flat?

The people themselves could not offer any explanation beyond "it is our custom," "our soil does not require mounds," and "we still get good yields." Surely the reason cannot be purely environmental. A possible explanation lies in the sub-cultural background of the two Igbo groups. Izombe people are pure Igbo in origin and probably occupied their present positions from the Igbo nucleus further east (Jones, 1963, p.30-32). Like the Igbo elsewhere east of the Niger, they make mounds. The founders of the present Egbema communities emigrated to their present sites from Benin where yams are planted on the flat. They adopted the language of their hosts but not their cropping system. Similarly the system of planting on the flat in western extremities of Igboland can be explained in terms of cultural contact with Benin (See Chapter IV, p. 142).

Most farmers east of the Niger plant on mounds, whose sizes vary with relief, drainage conditions of the soil, the size and type of planting material. In Etche and Mbaise the mounds are scarcely 13-30 cm high with a diameter ranging from 30 - 70 cm. On the Awka-Orlu uplands the corresponding figures are 22-43 cm and 45-80 cm but huge early eating yams grown in earth pits (ogwugwuru) have higher and fatter mounds. Rainwater from the courtyard often drains into the earth pit and high mounds are required to keep the growing yam above the flood level. The highest mounds occur on the poorly draining hydromorphic soils of Abakaliki and Afikpo. The heights vary according to the slope and drainage conditions. In one farm it was found that the heights ranged from 60 cm on the hill tops through 120 cm on the intermediate slopes to nearly 180 cm in the valley bottoms.

The construction of the high mounds require the large bladed hoes already described and is essentially the work of the men. On the average a labourer builds sixty such mounds a day. The Ezza who specialise in mound-making have exported their technology to other parts of Igboland where similar environmental conditions call for high mounds. Many of them can now be found as far west as Nike working as labourers. (Udo, 1971, p.123).

Generally speaking cocoyam mounds tend to be flatter at the top than those of yams. The farmers explain that the crop requires more water than yams and flat topped mounds hold water more than conical ones.

(g) Elements of Intercropping and Crop Mixtures.

One of the most outstanding features of Igbo agriculture is the tendency to mixed cropping. Very seldom do farmers clear a plot just to grow one crop. Usually he grows on each plot a little of everything needed for subsistence. The crops mixed may be tubers, grains or legumes. While clearing the plot useful perennials such as the oil palm, African breadfruit, African pear, oil bean trees, bananas, black pepper, coconuts and Kola trees are spared, thus introducing yet another element in the farming system - intercropping.

It is not uncommon to find in a patchwork of irregularly shaped fields upwards of seven different crops at various stages of maturity. In one such field at Amumara, the author counted four different perennials and seven annuals - oil palm, African pear, Kola trees, bananas, yams, cocoyams, cassava, maize, melons, fluted pumpkins and beans. The time of planting the crops, their actual arrangement in the fields and densities per unit area vary considerably.

Mixed and intercropping systems merit special study since they also influence the rate at which new lands are cleared, the techniques of cultivation in use, the distribution of farm labour in any field during the agricultural year and the nutritional habits of the people. Moreover, interviews with the farmers revealed that the choice of crops mixed is not fortuitous but based on sound environmental knowledge and knowledge of the growth habits of the component crops in the mixture. In areas of high relief one often observes catenary arrangement of mixtures. The density of plant species ensures adequate cover of the soil, makes maximum use of the land area and at the same time prevents too much overlapping of the foliage. Crop plants requiring much sunlight for healthy development seldom feature in intercrops involving those with thick canopies or foliage. Above all the number of each species per unit of area and their arrangements on the mounds reflect not only their importance to the farmer but also their micro-ecological requirements.

(h) Intercropping and roles of Perennial Tree Crops and Vegetables.

It has been shown that small holder Igbo farmers intercrop their annual root crops, grains and suckers among perennial economic trees. These indigenous as well as exotic crop plants play vital roles in the food-crop economy of the people. They add to the variety and improve the protein vitamin and fat contents of the diet. The Igbo still differentiate between groups who 'reap the land' by cultivating the soil and those who mainly 'reap the land' in tree vegetation (Írì àla na ufè). The latter group usually maintain very dense cover of perennial tree crops of various sizes, shapes and utility.

Generally speaking, the number, variety and density of the tree crops vary among the different Igbo subgroups. Thus wild mango and parkia species appear to be more important in Nsukka and Isi-Uzo divisions than in any other parts of Igboland. Oil palm, oil bean, African breadfruit and African pear dominate the tree crop economy of the heartland while raphia palms feature mostly along water courses especially in Imo, Southern Anambra and Abo division of Bendel State.

Tree vegeculture is essentially a feature of the compound land mainly. As one moves away from the village settlement their range and variety decrease progressively. A great many of them do not do well on the outer farmland because according to my informants, "they do not hear the scent of human beings in such locations." This statement simply implies that they do not benefit from farm yard manure and protection provided by man.

Following Okigbo, the useful perennial tree crops and vegetables of Igboland may be divided into three broad categories - wild, semi-wild, protected and cultivated (Okigbo, 1977, p.5-6). There is little doubt that all the indigenous varieties started off as wild forms later protected by sanctions and still much later deliberately removed to favourable locations near the house. Table 6.7. lists the botanical names, local names and the modes of exploitation of the perennial tree crops exploited as food by the Igbo. The list is by no means complete but is designed to give some impression of the range of trees used.

ABLE 6.7: Indigenous, Wild, Semi-wild, and Protected Perennial Tree Crops of Nutritional Importance in Igbo Traditional Farming Systems.

otanical ame	Common Name	Igbo Name	Mode of Exploitation W = wild SW= semi-wild C = cultivated	Part used as food or drink	How used/main food/ Ingredients
. Elaeis guineensis	Oil Palm	Nkwu	W,SW,C	Fruit sap Kernel oil	Roasted and eaten to extract oil Intoxicating drink. Cracked and chewed. Preparation of yam stew. Preparation of soup for foo foo. Eaten along with roasted yam. " " " boiled yam.
. Treculia africana	African breadfruit	Ukwa	W,SW,C	Seed	Eaten boiled alone. Fried and eaten with palm kernels. Boiled mixed with cassava chips. Boiled mixed with maize.
. Dacryodes edulis	African pear	Ube	W,SW,C	Fruit	Fruit alone Fruit/maize
. Irvingia gabonensis	Wild mango	Ogbono or Ujuru	W,SW,C	Seed fruit	Making soup that draws.Fruit pulp eaten.
. Pentaclethra macrophylla	Oil bean	Ukpaka or Ugba	W,SW	Seed	Seeds/cassava chips/pepper/palm oil Seeds/maize/pepper/palm oil Seeds/maize/cassava chips/pepper/ palm oil. Seeds/beans/maize/palm oil/pepper. Seeds/yams/vegetables/ palm oil/pepper. Seeds/cocoyam/ vegetables/pepper/palm oil.
. Cola nitida	Kola	Oji	SW,C	Seed fruit	Ceremonial present to visitors Outer fleshy pulp of seed eaten
. Pandanus spp	Raphia palm	Ngwo	W,SW,C	Sap	Sweet but intoxicating drink
. Parkia clappertonia	Locust bean	Ogiri Awusa	W,SW	Seed	Ingredient for soup
. Ceiba pentandra	Red silk cotton	Akpu or Akwu	W	Leaves	Leaves/yam/pepper/palm oil Ingredient for soup.
0.Chrosophyllum albidum	African star apple	Udala	W,SW	Fruit	Ripe fruits eaten
1.Chrosophyllum africanum	African star apple	Udala Nwa enwo	W	Fruit	Ripe fruits eaten
2.Monodara myristica	African nutmeg	Ehuru	W	Seed	Spice added especially to a mixture of beans, maize, pepper and palm oil.
3.Vitex ferriginea	Vitex	Oha or Ora	W,SW,C	Leaves	Vegetable for ora soup

(Based on fieldwork and Okigbo, B.N. 1977)

In addition to the tree crops, there are other wild leafy climbers, fibrous root plants and herbs whose seeds, leaves or young shoots serve as important sources of vegetables and spices. They have not as yet been brought under cultivation. Man relies almost entirely on the harvest from wild and protected forms. Gongroneina latifolium (Ùtazi), Piper guineensis (Uzuza) and Pennisetum purpureum (Achara) are typical examples. The part of the plants eaten differs. In Ùtazi, the leaves only are edible. The young shoots of 'Àchara' are eaten as vegetables. Úzuzà seeds serve as spices while the leaves perform dual function as spices and vegetables for preparing special dishes.

(i) Types of Crop Mixtures.

Five basic types of crop mixtures were noted in the field and may be classified thus (Fig. 6.4).

(i) Etche Type or Boundary Type.

In this type of mixture cassava is planted round the periphery of the plots as family boundary and round the periphery of individual or sub-family plots as sub-family boundary and later intercropped with yams, melons, fluted pumpkin, some cocoyams and okro within the plot. The width of the cassava boundary is about 150 cm and the crop is planted at the same time with the yams. Within the plot, interplanting with maize, melons, okro, pumpkins and other vegetables may proceed simultaneously. As a

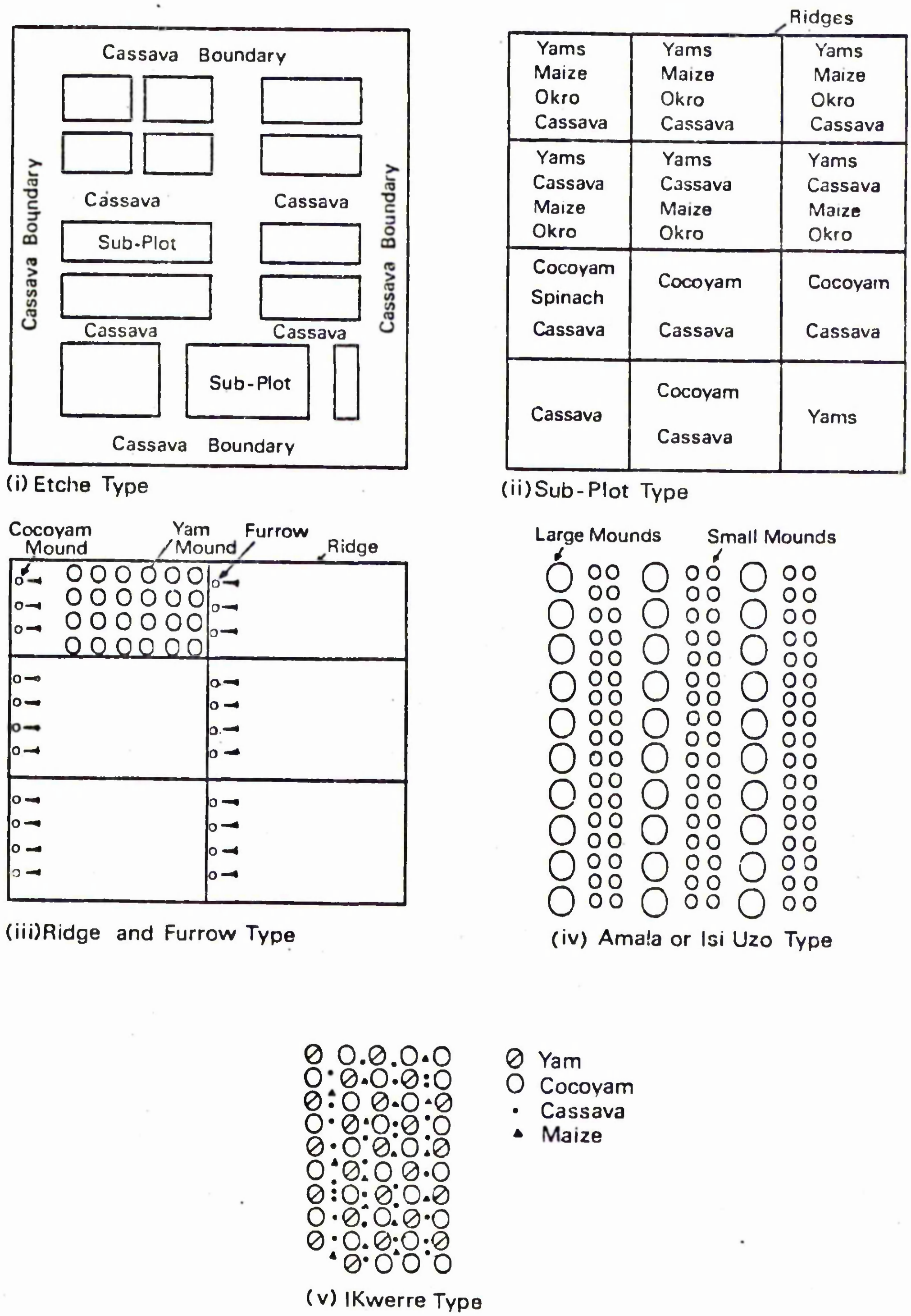


FIG. 6.3: TYPES OF CROP MIXTURES

Source: Fieldwork

rule cassava follows when the yams have produced some leaves. In fact the purpose of maintaining a wide cassava boundary round the entire plot was to keep off weeds and runners from the yams, the main object of farming at least to the men. This type of mixture was found to be very common in Etche division hence the name Etche Type.

(ii) The Sub-plot Type:

Here the plot is divided into a number of sub-plots by ridges. Each sub-plot is individually under one or more crops planted on mounds, ridges or beds. Few examples of this were observed at Anam, Izii and Akokwa. In Izii the crops usually grown in this way are groundnuts and cassava or yams and cassava. On the Awka-Orlu uplands cocoyam plots are usually planted with cassava but not maize, the reason being that cocoyams are planted late in the year, around May and June, and experience has shown the farmers that maize does not give good yield if planted that late. The farmers explained that by June, "the land has drunk too much water and has become cold." "Ǹmírí èjuna àla áfo òwé juo óyi." At Akokwa there is a deliberate policy of not mixing seed yams and cocoyams. The low thick foliage of the cocoyam, it is claimed, does not allow sufficient sunlight on the yam roots. The tendency therefore is to separate the two crops in a two-year pseudo-rotation, thus:

1st Year - yams, okro, maize, beans, fluted pumpkin, cassava.

2nd Year - cocoyam, okro, spinach, cassava.

3rd Year - yams, okro, maize, beans, fluted pumpkin and cassava.

A few farmers who mix cocoyam and yams plant the yam member very early in February at very wide intervals. Cocoyams come in about May - June so that the growth of the yam is not impaired.

(iii) Ridge and Furrow Type:

This type of mixture was found to be the most popular and traditional mixture on the Awka-Orlu Uplands but is reported to be dying away. Two old men who still use the method at Akokwa explained that:

(i) It gave each crop the type of food it wanted.

(ii) Provided for the man as well as the woman.

(iii) Yielded both eating and seed yams.

Fig. 6.3 (iii) shows a diagramatic representation of the cultivation technique and mixed cropping system. Basically after clearing the bush and firing the rubbish, the plot is divided into sub-plots by means of ridges. A furrow is then opened up parallel to the ridges but on one side only. Small mounds are then constructed in the furrow. Any unburnt rubbish and ashes from the sub-plots are thrown into the furrow to cover the small mounds. The rubbish is fired again to give a thick layer of wood ash over the mounds on which the woman will plant her cocoyam. Linear mounds are then built over the rectangular sub-plots.

In the planting process large uncut seed yams occupy the ridge tops, smaller or cut seeds go into the individual mounds while the woman plants her okro, maize, pumpkins, melons and African spinach lower down the sides of the ridges and mounds. Cassava follows when the yams have produced some leaves. The readers attention is drawn to the fact that the farmer deliberately creates ecological environments suitable for the crops grown in the mixture. Thus the cocoyam member which requires much manure finds much of this in the furrow. In fact a close examination of the mounds will show that all the quadrants do not have equal fertility. The quadrant facing away from the direction of movement during mound construction is often more fertile. The cultivators usually collect the wood ash and unburnt leaves into this quadrant while making the mound and housewives plant the maize and okro members here to take advantage of the higher fertility. Once they know the direction along which the labourers moved in the cultivation process it is a simple matter locating these fertile spots on the mounds. They do not have to be present to be able to locate them. A mere look at the mounds is sufficient. Many of the present generation of farmers on the uplands do not make such elaborate preparation before making their mounds. Some do not even bother to divide the plot into smaller ones by ridges since it wastes more time. Consequently there is much surface run off and soil erosion.

(iv) Àmala or Isi Uzo Type:

This is a form of mixed cropping in which there exists clear cut distinction between the spheres of influence of the man and his wife or wives on the same plot of land. Àmalà cultivation involves making one row of large mounds for the man's yams alternating with two rows of small mounds for the woman's crops like cassava, maize, pigeon pea and okro. The system appears to be peculiar to eastern Isi Uzo division around Ikem. It was explained that the aim behind the segregation was to minimise the risk of choking the yams by woman's crops.

(v) Ikwerre Type:

In this system yams and cocoyam are planted on alternate mounds along with maize, okro, gourds and cassava.

(vi) The Interplanted Type:

The main distinguishing feature of this type is that many different annuals and perennials are mixed. The planting system may show no regular pattern as in most of Abakaliki. Here yams, maize, cocoyams, cassava and even rice are mixed with okro, spinach, pepper and tomatoes. There is often a catenary sequence of planting on the mounds. Occasionally we may get single cropping along the row with double or multiple cropping across as in Akokwa. Usually when yams, melons, maize and okro occur in the mixture, they are planted first. Yams and melons occupy the top of the mounds or ridges and the maize and okro, the sides. All other crops are tolerated by the sides later. In Mbaise and Ngwaland, it is a common practice to plant the cassava member on the flat or bare ground. Three cuttings are buried flat in a single hole as opposed to single cutting used in Onitsha, Northern Owerri, Enugu and Ika divisions.

(viii) Miscellaneous Type:

In the miscellaneous type of mixture various combinations of (i) - (vi) may occur depending on the crops involved.

(i) Problem of Crop Mixtures:

Mixed cropping poses a major problem for research into land use patterns in the field. Under the various types of crop mixtures described, it is extremely difficult to define separately the area under a given crop. The assessment of the total output for each component of the mixture by area and yield raises many problems. We may decide to allocate the total area of the plot to the principal or predominant crop and zero area to the rest. Such a procedure will make the sum of the areas under the individual crops equal to the total cropped area but then it has the tendency to over-estimate or even completely neglect the area under the minor crops.

The area under mixed cropping may be apportioned among the component crops either in the ratio of their yields or the proportion of the area occupied by each crop. Whichever we adopt the labour involved is immense under the various mixtures discussed. Table 6.8 showing the crop mixtures for Amapu illustrates the complexity of the problem. The method is subjective and the area under the components of the mixture will greatly exceed the cropped area. Moreover such allocation of area is very difficult to justify since the crops in the mixture are not planted together or harvested together. The constituents may have unequal growing period. For example in a mixture involving maize, cassava and plantains, the time of harvest

TABLE 6.8

Crop or Crop Mixtures for 30 Farmers at Amapu, Northern Ngwa, 1959/60.

Crop or Crop Mixture	Acreage
Water yam	0.80
Old Cassava	0.89
New Cassava	0.50
Yellow Yam/New cassava	3.97
Gourds/New cassava	0.29
Yellow yam/groundnuts	0.50
White yam/New cassava	0.58
White yam/Okro	0.08
Water yam/New cassava	0.10
Yellow yam/Cocoyam	0.06
Yellow yam/Old cassava	1.20
White yam/Cocoyam	0.14
White yam/trifoliate yam	0.44
Yellow yam/New cassava/Melons	1.17
Yellow yam/Trifoliate yam/Fluted pumpkin	0.36
White yam/Maize/Fluted pumpkin	0.05
White yam/Trifoliate yam/Maize	0.34
Water yam/New Cassava/Okro	0.11
Yellow yam/old cassava/Maize	0.29
Yellow yam/groundnuts/New Cassava	1.06
White yam/Old cassava/Maize	0.13
White yam/New Cassava/Maize	0.32
Yellow yam/Old Cassava/Melons	1.97
Yellow yam/Water yam/Trifoliate yam	1.03
White yam/Water yam/Cocoyam/Fluted pumpkin	0.30
Total :	16.68

Source: Computed from Rural Economic Survey data 1959 - 1960.

varies from 3 months for maize through 9 - 12 months for cassava to several years for plantain.

The area under crop mixture may be assigned to each of the components in turn irrespective of the varying densities. It is obvious that the procedure will overestimate the importance of crops especially the minor ones. It will also overestimate the total cropped area. Comparison of areas and yields of crops among countries differing in the degree of mixed cropping would be pointless. Zarkoriah (1965) proposed the use of Imputed Area defined as

$$\frac{\text{density of the crop in the mixture}}{\text{density of the crop in pure stand}} \times \frac{\text{Area of Mixture}}{1}$$

This method may look attractive in principle but very difficult to apply in practice. It required a prior study of crop densities in both pure and mixed situations for each plot. Crop densities vary from one location to the other even under monoculture. Besides the total cropped area computed using this method will seldom agree with the actual cropped area making it necessary to scale the figures up or down to bring them in line with the area actually cultivated.

Zarkoriah also discussed the possibility of utilizing the concept of 'necessary land.' Necessary Land concept is based on the theoretical assumption that for every plant, there is a certain circular area ideal for its growth and under which it gives highest return per unit area. This circular area has a diameter equal to the optimum distance between the species in pure stand.

Decrease in the diameter results in decreased yield due to competition from other crops for sunlight, air, water and nutrient. An increase in the diameter naturally would not have any effect. It can be seen that the Necessary Land area concept like the Imputed Area would be very difficult to use in the allocation of areas under mixtures to the components. It varies with soil, climate and other variables that affect plant growth.

In this study therefore, the total area cropped was allocated to all the food crops in turn wherever their densities were found to be 'reasonable.' In arriving at the total area of cropland for mapping purposes, the actual cropped area was used. Thus the size of the circles in any maps showing the hectarage of foodcrops planted per farmer is proprtional to the actual cropped area and not to the sum of the areas under the component parts of the mixture. It will be seen that such a procedure makes it possible to derive simple and meaningful ratios. More important than this is the fact that it will reveal intensities of cropping more than any of the other methods especially when the aggregate area under double counting is expressed as a ratio of the actual cropped area.

Finally it must be stressed that cassava in particular presents a peculiar problem. Unlike yams, it is planted and harvested all year round. A survey which does not last for 12 months will therefore not record all the acreages under the crop. Cassava is not a true annual. At any time in the year both new and old types can be observed growing in the field. If we use the sum of the acreages under new and old cassava in our calculations, the tendency would be to increase the acreage under this crop at the expense of the others. It was observed however that in most villages, the area under new cassava far exceeded that of old cassava. The reverse was the case in a few isolated samples. It was therefore decided that in each village, the greater of the two acreages should be used. Bearing all these in mind let us examine the emergent crop production patterns in the region.

CHAPTER VII

THE EMERGENT FOOD CROP PRODUCTION PATTERNS

INTRODUCTION

More than 37 different crops were covered in the Rural Economic Survey. These include cereals, grains legumes roots, oil seeds and nuts, vegetables and some perennial fruit trees. About 24 of these are grown in Igbo-land (Appendix V) in varying combinational associations and intensities. The first section of this chapter therefore examines the patterns of production of the major staples. The second part focuses attention on their combinational associations emphasising the importance of each crop in the association. Throughout the discussion attempts are made to discover the extent to which the physical and human patterns correspond with the broad patterns of production as suggested in the theoretical framework. Finally the changes which have taken place in the cropping pattern since 1963 are discussed.

A. DISTRIBUTION OF MAJOR STAPLES:

1. Yams. It is estimated that in the 1963/64 agricultural season the hectarage of yams in Igboland stood at 295,000. By 1974/75 the figure has increased to 308,000. Figs. 7.1 and 7.2 which show the distribution of the crop in 1963/64 and 1974/75 agricultural years, indicate that no part of the territory is completely inimical to yam cultivation.

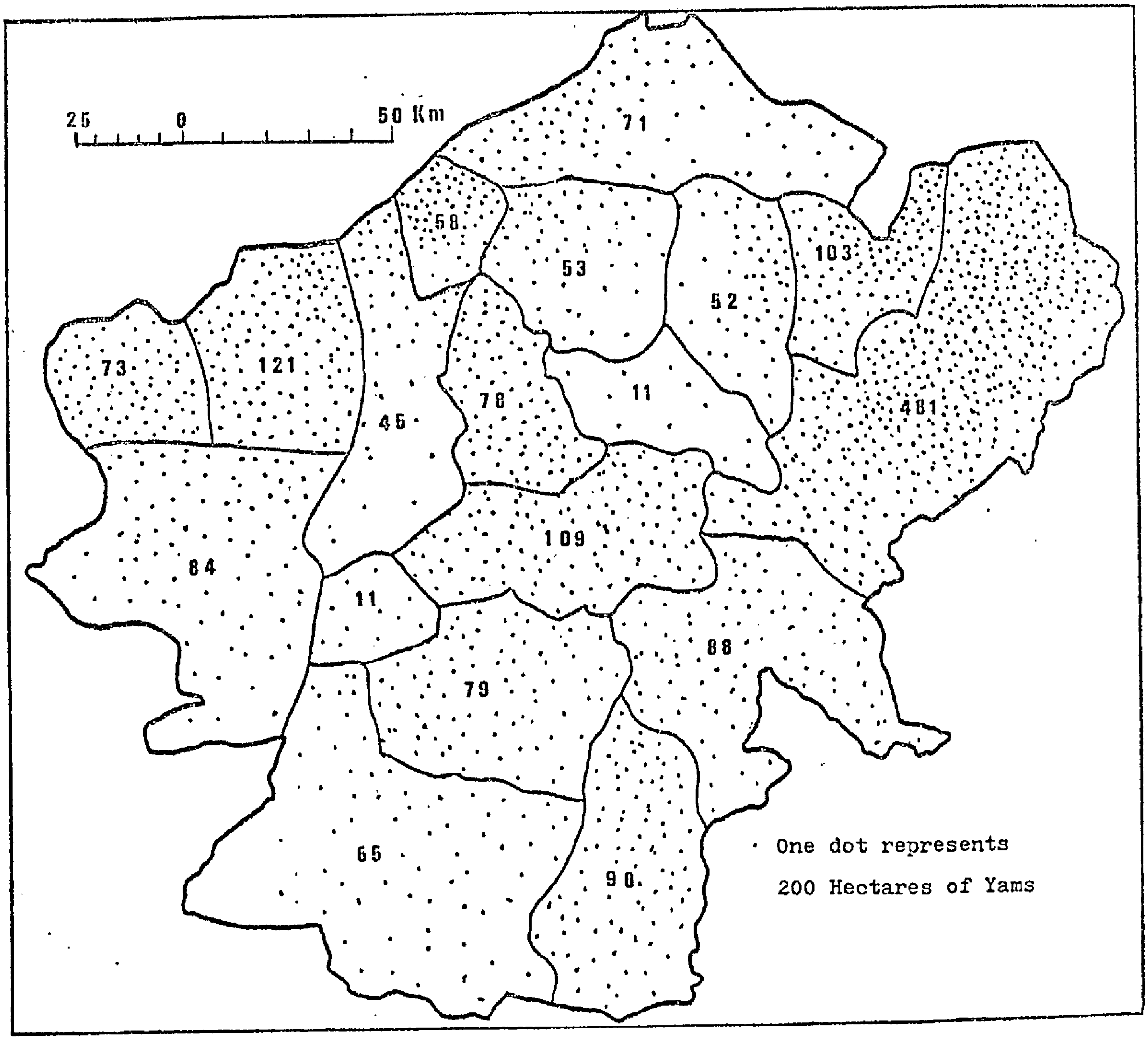


Fig.7.1:Distribution of Yams 1963/64

Data Source: Rural Economic Survey, 1963/64

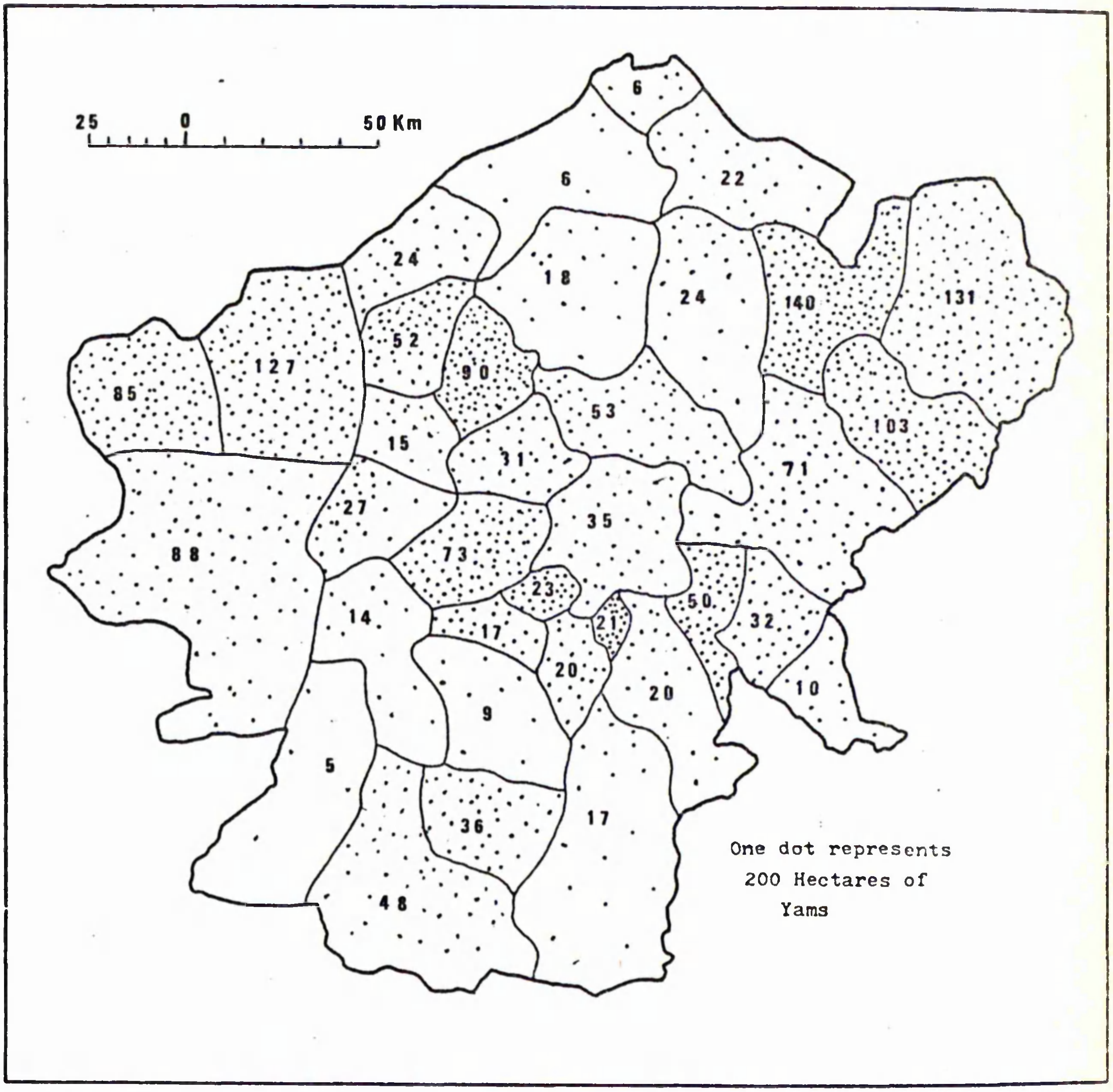


Fig.7.2

Distribution of Yams 1974/75

Data Source: Rural Economic Survey, 1974/75

The distribution pattern even at a time when cassava is allegedly occupying more ground shows the importance which the traditional Igbo cultivator attaches to this crop. Throughout the region, the yam continued to be a status symbol. Therefore every male farmer tries to grow it irrespective of poor yields especially in the overcrowded heartlands and badly eroded slopes of the escarpment.

Another factor contributing to the wide-spread cultivation of the crop is the farmers' ability to select through several years of trial and error the varieties suited to their particular environment. We noted much earlier in Chapter V that the farmers have a wealth of knowledge about the growth habits and environmental requirements of each of the crop varieties. They know their yield potentials and some of these are reflected in the names. In fact the response one often gets to questions on why they grow a particular variety of yams and not another is "because I know it does better on our soil."

In the wetter south, bitter and water yams requiring more humid conditions are dominant. The bitter or cluster yam takes much longer to mature and naturally would be suited to the southern areas with a longer growing season. With increase in the length of the dry season and decrease in mean annual rainfall totals further north, yellow and bitter yams give way to white yam as the dominant yam species cultivated. The northern half of the region is therefore dominated by the white yam variety.

There are however few exceptions to this general distribution pattern. In Abakaliki where traditionally the water yam belongs to the women, they continue to feature on the sides of the high hemispherical mounds as subsidiary yam species. Surprisingly the water yam is the dominant species on the compound lands of Nsukka Plateau with a dense cover of oil palms, Irvingia species and Kola trees. The farmers claim that water yams give much higher yields than the white yam variety in such shady environments. It is also the first yam crop of the year.

The water yam is seldom grown on the sandy Awka Orlu Uplands except where the farmers have cleared a thick forest which yields abundant wood ash. A few farmers on the uplands grow their water yam on rented lands located on the wetter Imo clay shale to the east of the upland. Four varieties of the white yam varieties are reported to be admirably adapted to the poor soils of the upland. They are jī ànụnụ, Jí àga, Jí ocha and jí òyibere. The last named is limited to the compound lands. The very hardy variety of jí ànụnụ locally known as òkéwàla (land breaker) are very important on the sandier soils of Aguata especially the region around Uga, Achina and Ezinihite. The whole of Anambra specialises in ji aga. The commercial yam grown in Anam belongs to the Ìchékè variety of Jí àga. Yellow yams are entirely absent. In an environment where the growing season is reduced to less than seven months by flood, it is not surprising that species requiring ten months to mature properly are excluded. Most of the yams in Abakaliki and part of Afikpo division belong to the high yielding Nwòpoké family.

Fig. 7.3 shows in broad outline the areas where various yam species are dominant. It represents the farmers' assessment of the productive capacities of their soils for the major varieties - white, bitter, water and yellow. The map also reflects the socio-cultural factors affecting their ownership and consumption.

The latitudinal zonation in the varieties cultivated may be summarised in quantitative terms using the 1963/64 hectarage figures. At Amapu lying in the southern part of the region, yellow yam varieties account for 66% of total yam hectarage. The white yam claims 17%, bitter yam 11% and water yam 6%. At Afikpo further north, white yam claims 65%, water yam 30%, yellow yam 4% and bitter yam less than 1%. Among the Ezza living in the extreme north east only two varieties, namely, white and water yams are grown in any appreciable quantity. Here the percentage contribution of the white yam to the total hecterage rises to 81. Water yam accounts for only 16%. Similar latitudinal zonation occurs west of the Niger among the Ika Igbo. However the varieties of white yams grown by the Agbo Igbo differ from those of Asaba Igbo. The former concentrated on Àsúkwọ̀, Ērefú and Ōrí varieties while the latter specialises on the Àga and jí ocha. Among the Ika Igbo, the water yam is not very much valued. It is regarded as a crop for the poorer elements in the society. Others eat this variety only during periods of scarcity. In fact the farmers at Ekwoma, near Agbor do not regard the water yam as a true yam as can

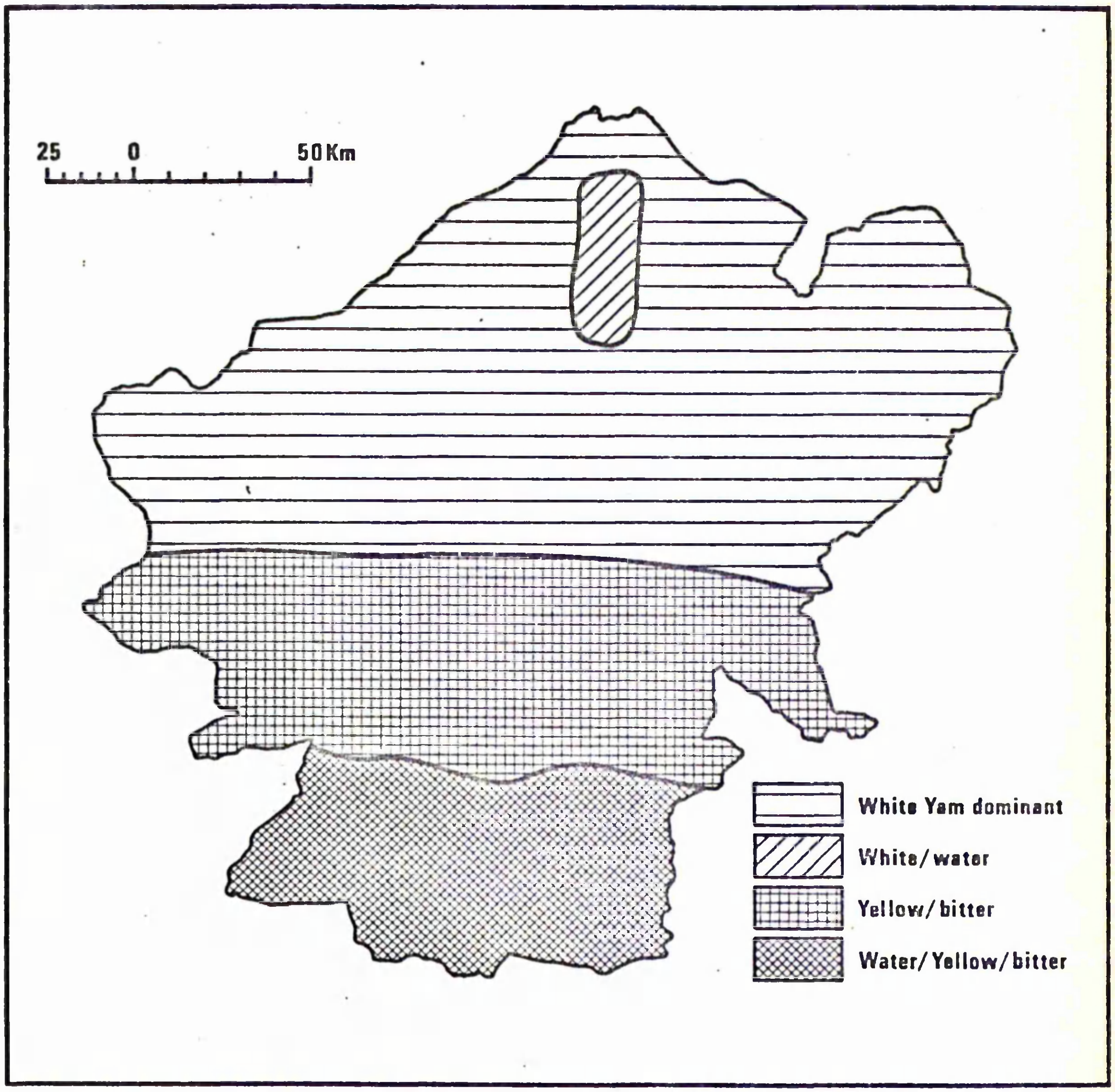


Fig. 7.3: Yam Variety Regions

Data Source: Rural Economic Survey, 1959-1964 be inferred from this saying:

'Wá agba jì wá agba mbua' - ' when you count yams you do not count water yams.'

The foregoing discussion suggests that it is not safe to generalise on the distribution of yams without taking into account the variations in the species grown, their environmental requirements and traditional attitudes to them. Figs. 7.1 and 7.2 showing the distribution of the crop in the 1963/64 and 1974/75 agricultural years also indicate substantial variation in the distribution of hectarage under the crop. They reflect the degree of dependence of the crop and its varieties and farmers assessment of their productive capacities.

The producing areas of Igboland according to these maps include

(i) The hydromórphic soils of the Cross River Plain underlain by a shale group of rocks.

(ii) The alluvial and river flood plains of the Niger, Anambra and Ase.

(iii) The dissected plateau and lowlands of southern Onitsha and northern Owerri districts with poor draining sandy soils.

(iv) The dip slopes of the Cuesta between Awgu and Nsukka and its replica on the Asaba plateau and extending westwards to Agbor. Elsewhere in the region, 'there is a light scatter of yam hectarage.'

II. Cassava. A wide range of cassava varieties are grown in the region but the most widespread include the early maturing and high yielding Òkótòróghō, Óhupoṅ and pànyá. Again unfortunately the Rural Economic Survey does not differentiate between the various types. It is not therefore possible at the moment to use the data in drawing maps to show areas where particular varieties appear dominant. According to Ekandem (1962,p.3) high yielding and early maturing types are dominant in Ngwa, Akwete and Owerri areas where there is a large scale gari industry. My field work also reveals that Òkótòróghō has displaced late maturing Ìwá on the Awka and Orlu uplands. It is now the dominant species on the flood plains of the Niger-Anambra basin. The flood season which lasts for about six months excludes late maturing types.

A significant development especially during the Nigerian Civil War was the large scale adoption of the sweet variety called ábùrúērie. Faced with starvation the farmers were prepared to try many novel food plants including this variety of cassava which did not require a long period of fermentation in preparation. They were in great demand on the overcrowded uplands throughout the war years, a demand which seems to have been weakened by cessation of hostilities and availability of more traditional foodstuffs. A number of farmers still maintain a few stands of the ábùrúērie variety among the dominant òkótòróghō to remind them of this war-time innovation in food consumption.

In 1963/64 about 237 thousand hectares of farmland were under cassava in Igboland as against 288 thousand hectares in 1974/75. In terms of total hectarage under annual root crops cassava ranked second to yams in 1963/64 in spite of its ability to adapt to a wider range of environmental conditions than yams. Post Civil War figures show that cassava still ranks second after yams. Surprisingly, the figures also clearly indicate that yams consistently rank first in the eastern half of the territory often thought to be dominated by cassava (Appendix VII).

Figs. 7.4 and 7.5 show that the broad belt of high population density trending north-west to south-east across Eastern Igboland accounts for the greater proportion of cassava grown in the region. It covers the dissected plateau and lowlands of Southern Onitsha and Northern Owerri. Specific areas within the belt includes Mbaise, Mbano, Mbitoli, Okigwi, Mnewi, Orlu, Aguata and Njikoka divisions. The deep porous sandy soils covering these districts, as noted earlier, were the sites of early Igbo settlements where the chief staple yams were produced under extensive bush fallow systems. As population increased the length of fallow was shortened with a consequent decline in soil fertility and yields thus preparing the ground for a major change in the food crop production system. It appears from information gathered from the farmers that nature offered their ancestors two alternatives, either to emigrate to the more difficult environments to the east, west and south or to change their cropping patterns.

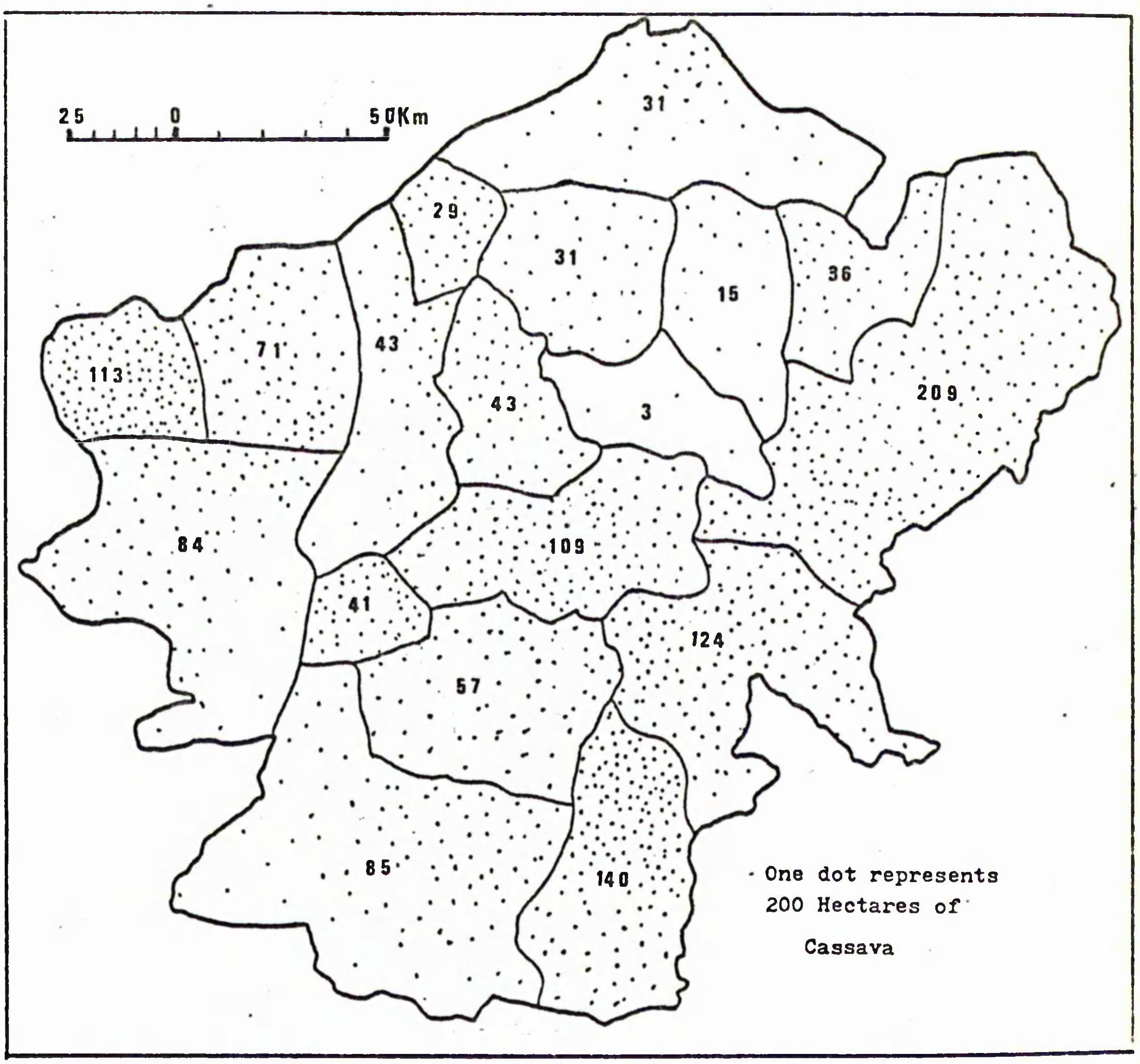


Fig.7.4:Distribution of Cassava 1963/64

Data Source: Rural Economic Survey, 1963/64

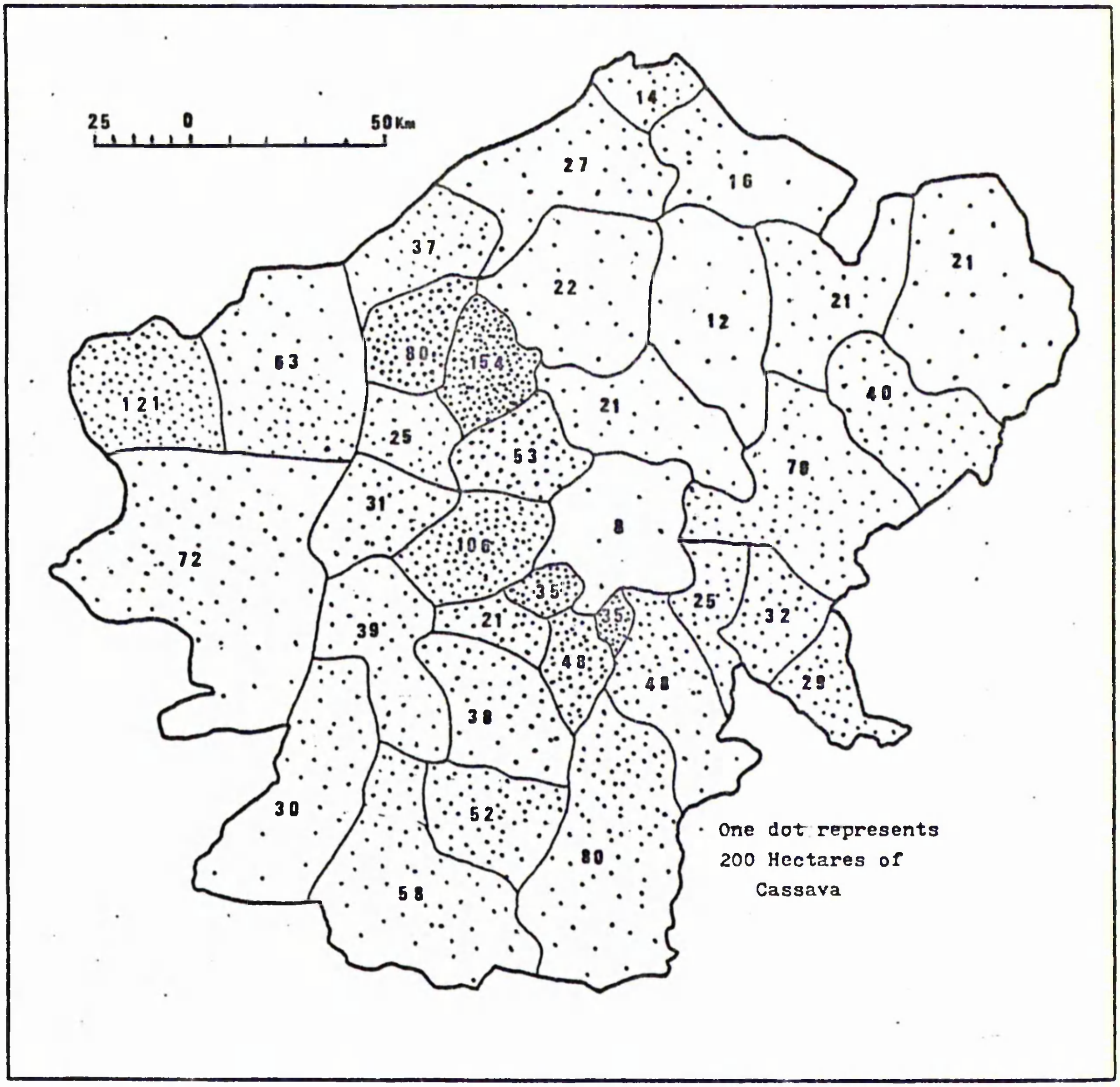


Fig.7.5
Distribution of Cassava 1974/75

Data Source: Rural Economic Survey, 1974/75

Both alternatives seem to have been followed. Some emigrated to the riverine areas of the Niger and far beyond. Others moved south into the coastal districts and east into the Cross River basin where the environments were still ideal for the production of the traditional staple. Those who remained were compelled to shift emphasis from yams to cassava, a crop capable of giving relatively good yield on a poor soil. No single date can be assigned to these movements but oral traditions suggest that they started before the colonial period.

It will be observed that the distribution of cassava thins out in the sparsely populated areas of secondary migration lying on either side of Igbo heartland. The sharp decrease in the hectarage planted to cassava in these areas seems to reflect the combined influence of human population and competition from highly valued traditional staple which continues to give good yields. The yam is still regarded as the chief staple in these areas and cassava is only just beginning to assume some importance.

There have been remarkable fluctuations in the area under cassava since 1971 as illustrated by the official returns for East Central State (now Anambra and Imo States). Post Civil War estimates show that in 1971/72, 61 thousand hectares of land were under the crop. In 1972/73 the figure increased to 108 thousand then dropped to 54 in 1973/74 and rose again to 88 thousand in 1974/75. These fluctuations are extremely difficult to explain. The question is do they reflect real fluctuations or data gathering inadequacies?

Our discussion of the accuracy and reliability of the data source suggests that the fluctuations could result from inadequate data collection techniques. However, it is equally possible that the depression of the immediate post Civil War years forced farmers and non farmers to take to farming geared towards the production of crops requiring very little capital input. By 1973/74, many of these traders-turned-farmers had saved some capital to enable them return to the devastated towns to establish their trade once again with consequent decline in the hectarage of cassava.

III. Cocoyam. Cocoyam naturally does well in areas with high annual rainfall totals but poorly draining soils and abundant shade can compensate for any deficiency in rainfall. The cultivators recognise cocoyam as a crop which does well under shady environment.

Cocoyam is used in a variety of ways -

(i) The leaves supply materials for wrapping other products.

(ii) The leaves from the old cocoyam serve as vegetables and can be dried and preserved for the period of scarcity.

(iii) The corms are used in thickening soup especially the varieties called ófe edè (cocoyam soup) and ófe òra (vitex soup).

(iv) Cocoyam can be boiled and eaten with oil or pounded alone to give ùtara édè (cocoyam foo foo). Alternatively it can be pounded with yams, plantains, bananas and cassava to give varieties of foo foo meals.

(v) In Nsukka division the corms are boiled, sun dried and preserved as ãchicha against the hungry season.

(vi) Finally, the corm from the new cocoyam can be roasted in the naked fire and consumed with or without oil.

These three factors (environmental requirements, shade tolerance and multiplicity of uses) account for the widespread cultivation of cocoyam as can be seen in Figs. 7.6 and 7.7. Once again the distribution pattern follows population and areas of dense coverage of economic tree crops. Nsukka plateau and Awka Orlu uplands are typical examples of the latter. The Niger - Anambra - Ase basin are negative areas. Here the crop cannot compete effectively with yams. Cocoyam features prominently in the food crop economy of the wetter south with over 2531 mm of rainfall. Unfortunately Figs. 7.6 and 7.7 do not bring this out clearly due to the low rural population density characteristic of the area. At the level of individual farms the crop attains the status of co-staple with plantains. Much of the basaltic soil of Arochukwu is planted to cocoyams and introduction of cocoa in the late fourties and the use of cocoyam as a shade crop resulted in a rapid expansion of the hectarage under the crop. It is interesting to note that the man-modified dense vegetation cover of oil palm, wild mango and Kola trees of Nsukka plateau carries the cocoyam far beyond its natural environment into what may be described as the

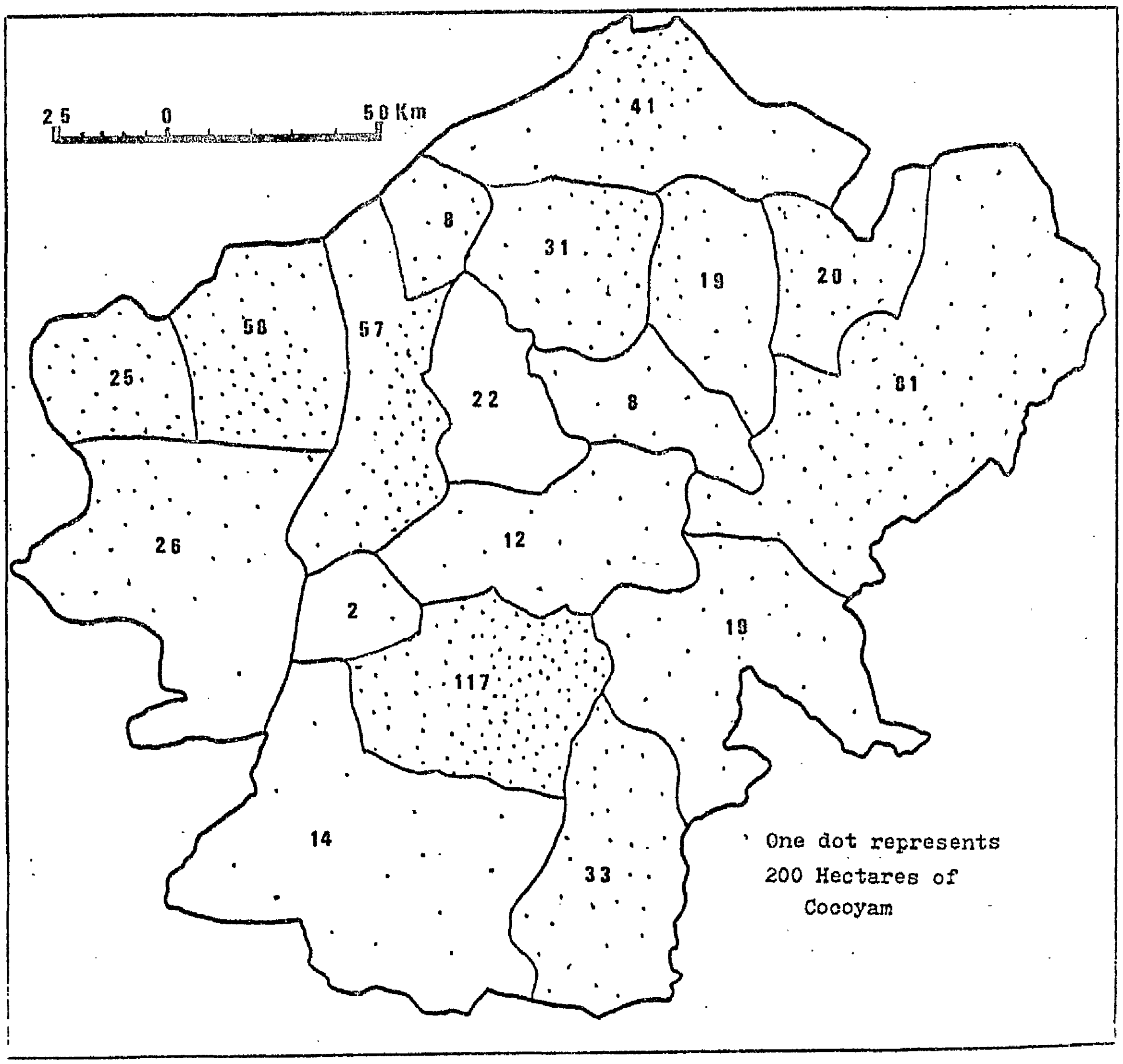


Fig.7.6:Distribution of Cocoyam 1963/64

Data Source: Rural Economic Survey, 1963/64.

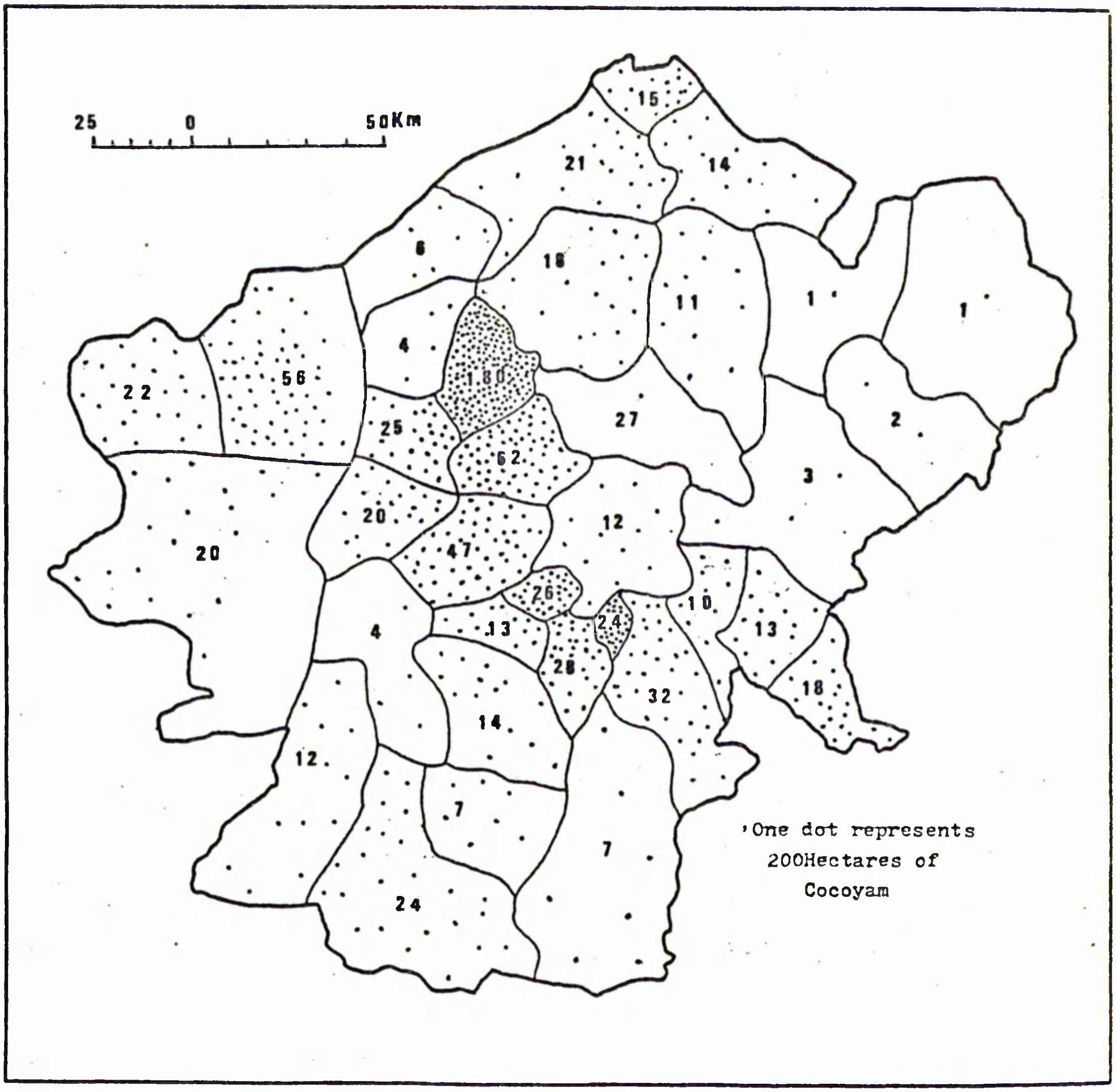


Fig.7.7

Distribution of Cocoyam 1974/75

Data Source: Rural Economic Survey, 1974/75

drier north.

One other factor responsible for the wide scatter of cocoyam cultivation is the tremendous variation in the varieties grown and their environmental requirements. As with the yam, farmers have been able to select varieties most suited to their particular locations. Thus all the southern divisions with much higher rainfall totals grow practically all the varieties of Xanthosoma sagittifolia, Colocasia antiquorum and Colocasia esculenta. With decrease in annual rainfall totals and the length of the growing season further north, Okubiaba,(Xanthosoma sagittifolia) which requires at least ten months for full maturity ceases to be grown. It is seldom grown north of a line joining Osina, and Umudura. Throughout the cocoyam growing areas there has been, especially since the late thirties, a gradual displacement of the 'old' cocoyam (Colocasia esculenta) by two 'new' varieties of Colocasia antiquorum (new cocoyam) called Édè Bèkéè and Kọchụọm. They are both high yielding early maturing and relatively easy to prepare for table. On the Awka-Orlu uplands they have almost replaced ópà and àkírī as the premier cocoyam.

(III) Maize. Of all the grain crops of Igbo land, maize has the widest distribution in view of its importance as a hunger breaking crop. Maize is the first crop of the year. The first harvest coincides with the ripening of the African pear. Together they supplement the food consumed during the hungry months lasting from about May to early July. The appearance of the two crops in local markets ushers in hope of survival to starving families. They are often a great relief. During the peak of the rainy season in June - July, many families can be observed sitting by the fireside roasting and eating maize and African pear.

Two other reasons given by the farmers for the popularity of maize are the ease of getting planting materials and intercropping them with the basic root crops. Unlike yams and cocoyams, maize can be given freely to neighbours and one cob is usually enough to plant several mounds depending on the size. The short growing period of 3 months for the dwarf variety makes it an ideal intercrop for yams. Among the Ika Igbo, maize is often the first crop to be planted followed by yams. By the time yam seeds germinate and start absorbing plant food, the maize has reached an advanced stage in its growth. It therefore seldom impairs the normal growth of either yams or cassava. However the NSI variety introduced by the Ministry of Agriculture takes more than 3 months to mature and grows too tall thereby overshadowing the yams. They are also hard and not good for eating. Consequently they are not very popular with the farmer inspite of the publicity and emphasis in extension work. One of the farmers in Akokwa confessed that he once collected some NS1 maize seeds from a local Extension Officer but did not plant them. Apparently they ended up in the wife's kitchen. To date the farmer still plants the dwarf and early maturing variety only.

Like cassava, the distribution of maize follows the population pattern and the drainage condition of the soil. (Fig. 7.8 and 7.9). High hectarage occurs on the sandy and well drained soils of Aboh, Asaba and Ika divisions west of the Niger and in the Igbo heartland extending south eastwards into Ngwa division. Elsewhere there is a tendency to diffusion rather than concentration.Since the crop requires well drained sandy warm soil, the contribution of the poorly draining and water logged soils of the Cross River plain and the small area of delta lying south of Aboh to the total maize hectarage is low.

IV. Rice. Rice is an alien grain crop in Igboland. Its cultivation is essentially a feature of the early 1940's. In spite of its recent introduction,it now ranks second to maize among the grain crops of the region. The crop now occupies an important place in the food economy and has a much wider range of acceptability than cassava. In fact it is considered superior to yams in some respects. The high esteem given to the crop is shown by the fact that in the early fifties and sixties, it was mainly eaten during festive occasions especially Christmas day and during visits by important personalities. Among Mbanasa people rice is sometimes called Ọ́pụrụ-agboghọ̀-ézé-ǹkọ́ a name which suggests that if you entertain a girl friend with a meal of rice she is likely to develop a considerable appetite and talk more freely.

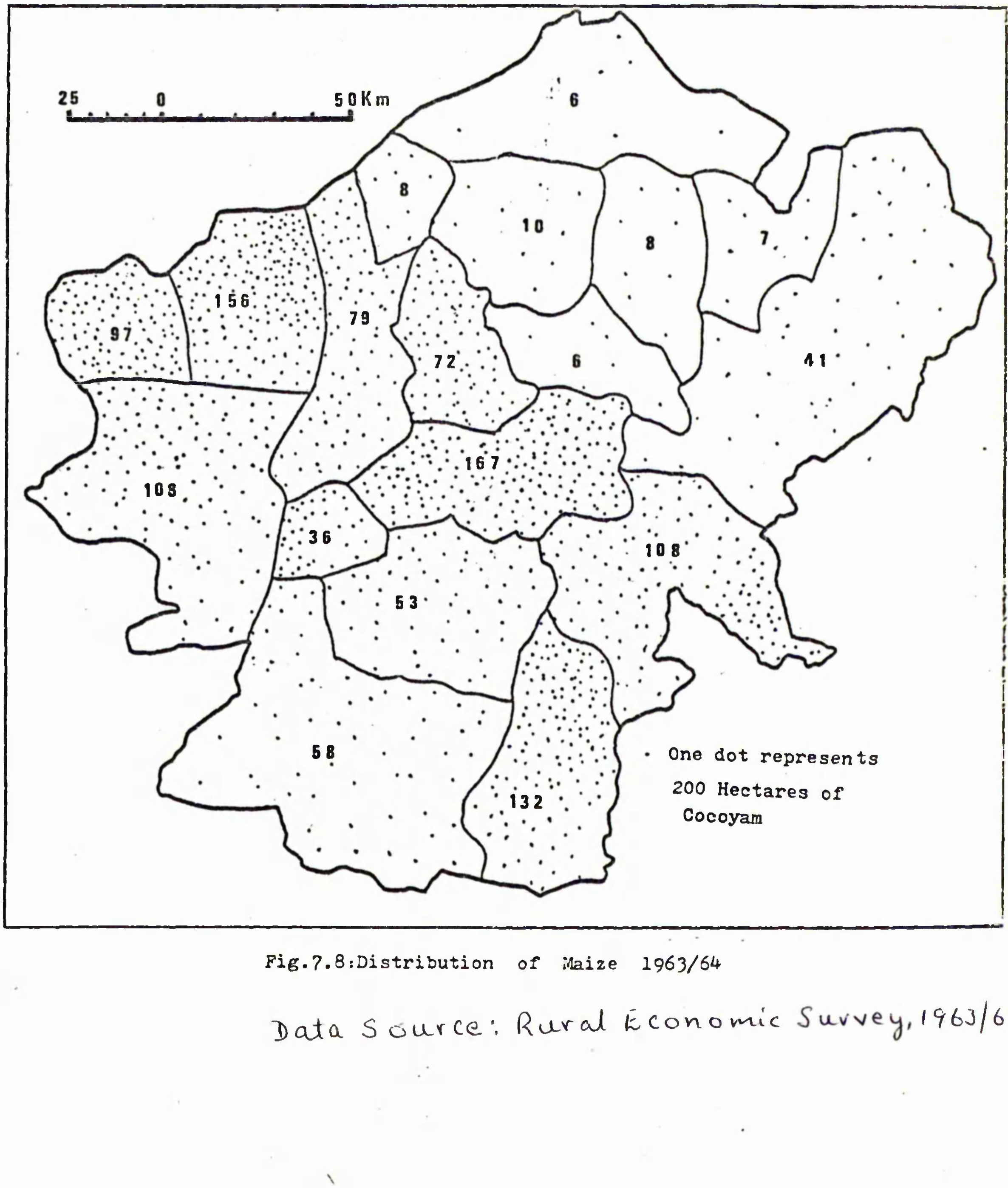


Fig.7.8:Distribution of Maize 1963/64

Data Source: Rural Economic Survey, 1963/64

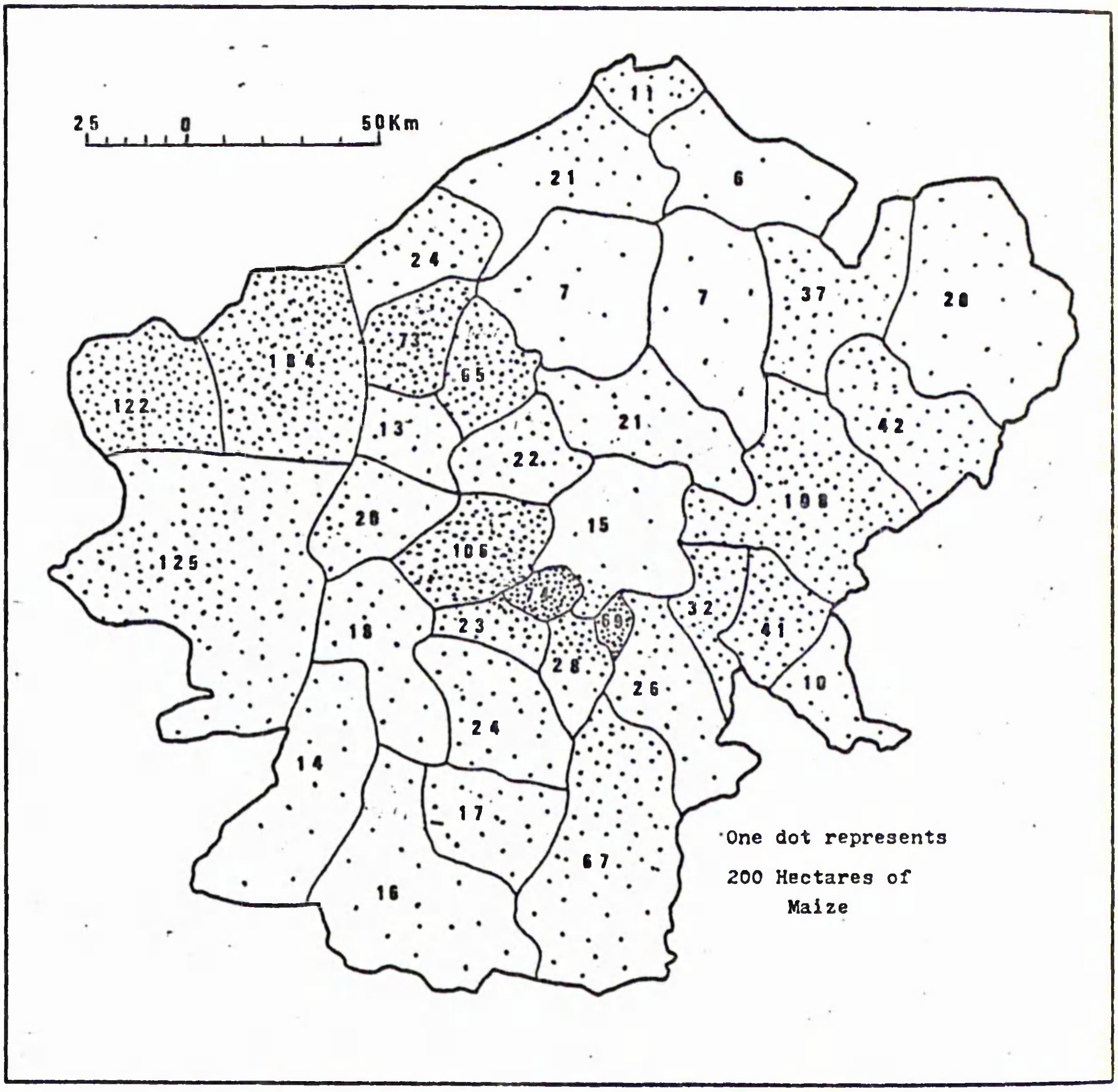


Fig.7.9

Distribution of Maize 1974/75

Data Source: Rural Economic Survey, 1974/75

In the 1959/60 agricultural sample survey a total of 8097 hectares were reported to be under rice in the Eastern States with about 60%coming from the Igbo-speaking areas (Federal Office of Statistics, 1961). The annual production was also estimated at 14,255,000 kg. giving an average yield of some 1,800 kg. per hectare. Later publications by rice experts suggest that the hectarage figures were underestimated and as a result the yield per hectare was overestimated. For example Zwankhuizen (1961) estimated that in 1961, a total of 41,308,000 kg. of paddy was produced in Abakaliki and Ogoja provinces alone. His estimates based on the quantity of rice handled by the milling stations in the area, put the total hectarage under the crop at 24,291.

According to the 1961/62 sample survey, the area planted to rice in the region as a whole is about 12,956 hectares with a total output of 12,218,000 kg. This discrepancy between Zwankhuizen's estimates and those of the Federal Office of Statistics stem from mainly the methods of estimation. There is reason to believe that both the area under this crop and total production are bound to be underestimated by the Federal Office of Statistics who base their calculations on a sample survey of rural households. The fact is that most of the rice fields in the major area of production in Abakaliki were owned by tenant farmers who lived in the townships and employed labour to work in the paddy fields. A sample of farmers in the village will therefore not pick them up. Consequently both the hectarage and production will be much below actual figures.

Estimates for the period 1971-1976 (Appendix VII) show substantial increase in the area under the crop in the immediate post-Civil War years when many young traders took to rice farming for want of capital to trade. Part of the increase can however be explained in terms of greater participation of the local farmers in the production process and the use of larger samples capable of picking up many of them. Figs. 7.10 and 7.11 show that four areas now produce practically all the rice in Igboland. These include

(i) The Abakaliki - Afikpo area.

(ii) The Adani - Umubo - Aguleri area.

(iii) The Niger - Ase flood plain and adjoining small area of delta south of Aboh.

(iv) The flood plains of Imo and Mamu rivers and the 'Ude lands' which develop upstream along the tributaries.

Topographic, soil and climatic conditions in the first two areas are similar in many respects and they may be discussed together. In both areas rice cultivation is limited to the seasonally flooded lands bordering the rivers but the crop is also produced on the fairly level plateau tops with poorly draining or hydromorphic soils. The heavy summer rain which floods the rich fertile clay to clay loam soils is an added advantage.

Vast areas of potential rice fields still await exploitation especially in the Adani - Umubo area and adjoining Anambra - Niger flood plains. The labour involved in the establishment of paddy fields in these areas will be small since there are few large trees to clear.

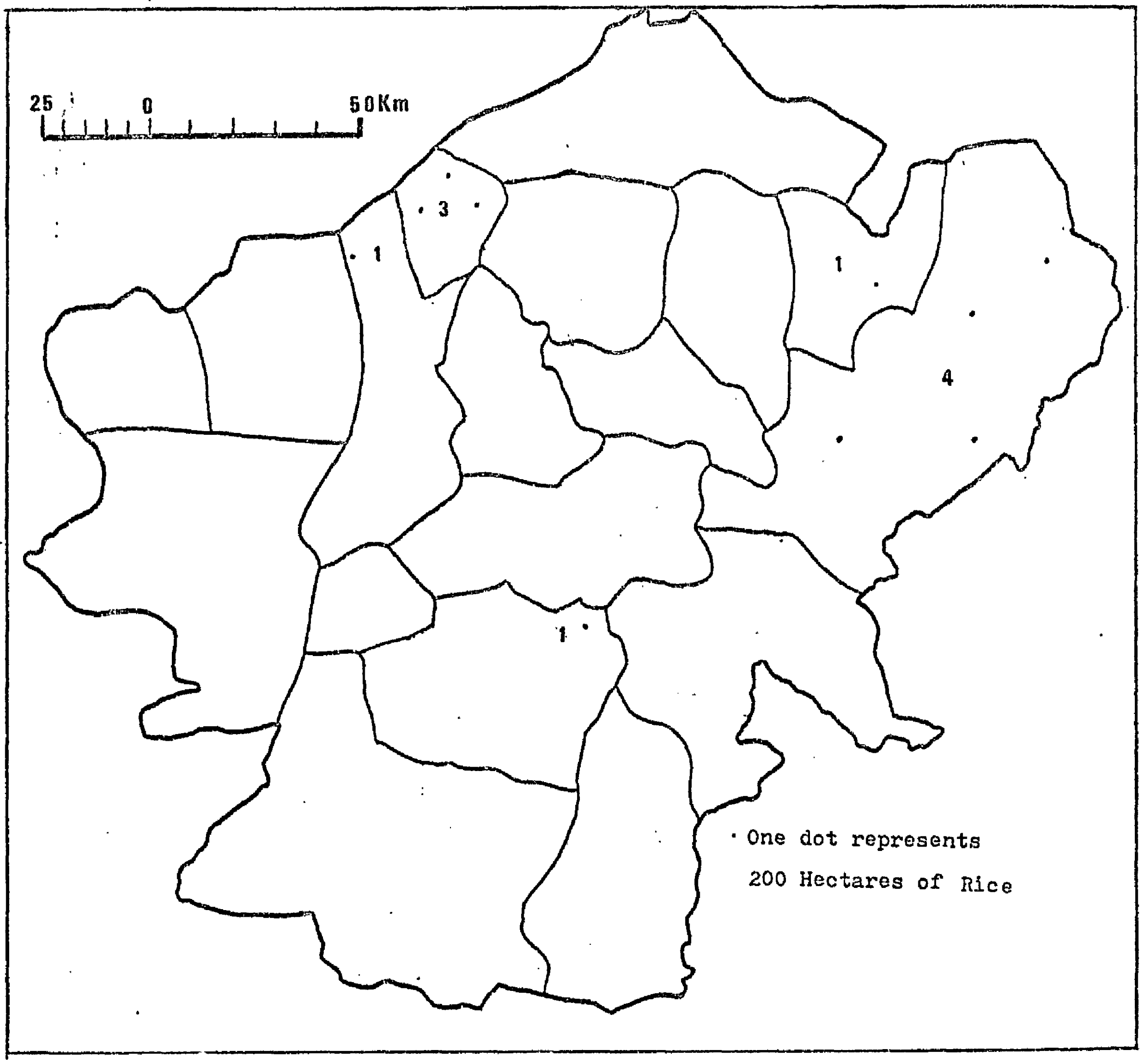


Fig.7.10:Distribution of Rice 1963/64

Data Source: Rural Economic Survey, 1963/64

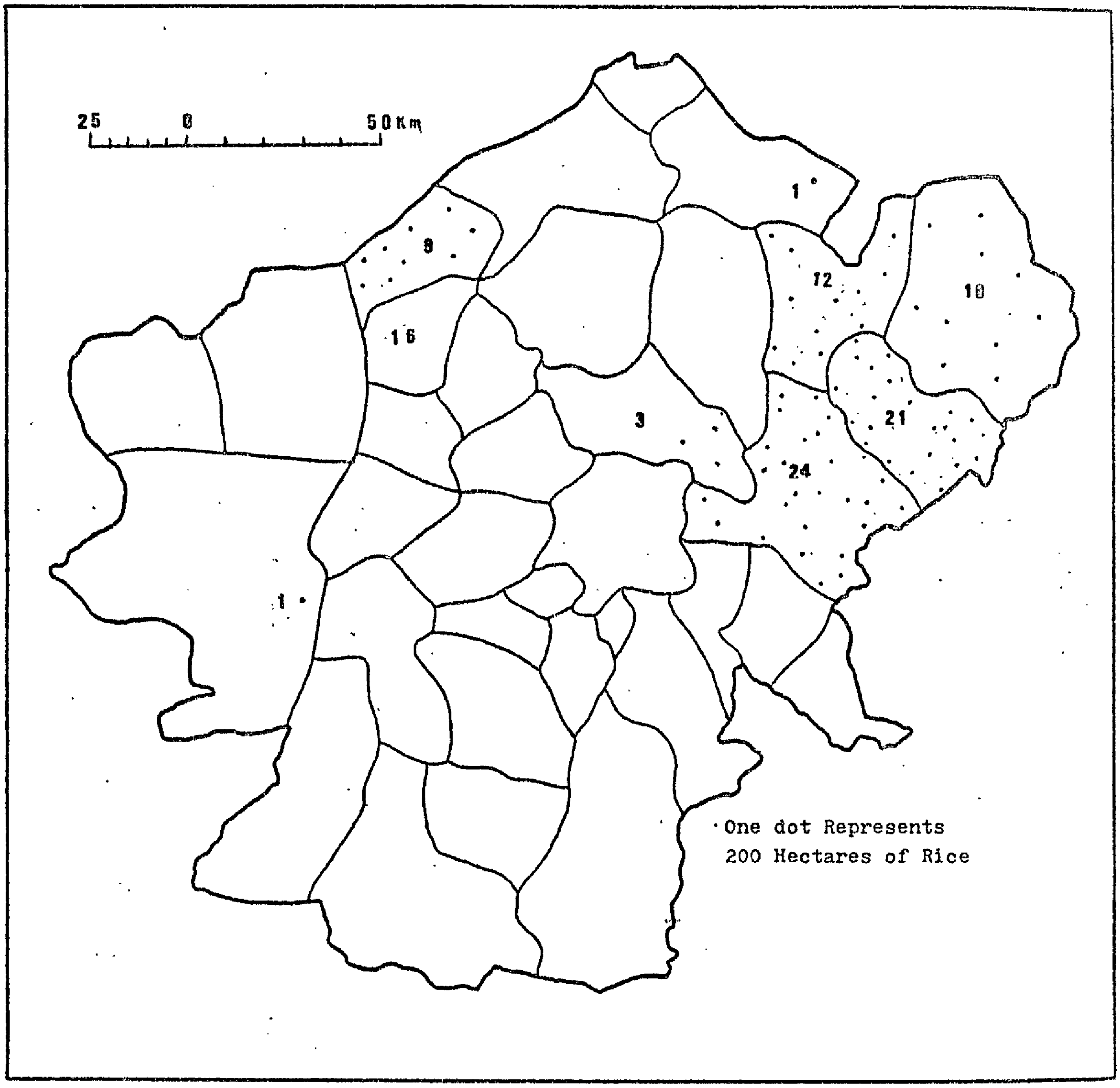


Fig.7.11: Distribution of Rice 1974/75

Data Source: Rural Economic Survey, 1974/75

The main task would include clearing the grasses and shrubs. The level topography, abundant clay soil and heavy rainfall which exceeds 1,518 mm ensure that rice could be grown without artificial irrigation. All-weather roads have been driven from Onitsha to Aguleri via Ukpo thus opening up the area to outside markets. Furthermore the Government has established irrigation dams and rice mills in Adani to help boost production. It is reported that as a result of these, the area under the crop has been increasing.

Figs. 7.10 and 7.11 show that the contribution of the Niger-Ase flood plain and the Ude lands of Imo and Mamu to the total rice hectarage is very small. Several factors physical, biological and economic seem to limit large scale rice production in these areas. Ten farmers who owned swamp lands at Aro-Ndizuogu were asked why they had not used all the land for paddy cultivation. Six mentioned that the cost of clearing them was prohibitive. In fact one paid ₦21 for the clearing of approximately 0.05 hectare. One observed that he needed to reserve some of the swamp lands for the production of raffia palm wine, bamboos and mats for building and staking of yams. One pointed out that his previous year's rice crop was eaten up by ubiquitous weaver birds which converged on the small fields just as the rice was about to produce seeds. The remaining two farmers confessed that they were more interested in clearing the swamps for the cultivation of yams than rice. In the case of Lower Ase River and Niger Delta the problem is compounded by relative isolation from the main centres of population and consumption which increases the cost of transportation (Davis, 1962). In fact there has been a remarkable shift of emphasis away from the Deltaic areas to the poorly draining clayey soils on the Cross River, Niger-Anambra Imo and Mamu valleys. In spite of the environmental and biotic problems discussed above the area under rice has been increasing since the end of the Civil War. Ogboji and Aro-Ndizuogu are becoming important rice producing centres.

Other Crops:

A number of minor food crops are grown in the region but available information on their distribution does not justify separate treatment. They will therefore be examined in the next section of this chapter which deals with the major crop associations.

PATTERNS OF CROP COMBINATION.

(a) Methodological Approach:

The procedure for determining the production patterns and the importance of a crop in a traditional agricultural system has been outlined in my earlier study of food production in Eastern Nigeria (Uzozie, 1971, pp. 66-67).Here the main points may be restated to guide the reader. It was argued that since crops are grown in different combinational associations, it is essential to determine the character and extent of these combinations. The position of any crop in any location may be correctly assessed by examining the number of times it enters the combination and the total cropland it occupies in any clearly defined crop combination region.

The method developed by Weaver (1954) and later used by (Scott (1959), Thomas (1959), Coppock (1964) and Agboola (1968), involves using a mathematical model to classify agricultural systems. It is an objective but essentially arbitrary taxonomic classification of crop production patterns. Weaver discovered that the percentage hectarage of total cropland when arranged in order formed a declining curve. On the basis of this discovery, he set up a mathematical model in the form of a theoretical curve against which the cropland areas for each of the counties studied could be measured.

The basic assumption was that in an ideal combination each of the crops would occupy an equal area Thus:

Under monoculture the crop occupies 100% of the total cropland.

Under 2 - Crop Combination each of the two crops occupies 50%.

Under 3 - Crop Combination each of the three crops occupies $33^{1}/3$%.

Under 4 - Crop Combination each of the four crops occupies 25%.

Under 10 crops combination each of the ten crops occupies 10%.

He then measured the actual crop percentage in each of the counties against this theoretical curve. The standard deviation provided a measure of the departure of individual figures from the ideal base curve.

Thus $$\sigma = \sqrt{\frac{\sum_{1}^{n}(x-\bar{x})^2}{N}}$$

Where x = area occupied by the crop in the county.

$\bar{x}$ = area occupied by the crop in the ideal case.

N = number of crops involved in the calculation.

Since Weaver was mainly interested in the relative ranks of the deviations under different crop associations he did not bother to extract the square root. The combination which returned the least squared deviation from the ideal case was taken as the combination for the county. Using figures from about 1080 centres he was able to divide the Middle West into significant crop production regions. The formula now reads

$$\sigma = \frac{\sum_{1}^{n}(x-x)^2}{N}$$

The major weakness of Weaver's model is that it assumes that all the crops in the combination occupy equal area in the ideal situation. In real world situations one or two crops could occupy a large area or are dominant over a number of other crops which are equally important in the agricultural system. This is particularly true of some parts of Igboland. Scott (1959) and Coppock (1964) spotted this problem and in their work mapped the ranked percentages in the basic crop associations. Thus : cassava/beans/okro; okro/beans/cassava, and cassava/okro/ beans would be lumped together under cassava/beans/okro by Weaver but differentiated as three different combinations by Coppock and Scott. Nevertheless, given the weaknesses of the method as a whole, there is something to be said for the simplicity of Weaver's model whose use in this study is prompted by three considerations. First, it was confirmed that under the system of double counting employed in the calculation, the area under individual crops, when arranged in order, formed a declining curve similar to that of Weaver. This should be obvious from the discussion of mixed cropping systems. Secondly, since one of the aims of the present study is to examine the changes that have taken place in the patterns of crop production, since my earlier study in 1963/64, it is logical that for any meaningful comparison, the method of analysis should be the same in each case. Thirdly, the method is as free as possible from subjective judgement which plagues other methods using similar data. Once the procedure is followed anybody working with the same data will arrive at the same result.

Appendix VI is an attempt to use the method to determine the significant crop associations for Udi village for the 1959/60 agricultural year when the area occupied by five different crops in the village were cassava 37%, yams 20%, maize 18%, melons 15%, cocoyam 8%. The least squared deviation occurs under four crop combinations of cassava/yams/maize and melon which became the significant crop association for the village. Cocoyam becomes a minor crop. Similar analysis was made for the rest of the sample villages. For ease of mapping, the villages which have the same number and type of crops were grouped together irrespective of the percentage of the total cropped area the crops occupy. Thus in the example above, all the villages with CYMm, YCMm, MCYm and MCYm were grouped as CYMm. In spite of this merger, many crop combinations emerged presenting a formidable problem of mapping. It therefore became necessary to recognize only the standard food crops which according to the cultivators include yams, cassava, cocoyams, plantains, maize, beans and pigeon pea. All the other crops not drawn into the final combination but occupying 1% and over of the total cropland are shown as specialty crop by symbols.

Annual food crops compete for land not only among themselves but with perennial tree crops also. Of those discussed in Chapter VI only five (oil palm, cashew, cocoa, rubber and kola) were included in the Rural Economic Surveys. There is no mention of raffia palm, <u>Irvingia species</u>, oil bean, African pear or even African breadfruit. The oil palm was both a food crop as well as export crop until 1975 when the Federal Government banned the export of the oil. Today all the produce is consumed internally. The traditional farmer consumes large quantities of the oil, kernels and wine from the flowers and stems. Rubber, cashew and cocoa are essentially export crops.

In order to show the extent to which the cash/ food tree crops are combined with annual food crop production, these are shown in capital letters as specialty crops. Since most of the cocoa, rubber and cashew trees in the region are grown in plantations, their hectarages are known. Their symbols occur over areas where 120 or more hectares are planted to any of the crops. The oil palm presented a peculiar problem as both wild, semi wild and plantation types exist in the region. The number of stands per unit area varies considerably with the highest density occurring in the overcrowded heartland and some areas on the Nsukka plateau. From here the density decreases outwards into the Cross-River plains. The yields rather than their hectarages were used. An arbitrary figure of 20 kilograms fruit harvest per farmer per annum was selected. The symbol 'P' therefore occurs over areas where the average farmer harvests over 20 kilograms of palm fruits per annum.

In order to show the competitive position of any of the main annual food crops relative to those with which it is competing for the use of agricultural land, rank order analysis was performed using the hectarage figures. The areas were arranged in descending order of magnitude and those attaining the same rank were mapped. Bearing all these in mind we may now examine patterns of food crop production in the region.

The Crop Combination Regions.

In spite of the obvious limitations of the method and the time taken by the calculations the results are encouraging. It is now possible to see at a glance the crop production patterns of Igboland for the 1974/75 - 1975/76 agricultural years (Fig. 7.12). The main crop associations are derived from three roots (cassava, yams, cocoyams): two pulses (yam bean, pigeon pea); and two grains (maize and rice). The seven crops produced nine principal crop combination regions. Thus

(i) 2 - Crop Combination - Cassava/pigeon pea.

(ii) 3 - Crop Combinations - Yams/cassava/rice
- Yams/maize/cassava
- Yams/cassava/cocoyam
- Rice/maize/yams

(iii) 4 - Crop Combinations - Cassava/cocoyam/yams/maize
- Yams/maize/cassava/pigeon pea

(iv) 5 - Crop Combinations - Yams/cassava/beans/maize/cocoyam
- Cassava/cocoyam/yams/maize/pigeon pea.

Comparison with the 1963/64 agricultural year (Fig.7.13) brings out important differences not only in the number and designation of the crop combinations but also the area covered by each combinational association. The entry of rice and beans in post war crop combinations is

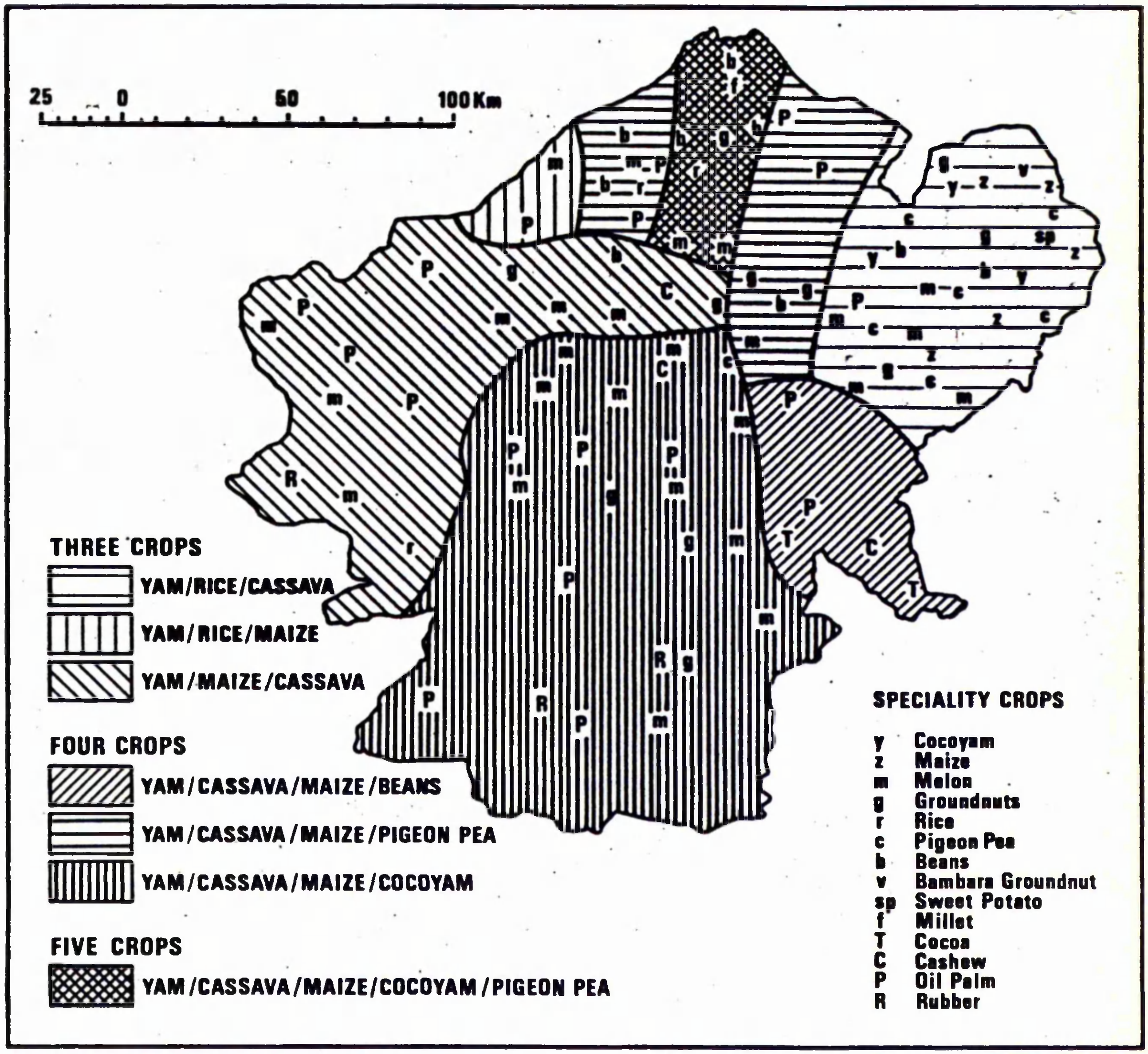


Fig. 7.12: Crop Combination Regions 1974/1976

Data Source: Rural Economic Survey, 1974/1976

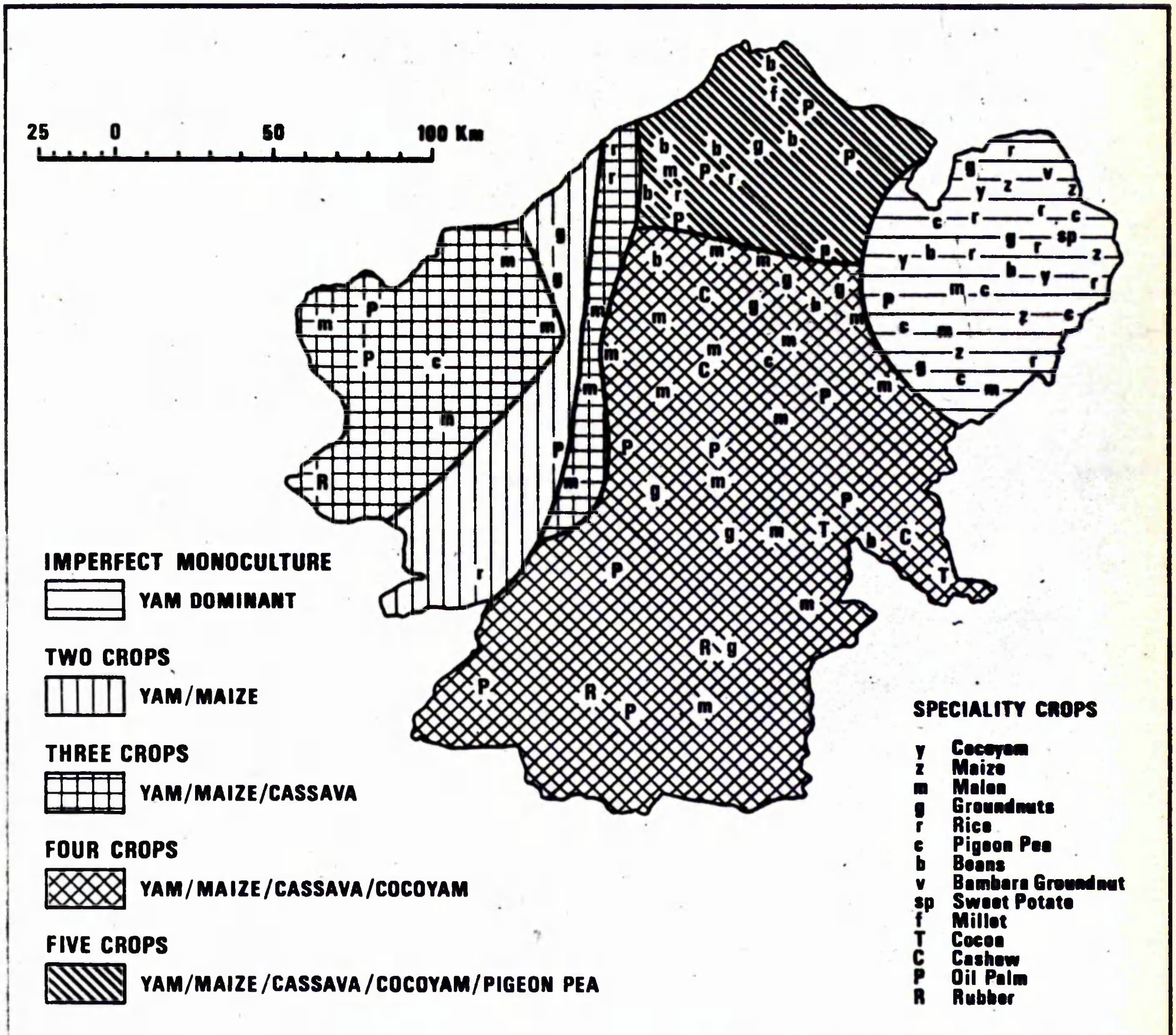


Fig.13: Crop Combination Regions, 1963/64
Data Source: Rural Economic Survey, 1963/64

notable and will be discussed later. Meanwhile let us examine the pattern of distribution of the crop associations for the period 1974 - 1976 and the changes that have taken place since 1963.

Yam/Cassava/Rice. The hydromorphic soils of Abakaliki, Ishielu, Ezikwo and Afikpo divisions are dominated by a three crop combination of yams, cassava and rice but there are still islands of imperfectly developed monoculture based on yams. (Akibarahu - Y 73%, C 16, R 14). There is considerable variation in the degree to which village figures depart from the pre-war near monocultural situation judged by the high hectarage of the main staple. Among the Ezza, yams account for 51% of the total cropland area, rice, 16% and cassava 13%. Corresponding figures for Izii are yams 62%, rice 8% and cassava 7%. It will be observed that the appearance of rice and cassava in the combination reduces considerably the contribution of the premier crop to the total cropland area.

Yams/Maize/Cassava. The whole of Ika and Riverine Igbo is dominated by yam/maize/cassava association but there are differences in the ranks of the different crops within this broad category. Among the northern Ika, the combination may be more appropriately designated as cassava/yam/maize. (Owa Oyibu - C 32, Y 23, M 11; Ute, Orume - C 25, Y 24, M 24; Alizomor - C 30, Y 26, M 28). In the Niger-Anambra- Ase trough where maize consistently ranks first the combination should be classified as Maize/Yam/

cassava (Ezionum M 42, Y 34 C 16; Okirioki M 32, Y 20, C 14; Obiadigwe M 33, Y 25, C 11). The interesting feature of food crop agriculture in the entire western Igboland and adjoining riverine areas in the east is the relative insignificance in the contribution of cocoyam in the food economy. Ika Igbo people do not eat foo foo prepared from a mixture of pounded yams and cocoyam as their eastern counterparts do. Though cassava appears in the combination over much of the riverine areas, it is much less suited to the environment than either yams or maize. It is therefore often relegated to the third position. The soil environment and man/land ratio over much of the territory are still favourable to the cultivation of yams on an extensive scale. The shorter growing season imposed by the annual flooding tends to reduce the competitive strength of cassava.

Rice/Maize/Yams. The Niger-Anambra lowland is covered by a three-crop combination of rice, maize and yams. This crop region extends eastwards from the Anambra River to Adani and includes the villages of Anaku, Omo, Ogwurugwu, Ifite-Ogwari, Iga, Umumbo and Omasi. The compound land often contains few stands of coconuts and oil palm exploited mainly for subsistence. Emphasis is on the production of annual grain and root crops. The region is noteworthy because it is the only part of Igbo land where rice emerges distinctly as a leading member of a crop association. The reason for this peculiar position can be found in the physical historical and economic circumstances of the area. The poorly draining clayey soils are seasonally flooded thus creating ideal environments for the cultivation of wet rice. Before the introduction of Asian rice into Igboland, the staple food crop of the Igala and Igbo people who inhabited the lowland were yams, maize and a variety of local rice called ji agwunà (yam has finished). Maize however had first claim to the land, rice came second and could be pounded to make foo foo. When Asian rice was introduced in the early 40's and Government established a farm settlement at Adani with emphasis on rice, it was not difficult for the people to switch over to large scale paddy cultivation. The cultural infrastructure was already there. The establishment of the farm settlement and the construction of giant rice mills to handle and market the produce, added impetus to the change.

Rice now ranks first and accounts for about 40% of the total cropland. Maize claims 25% and yams, 22%. Cassava, soya beans and cocoyam are minor crops in the southern part of the region. Around Igbaku and Umumbo, sugar cane is becoming important.

Rice hectarage has been on the increase since the establishment of the farm settlement. The cost of production is small in relation to the net profit per hectare. The land tenure system constitutes no serious problem. Traditionally, all the farmland belongs to exogamous family units but is administered on their behalf by the chiefs and elders. Non-natives can rent land by making presents and token cash payments to the family through the chiefs.

Appendix VII which shows the cost and returns per hectare of paddy at Adani suggests why the area has been a source of attraction to migrant tenant farmers who rent land for commercial cultivation of rice. Many of the migrants come from Udi Local Government Area, Aku and Nkpologwu on the plateau to the east.

Low population density still permits extensive system of land use. Fallow periods in many places exceed four years and there are vast areas of potential rice fields awaiting exploitation. Since the land is fairly level, the soil clayey and the annual rainfall greater than 1,500 mm, rice is grown profitably without artificial irrigation, but this is limited to the rainy season. Raising a second crop in the year requires irrigation.

The influx of young able-bodied men into the area after the Civil War and the flexibility in the land tenure system which allowed stranger-farmers to rent land for agriculture added to the natural advantages of the lowland to large scale paddy production. Today it has emerged as one of the leading rice producing centres in Igboland.

The main problem of the farmers is lack of capital to expand their scale of operation. This is demonstrated by the fact that at Adani the average hectarage cultivated per farmer per annum is only about 0.3. Except in the farm settlements irrigation is seldom used to raise a second crop during the dry season. Another main problem of the region has always been physical isolation. During the rainy season, the only road link with Nsukka is reduced to fine mud and very few vehicles ply the route for purposes of evacuating the produce. It is hoped that when the all season road link planned for the area under the Third National Development Plan is completed, the physical isolation will come to an end with consequent increase in rice production.

Yam/Maize/Cassava/Pigeon Pea. This crop region occupies the zone lying between the seasonally flooded soils of Anambra basin and the edge of the plateau. The demographic situation still allows bush fallowing of 3 to 4 years' duration on the outer farmland. Cultivation is limited principally to the more fertile river valleys. Very wet soils are used for paddy. Yams, maize and cassava, are grown as intercrops on the valley floors while cassava, pigeon pea, and occasionally groundnuts occupy the low hills and intermediate slopes. Consequently the area under cassava often exceeds that of yam.

Substantial variation occurs in farmers' crop emphasis. At Okpuje, Opanda, Ukpabi, Nimbo and Okutu, emphasis is on yams and maize. In fact two crops of maize are taken annually and there is a large surplus of yams for export to other regions. Since 1973, there has been a growing interest in the cultivation of tobacco in response to the campaign by the Nigerian Tobacco Company which undertakes to purchase all the produce.

<u>Cassava/Cocoyam/Yam/Maize</u>. This distinctive crop combination is the most widespread east of the Niger and covers the densely populated Igbo heartland extending southwards into Oguta, Ngwa, Ikwerri and Etche divisions. Internally the region is very diverse in terms of climatic, and demographic conditions and these are reflected in the crops grown and the degree of emphasis. Generally speaking, crops which require very humid conditions tend to be more important in the southern half. Towards the north those favouring drier climates become dominant. But this is not always the case as demonstrated by the areal contribution of the component crops to the total cropland in a number of villages. At Ubie in the extreme south western corner of the sub-region, cassava occupies 40%, cocoyam 28%, Yams 16% and Maize 14%. Further north at Eziala, Mbaise with a dense cover of 'economic' tree crops the areas under cassava and maize surprisingly decrease to 33% and 11% respectively while cocoyam increase to 33%. Corresponding figures for Ezihu Aguata in the extreme north are - cassava 34%, cocoyam 23%, yams 21% and maize 21%. The close association between yams and maize in the mixed cropping system is shown by their equal area in this village.

<u>Yams/Cassava/Yam Beans/Maize</u>. This unusual combination occurs in Bende, Ohafia and Aro-Chukwu divisions. This is the only region where yam beans (<u>Vigna species</u>) now enter the combination. In the past its cultivation was much more widespread than at the moment. Yam bean is so important in the food crop economy that at times it ranks

third after maize and yams thereby displacing cassava to the third position (Mkporo Ohafia - M 33, Y 25, B 16, C 14). During the Civil War, Aro Chukwu and Ohafia were important sources of the protein-rich yam bean for what then remained of Biafra from early 1969 to the end of the war in 1970.

Cassava/Cocoyam/Yams/Maize/Pigeon Pea. Fig. 7.12 shows that the C/Cy/Y/M/PP combination occupies the Nsukka plateau and extends from about the latitude of Ukehe to the boundary with Kwara state. The essential features of this combination appear to be influenced by two major factors - climate and man-made vegetation. With rainfall reduced to less than 70 inches (1772 mm) and variability above 18% and a long dry season lasting some four months, we would expect crops requiring drier conditions. Two such crops - maize and pigeon pea, appear in the combination with pigeon pea being more important on the gravelly and stoney soils developed on the outcrops of sandstone formations.

There is substantial variation within this region. The crop association mapped is that which appears to be dominant for within the area we have islands of cow pea/cassava/maize/pigeon pea, cassava/cocoyam/maize, cassava/cocoyam/yam, maize, cassava/cocoyam/yam/maize/cow pea. The tendency is for cassava, cocoyam, maize to occupy the compound land while the cassava, pigeon pea and cow pea associations dominate the outer farmland.

Substantial variation also occurs in the ranks of the crops raised. Among the Idoma peoples living in the driest part of the area, maize ranks first, followed by guinea corn and cassava. In the broad zone extending from Enugu Ezike to Ukehe, cassava and cocoyams are the principal root crops. Cassava, however, ranks first. As a hardier crop, its cultivation is extending outwards into areas of very poor soil usually set aside for the collection of thatch grasses.

Yams have ceased to be an important root crop on the Nsukka plateau though the water variety continues to be grown in favourable locations on the compound land. A thick man-made tree cover of *Irvingia* species, Kola trees and oil palm covers the densely settled uplands or plateau tops thus creating micro-environments for crops that thrive under shady conditions. Cocoyam and water yam appears to be admirably adapted to such an ecological zone. Nearly all the yams grown on the compound land here belong to the water yam variety which the farmers claim to be well adapted. For similar reasons the 'Kochuom' variety of cocoyam has proved very popular. It matures early and gives a high yield. Towards the eastern escarpment with thin gravelly soils, yams and cocoyams are replaced by a two-crop combination of cassava and pigeon pea interplanted with *parkia* species. The soils are so poor that even cassava presents a stunted growth.

Many plateau farmers now walk long distances to the eastern and western lowlands to grow their yam. For example, Ibagwa Ani has farms at Okutu some 9.6 Km away. Similarly Obolo-Afo, Eha-Alumona and Opi move down the scarp to farm the more productive soils of Obolo Agu, Eha-Ndiagu and Opi-Agu.

Under mounting population pressure, the poor soils on the slopes of the residual hills are being exploited for cassava and pigeon pea cultivation. Extensive area of open grassland set aside for the collection of thatch grass and hunting, are being reclaimed for this purpose by planting Acioa barteri.

Distribution of "Specialty" Food Crops. Melon is undoubtedly the most widespread specialty annual food crop among the Igbo. In the drier north the crop occasionally features in the crop combination (Ute Erume, Ika - C 25, Y 24, M 24, m 21; Amagu, Anambra - C 45, M 15, m 18, Cy 10; Ozii, Mgbidi - M 40, Y 22, C 20, m 17; Alizomor, Ika - C 30, m 28, Y 26).

Obviously the widespread cultivation of melon is not unconnected with its uses. Melon features very much in the preparation of very spicy and highly cherished Ọ́gbarọti (open and drop into your mouth). It also features in the preparation of sauces in the form of Ègúsi (for Ègúsi sauce) and Ōgiri (for other forms of sauce but most especially bitter leaf and òrá sauce). No traditional Igbo housewife prepares ọ̀rá or bitter leaf sauce without ogiri as demonstrated in the saying - Tègwó anụ̄ tègwó ázụ̄, ōgiri bụ́ ọgwụ̀ ofe which means 'No matter the amount of meat or fish you put into your sauce, it is not sauce until you have put in ōgiri.

Another reason often given for the popularity of melon in the agricultural system is the ease with which it intercrops with yams, cassava and other crops can be effected. Farmers in Mbanasa and Aguata division use the juicy pulp in trapping edible snails but disagreed with the suggestion that anybody grows melons with this objective in view. Rice appears as a speciality crop in the seasonally flooded lands of Aboh, southern half of Afikpo and Ùdē lands of Arondiguogu and Oghoji. Sweet potatoes are fast becoming important field crops in Abakaliki, Nkanu and Anambra divisions. Fluted pumpkin (Telfairia occidentalis) is noticeably important in Ohafia, Bende, Etiti and Arochukwu divisions where they are grown as mixtures with yams and yam beans both for the oily seed and for its leaf which is an important vegetable in Umuahia markets.

Plantains and bananas feature prominently in the very wet southern half of the region. Pepper and yam beans have unusually high hectarage in Okirioki and Ibusa respectively. Pepper claims 28% of the total cropland and yam beans 11%. High hectarage and wide distribution also characterises okro, a vegetable fruit grown for the preparation of a glutinous sauce called Ofe Okwuru often preferred to all other sauces for eating gari.

Distribution of Perennial Tree Crops. The distribution of the main speciality tree crops which supplement the annual food crops is shown in Figs. 7.12 - 7.13 by means of capital letter symbols. They include oil palm, African breadfruit, oil bean, African pear, kola trees, Irvingia and Parkia species. Like most other food crops the distribution pattern tends to follow human population hence the highest densities occur in closely settled zones, the only exception being *Parkia* species widely dispersed in the relatively open savanna areas. The oil palm remains the most widespread food and cash earning perennial. Nature appears to have compensated areas with poor acid soils for the main annual food crops with this all important cash earning perennial. While Riverain and Ogu Ukwu Igbo depend on yams and rice for cash, other Igbo groups rely heavily on the oil palm, African breadfruit and at times oil bean. *Parkia* and *Irvingia* species are limited to the drier northern part with highest concentration in Nsukka division and part of Isiuzo.

Comparison of Pre-War and Post-War Patterns.

A close examination of Figs. 7.12 and 7.13 brings out interesting differences between pre-war and post-war patterns. Post-war data produced seven significant crop regions as against five of the earlier surveys with substantial changes in their composition. There are differences also in crop ranks. Figs. 7.14, 7.15 and 7.16 summarise the results of rank order analysis of 1959-63 and 1974-76 crop area data. The maps bring out clearly the competitive strength of each crop in relation to those of its rivals in all the combinations and the changes that have occurred between the two survey periods.

Fig. 7.14 (a) shows that five crops ranked first in 1959-1964. Each of the four crops in the basic YC cyM combination ranked first in at least two of the survey villages. The only addition to the list was rice which ranked first only at Adani. Fig. 7.14 (b) shows that there is no change in the number and designation of the first

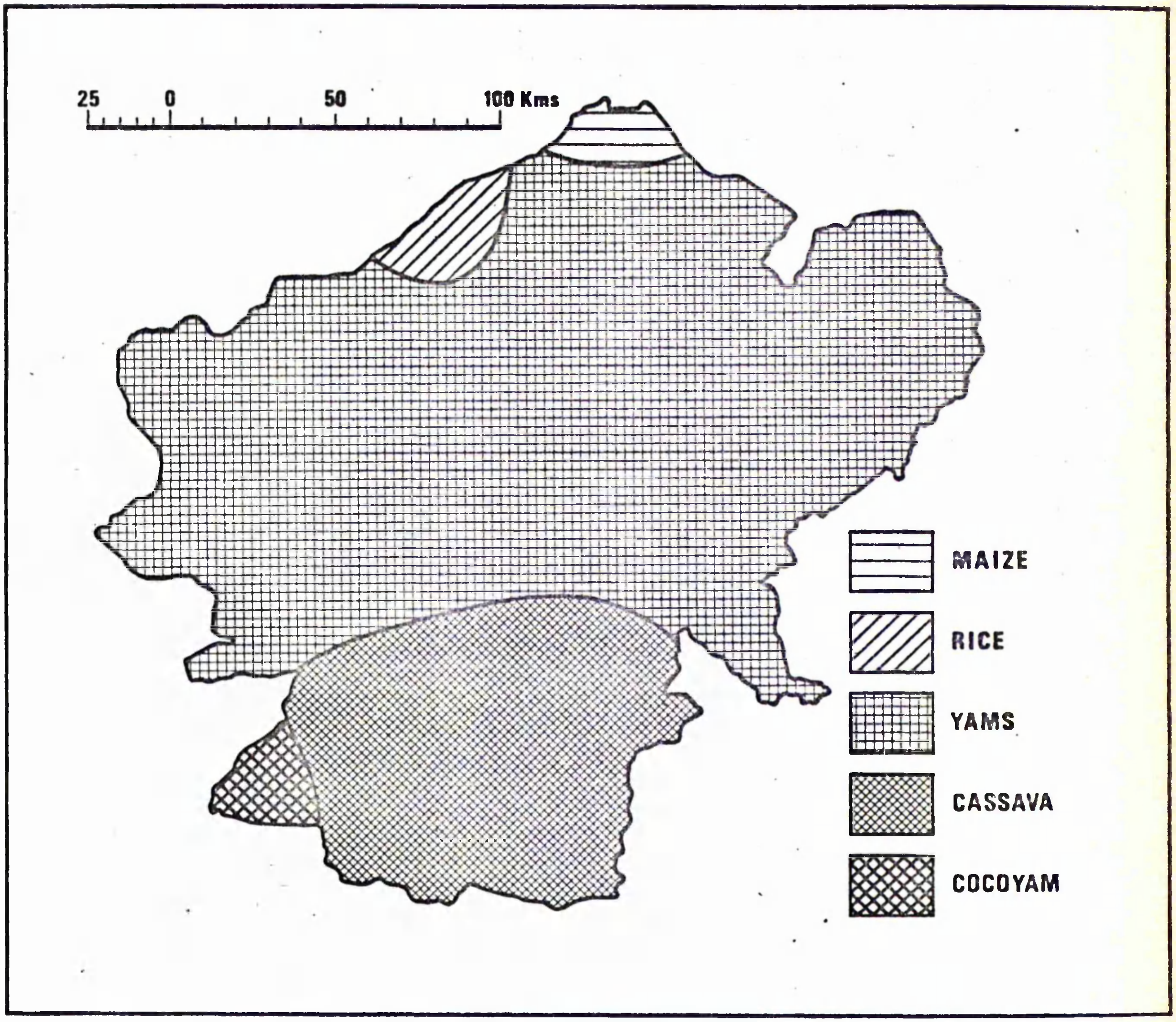


Fig. 7.14(a): Distribution of First Ranking Crop 1963/1964

Data Source: Rural Economic Survey, 1963/64

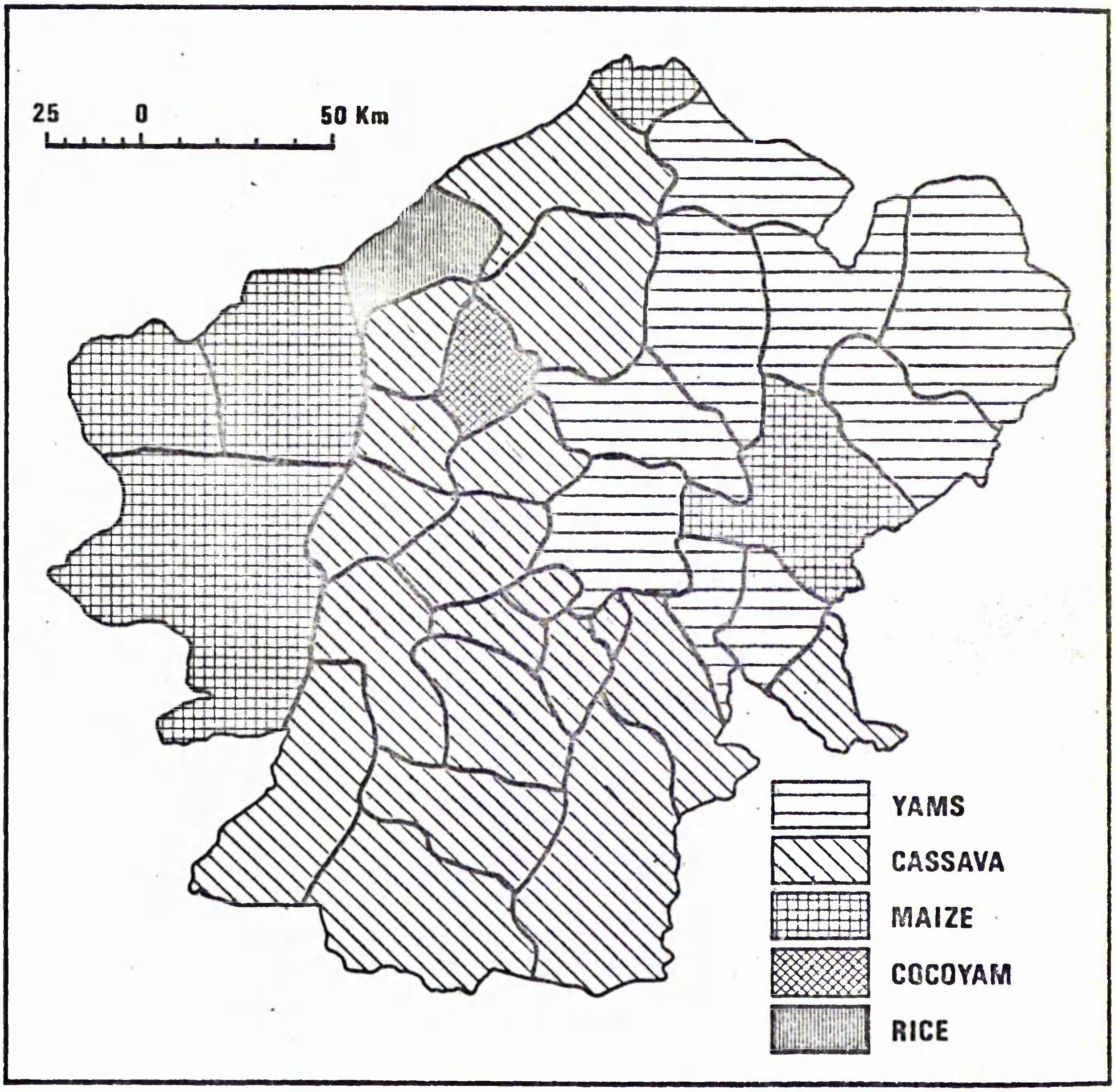


Fig. 7.14(b): Distribution of First Ranking Crop 1974/1976

Data Source: Rural Economic Survey, 1974/76

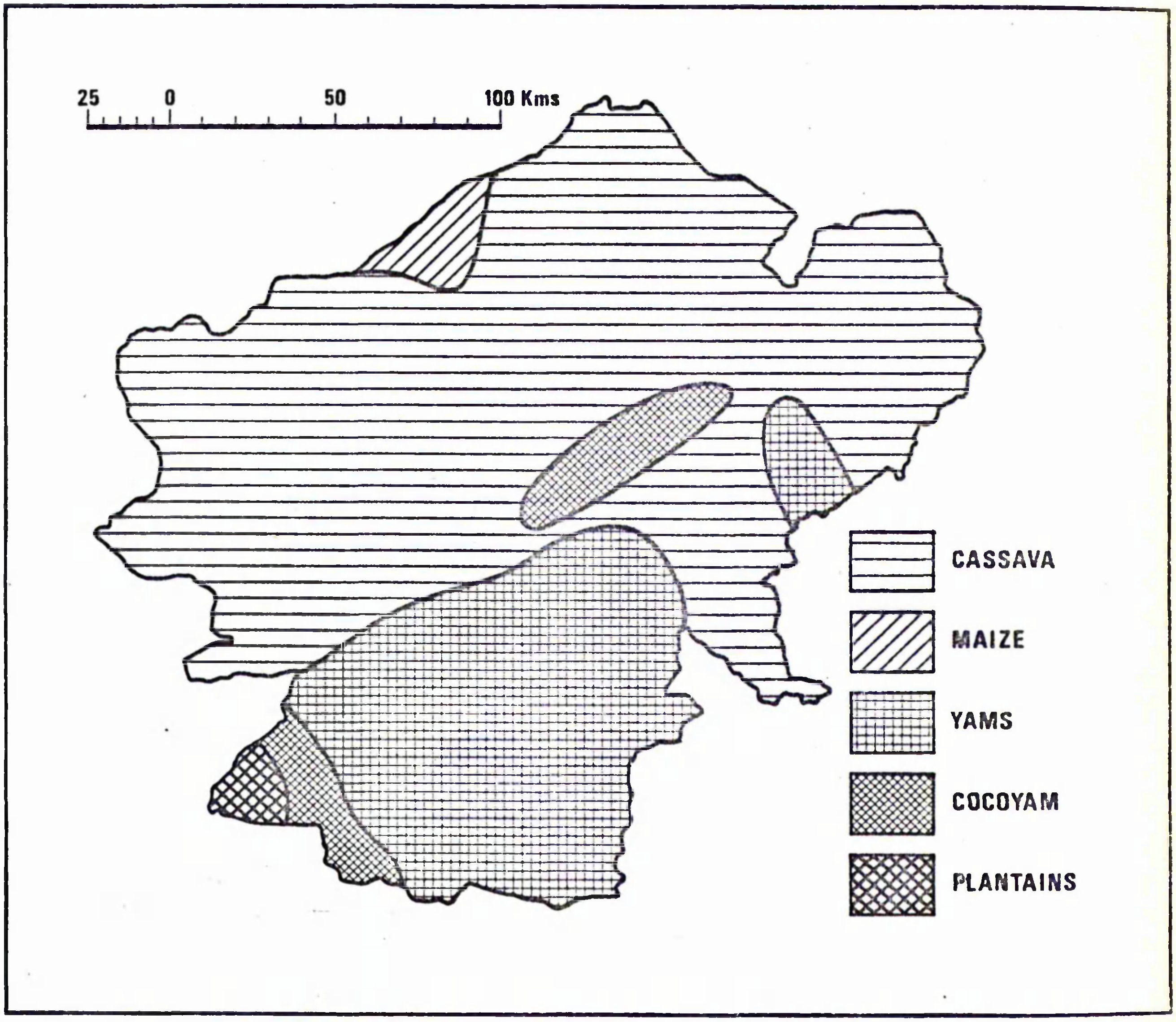


Fig.7.15(a): Distribution of Second Ranking Crop 1963/1964
Data Source: Rural Economic Survey, 1963/64

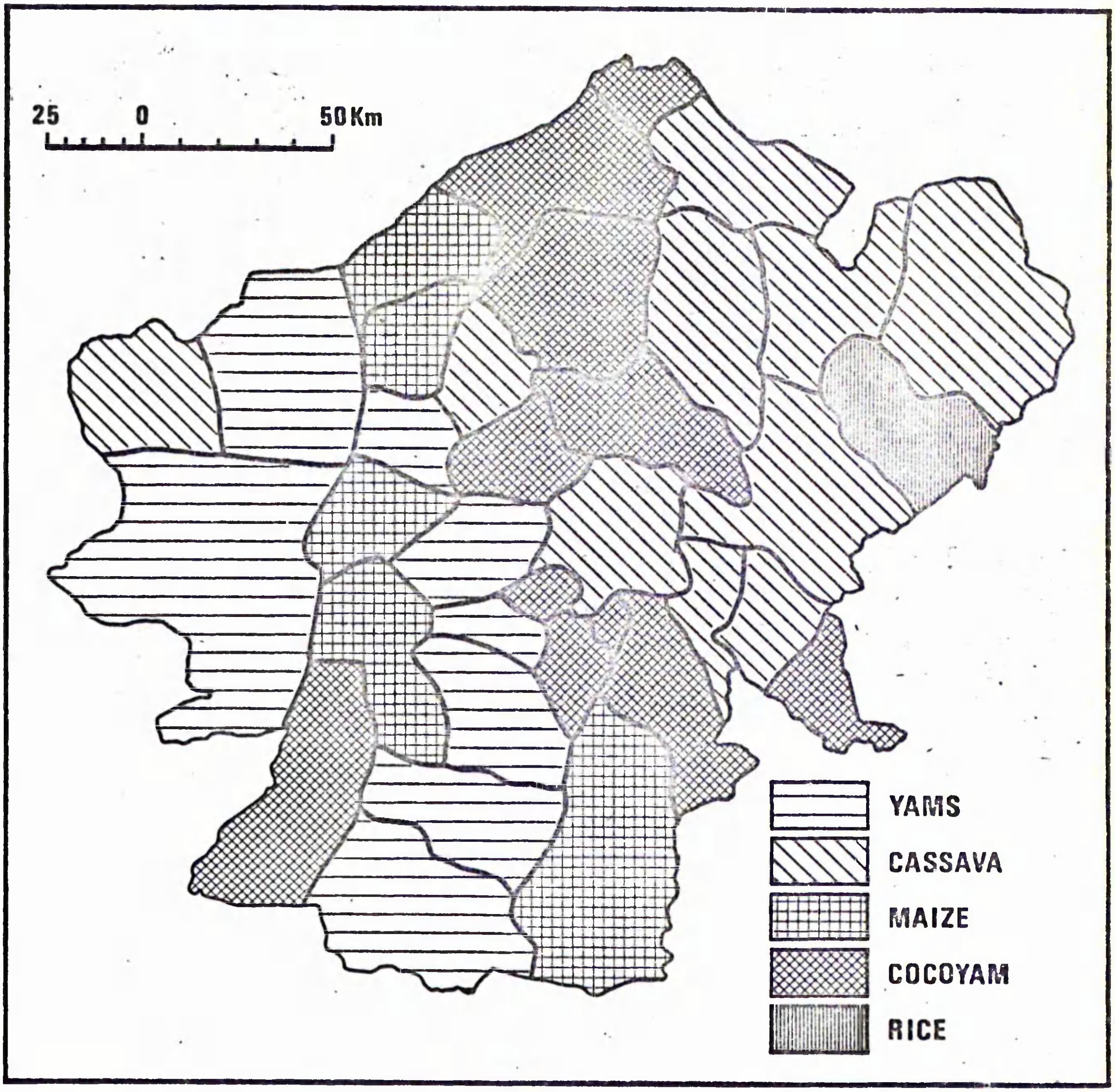


Fig. 7.15(b): Distribution of Second Ranking Crop 1974/1976

Data Source: Rural Economic Survey 1974/1976

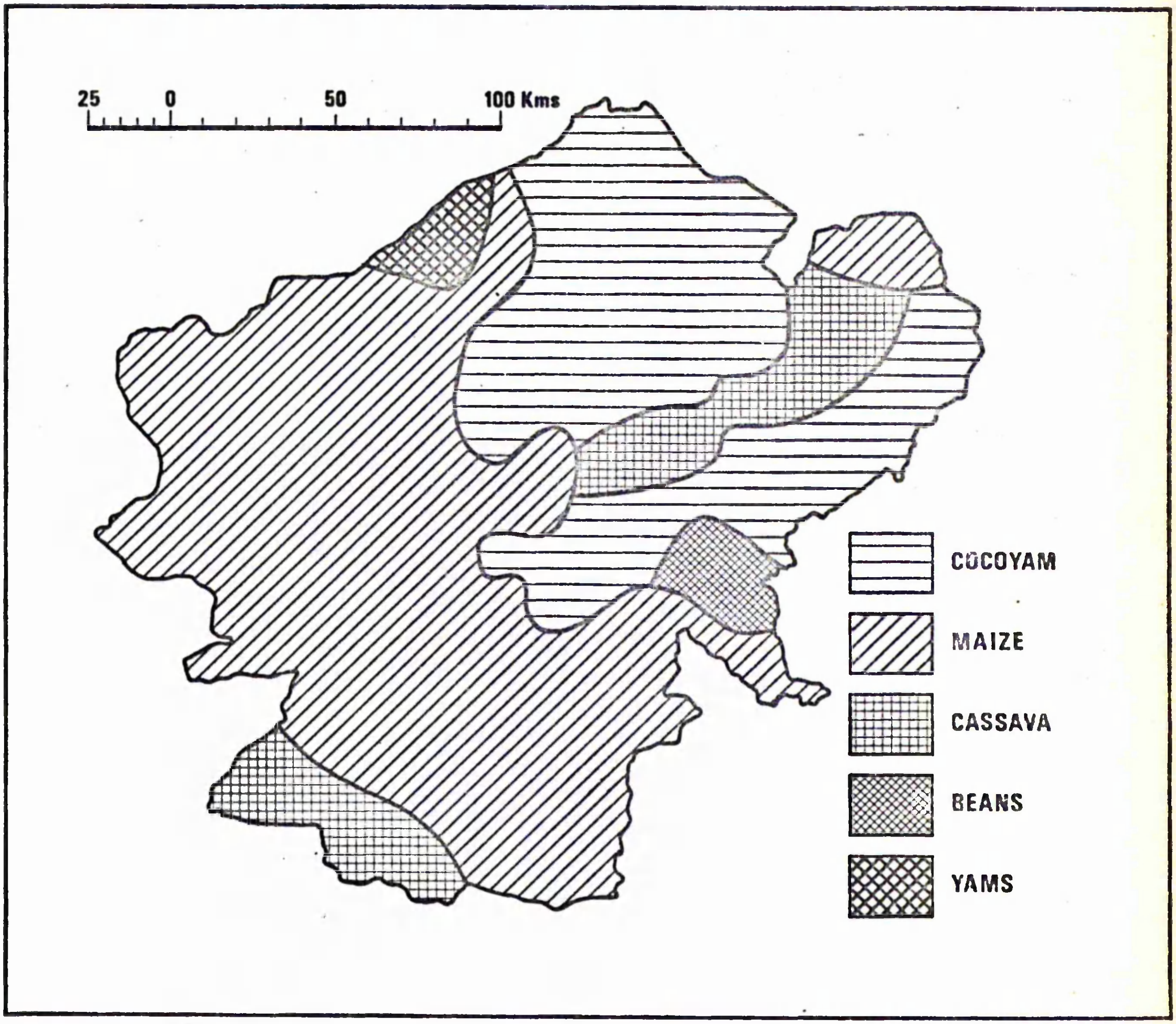


Fig. 7.16(a): Distribution of Third Ranking Crop 1963/1964

Data Source: Rural Economic Survey, 1963/64

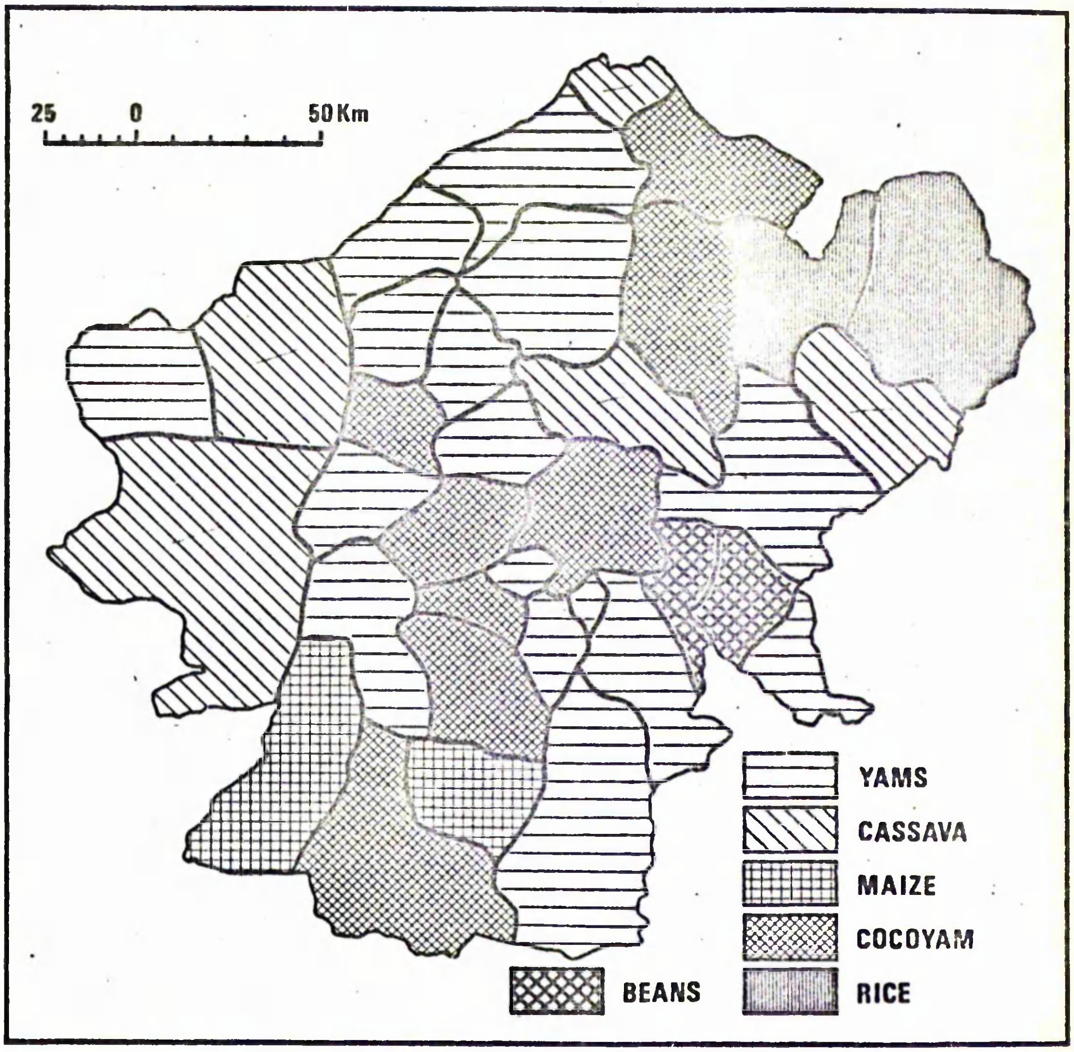


Fig. 7.16(b): Distribution of Third Ranking Crop 1974/1976

Data Source: Rural Economic Survey, 1974/76

ranking crops. As in the pre-war years, yams, cassava and maize are dominant over the other first ranking crops. However noticeable changes in their distribution can be observed from the two maps. In the 1959-1964 surveys, yams occupied the entire northern half of the region while cassava held sway in the south. Post-war surveys show a broad belt running north south across the region where cassava now ranks first. In other words, the crop has pushed its frontiers northwards into Nsukka-Udi plateau where yams ranked first according to the earlier surveys.

All the first ranking crops also rank second in both surveys. In fact maps of first and second ranking crops for the 1959 - 1964 surveys are almost complementary. Cassava and yams mainly interchange positions. Fig.7.15 (b) based on post-war data does not have such a simple pattern. For example, in Nsukka and Igbo-Eze divisions where cassava ranks first, cocoyams rank second whereas among the Ika Igbo maize ranks first and either yams or cassava second.

The maps of third ranking crop is a mosaic of many different crops. The new additions to the five in the first rank are groundnuts, beans, bambara nuts and melons. Though fragmented in pattern, the maps still exhibit certain characteristic features. Maize and cocoyams fairly consistently rank third over much of Igbo heartland. Towards the east in Ohafia and Bende divisions, they are displaced by yam beans. In the southern half of the Ika Igbo where maize ranks first and yams second, it is cassava which always ranks third.

The question naturally arises as to how one accounts for the differences. Are these the results of real changes in the cropping patterns or of improvements in the techniques of data collection which made more detailed analysis possible? Certainly one would expect that the increase in the sample size and improvement in the survey techniques during the post-war years would influence the quality of the data and the results of their analysis. It would appear that the emergence of rice and cassava in the crop association of Anambra and Abakaliki previously designated as imperfect monoculture, can be explained partly in terms of this factor. It has been widely reported that immediately after the Civil War, many young men who lacked capital to purchase seed yams or to return to their trading posts in the townships, migrated to these rice lands to engage in commercial paddy production. The lower cost of seeds per unit area and favourable land tenure systems were their main attractions. The situation,it is claimed,produced a frenzy of activity on this front of food crop farming, a hope which was later shattered by the appearance of 'oil money' and consequent movement out of the rice lands back into the townships.

As has been outlined in the theoretical framework, the factors which influence cropland use in traditional societies are many and often conflicting. The best authorities capable of explaining the intricate relationships involved are the farmers themselves. The patterns under examination are the results of their individual decisions. The next chapter will therefore focus attention on the farmers' ideas of what is actually happening to their enterprise and the reasons for their choice of crops and crop associations.

CHAPTER VIII

IDENTIFICATION AND ANALYSIS OF FACTORS INFLUENCING FARMERS CHOICE OF CROPS AND CROP ASSOCIATIONS

> "Aim of Agricultural Geography should be the interpretation and analysis of actual patterns or spatial organisation of agricultural phenomena."
>
> Pred. (1967 p.10).

Introduction.

In Chapter II, it was postulated that agricultural land-use decisions are often based on economic, physical and socio-personal considerations. It was also hypothesised that in traditional societies, patterns of production are in broad terms dependent on the characters of the physical environment but that local variations within areas of similar environmental conditions reflect the farmers' socio-personal circumstances. These latter are very powerful in influencing farmers' decisions to develop or not to develop cultivation of particular crops or crop associations. The patterns of crop production examined in Chapter VII can therefore be regarded as the result of group as well as individual assessments of the various facets of the environment of Igboland in which social considerations are considered paramount. The formal connections between the physical economic and socio-personal factors have already been examined in Chapters III, IV, V, VI and relevant sections of Chapter VII.

This chapter now focuses attention on how the farmers themselves view, judge and talk about the more important of these factors affecting their food crop production, their relative importance in the choice and continued cultivation of given crops and crop associations. This is done at four levels - the entire crop production system, individual villages, individual farms and the two competing root crops. Above all it seeks to explain why yam cultivation survives in some parts of the region where the edaphic environment is now not suited to the crop.

Identification of the Factors and Coding Responses.

As was mentioned in Chapter I, five villages were chosen from different ecological zones in order to bring out significant cultural variations from one area to another. The factors affecting food crop production generally and the choice of particular crops and crop associations in particular were elicited through the use of structured and unstructured farmer interviews during the pilot survey. An inventory of constructs and perceptions which farmers use to make meaning of their agricultural operations, their ideas about the crops they raise and reasons for their choice was compiled and analysed (Appendix VIII. Twenty two factors, each mentioned by at least two farmers, were then used in compiling the decision-making questionnaire (Appendix IV). Since farmers differ markedly in terms of their socio-personal and economic backgrounds, there was provision for them to add any factors which influenced their choice of enterprise but are omitted in the standard questionnaire.

During the survey, the farmers were asked whether they took each of the 22 variables into consideration before deciding to grow the crops. If the answer were 'yes,' they were then requested to state the importance they attach to the particular variable and how it in turn influenced their choice and continued cultivation of the crop. Ratings were graduated and coded.

Thus:

Ọ́ dịghi mkpā ma ọ́lị Not considered at all/not important at all	- 0
Ọ́ dị̀ ḿkpā ma Ọ dịsịghị Considered but not really important	- 1
Ọ́ dị̀ ḿkpā It is important	- 2
Ọ́ dìnọ̄ọ ḿkpā It is very important	- 3
Ọ́ dịnọ̄ọ ḿkpa nke úkwu/Ọ́ dị̀ ǹnukwu ḿkpa It is extremely important/essential	- 4

Coding responses in this manner necessarily involves some element of arbitrariness, but the assignment of numerical values to different categories of importance facilitates comparison and further statistical analysis. The importance of each factor in the traditional agricultural system can be inferred from resulting scores and the number of times or cases where a factor applies. Comparison of the scores on particular factors for different villages brings out the spatial variations in the importance of each factor in agricultural decision making. Similarly, the total score for each factor on each crop reveals its relative importance in the choice of crops and crop associations. Thus by comparing the ranked arrangement of the scores in different villages and for different crops one can gain an insight into the relative importance of the factors in agricultural decision making.

For the entire crop production system, for each crop and for each village, each factor has a maximum possible score from which the following indices suggested by Van der Vliet (1972) and used by Ilbery (1977) can be calculated.

$$\% \text{ Applicability } (\% A) = \frac{\text{No. of cases where factor applies}}{\text{Total No. of farmers interviewed}} \times \frac{100}{1}$$

$$\% \text{ Total } (\% T) = \frac{\text{Total score for each factor}}{\text{Max. possible score for all cases interviewed}} \times \frac{100}{1}$$

$$\% \text{ Importance } (\% I) = \frac{\text{Total score for factor}}{\text{Total max. possible score for all cases where factor applies}} \times \frac{100}{1}$$

Appendix A. shows the inventory of the farmers' constructs, ideas and suggested reasons for their choice of crops and the number of times they were mentioned. These are reproduced as collected in the field. In many cases, literal translations are reproduced to avoid distortion of ideas. An examination of the statements reveals interesting aspects of the farmers' decision making attitudes. Attention is drawn to the use of direct statements, proverbs, wise sayings and questions under conditions of unstructured interviews. Note how the prestige associated with the growing and consumption of yams is brought out by the two statements - "We do not use cassava to entertain important visitors like you," "In the past energetic and successful yam farmers got free wives." Similarly the importance attached to ease of preparation of crops and particular methods of consumption is brought out in the direct question posed to the investigator - "Can you roast cassava and eat?"

The use of unstructured questionnaire here elicited views and ideas which even the most carefully thought-out structured questionnaire would have omitted. Moreover, since all the factors derive from the inventory suggested by the farmers themselves and not imposed on them for ratification by the researcher, they can be understood as embodying the more important physical, economic and socio-personal influences which farmers are aware of and react to. We are now in a position to appreciate that whereas on the surface farmers' actions may seem chaotic and irrational they are in fact not only rigidly ordered but also deeply rooted in the traditional wisdom of the group.

Classification of the Factors.

Table 8.1 shows a classification of the 22 significant factors derived from the interviews into physical/environmental, physical/biotic, economic, political and socio-personal categories. The numbers in brackets refer to those of statements in Appendix A. which fall within the category. The distinction between the categories involves some form of arbitrary judgement. According to Ilbery (1977, p.68), some overlaps are bound to occur in such classifications as a result of the interrelationships and common causal connections between the variables being classified. 'Amount of shade and density of economic trees' on the surface looks very much a physical/biotic factor, but is the result of a traditional cropping system whereby the farmer intercrops his annuals with perennial tree crops and allows practically every tree crop that germinates to grow to maturity irrespective of the density per unit area and the fact that the thick foliage shuts off the sun's rays from the annual crops growing below. Similarly, some of the factors often classified as economic have some socio-personal connections and vice versa.

The classification does, however, bring out the relative importance of physical/environmental, physical/biotic, economic, political and socio-personal factors in the farmers' choice of crops. Of the 22 significant factors considered by the cultivators, as many as 10 relate to socio-personal characteristics of the farmers. Five relate to the biotic qualities of the crops, three to physical environment and only one to political circumstances of the farmers. The classification therefore establishes the paramount importance of socio-personal factors in agricultural decision making.

TABLE 8.1 : Classification of Constructs/Ideas identified by Farmers as affecting Crop Choice.

A. Physical/Environmental:

1. Amount of shade/density of economic trees. (Nos. 8, 10, 44).
2. Type of vegetation. (8, 10, 39, 44).
3. Soil type. (1, 12, 16, 31, 38, 49, 54).

B. Economic:

1. Market demand. (45)
2. Cash income from sale of produce. (23, 30).
3. Availability of labour. (7, 18).
4. Ease of getting planting materials. (9, 24, 37, 43).
5. Transport cost to house/market. (45, 46, 51).

C. Political.

1. Government encouragement. (22).

TABLE 8.1. continued.

D. Socio-Personal Factors:

1. Age of cultivator. (19).
2. Size and composition of family to be fed. (2, 3, 28).
3. Degree of nourishment. (26).
4. General taste of meals prepared from crop. (5, 32, 53).
5. Prestige association with crop. (17, 21, 29, 35, 36, 40).
6. Ancestral connections. (4, 11).
7. Ritual association. (13, 41).
8. Land Tenure systems. (25, 15)

E. Physical/Biotic Qualities of Crop:

1. Storage quality of produce or by-product. (34).
2. Maturity during period of general food scarcity. (6,50).
3. Degree of sustenance during hard work. (14).
4. Availability of harvest most of the year. (20).

Farmers' Ranking of the importance of factors in the Crop Production Systems:

The importance of these factors in the production of the four basic food crops is revealed by the scores in Table 8.2. It can be seen that the four top-ranking factors have socio-personal connections. In fact 40% of the top ten

TABLE 8.2: Classification and ranking of factors affecting decision making in all five villages in order of importance. (Four major crops).

Source: Fieldwork

Rank	Factor	Classification	Total Score	Rank
1.	Experience/Personal knowledge	Soc-Per.	1172	1
2.	Ancestral connections	Soc-Per.	1125	2
3.	Size of family	Soc-Per.	1115	3
4.	General taste of produce	Soc-Per.	943	4
5.	Maturity during strategic season	Bio.	912	5
6.	Good soil for crop	Phy.	880	6
7.	Ease of getting planting materials	Econ.	797	7
8.	Vegetation type	Physical/ Bio.	796	8
9.	Availability almost all year round	Bio-Phy.	694	9
10.	Storage quality of produce - Good	Bio.	625	10
11.	Low labour demand	Econ.	580	11
12.	Sustenance during hard work	Bio.	579	12
13.	Prestige association of crop	Soc-Per.	548	13
14.	Age of farmer	Soc-Per.	509	14
15.	Favourable land tenure systems	Soc-Per.	497	15
16.	Cash income from sale of produce	Econ.	458	16
17.	Good market demand	Econ.	411	17
18.	Amount of shade/density of economic trees	Bio.	409	18
19.	Ritual Association	Soc-Per.	271	19
20.	Necessity for title taking	Soc-Per.	165	20
21.	Government encouragement	Pol.	130	21
22.	Low transport cost	Econ.	115	22

factors are socio-personal, and 30% biotic. Of the remaining 30%, 10% goes to physical, 10% to economic and 10% covers the area between physical and biotic. The only political factor ranks 21st, a clear indication that farmers see their agricultural decisions as being little influenced by government policies.

Aggregation of scores of factors cited for the five sample villages tends to mask significant variations from village to the village. Table 8.3 shows the ranking of the factors in each of the villages. It is worth noting that government encouragement is rated very low in all the villages (Izii, 20th; Akokwa, 17th; Ihe, 20th; Okehi, 22nd; Umunede, 21st).

Of the first ten variables at Okehi, seven (ancestral connections, size of family, good taste of produce, experience, ease of getting planting materials, prestige and favourable land tenure) have socio-personal connections. Biotic, physical and economic factors each occur only once. In fact the first five top-ranking factors relate exclusively to the socio-personal circumstances of the cultivators. Corresponding figures for Umunede located in a similar ecological zone are - socio-personal, 4; biotic, 1; physical, 2; economic, 3. Akokwa has fewer socio-personal variables among the top ten (socio-personal, 3; biotic, 3; physical, 3; economic, 1). Corresponding figures for the two remaining villages are Ihe (socio-personal, 4; biotic, 3; physical, 2; economic, 1); Izii (socio-personal, 6; physical, 1; biotic, 3). It will be recalled, however, that most of the physical and biotic factors which assume

TABLE 8.3: Ranking of Factors in Five Villages. (Four Major Crops).

Rank	Izii	Okehi	Ihe	Akokwa	Umunede
1.	Availability of planting materials	Ancestral connection	Family size	Family size	Family size
2.	Experience	Family size	Experience	Maturity during hungry season	Ancestral association
3.	Good soil	Availability of planting materials	Ancestral association	Experience	Experience
4.	Good taste	Experience	Veg. type	Availability all year round	Good soil
5.	Maturity during hungry season	Good taste	General taste good	Ancestral association	Veg. type
6.	Energy content	Good soil	Good soil	Low labour demand	Market demand
7.	Year round harvest	Land tenure	Low labour demand	Density of Econ trees	Land tenure
8.	Storage quality	Maturity during hungry season	Amount of shade/density Econ. trees	Good soil	Maturity during hungry season
9.	Ancestral connection	Prestige association	Year round harvest	Vegetation type	Availability of planting materials
10.	Family size	Low labour demand	Maturity during hungry season	Storage quality	Low labour demand
11.	Low labour demand	Market demand	Storage quality	Good taste	Good taste
12.	Vegetation type	Vegetation type	Age	Age	Cash income

Source: Fieldwork

TABLE 8.3: continued.

13.	Age of farmer	Cash income	Availability of planting materials	Availability of planting materials	Good storage
14.	Prestige association	Ritual association	Prestige association	Energy content	Year round harvest
15.	Cash income	Title association	Energy content	Prestige association	Prestige association
16.	Market demand	Energy content	Cash income	Ritual association	Energy content
17.	Land tenure	Age	Land tenure	Government encouragement	Age
18.	Ritual association	Storage quality	Market demand	Cash income	Low transport cost
19.	Density of Economic trees	Low transport cost	Low transport cost	Land Tenure	Title Association
20.	Government encouragement	Year round harvest	Government encouragement	Market demand	Ritual association
21.	Title association	Amount of shade	Ritual association	Low transport cost	Government encouragement
22.	Low transport cost	Government encouragement	Title association	Title association	Amount of shade/density of econ. trees.

Source: Fieldwork

importance in the last three villages are causally related to tradition. The formal connection between density of economic trees and traditional system of intercropping has already been highlighted in chapter VI page 241.

A few socio-personal factors which, according to the farmers, used to rank very high in the pre-colonial and early colonial years, now consistently rank very low. Typical examples include ritual connections, title taking, and, to a limited extent, prestige. Successful yam farmers and yam title holders do not command as much respect as successful traders in present day Igbo society. Their prestige and authority has been eroded away by modern political and educational set up which tilted the balance in favour of the man with naira or formal education.

Effect of Factors on the Choice of Yams and Cassava

In terms.of the two major competing root crops, the ranked arrangement of the factors shows interesting results (Table 8.4). Seven of the top ranking factors influencing the cultivation of yams are socio-personal in origin as against only three for cassava. As an indigenous crop, the yam is integrated more to Igbo social life than cassava. It is important to note that socio-personal factors such as ritual association, title taking and age of the farmers are important considerations in the cultivation of yams. These factors consistently rank high with respect to yam cultivation and low with respect to cassava. Cassava is not in any way associated with either title taking or rituals. Consequently the two factors rank last. It is also worth noting that Government encouragement ranks low for both crops. The positions of

TABLE 8.4: Ranking of factors in five villages with respect to Yams and Cassava. (Source: Fieldwork)

	YAMS			CASSAVA		
Rank	Factors	Class	Total Score	Factors	Class	Total Score
1.	Experience	Soc.P.	468	Maturation during hungry season	Bio.	378
2.	Prestige association	Soc.P.	458	Size of family	Soc.P.	354
3.	Ancestral connections	Soc.P.	454	Ease of getting planting materials.	Soc.P.	324
4.	General taste	Soc.P.	376	Availability of harvest most of the year	Bio.	320
5.	Size of family	Soc.P.	345	Good vegetation type	Phy/ Bio.	295
6.	Cash income from sale	Econ.	253	Storage quality	Bio.	268
7.	Sustenance during hard work	Bio.	251	Good soil for crop	Phy.	266
8.	Age of farmer	Soc.P.	244	Experience/Personal know-ledge	Soc.P.	250
9.	Storage quality	Bio.	234	Low labour demand	Econ.	188
10.	Favourable land tenure	Soc.P.	223	Sustenance during hard work	Bio.	184
11.	Ritual association	Soc.P.	211	Favourable land tenure	Soc.P.	182
12.	Good soil for crop	Phy.	206	Good market demand	Econ.	166
13.	Availability of harvest most year	Bio.	197	Age of farmer	Soc.P.	146
14.	Ease of getting planting 'seed.'	Soc.P/ Econ.	190	Cash income from sale	Econ.	145
15.	Low labour demand	Econ.	189	Good taste of produce	Soc.P.	141
16.	Good market demand	Econ.	179	Amount of shade	Bio.	120
17.	Maturation during hungry season	Bio.	175	Ancestral connections	Soc.P.	114
18.	Good vegetation type	Bio.	174	Government encouragement	Pol.	54
19.	Amount of shade/density of Econ. Trees	Bio.	79	Prestige association	Soc.P.	51
20.	Necessity for title taking	Soc.P.	71	Low transport cost	Econ.	45
21.	Low transport cost	Econ.	56	Title taking	Soc.P.	0
22.	Government encouragement	Pol.	43	Ritual association	Soc.P.	0

this factor in Table 8.4 however confirm one earlier observation that government, through the Ministry of Agriculture, pays greater attention to cassava than to yams, the indigenous staple.

Since the ranking of the factors varies between the villages and between the crops, it follows that the percentage applicability (% A), percentage total (% T) and percentage importance (% I) will also exhibit spatial variation. We will therefore analyse the importance of these variables in the choice of the two competing root crops (yams and cassava) now caught up in the dynamic process of change. The crucial question is: to what extent do these factors correlate with (and by implication encourage or discourage) the change of emphasis from yams to cassava? Or why does yam cultivation survive in areas which the farmers themselves judge to be unsuited to the crop? The remaining part of this chapter focuses on these themes.

Size of Family.

Agricultural geographers have for long been unduly concerned with the profit maximization concept in production as a behavioural factor (see for example, Garrison and Marble, 1957). Simon (1959), Wolpert (1964), Harvey (1966) and Pred (1967), have all pointed out that the concept is unrealistic as a predictor of farmers' behaviour. In many cases, for example, the need to satisfy the immediate food requirements of the family is paramount in the farmer's mind and overwhelms the profit maximization notion at the 'satisficer' level.

In subsistence and near-subsistence economies in which the greater proportion of the produce is consumed on the farm and in which the primary object of production is to satisfy family and local needs, the size and composition of the family would undoubtedly be one of the main factors affecting agricultural decision making. The larger the family, the more the food required to feed it and the more the area to be cleared and cultivated under the traditional system of production. It is suggested, too, that in technically less advanced economies, the larger the proportion of young and non-productive elements in the family, the more the tendency to depend on cheaper or less demanding crops in terms of labour and capital.

Results of interviews with farmers throughout Igboland brought out the paramount importance of this factor in the choice of yams and cassava. Farmers in Igbo heartland, especially those with large and young families, stated that they depend more on cassava than yams for feeding the families since it is cheaper to buy or grow. It will be recalled that size of family as a factor ranked either first or second in four of the five villages. The only exception is Izii where it surprisingly ranked 10th. In terms of the major crops, family size with an aggregate score of 1115, is the main consideration of the farmers. 92% of all the farmers thought that this factor entered into their decision making. The remaining 8% who did not consider it in crop choice came mainly from Izii (5%) and Akokwa (3%). The fact is that Izii has a large proportion of young, unmarried farmers without children. Strictly speaking, the unmarried young farmers are to some extent economically dependent on their parents though they maintain separate barns and live in separate houses. Their mothers and sisters - married and unmarried - carry out women's tasks in the farms. One of the farmers at Akokwa who did not consider family size in his choice of enterprise explained that it was not possible to relate his crop choice and cultivated hectarage to the size of his family since the family is so large and available land so small that over 50% of the food requirement has to be met by purchase from the local markets.

Among those who considered family size in their choice and continuation of enterprises, the degree of importance attached varies considerably between villages and the two staple root crops. At Umunede, the size of families appear equally important as a factor influencing decisions relating to the cultivation of yams and cassava. At Izii where the yam is the dominant crop, this factor is much less important where cassava is concerned. At Akokwa and Ihe, located in the densely settled parts of the region, family size is cited more frequently in the choice of cassava and cocoyam than yam. Most of the farmers considered family size an essential factor and scored it four on the graduated scale.

The importance of cassava in feeding the families is shown by the higher Percentage Applicability in all the villages, with Izii scoring the least. The village, however, returns higher Percentage Applicability, Percentage

TABLE 8.5: Importance of Family Size

(Source: Fieldwork)

Village	No. of Farmers Inter- viewed	No. of Respon- dents Y	C	Total Score Y	C	% A Y	C	% T Y	C	% I Y	C
Akokwa	28	22	24	74	93	79	86	66	91	84	97
Ihe	22	17	22	38	81	77	100	43	92	56	92
Izii	29	23	26	77	46	79	66	67	40	87	61
Okehi	27	27	25	85	49	100	93	79	45	79	52
Umunede	22	20	22	71	85	91	100	89	81	87	96

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Total and Percentage Importance for yams than for cassava. In contrast, the Percentage Total and Percentage Importance values for cassava are much higher in the overcrowded Akokwa and Ihe villages where the crop has replaced yams as the chief staple. At Umunede, the difference between the Percentage Total and Percentage Importance values for the two crops is small (% T, 8; % I, 9). Here the two crops are equally important in the feeding of the families and their choice appears to relate to family size.

As one would expect, family size is a major consideration in the choice of crops, their continued cultivation and the area cultivated where land is amply available. In terms of the two rival crops, this factor appears to be more relevant for yams than for cassava at Okehi and Izii, and for cassava than yams in the rest of the sample villages (Table 8.5).

Personal Knowledge and Experience.

The importance of personal knowledge in encouraging and discouraging changes in agricultural systems has been noted by Lagemann (1977, p.118), Tarrant (1964, p.47) and Ilbery (1977, p.68). This factor manifests itself in many ways with respect to yams and cassava - personal knowledge of (1) the growth habits of the crops, (2) environmental requirements, (3) nutritional value, (4) yield potentials of the fields on which the crops grow and (5) where each crop grows best. For example it has been shown in Chapter V. that the Igbo classifies his field according to its suitability for particular crops. Through several years of trial and error and interaction with his environment he knows the growth habits and environmental requirements of his staple food crops. Igbo farmers generally recognise experience in the management of the traditional food crops as an essential factor in their continued cultivation even when the environment which brought them under cultivation initially has changed. For many of them the cultivation of yams has become a way of life. They understand no other crop better than this traditional staple.

All the farmers who grow yams thought their choice was guided by their experience in the cultivation of the crops and rated the factor very high. Not one scored it less than two. As a result the Percentage Applicability, Percentage Total and Percentage Importance are all high. Surprisingly as much as 89% also thought that experience was a major factor in their choice of the exotic crop - cassava. The percentage for the crop is lowest at Izii (62%) located in the Cross River Basin where the cultivation dates from the early 40's. The crop is not yet fully integrated into the agricultural system. This is shown by the fact that housewives do not bother to plant cassava on all the yam mounds. One of the farmers explained that he was never taught how to grow cassava and wondered whether it required any special skill. In his view it is not a challenging crop. It is obvious from Table 8.6 that experience is a more important factor in the choice of yams than cassava.

TABLE 8.6: Importance of Personal Knowledge and Experience. (Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents Y	C	Total Score Y	C	% A Y	C	% T Y	C	% I Y	C
Akokwa	28	28	28	108	67	100	100	96	60	96	60
Ihe	22	22	22	83	20	100	100	94	23	94	23
Izii	29	29	18	112	46	100	62	97	40	97	64
Okehi	27	27	25	82	36	100	93	76	33	76	36
Umunede	22	22	21	83	81	100	95	94	92	94	96

Y = Yams, C = Cassava

% A = % of cases where factor applies

% T = % of maximum possible score

% I = % importance where factor applies

Ancestral Connections.

Conservatism is often manifested in food habits. The food of the ancestors usually has special appeal, in spite of modern affluence. A classic example is the importation of dried fish, gari, bitter leaf, okro and yam tubers into Britain, often at prohibitive prices, for use by expatriate West Africans.

Food habits are not easy to change because they are handed down as part of the culture from one generation to another. In a rapidly changing environment some elements may be lost, but the essential parts often continue to be transmitted. The older elements in the society being nearest to the ancestors are in general more conservative than the younger ones. In terms of crops, they have better knowledge of method of production and preparation. Some crops may therefore continue to feature in the agricultural system, not so much on account of their yield potential but simply because of their ancestral connections.

The introduction of alien crops into basic yam farming systems in Igboland has not changed the people's preference for the traditional staple. The annual Yam Festival now revived in most villages after the Civil War. confers some degree of permanence to yam cultivation in spite of declining yields. As might be expected, farmers assessment of the influence of ancestral connections in crop choice varies between the two rival root crops. About 95% of all the farmers interviewed thought that their choice of yams had something to do with the fact that they are traditional food crops. The remaining 5% recognized that yams were ancestral crops but were not influenced by that fact. Surprisingly, the foreign origin of many other crops, including cassava, is gradually being forgotten and some younger elements now think they were part and parcel of the yam culture. However, it is important to note that in Izii where the cultivation of cassava dates from the early 40's the percentage number of farmers who regard it as an ancestral staple and are influenced by that notion, is small (14%.) Many of the older farmers are still aware of its recent introduction. Consequently, the Percentage Applicability and Percentage Importance for the village are low being 27% and 44% respectively (Table 8.7). In fact none of the farmers thought that ancestral connections were a very important factor in their choice of cassava. None scored the factor more than two points, on the graduated scale.

Igbo farmers therefore distinguish between crops that have ancestral connections and those that have been introduced from elsewhere. To them the yam has great antiquity and cultural significance. It is a link between them and their ancestors. Many farmers refer to the crop as Ńri nnà ayi hă (the food of our ancestors) and have found it extremely difficult to change completely to a new crop such as cassava even under rapid decline in yields. Cassava does not carry this traditional connotation, but it is interesting to note that the crop has been in cultivation in some parts of the region for so long that it is now

TABLE 8.7: Importance of Ancestral Connections of Crops

(Source: Fieldwork)

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	26	13	96	24	93	43	87	21	92	46
The	22	22	10	85	21	100	45	97	23	97	53
Izii	29	28	8	106	14	97	27	91	12	95	44
Okehi	27	27	11	93	30	100	41	86	28	86	68
Umunede	22	19	8	74	25	86	36	84	28	93.	78

% A = % of cases where factor applies

% T = % of maximum possible score

% I = % importance where factor applies

Y = Yams, C = Cassavas

being treated as part of the traditional food complex .

Physical Factor - suitability of soil.

Explanations of agricultural distribution based purely on the analysis of physical environment factors, e.g. soil, vegetation and climate, is no longer acceptable. Whereas such factors still influence crop production, what is required is the ability to see the physical environment from the point of view of the cultivators. Farmers' choice of crops is bound to be tied up with their yield expectations from the various types of soils. Through several years of trial and error they get to know the productive potentials of different fields, terrains and soil types. It is therefore not surprising that the Igbo farmers rank availability of suitable soils high among the factors influencing their crop decisions.

The farmers were specifically asked whether suitability of soils for their field crops was a factor in their choice of the crops and their continued cultivation. If the answers were positive, they were then requested to indicate the degree of importance they attach to favourable soil environment in their choice of field crops and their continued cultivation.

Table 8.8 shows that all farmers interviewed at Okehi and Umunede considered their soils suitable for the production of the major food crops and were guided in their choice by the soil suitability factor. Somewhat surprisingly 45% of the farmers at Ihe and 43% at Akokwa did not consider

TABLE 8.8; Importance of Good Soil

(Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	16	25	18	57	57	89	16	51	28	57
Ihe	22	12	14	13	34	54	63	15	38	27	61
Izii	29	27	17	76	30	93	58	65	25	70	44
Okehi	27	27	27	51	84	100	100	47	77	47	77
Umunede	22	22	22	48	61	100	100	54	69	66	69

Y = Yams, C = Cassava

% A = % of cases where factor applies

% T = % of maximum possible score

% I = % importance where factor applies

their soils naturally suitable for the production of either yams or cassava, but grow them nevertheless. Factors other than soils such as prestige and ancestral connections are involved in the cultivation of yams. Results for the remaining farmers indicate that the soils are much less suited to yams than to cassava. In both villages, the ranking of the soil suitability factor is consistently lower for yams than for cassava. High population density (over 400 per sq. km), and resultant high frequency of cultivation has impoverished the heavily leached acidic soils greatly. Since yams are more demanding than cassava in terms of soil fertility, the yields are often lower. The farmers are aware of this. As a result, the Percentage Total and Percentage Importance of the soil suitability factor are low (% T,25; % I,43). The reverse is true of Izii where the farmers explained that heavy clay soils of valley bottoms do not give good yields of cassava. However, they all agree that their soils are suitable for the raising of yams.

The importance of the productive capacity of the soil in the choice and continued cultivation of the two staples varies between the sample villages. The soil factor appears to be more important in the sparsely populated areas of secondary migration with clay loam and alluvial soils than in the overfarmed heartlands and eroded plateau tops. In the latter soil deterioration has reached such proportions that at times cassava presents stunted growth.

Vegetation type and density of economic trees.

These two variables may be taken together but we must distinguish between two types of vegetation cover. The first type includes plant associations which the farmer regards as potential sources of nutrients for his crops and which he can either clear, dig in or lop and burn to enrich his soil. The suitability or otherwise of the soil for a particular crop at any point in time would depend on the perceived nutrient level of the entire vegetal cover, grasses, shrubs and trees. The second type consists of economic trees which are seldom lopped during cultivation. For some, like the kola tree, lopping is strictly forbidden and annual crops adapted to growing in shady environments have to be found if the land is to be used for field crops. It is not therefore difficult to see that the effects of the two types of vegetation on crop production will vary somewhat.

We noted earlier in Chapter V. that the Igbo classifies his fields on the basis of vegetation cover and that mere mention of the vegetation growing on a field conveys some idea of crop suitability. Yams require stakes to support the vines which raises the question of vegetation cover and its ability to supply sufficient stakes. It has been suggested that the decline in the cultivation of yams can partly be explained in terms of shortage of stakes.

Ecological conditions vary among the five villages and no less varied are their effects on farmers crop decisions.

It is evident from Table 8.9 that a high density of economic trees is an important factor in Ihe and Akokwa and to a limited extent at Okehi. These villages depend very much on the oil palm trees, kola and Irvingia species for food and cash. The high density of these tree crops results in an almost permanently shady environment in which the rays of the sun may be effectively shut off. The only important root crop widely believed to do well in such situations is the cocoyam. Ihe farmers, however, claim that water yam also gives fairly good yields. High density of economic trees therefore appears to be a more important factor in the localization of cocoyam cultivation than either yams or cassava. Table 8.9 shows that the Percentage Total and Percentage Importance for this factor is low in all the villages studied except Ihe where the water yam is widely grown. Izii is situated in an area with few economic tree crops and widely dispersed village farmsteads. Consequently, farmers do not consider this 'vegetation' factor relevant to their crop choice. Only three farmers at Umunede considered the factor but thought it was not important in their choice of crops as there still exists an abundant supply of open farmland in the village. This is shown by the low aggregate score - 7 for cassava and 3 for yams.

It can be seen from Table 8.10 that the characteristics of the vegetation cover other than economic tree crops are believed to influence crop choice and production in all the villages. The least Percentage Applicability for this factor occurs in Izii (66% for yams and 28% for

TABLE 8.9: Importance of Density of Economic Trees

(Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	18	20	41	52	64	71	36	46	56	65
Ihe	22	18	15	44	50	82	68	50	57	61	83
Izii	29	-	-	-	-	-	-	-	-	-	-
Okehi	27	8	12	19	31	30	45	7	29	59	64
Umunede	22	3	3	3	7	32	32	8	8	25	58
Total	128			107	140						

% A = % of cases where factor applies

% T = % of maximum possible score

% I = % importance where factor applies

Y = Yams, C = Cassava

TABLE 8.10: Importance of Vegetation Type

(Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	28	28	59	38	100	100	53	34	53	34
Ihe	22	11	17	34	45	50	77	39	51	77	66
Izii	29	8	19	17	72	28	66	15	64	53	94
Okehi	27	16	21	17	57	59	78	16	53	27	68
Umunede	22	22	22	47	83	100	100	53	94	53	94

% A = % of cases where factor applies

% T = maximum possible score

% I = Importance where factor applies

Y = Yams, C = Cassava

cassava). We noted earlier in Chapter V. that land in this village is communally held and that the choice of area to be planted is the duty of the elders. For purposes of decision making involving crop choice, individual perception of vegetation cover is only relevant to the limited area allocated to the farmer by the elders. Once the allocation is made, the farmer cannot change it even when the vegetation cover suggests lower soil fertility for his crops. This contrasts with the situation in Okehi with a favourable man/land ratio, abundant supply of farmland and less rigid control by the elders. An entire exogamous family unit in Okehi is not bound by custom to cultivate one large tract of land annually as is done in Izii. Individuals select areas they consider ripe for cultivation judged by the characteristics of the vegetation cover. With favourable man/land ratio, therefore, availability of farmland under dense cover of vegetation is still very important in site selection and crop decision making.

Land Tenure Arrangements.

It has been observed that the mere availability of suitable land for a crop does not immediately mean that the farmer will cultivate such a crop. Much will depend on the land tenure systems operating in the area and the type of security which the system confers on the user (Chapter V). We also noted above that where the land is communally held and where the system of annual redistribution operates, farmers' choice of crops and the area cultivated will to some extent depend on the type of soil which falls within a farmer's area of control for that agricultural year. The range of crops that can be grown on the plot is limited. Perennial food crops may be ruled out completely depending on the rigidity of the control. This is so because the land is supposed to revert to the common pool at the beginning of every farming season. Individual tenurial systems allow the farmers a much wider freedom of choice.

Interviews with farmers revealed that communal tenure militates against the planting of perennial food tree crops. In Izii the system sets a limit to the area cultivated by a farmer but is flexible enough to allow him to utilize pieces left out by neighbours. Generally speaking, the farmers in Izii, Okehi and Umunede where communal tenure still operates, mentioned that the system influences their agricultural decisions. Less than 50% of the farmers in Akokwa and Ihe took the factor into consideration. As a result the Percentage Applicability, Percentage Total and Percentage Importance values are low (Table 8.11). One farmer explained that he found it easier to rent land for the cultivation of true annuals such as yams than for perennial root crops such as cassava. But since there exists a critical shortage of good yam land in this area, what he often 'rented' was land judged by the owner as unsuited to the raising of most crops. Not surprisingly, the tendency is to concentrate on the growing of less demanding crops such as cocoyam.

TABLE 8.11: Importance of Land Tenure Arrangements
(Source: Fieldwork)

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	12	6	36	22	43	18	32	21	75	91
Ihe	22	8	11	13	41	36	50	15	47	41	93
Izii	29	23	9	69	15	79	31	59	13	75	41
Okehi	27	19	15	43	57	70	56	40	53	57	95
Umunede	22	19	13	62	47	86	59	70	53	81	90

% A = % of cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Y = Yams, C = Cassava

Insecurity of tenure tends to limit the planting of perennial food crops such as oil palm, African mango and kola trees. For example, one of the farmers located at Ihe characterized by the raising of annual food crops and the tending of perennial tree crops had only 4 oil palm trees, no kola trees and no African mango. His farm was free of dense cover of these economic tree crops. Unlike his immediate neighbours who grew mainly cocoyams and a few water yams, he concentrated on the production of white yams, maize, cassava and some cocoyams. Asked why he could raise a number of annuals not grown by his immediate neighbours, he explained:

> This land on which my family and I live was given to my father by a relative. His sons cannot now eject us easily but they have a right to any fruit trees on it. Why must I allow such trees to grow or plant them?

It will be seen therefore that the effect of land tenure systems on food crop production is highly complicated and varied. Generally speaking insecurity of tenure has more limiting effect on the cultivation of perennial food crops than on annuals.

Taste Energy and Nutritional Factors.

In an economy in which the greater proportion of the produce is consumed on the farm, the farmer's subjective assessment of the energy content and palatability of meals prepared from his crops is of considerable importance in determining land use. The farmer may pay particular attention to subjective factors of his intimacy and personal significance.

The nutritional characteristics of crops, taste of meals prepared from them, and their ability to sustain labour during hard work in the farms, are all of considerable importance. Different sub-cultural groups pay attention to different factors as can be seen from Tables 8.12 and 8.13. Taste appears not to be a very important factor in the selection of cassava. Many farmers agree that the crop naturally does not taste as good as yams and tends to require the addition of more ingredients during preparation to improve the taste. This notion is reflected in the Percentage Applicability, Percentage Total and Percentage Importance values for both crops. Farmers would always prefer meals from yams to similar meals from cassava.

The analysis of the results relating to perceived energy content of both crops show remarkable contrast among the five villages. The factor is considered important in the cultivation of yams at Izii, Okehi and Umunede. Izii also returned the lowest total score for cassava. The explanation is that yam, boiled or roasted over a naked fire and consumed without palm oil, is the traditional food for working parties among the Ezaa and Izii peoples. It is widely believed by these people that if the crop is eaten with oil, it induces much perspiration, thereby wetting the hands and reducing working efficiency. Working parties in the other four villages prefer pounded yam to pounded cassava, if available, but do not, like the Izii, object to eating pounded cassava when engaged in

TABLE 8.12: Importance of Good Taste of Crop and Nutritional Factors

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	27	19	69	37	96	68	62	33	64	49
Ihe	22	22	22	61	28	100	100	69	32	69	32
Izii	29	29	16	110	38	100	55	95	33	95	59
Okehi	27	27	12	74	25	100	44	69	23	69	52
Umunede	22	22	9	62	13	100	41	70	15	70	36

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

TABLE 8.13: Importance of Energy Given to Labour
(Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	15	19	35	73	54	67	31	65	58	96
Ihe	22	11	17	32	53	50	77	36	60	73	78
Izii	29	29	8	112	19	100	19	97	16	96	60
Okehi	27	24	16	31	18	88	59	29	17	32	28
Umunede	22	17	13	50	21	77	59	57	24	57	40

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = Importance where Factor Applies

serious cultivation. It is also believed that wounds sustained by an Izii farmer during the mound-making exercise do not bleed much because he often eats his roasted yams without oil. Since cassava requires oil for making sauce, considered a necessary component of foofoo,[1] the typical Izii farmer does not indulge. In contrast, working parties in Akokwa and Ihe are usually entertained with pounded cassava. Yam foofoo has become a luxury which many farmers can no longer afford. As one would expect, the total scores on cassava are much higher in the two villages than in Izii. Table 8.13 indicates that in terms of taste, yams are seen as being far superior to cassava. The greater attention now paid to cassava cultivation in the overcrowded Igbo areas does not reflect its superior taste qualities. This point is brought out clearly by the low Percentage Total and

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1. Foofoo is the name for boiled and pounded yam, cassava, cocoyam or any boiled and pounded mixture of these root crops. Boiling and pounding reduces the chips to fine pastes often swallowed in small lumps without mastication along with thick sauce containing plenty of vegetables, fish and/or meat. Children are taught from early childhood to swallow foofoo without mastication. It is considered a bad habit to masticate the food and children who did so among Mbanasa peoples were in the past forced to swallow it whole in the presence of masquerades (mmuo).

Percentage Importance values.

Thus, whereas taste and energy yields of the two rival crops have been considered by the farmers in the study area, there appears to be no consensus of opinion on the relative importance of each factor in the decision making process. This lack of consensus reflects variations in beliefs and mores.

Availability of Labour.

Labour is a major imput in crop production. It combines all the other imput variables in the production process. Therefore the availability or lack of a suitable labour force can exert a considerable influence on crop choice. Most farms in advanced agricultural economies are still owned and operated by family labour. In subsistence and near subsistence agriculture, the family not only provides the labour force but also serves as the locus of consumption for the produce. Labour influences crop choice because different crops require different categories and intensities of labour imput. Since there is sex specialization of labour and crops among traditional societies, the size and composition of the family labour force is likely to be important considerations in crop production. Changes in the structure of the family labour force as a result of sickness, migration employment outside agriculture and education occur periodically and have important repercussions on agriculture. The crops for which the labour requirement can be met readily by the family labour pool will tend to be the ones cultivated, though there are exceptions to this rule.

Labour proved a very difficult factor to score because it has many facets. Since most of the requirement in the study area is provided from within the family system, the farmers were simply asked whether they found it easy to get the necessary labour for their enterprises from within the system. If the answer was 'yes,' they were then asked to state the importance they attached to the ease of getting labour in the choice and continuation of cultivation of crops. It is interesting to note that farmers who were limited in their size of operation by the labour factor ended up discussing how the shortage of labour influenced their farm size and crop choice, thus providing useful information for comparison of results.

Table 8.14 shows that the extent to which labour demand for the two crops can be met from family pool varies greatly from person to person and place to place. It would appear that Ihe and Akokwa, located in the densely populated Igbo areas, do not experience any real shortage of labour for yams. The two villages return high Percentage applicability and low Percentage Totals and Percentage Importance figures for the factor. The farmers therefore do not consider the fact that they have suitable labour a very important factor influencing their choice of yams or its continued cultivation. One obvious explanation is that, in both villages, the ecological environment as perceived by the cultivators no longer favours yam cultivation. The crop is maintained by prestige

TABLE 8.14: Importance of Low Labour Demand/ Ease of Getting Labour

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	19	13	34	47	68	46	30	42	45	90
Ihe	22	20	17	29	52	91	77	33	59	36	76
Izii	29	14	24	48	45	48	83	41	39	86	46
Okehi	27	14	21	47	29	52	77	43	26	83	35
Umunede	22	11	17	51	27	50	72	35	31	70	40

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

and tradition and family labour is often adequate to satisfy this desire. Farmers have shifted their emphasis to cassava, for which most family labour forces are adequate considering the small area of land available for cultivation each year. Farmers therefore do not think that the area they plant to yams are directly proportional to their available labour force.

In contrast, about 53% of the farmers in the other villages with favourable man/land ratio and abundant supply of farm land have adequate labour force for yams. The area under the crop reflects available labour force as shown by the high percentage importance. Labour is seen therefore as a constraint to increased yam production in these ecologically more favourable environments, particularly since the introduction of Universal Free Primary Education which made it possible for most of the child labour force to attend school. The farmers attach great importance to availability of labour force. The Percentage Importance values for both crops suggest that, given extra labour, the farmers are much more likely to invest it on yams than on cassava. Many yam farmers in these villages are deeply worried about the crippling effects of labour shortages on yam cultivation. The crop requires an abundant male labour force for clearing the plots, mound construction and stake cutting which involves climbing trees. Also, tradition requires the farmers to visit the farms from time to time to train the vines. The other operations - weeding, harvesting and transportation of produce to the barns can often be covered using child and adult female labour. The problem is that it is among the male population that rural - urban outmigration has proved greatest in recent years.

Storage Quality of Produce.

Availability of Harvest most of the Year.

Maturity during periods of General Food Scarcity.

These three variables are closely related. They are all biotic in nature and need to be discussed together.

The production process in agriculture is essentially biological and geared towards the life cycle of the plant and animals concerned. Many of the processes involved are outside the control of the farmer. He may quicken or slow down the growth cycle, but in many cases there is a limit to what can be done. This raises the whole question of time, seasonal rhythm and cyclic phenomena as they affect farm products and availability of foodstuffs.

The output of most food crops in Tropical Africa is not constant and reliable from year to year due to the vagaries of the physical environment. Paramount factors are rainfall, soil leaching, drought, pests and crop diseases. Many writers have drawn attention to the periodic hunger which sweeps across the continent between the time when the last crop goes into the soil and the first harvest. Ukonu (1964) discusses the possible causes and emphasizes the leading role played by seasonal variations in the incidence and duration of rainfall. Others have challenged the notion. For example Miracle (1961, p.279) claims that the concept is vague and requires precise definition.

Igbo farmers suffer from acute food shortage. Some crops are therefore not consumed immediately after harvest but are sun dried and preserved against the "hungry months." In such circumstances, storage quality becomes an important issue in production decision-making. Some types of crop may be preferred simply because they mature during strategic periods and act as hunger-breaking crops. A further type of crop may feature in the farming system because it is not rigidly seasonal but produces edible food all through the year.

Of the two main root crops under consideration, cassava does not keep long after harvest unless processed as gari, a point which has been brought out as a major factor affecting production (Flinn, 1975, p.1). The crop, however, has the advantage of being stored in the ground until needed. A few local yam species also have this quality but their cultivation is limited in area. The yam is clearly superior to cassava, however, in terms of post-harvest keeping properties. In general, yams deteriorate much less quickly than cassava after harvest under the traditional methods of storage in which there is maximum exposure to air and protection from direct rays of the sun using leaves and shade from live trees. The storage quality, however, varies with species. Some, for example, water yam and <u>ànụnụ</u> variety of the white yam store very well and could remain fresh up to the beginning of the next harvest in July. Others, for example, the <u>òyibere</u> variety of the yellow yam do not keep for more than a month after harvest if the head is cut off and replanted as the farmers often do.

The Igbo farmers recognize the importance of the three different factors - availability of harvest most of the year, maturity during the hungry season and storage quality - in their choice of crops. Table 8.15 suggests that storage quality is more important in the choice of yams than cassava in Izii and Umunede. Farmers recognize that cassava can be stored in the ground until required, but this fact is not considered very important in the choice of the crop as shown by the low Percentage Importance (33%). In fact one farmer in Izii argued that the soil is such that yams can be stored in the soil equally well in the short term until the beginning of the next rainy season. It would therefore appear that in villages where the yam is still the chief staple, the superior ground storage quality of cassava does not seem to be important in explaining the farmers' choice of the crop. Other cultural factors appear to be more relevant than physical quality. In contrast, villages which can no longer produce enough yams and so rely heavily on cassava all the year round, including the hungry season, rank storage quality and a crop's ability to supply food almost all year round, very high. (Table 8.16).

Differences in cultural assessment of the storage factor for yams in particular appear to relate to the differences in the local varieties grown and the traditional storage methods used. Akokwa farmers growing mainly hardy varieties of white yam locally known as <u>jí ànụnụ</u> with much water content, claim that these

TABLE 8.15: Importance of Good Storage Quality

(Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	25	27	62	74	89	93	55	66	62	74
Ihe	22	18	20	29	69	82	91	33	78	40	94
Izii	29	24	18	67	24	83	62	58	21	70	33
Okehi	27	21	23	25	59	78	85	23	54	30	64
Umunede	22	22	19	51	42	100	86	58	48	58	55

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

TABLE 8.16: Importance of Availability of Harvest Most of the Year

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	17	28	52	112	61	100	46	100	76	100
Ihe	22	10	22	21	83	46	100	24	94	53	94
Izii	29	16	27	58	91	55	93	50	78	90	84
Okehi	27	12	23	36	72	45	85	33	66	75	78
Umunede	22	11	17	30	62	32	77	37	70	68	91

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

preserve better than the other white yam varieties. Similarily Ihe farmers claim that their water yam stores better than all other yams. In contrast, however, at Umueze Anam, on the Niger-Anambra flood plain, farmers are forced to sell more than seventy five percent of their yam harvest because yams grown on the flood plain do not keep long. Often there is insufficient yam remaining for seed purposes.

All the interviewees confirmed the view that maturation during strategic seasons is more important in the cultivation of maize than in most other crops. We noted in the discussion of crop distribution that maize is the first crop of the agricultural year, a hunger-breaking crop eaten during the peak of the seasonal shortage, along with kernels, African pear and coconuts. The same factor, i.e. maturity during a strategic point in time proves to be more important in the case of cassava than with yams. Over 90% of the farmers considered this factor in their cultivation of cassava against 46% for yams. In Umunede the percentage is as low as 18 but, over 81% of the farmers thought the ability of cassava to provide food during the period of scarcity was relevant in their decision to grow the crop (Table 8.17). The higher Percentage Applicability of this trendiness for yams in Akokwa may look surprising but the farmers in this particular village rely very much on early eating yams to end the hungry period. The eating of yams marks the end of hungry season. They have therefore devised ingenious ways of raising early maturing yams called <u>Òkwúèfē</u> on

TABLE 8.17: Importance of Maturity of Crop During Period of Scarcity

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	20	28	75	102	71	100	67	91	93	91
Ihe	22	12	22	21	82	55	100	29	93	44	93
Izii	29	15	29	36	74	52	79	31	64	60	80
Okehi	27	9	25	31	52	33	93	29	48	86	62
Umunede	22	5	18	12	68	23	81	14	77	60	94
Total	128			178	378						

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

the compound gardens using farm·yard manure, heavy mulching and a system of "milking"the crop.

Milking is the art of digging up the yam tuber before it matures properly without doing much damage to the roots of the growing yam. The farmer digs round the tuber, carefully cuts it off from the growing plant just below the head, removes the tuber for consumption and covers the roots with earth so that the plant grows bunches of yams which can be harvested and preserved as seed yams against the next planting season. Wilting of the leaves after 'milking' indicates bad milking techniques. The seed yams (Ákpù ji) produced in this way, are usually suspended from tree trunks within the courtyard by means of ropes. The trees protect them from the direct rays of the sun. Alternatively, they could be covered with a thick layer of palm fronds. In such an environment the seed yams sprout about November - December. If planted in December or early January under heavy mulching, they will be ready for "milking" again in late June or early July, which corresponds with the peak of the 'hungry season' (Únwu).

'Milking' is regarded as a means of changing the life cycle of yams to produce harvest during a period of scarcity. Before the introduction of cassava and maize, which now perform the same function, 'milking' was an important strategy for surviving the lean months and required some form of training or else the yam would wither away. Even now, it is considered 'abominable' (árù) to eat healthy 'Ákpù jí' even in an emergency. No sanctions would be applied on offenders but their state of mind would be regarded as abnormal. It is however interesting to note that the practice of producing seed yams by milking and the art of performing the operation on the growing yam is fast dying out because many people now depend more on cassava to satisfy their hunger.

Ease of getting Planting Materials.

One problem facing farmers who depend on vegetatively propagated crops for their livelihood relates to the difficulty of obtaining planting materials. In societies with inadequate credit facilities for the purchase of seeds or where it is difficult to reserve enough seeds against the following year, farmers may be tempted to grow crops for which the planting materials are readily available. The proportion of the harvest which has to be reserved as seed and the ability of farmers to meet the target are all important influences on action. Crops for which the edible parts are not required for seeds may be more popular on account of the relative ease of getting planting materials.

Of the main staples grown in Igboland - yams, cassava, cocoyam and maize - only maize is propagated by seed and one cob can plant a considerable area of land. With yams, as much as 25% of the harvest needs to be reserved as seed annually according to the farmers. The figure falls to about 10% for cocoyam. Cassava is the only crop for which no edible part is vital to its continued cultivation. The stem is used and several cuttings can be made from one stem. Among several sub-groups of the

TABLE 8.18: Importance of Ease of Getting Planting Materials

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	6	26	11	79	21	93	10	21	46	76
Ihe	22	9	14	16	48	41	50	18	54	44	55
Izii	29	26	27	96	81	86	93	83	69	96	75
Okehi	27	18	23	39	62	67	85	36	57	54	67
Umunede	22	16	19	28	54	73	86	32	61	44	48

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

Igbo-speaking peoples, tradition allows one to cut planting sticks from neighbours' farms, without prior permission.

Responses to the question relating to the effect of the ease of obtaining planting materials to farmers' crop decisions revealed the variations in the importance of this factor. The percentage of farmers who grew yams because they found it easier to get 'seeds' was small in some villages and large in others. It ranged from 21% at Akokwa through 41 in Ihe to 86% in Izii (Table 8.18). Shortage of planting materials is most acute in Akokwa, where only 10% of the farmers link yam cultivation to ease of procuring seeds. The other 90% cited lack of seeds as a limiting factor. One farmer explained that his large family often depleted his reserves of the crop and forced him to rely more on cassava. Table 8.18 shows that farmers in Izii are best blessed in terms of availability of planting materials, both yam and cassava. However the Percentage Total and Percentage Importance values for the village confirm that availability of planting materials is more important in the choice of yams than cassava. The reverse is true of the other four villages.

Prestige Value and Title Taking.

These two factors are very closely related. Morgan and Munton (1971, p.29) categorise such factors as 'social recognition - the achievement of status, respect or even power within a particular community or group.' In traditional societies, agricultural systems are tied up with the other systems - religious, political, economic and social - at a deep structural level. A change in any element of the interracting systems is reflected in agricultural production to varying degrees. An examination of food production among any society in Africa must take this into account.

It has been argued that Africans are acquisitive and that wealth is often the basis of status distinction and political control (McLoughlin, 1969, p.25). Uchendu (1968, p.12) sees acquisition of wealth not as the primary goal but as a means of gaining prestige and political control over others. To quote Uchendu "the orientation of African traditional agriculture is not necessarily towards growth: it is a prestige-oriented economy - an economy where surplus produce is converted as soon as practicable into items that confer prestige: plural wives, cattle, power and - most important - the command over people." (Uchendu, 1968, p.7).

Igbo traditional systems of agriculture - at least during the pre-colonial and immediate colonial periods - fitted Uchendu's model perfectly. Prestige and title taking were major incentives in agricultural production. The number of yam sticks was a measure of a man's social status. In many parts of the region, successful yam farmers or those with long barns were the most sought after by parents wanting to give away their daughters in marriage. The desire to gain recognition or take a title was a powerful incentive for increased production of yams, not only for immediate family use but also for the community as a whole.

For example, the village of Okehi and in fact most villages in Etche recognize four categories of yam farmers in accordance with the number of sticks (<u>m̀kpā jí</u>)[1] a man owns (Table 8.19). Locally they are known as <u>Éze jì</u> (Yam King)[2] grades. Grade 1 is the lowest and Grade 4 the highest according to this classification. Two of my informants had qualified for the fourth grade. There are more people in the lowest grade. Two of these were preparing seriously for admission into the next higher grade. The initiation ceremony is called <u>M̀memmé jì</u> (Yam Ceremony) and the following procedure is usually followed:

1. The farmer first makes sure he plants enough yams to enable him throw a big party in addition to displaying in his barn the required number of yam sticks.
2. After the harvest he ties the yams in accordance with the accepted tradition. In other words there must be 20 yams to a yam stick.
3. He then invites members of his immediate family for a preliminary inspection aimed at making sure his yams are huge enough to qualify him for entry into the higher grade. This constitutes a formal application.
4. If the family approves his application, he then throws a big party to which all the extended family as well as friends within and outside the village are invited.

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1. <u>Jí</u> is the Ibo word for yam and when used with <u>m̄kpa</u> means yam stick. There are 20 yams to a yam stick in Okehi.
2. <u>Èze</u> is an Ibo word for either Chief or King.

Pounded yam and other dishes are served. Usually everyone has enough to eat. The initiate gives some huge yams to his uncles, elder brothers, other immediate blood relatives and friends. In return he receives presents from them in the form of hoes, knives and cloth.[1] Henceforth the initiate is invited to all the Mmemme Ji feasts and is given a place befitting his status.

TABLE 8.19: Number of categories of Yam Kings at Okehi, Etche County.

Grades	No. of Farmers in grade out of 27	Local name of Title Holders	Minimum No. of yam sticks	Minimum No. of yams
1	11	Ndị Ọgụ mkpa Ise	400	8,000
2	7	Ndị Ọgụ mkpa Asa	560	11,000
3	3	Ndị Ọgụ mkpa Iri	800	16,000
4	2	Ndi Nnụ Ụsọ	2,000	40,000

Source: Fieldwork

Umueze Anam has a similar institution aimed at encouraging the farmers to produce more food for the community. Here it takes the form of an investment against old age. The series of ceremonies culminating in the highest title, Obã, is known locally as Echichi (Initiation). About 160 people in the village have so far been initiated. Altogether there are four different stages.

1. Note that two of the presents are meant to enable him produce more yams.

1. <u>Ìfiji Ọkụ</u> - The farmer pays a cash sum of N10 to the group and makes a present of 2 gallons of palm wine and 1 pint of illicit gin. Yams are not directly involved at this stage.
2. <u>Íwu Ùkwa</u> - Again the initiate pays a cash sum of N10, makes a present of 2 gallons of palm wine, 1 pint of illicit gin, two pints of beer. Again yams are not directly involved.
3. <u>Èkwú</u> - In the third stage the cash payment is increased to N40. In addition he makes a present of 8 pints of illicit gin, 2 gallons of palm wine and 100 fat yams to be shared by the title holders. If the yams are not fat enough, the initiate is asked by the sampling committee to augument by cash payment.[1] The actual amount paid depends on his bargaining power but it never exceeds N10. A big feast accompanies this stage of ceremony and the young initiate is expected to feed the title holders. Pounded yam takes a prominent place and about N10 worth of fish is used in the preparation of the native soup or sauce. Usually all initiates for the same year perform the ceremony the same day.
4. <u>Àsa·Mmò</u> - The ceremonies accompanying this stage are exactly the same as in <u>Ekwu</u>.
5. <u>Ọ́bà</u> - The last title is the most difficult to attain as it involves very heavy expenditure. As a result people are allowed to take the title in stages. From

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1. Yams weighing less than 4 kg. will be considered small.

start to finish may take a farmer 10 years. A total cash payment of N600 must be made. Moreover the prospective Oba makes a present of 4,000 fat yams, 1 goat, 1 cow in addition to throwing a big party of yam foofoo and palm wine.

All Oba title holders wear cotton thread on the ankles and are free to attend all initiation ceremonies. All the holders of the lower titles can only participate in ceremonies involving the stages they have reached.

Asked when and why such an elaborate title-taking ceremony was evolved the eldest man in the village replied:

> "My son, it was started by our great-grandfathers. I do not know when and I do not think any one knows. We look upon it as a form of investment. The society caters for the aged and childless people. At 60 men stop eating cassava and must be provided with yams by the younger and more energetic people."

These are but few examples of the numerous institutions associated with yams among the different tribal groups in the region. The main objective is to ensure a constant supply of food for the individual as well as the community.

In the absence of a Savings Bank, some communities came to regard title taking as a kind of security against old age. Men worked hard in their youth to produce enough yams to take an Ózo or 'Ēze ji' title which in old age ensured a constant supply of yams from the new initiates. Usually there was a keen struggle to attain the highest title and, once achieved, the farmer could relax. In Umueze Anam his name would go into the 'Book of Life' a list of titled men who, even when physically dead, would still be entitled to shares of ceremonial yams through their successors.

Some of these concepts and notions relating to yams, title and prestige have been changing since the establishment of British control over the area but it is not always easy to part with the past. Since most of the people who feed the nation today are still traditional in outlook, the cultural dimension to agricultural decision making is still important, and it is certainly the case that a crop like yam can remain in cultivation either because it confers prestige or because it can be used in title taking.

It is clear from Table 8.20 that Igbo farmers grow yams partly for the associated prestige and partly for other reasons. All farmers interviewed in Izii, Okehi and Ihe are still guided by the prestige factor. Only three farmers in Akokwa thought that prestige was not relevant in their decision. Surprisingly, the prestige factor extended to cassava in four villages, but only to a limited degree as indicated by the number of respondents who think the cultivation of the crop confers some form of prestige. None of the farmers in Izii, however, attached any prestige value to the cultivation of this exotic crop. Table 8.20 suggests that continued cultivation of yams in all the sample villages relates to past notions about the crop and this sense of history is one of the major factors sustaining the enterprise in the overcrowded and overfarmed lands of Ihe and Akokwa. Of twenty five farmers who then considered prestige factor in their choice of crops, fourteen thought it was essential, ten

TABLE 8.20: Importance of Prestige Association of Crops

Village	No. of Farmers Interviewed	No. of Respondents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	25	7	88	10	89	25	29	8	88	38
Ihe	22	22	6	85	12	100	27	97	14	97	50
Izii	29	29	-	112	-	100	-	96	-	96	-
Umunede	22	18	4	71	11	82	18	81	13	98	68
Okehi	27	27	8	102	18	100	29	94	17	94	56

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

said it was very important and only one thought it was just important. In contrast, only three farmers thought prestige was important in the choice of cassava. Another four thought it was not really important though they did consider it.

Few farmers these days grow yams for the purpose of taking the Ozo title. Cassava, being an exotic crop, has never been associated with Ozo title-taking. In fact Nze the name for Ozo title holders, do not as a rule eat cassava at all. Title taking does not feature in decision making involving yam cultivation at Ihe or Umunede. It is however still considered important at Okehi. Until the end of the Nigerian Civil War in 1970, proceeds from the yam harvest in Umueze Anam were mainly used in title taking. In recent years, they are being invested in building projects.

The desire to gain recognition within society was an important element in food production. The underlying objective was to ensure a constant supply of food for the individual as well as the community. In effect the surplus produced in this way has sustained 20th century urban aggregations. The erosion of power and political authority once exercised by hardworking farmers by modern political systems has tended to kill incentive.

Market Demand.

No economic system in the 20th century African setting can be said to be truly subsistence oriented - a siege economy in which nothing comes in and nothing goes out. Even the most primitive economy involves some form of exchange which in turn raises the whole question of market demand - the varying quantities of a product which consumers would be prepared to take off the market at all possible alternative prices (Leftwich, 1965). Early theories of agricultural location were mainly market oriented and production was seen as a function of demand in a city and of transportation cost for the alternative products from the farm to the city-based market. Market demand is now regarded as a powerful force in agricultural production (Morgan and Munton, 1971; Tarrant, 1974).

The influence of market demand on subsistence and near-subsistence crop production is certainly not easy to ascertain. The main object of production may be to satisfy family needs, but other circumstances indirectly connected with family needs may force the farmer to display more than the normal surplus of subsistence in the local market for sale. The question now arises as to how one distinguishes the farmer who grows a particular crop because he knows there is demand for it from the farmer who sells his subsistence crop out of necessity.

Farmers were therefore asked whether they grew their crops with an eye to a market. If the answers were 'yes' they were then asked to state the importance they attached to demand for their crops in making this choice. Responses were varied and interesting. Some from farmers who were not market oriented include: "We do not produce enough; we even buy; where will you grow the crops on this small piece? You do not sell your stomach, I only sell when financial matters hold me on the neck."

The proportion of farmers who grew either yams or cassava with an eye to a market was least in areas with unfavourable man/land ratios and rapidly declining soil fertility (Akokwa 39% and Ihie 27%), rising to 91 and 93 respectively in Umunede and Izii (Table 8.21). Those who considered this factor in their decision making in the first two villages did not attach much importance to it, as shown by the total scores some confessed that they often sell when there is no other means of meeting certain financial commitments - notably payment of school fees, taxes, development rates and costs of burial ceremonies. More farmers grow yams for sale in Izii than in any of the other villages. Umunede comes next. Izii and Umunede supply yams to many urban centres in the region and far beyond. The famous Nwópòke family of yams, admirably adapted to the hydromorphic soils of Abakaliki, is cherished all over Igboland on account of taste. Their arrival in the markets at Enugu, Abakaliki and Onitsha is often followed by a drop in market prices for other yams. More farmers in Okehi raise cassava for sale than yams. The converse is true for Umunede. Here emphasis is on yams many of which are displayed for sale along the Asaba-Lagos express road around Agbor.

It is therefore clear that the extent to which the farmers respond to the market demand factor varies among the villages and with different crops. Nevertheless analysis confirms the subsistence and near subsistence

TABLE 8.21: Importance of Market Demand for Produce
(Source: Fieldwork)

Village	No. of Farmers Inter-viewed	No. of Respon-dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	11	14	24	33	39	50	21	29	54	59
Ihe	22	6	8	7	16	27	36	8	18	29	50
Izii	29	27	9	58	32	93	31	50	28	54	89
Okehi	27	16	19	27	41	59	70	25	38	42	54
Umunede	22	20	15	63	44	91	68	72	50	79	73

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

character of Igbo farming systems.

Cash income from sale of produce.

In our discussion of the influence of market demand it was noted that a pure subsistence economy in which the farmer produces all he consumes or consumes nothing he does not produce, no longer exists in 20th century eastern Nigeria. A minimum of both food and non food items - salt, tobacco, palm wine, matches, pots, pestles and mortar, clothing, hoes and matchets - must be bought from local markets. In recent years a number of commodities, notably radios, corrugated iron roofing sheets and cement (in place of thatch and mud) and bicycles for mobility and prestige have been added to the list. In a period of rapid rural development in which nearly every village has its own development plan [1] in addition to State and National Development Plans, paying local rates in addition to poll tax creates a further need for cash. This can be met through part-time employment in other sectors of the economy - smithing, bicycle repairing, casual labour, petty trading, tailoring and truck pushing - but most often through agriculture.

As one would expect, farmers in the study area are faced with ever pressing need for cash and hence pay

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1. For example, in Akokwa farmers pay as much as N5 the equivalent of £ 2.50 annually towards the Village Five-Year Development Plan aimed at providing pipe-borne water, building a Secondary School and improving roads. Already the village has completed a Post Office, a Police Post and a Hall under similar plans.

attention to crops which go a good way to satisfy subsistence needs and at the same time produce a surplus, however small, which can be used to raise cash. The roles of cash tree crops in this respect have been examined already (Chapter VI). Some food crops - notably yams and cassava - are also important.

Farmers' responses to the question concerning significance of cash in decision making once again varies with location and according to the nature of the two main rival crops. Table 8.22 shows that the percentage of farmers who took the cash factor into consideration in their decision to grow yams was highest in Umunede, followed by Izii. Both villages lie outside the acid sands noted for the production of oil palm. The soils are dominantly clayey and not suitable for raising this important perennial cash crop. The farmers therefore concentrate on root crop production for cash. In contrast, farmers in the other villages rely heavily on the oil palm for cash. Their ranking of the importance of cash factor in the choice of yams is therefore low with Akokwa recording the lowest figure (29%).

Though farmers in Akokwa and Okehi grow more cassava than yams for sale, paradoxically the question provided the response that cash generating potential was more important in the decision to grow yams than in the choice to grow cassava. This is clearly demonstrated by the Precentage Importance and Percentage Total values for both crops in the two villages. The explanation is that Akokwa farmers, for example, live in areas where the soil is considered poor for yam but manage through high labour

TABLE 8.22: Importance of Cash Income From Sale of Produce

Village.	No. of Farmers Inter- viewed	No. of Respon- dents		Total Score		% A		% T		% I	
		Y	C	Y	C	Y	C	Y	C	Y	C
Akokwa	28	8	13	25	23	29	46	22	20	78	44
Ihe	22	11	16	35	42	50	72	40	48	80	65
Izii	29	23	14	87	30	79	48	75	26	95	54
Okehi	27	13	16	39	27	48	59	36	25	75	42
Umunede	22	18	7	67	23	82	32	76	26	93	82

Y = Yams, C = Cassava

% A = % of Cases where Factor Applies

% T = % of Maximum Possible Score

% I = % Importance where Factor Applies

Source: Fieldwork

input to produce some yams which can be sold in times of emergency to get cash. The yams sold in this way are not surplus to subsistence needs. Some of the farmers reported that at times they sell eating yams to buy either seed yams for planting or gari to feed the family.

The other explanation relates to traditional attitudes to both crops. Traditionally men own yams and women own cassava crops and the proceeds from any sales. Though this concept is fast changing and men can now own cassava and women yam, some men for prestige reasons prefer yams to cassava as strategic reserves in spite of declining yield. One farmer explained that it is more dignifying for a man to display yams for sale in the market than to display cassava.

Conclusion

It is clear from the foregoing analysis that Igbo farmers' agricultural decisions are not based on the nature of the physical environment alone but on a wide range of physical, biotic, economic, political and socio-personal considerations. In broad terms, the physical environment as expressed in the climate, natural vegetation and soil suggest farmers' crop options. What he actually produces, where he grows them and the management practices adopted, are all dependent upon his subjective and personalised assessment of the environment and its potentials for the various crops and crop associations, constrained by availability of suitable labour force and planting seeds.

The primary aim of farming is to produce enough food for the family and occasionally some surplus for sale to meet ever increasing need for cash. This is often done at various levels of 'satisficing'. Considerable variations occur in the farmers' assessment of the importance of the various factors analysed in the achievement of these goals and the crops used in the process. The large scale adoption of cassava in most parts of the region is seen to relate to the problems of feeding large families on culturally acceptable and superior foodcrop such as yam in an environment which no longer favours its production.

Most of the socio-personal factors - ritual association, prestige, experience, title taking and ancestral connections - are more relevant in the decision to grow the indigenous staple, yams, than cassava. However, as a result of changing political, economic and educational circumstances of the area and their effects on social status, few farmers now grow yams with the ultimate aim of using the proceeds to take a title. However, the prestige associated with the consumption of the crop remains unchanged.

The analysis shows that socio-personal considerations are dominant over all others but there are variations from village to village and between the various food crops. In the heartland and Nsukka plateau, the factors of unfavourable man/land ratios, declining soil fertility and high density of economic trees, restrict the farmers' choice of yams, tipping the balance in favour of cassava and cocoyam, which are better adapted to such conditions. However, since the yam is still integrated to Igbo social, political and economic life in relation to social status, wealth, relations between men and women and between young and old, it is widely grown in these areas in spite of declining ecological conditions. There now appears to exist a sort of conflict between farmers crop preferences based on taste and other considerations on the one hand and capability of the soil on the other.

CHAPTER IX

CASE STUDIES OF FAMILY FARMS

Introduction.

The analysis of the factors judged by farmers to affect their food crop production brought out the paramount importance of a number of socio-personal factors in agricultural decision making. Yet, the analysis also revealed considerable areal variation among crop production systems, in terms of different crops and crop associations grown. These variations may well be the result of variations among the decision makers, i.e. they may reflect their likes and dislikes. Although the analysis aggregated the farmers in each of the villages, no two farmers are really alike. Their physical, socio-personal and economic backgrounds are often different and relate to a time dimension which in itself influences agricultural decisions. This chapter therefore examines three family farms located in three different ecological zones in order to demonstrate in some detail how some of the variables discussed in Chapters V, VI and VIII actually function, the temporal context of every decision and how such decisions in turn affect the farming landscape.

Family Farm at Akokwa.

The farm is in a village within the Igbo heartland, an area of rapidly declining soil fertility, covered by a high density of oil palm bush and with under-growth often dominated by the herbaceous weed, Chromolaena odorata. According to F.A.O. (1966, p. 8-9), soils developed on the acid sands of the area are classified as having particularly low productivity. Farms are generally small and fields highly fragmented. Under the prevailing system of land tenure, with subdivision of a man's holdings among his heirs at death, the number of plots ranges from 1 - 25 depending on social status of the farmer. Most of the farms are below 0.5 hectare in size with very few above 0.9 hectare.

Fig. 9.1 shows the holdings of a typical polygynous family surveyed by the author in 1964 and 1977. Fig. 9.2 shows the cultivated and fallow lands for the two years. Close examination of the two diagrams brings out interesting features. In 1964, the family which consisted of the man, his two wives, four children, a late brother's wife and an unmarried sister, cultivated 11 fragmented plots with a total area of 0.62 hectare. The plots varied in size from 0.01 hectare to 0.6 hectare. Their distances from the two farm houses also varied from zero to 9.6 kilometres (Table 9.1).

Judged by the character of the vegetation cover, productive potentials, method of acquisition and location relative to the farm houses and centre of the village settlement, the plots may be classified as shown in Table 9.2

Fig. 9.1: Land Tenure Types Akokwa 1964 and 1977

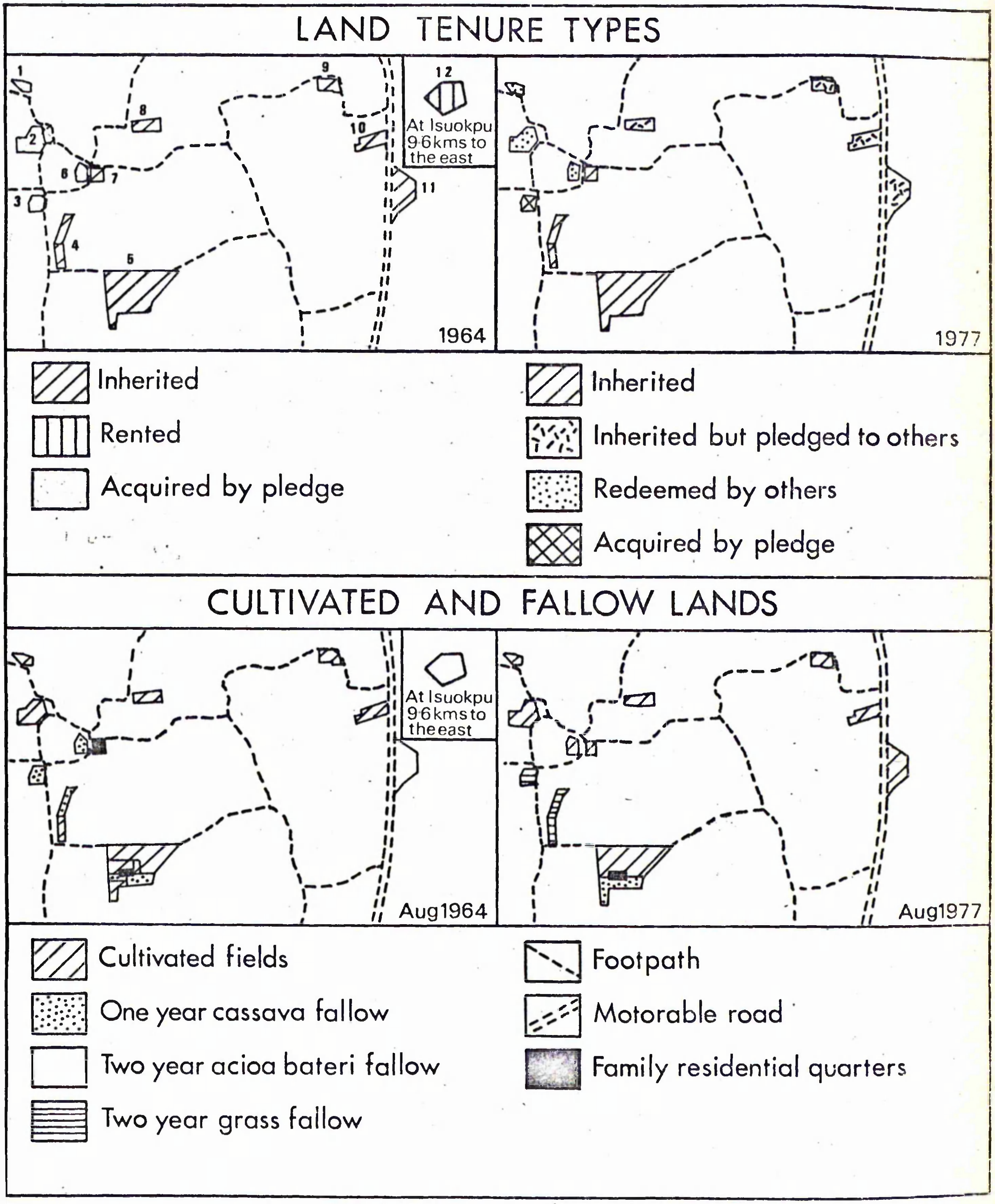


Fig. 9.2: Cultivated and Fallow Lands Akokwa 1964 and 1977

(Source: Fieldwork)

TABLE 9.1 : Area and distances of plots from the Farm Houses. (Source : Fieldwork)

Plot	Area Hectare	Distance from Primary[1] Farm House A (km)	Distance from Secondary Farm House B (km)
1	0.01	0.4	1.1
2	0.04	0.3	0.9
3	0.02	0.3	0.5
4	0.03	0.2	0.2
5	0.24	1.1	0
6	0.02	0	1.1
7	0.02	0	1.1
8	0.03	0.4	1.0
9	0.03	1.0	1.3
10	0.04	1.3	1.4
11	0.06	1.4	1.3
12	0.08	9.6	9.6
Total	0.62	16	19.5

1. The farmer was born in this farmhouse, and the entire family then lived here and cultivated the other plots including 5. He moved into farmhouse B about 1938.

TABLE 9.2: Classification of Family Plots at Akokwa

Plot	Criteria	Classification
1	Location	Àlá mbụ́bọ̀ (compound land)
	Vegetation	Àla ùfé (shady land)
	Soil type	Àla uzuzu (sandy soil)
	Crop suitability	Àla édè (cocoyam land)
	Mode of acquisition	Àla Íbè (pledged land)
2	Location	Àlá mbụ́bọ̀ (compound land)
	Location	Àla ọ̀nụamà (courtyard land)
	Mode of acquisition	Àla Íbè (pledged land)
	Soil type	Àla uzuzu (sandy soil)
	Previous use	Àlá ògwugwúru (mud pit land)
	Crop suitability	Àla jí ọkwụèfē (early eating yam land)
3	Location	Àlá mbụ́bọ̀ (compound land)
	Vegetation	Ala ufe (shady land)
	Soil type	Àla uzuzu (sandy soil)
	Mode of acquisition	Àla Íbè (pledged land)
	Crop suitability	Àla édè (cocoyam land)
4	Location	Àlá mbụ́bọ̀ (compound land)
	Vegetation	Àlá ùfé (shady land)
	Soil type	Àla uzuzu (sandy soil)
	Crop suitability	Àla édè (cocoyam land)
5	Location	Àlá mbụ́bọ̀ (compound land)
	Location	Àlá Azụ òwerrē (backyard land)
	Soil type	Àla uzuzu (sandy soil)
	Crop suitability	Àla jí okwuèfē (early eating yam land)

TABLE 9.2: continued

Plot	Criteria	Classification
6	Location	Àlá m̀bụ́bọ̀
	Location	Àla ọ́nụamà
	Soil type	Àla Uzuzu (sandy soil)
	Previous use	Àlá ògwugwúru
	Crop suitability	Àla ji ọkwúèfē
7	Location	Àlá m̀bụ́bọ̀
	Previous use	Àla ọ́kpụlọ̀ (original home land)
	Soil type	Àla uzuzu (sandy soil)
	Crop suitability	Àla jí okwuèfē
8	Location	Àlá m̀bụ́bọ̀
	Vegetation	Àlá ùfé
	Soil type	Àla uzuzu
	Crop suitability	Àla édè
9	Location	Àla Íkpà (distant farmland)
	Vegetation	Ahagba (Acioabateri land)
	Soil type	Àla uzuzu
10	Location	Àla Íkpà
	Vegetation	Àhagba
	Soil type	Àla uzuzu
11	Location	Àla Íkpà
	Vegetation	Āhagba
	Soil type	Àla uzuzu
12	Location	Àla Íkpa Isùọkpù
	Vegetation	Óke ọhìà (great forest land)
	Soil type	Àla Úrọ̀ (clayey land)

Source: Fieldwork

Plots 1 - 8 situated about 1·km from the nucleus family settlement and receiving various amounts of farmyard manure are classified as compound land (Àlá m̀búbò). All the others fall within the category of distant farmland (Àla Ĭkpà). Notice that the pieces of land directly in front of the walled compound are classified as Àla ókwuèfē (early maturing eating yam land). For safety reasons, they are considered the best locations for huge early eating yams. Location elsewhere would attract thieves. With the exception of one, all the plots are classified as having sandy soil (Àla uzuzu). High density of economic trees puts 4 plots in the category of shady land suitable for the cultivation of cocoyam. All the other plots not specifically classified as shady land are assumed to be good for yams. It is pertinent to observe that the family had no distant farmland west of their nucleus settlement. Population pressure reduced all the village land in that direction to one continuous compound land very intensively cultivated using farmyard manure.

Six of the plots were inherited by the family. Four were acquired by the farmer's parents through pledging about seventy years ago for a total sum of 40,800 pieces of cowry now equivalent to £17 or ₦34 (Table 9.3). Shortage of farmland resulted in the farmer paying N2 (£1) as annual rent for an 0.08 hectare plot located in another village 9.6 km to the east of Akokwa.

In theory the various classes of land should be reflected in the cropping patterns. For example, the

TABLE 9.3: Amount of pledge for four pieces of land

Plot	Amount pledged in local currency about 1908	Equivalent lent in N	Equivalent in £ sterling
a	Ǹnú ègo nesẽ (400 x 6 x 5 pieces of cowry[1])	10	5
b	Ǹnú ègo nesẽ (400 x 6 x 5 pieces of cowry)	10	5
c	Ǹnú ègó àbụa (400 x 6 x 2 pieces of cowry)	4	2
d	Ǹnú ègó nesē (400 x 6 x 5 pieces of cowry)	10	5
Total	Ǹnú ègó nerì na asã or Ǹnú másà (400 x 17 x 6 pieces of cowry)	34	17

Source: Fieldwork

1. The cowry or cowrie is a shell of small gastropod found in the Indian Ocean. It was widely used as money in Southern Asia and Africa. It probably reached West Africa by land and by sea via the Cape of Good Hope. Until the introduction of English monetory system in Igboland, most monetory transactions were reckoned in cowries. Six pieces of cowrie make one Íshí Ègō (principal money), 200 íshi ègō make one óhu ùkwū (twenty heaps) and 400 íshi ègō make one ǹnụ ègō. When the cowry ceased to be a legal tender about 1950, the Town Union met and agreed on a conversion rate of one ǹnụ ègō to a pound, a rate which many creditors have often refused to accept arguing that it does not favour them. This is particularly true of people holding land on pledge. Many are reported to have claimed that the land was sold outright to avoid receiving something considered too small.

plots classified as shady lands and so suitable for cocoyam cultivation should hold cocoyam. All the land situated in front of the walled compounds should hold early maturing eating yams. Similarly, the intensity of cropping should decrease with increasing distance from the farm house. Above all the farmer may not grow permanent tree crops on pledged land. In practice this is not always the case as will soon be evident later in the discussion.

That all land in this overcrowded Igbo heartland is intensively cultivated is demonstrated by the fact that only one plot was not cropped in 1963/64 agricultural year and this because the farmer wanted the Acioa bateri fallow to produce long stakes for yams. Three diminutive plots were under one year cassava fallow. The whole area is gradually becoming one vast compound land.

Figs. 9.3 and 9.4 show the crop mixtures and ownership of fields. A comparison of these maps and Table 9.2 brings out the relationship between the various classes of land, the crops grown and their ownership. The eastern half of the diminutive plot situated at the extreme north west has no yams at all. Dense cover of oil palm, African pear, kola nut and oil bean trees precludes yams from the mixture. The farmer estimated that the plot has not 'tasted' yams for over ten years. Plot 8, naturally suited to cocoyam, had a mixture of yams. The farmer had extra yams and had to find a place for them on plots not suited to the crop.

It will be observed that all the man's plots were

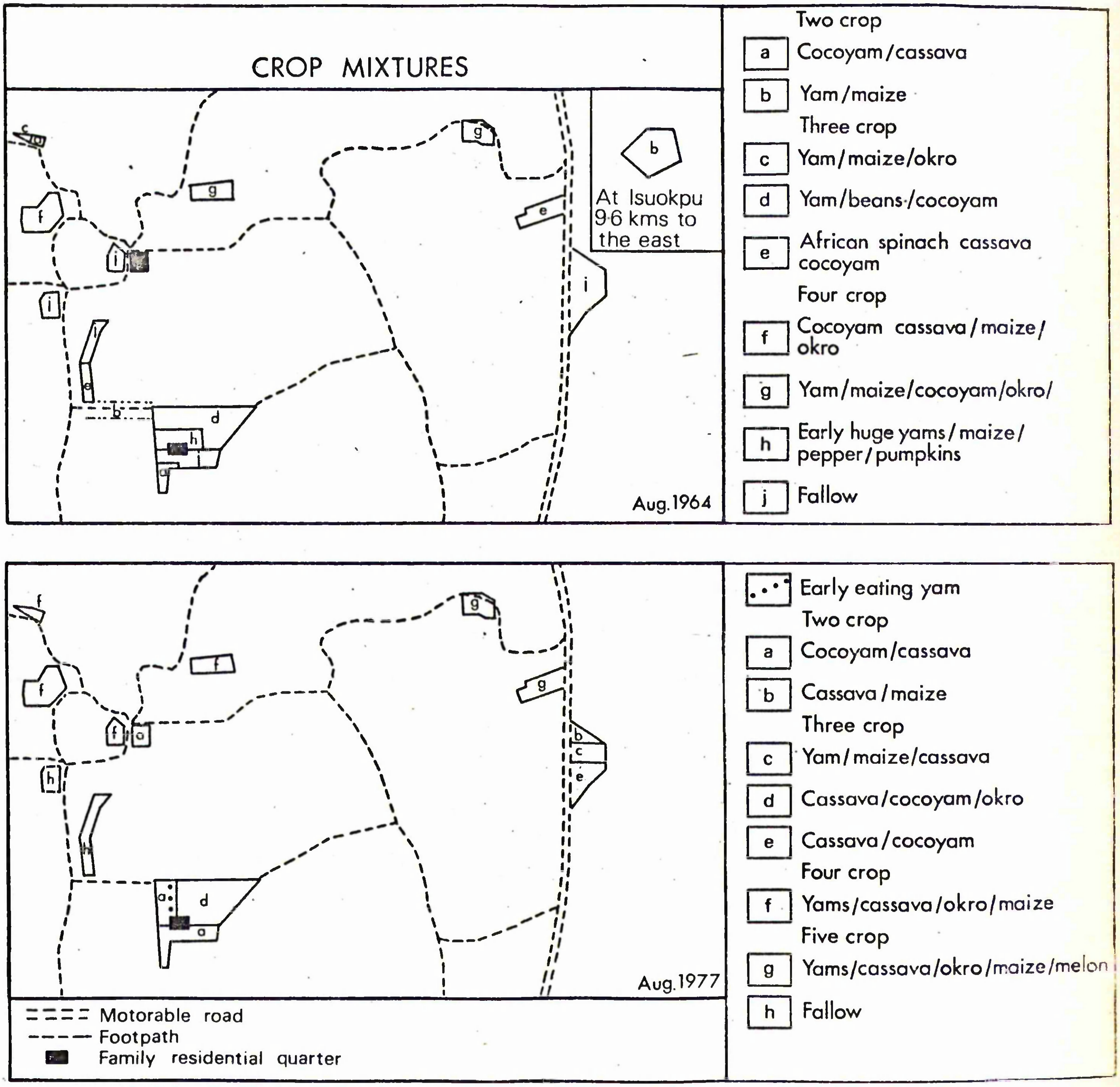


Fig. 9.3: Crop Mixtures at Akokwa 1964 and 1977

(Source: Fieldwork)

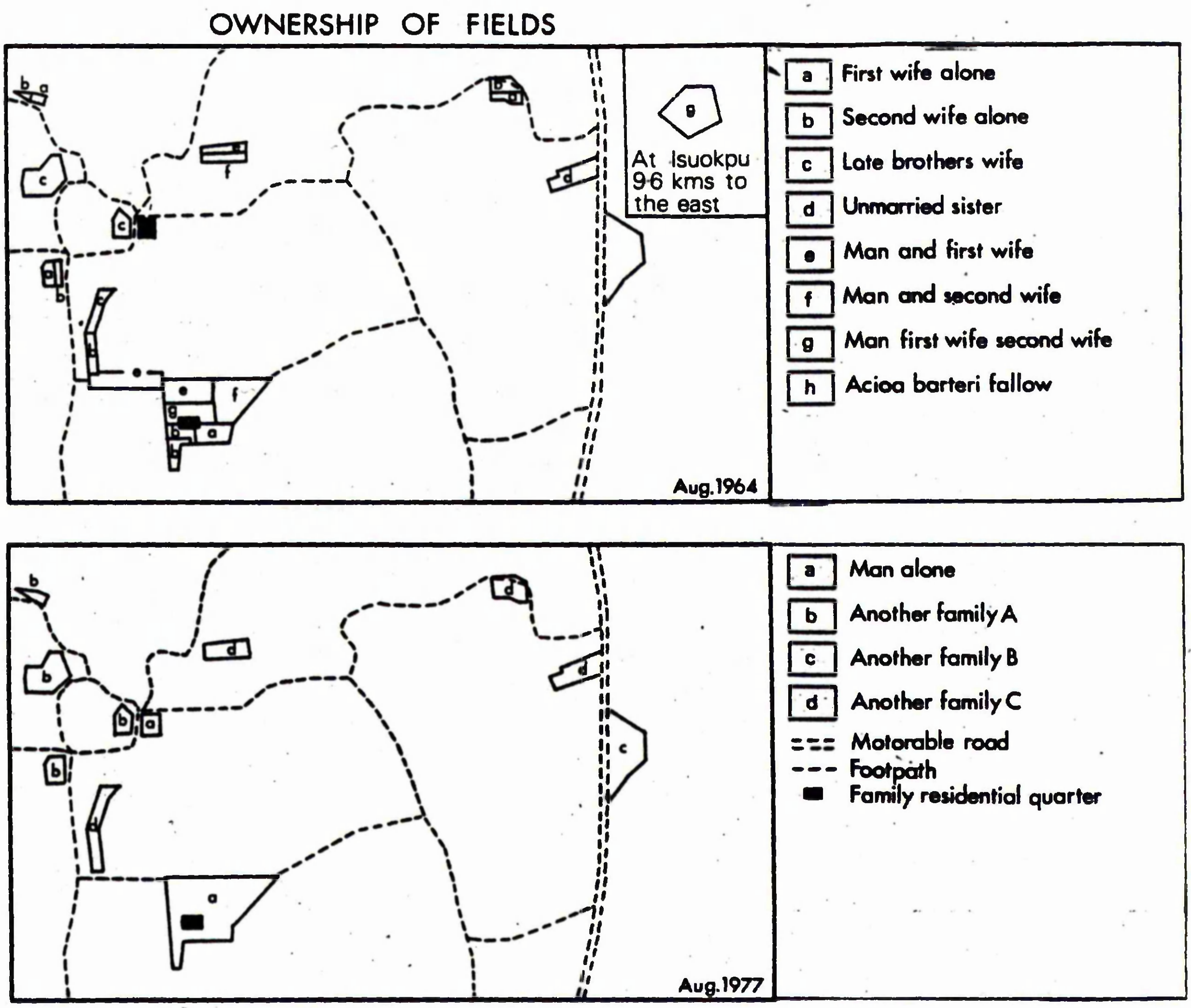


Fig. 9.4: Ownership of Fields at Akokwa 1964 and 1977

(Source: Fieldwork)

divided among the adult female members of the family for the planting of cassava, maize, okro, beans, and pumpkins. The only exceptions were the plots marked (b) and (h) in Fig. 9.3. (b) was not strictly speaking a farm plot. It consisted of two rows of yam mounds on either side of the path leading to the farm house. The land did not belong to the farmer. It was neither pledged nor rented. He was simply exercising a right conferred on him by tradition which allows him to plant a maximum of two rows of true annuals on either side of the path leading to his house just to keep it clean and free of grass. This explains the absence of cassava

The plot marked (h) and immediately surrounding the walled courtyard and containing the mud pit land (Ògwugwúru), was planted annually with about 120 early-eating prestige yams and the man forbade the planting of cassava since, according to him, the crop exhausts the soil and decreases the yield of yams. Other women's crops like okro, maize and spinach were allowed however. This plot received the highest amount of farm-yard manure (including droppings from 5 goats and about 18 birds) and palm leaves. The latter, often used as mulch for the huge early eating yams, added plant nutrients to the soil upon decaying. Each of the wives in addition had separate plots on which she planted cassava and cocoyam. The second wife and the unmarried sister planted African spinach (Amaranthus viridis) in addition to cocoyam and cassava. The plot rented at Isuokpu (now Umualaoma) had no cassava on it at all since the rent covered one agricultural year. Besides, the labour involved in transporting such a bulky produce 9.6 km to the centre of consumption was considered too much for the housewives.

It is important to note that at the time of the second survey in August 1977, the personal and family circumstances of the farmer had changed with far reaching micro-landscape consequences as can be observed from a comparison of the 1964 and 1977 situations. The factors which set up the chain reaction were partly personal and partly political. The farmer lost his two wives before the Civil War and during the war lost his brother's wife to kwashiokor. The sister and niece had married. His only son never returned from the war. At the end of the war the family consisted solely of himself and a daughter - a psychiatric patient. Therefore available labour force was reduced to one man.

The situation was a desperate one. To die without male issue is the greatest tragedy that could befall an Igbo man. In such circumstances land has no value as it would be inherited by a different family. The thought of dying intestate more than anything else dominated the farmer's mind for several months. He therefore proceeded to pledge four pieces of land and all the oil palm trees growing on them for a total sum of £65 (₦130). The only coconut tree in the courtyard was also pledged for £10 (₦20). The proceeds were paid as deposit on the bride price for a wife. Subsequently, three of the four pieces of land acquired by pledge were redeemed but the death of the brother's wife and consequent collapse and decay of her house, released her place of residence (Ókpulò) as farm land.

Renting of land at Isuokpu was completely out of the question as land shortage was no longer the problem. The man is now the only source of farm labour providing for the wife and four children. The daughter and wife are not fit to work due to poor health. The family now owns and cultivates only 7 plots with a total area of o.38 hectare all now situated within the compound land.

The pattern of cropping shown in Fig. 9.4 differs from the 1964 situation and shows clear evidence of decline in the area under the traditional crop yams. The pattern bears no relationship whatsoever to the farmer's personal taste or preference factor. The relationship with soil suitability factor is not clear either. He is forced by circumstances alone to rely on crops which rank low on his preference scale.

Interview with the farmer revealed that he was not motivated by the need for a title or cash in his decision to grow any of the crops. The economic factors of market demand and cost of transport did not feature in the decision making process because the farmer was not producing enough even for home consumption. For the same reason storage quality of produce was not considered at all in the case of yams and was rated low in the case of cassava. The choice of the latter crop relates more to the ease of getting planting material than to any of the other factors. In contrast the inclusion of some yams in the cropping systems appears to relate more to cultural factors of ancestral connections, personal knowledge, ritual and prestige associations than to suitable soil biotic and economic environments. That he lacked seed yams is shown by the fact that he no longer maintains two rows of yam mounds on either side of the path leading to his house. The prestige yams which used to occupy prominent places in front of the walled courtyard have been reduced to just five yam stands grown within the walled courtyard. The yams were ear-marked for consumption during the New Yam Festival in September but as the farmer explained shortage of food often results in the harvest being consumed before that date.

Much of the land including <u>àlá ògwugwúru</u> in which he forbade the planting of cassava in 1964, is given over to cassava, cocoyam, okro and maize. In fact, two plots are under two year fallow. The farmer has no yams to plant on them. Even his own labour, therefore, appears under-utilized. The crop associations on his farm contrast with those on plots which had been pledged to other farmers. Three of them had yam/cassava/maize/cocoyam associations. A significant change has occurred in the plot which in 1964 was under <u>Aciao bateri</u> fallow. Frequent cropping resulted in the death of most of the cover plants. The stumps are now hunted by women and children as firewood while <u>Chromolaena odorata</u> has invaded the plot replacing former re-growth. However, ecological conditions are not homogeneous over the entire plot and the differences are reflected in the crops grown.

The northern tip is very sandy. Apparently a contractor collecting sand from the road for building purposes had tipped several truck loads of sand in this section the previous year and failed to collect thereby rendering the soil very sandy. The farmer therefore planted just cassava and maize but no yams. He explained that he would not waste his precious yams on such sands as they would not give good yield. He estimated that it would take at least four years for fertility level suitable for yams to build up on such a sandy soil. Maize appeared in the association simply because the wife had enough seeds and more to spare. The middle portion of the plot being more open and less sandy was devoted to yams, cassava, maize, okro and some spinach. The extreme south covered by a dense growth of oil palm trees and lacking adequate sunshine was devoted to cocoyam and some cassava. Thus even on this small plot of land, the farmer could differentiate areas best suited to his crops and cropped them accordingly.

Family Farm at Ihe.

The farm is situated on the Nsukka plateau, an area that has witnessed human habitation for at least five thousand years (Hartle, 1966, p.13) and now dominated by a five-crop combination - yam/cassava/cocoyam/maize/pigeon pea. Throughout the village, oil palm, kola trees and African mango dominate the tree crop economy. Two distinct zones of crop production are still discernible in the village in accordance with the principles of Von Thunen - inner farmland or compound land and outer farmland or simply farmland. There is, however, a slight difference. Von Thühen's rings result from a consideration of the cost of carrying harvest to the market. The zonation of land use around Ihe arises from increasing cost of production in distant farmlands expressed in terms of the time it takes to walk to the farm, transport the produce to the consuming centre in the village and maintain its fertility through the application of farmyard manure. Also crops required often for the preparation of dishes are usually planted very close to the house.

Compound-land locally referred to as ànì únò, immediately surrounds the settlement or compound and is very intensively cultivated using farmyard manure to maintain fertility. All the usual characterizations of the so called 'shifting agriculture' (Pelzer, 1945, p.134; Buchanan and Pugh, 1955, p.103-105; Waters, 1960, p.59-99; Laut, 1968, p. 13 - 14; Grigg, 1974, p.57) do not apply to this zone. Clearing is often done with the hoe and matchet but many farmers now practise green manuring. There is very little trash and so no burning. The outer farmland (Ágù) immediately surrounds the compound-land. Due to more woody growth, the plots may be cleared using the hoe or matchet and the trash burns.

The family under examination abandoned their residence, livestock and crops to seek refuge in Igbo heartland during the Civil War. On their return three years later, all the livestock was gone and their huts were in ruins. They had to start life all over again and depended on their tree crops and casual labour for initial supply of capital since the Biafran currency they acquired in exile was not legal tender in post-Civil War Nigeria.

Fig. 9.5 shows the polygynous family holdings in July, 1977. Unfortunately, the farm was not surveyed in 1964 so that no comparison with earlier patterns of cropland use can be made. Good cultivable land is scarce and the family, made up of the man, his two wives, each with two children, owns three plots of about 0.47 hectare. One lies within the compound land and the other two in the outer farm land about 1.5 km to the west.

Some features of Fig. 9.5 suggest that there is real pressure on the land. For example, the ownership of the piece of land lying immediately west of the path leading to the farmhouse is in dispute. The family in which the school is situated is claiming the piece back from the school authorities and has set up two temporary huts on the site to warn intruders. Another clear evidence of pressure is that a once extensive idol forest on the other side of the path is in the process of disappearance. Some twenty years ago, it covered much of the area under dispute including the school farm. Each year a portion of the idol forest passes into the hands of bold land-hungry farmers. The plot owned exclusively by the head of the family was part of the idol forest in 1976. It is important to note that the family has no fallow land on

Fig. 9.5(a): Ownership of Fields at Ihe 1977

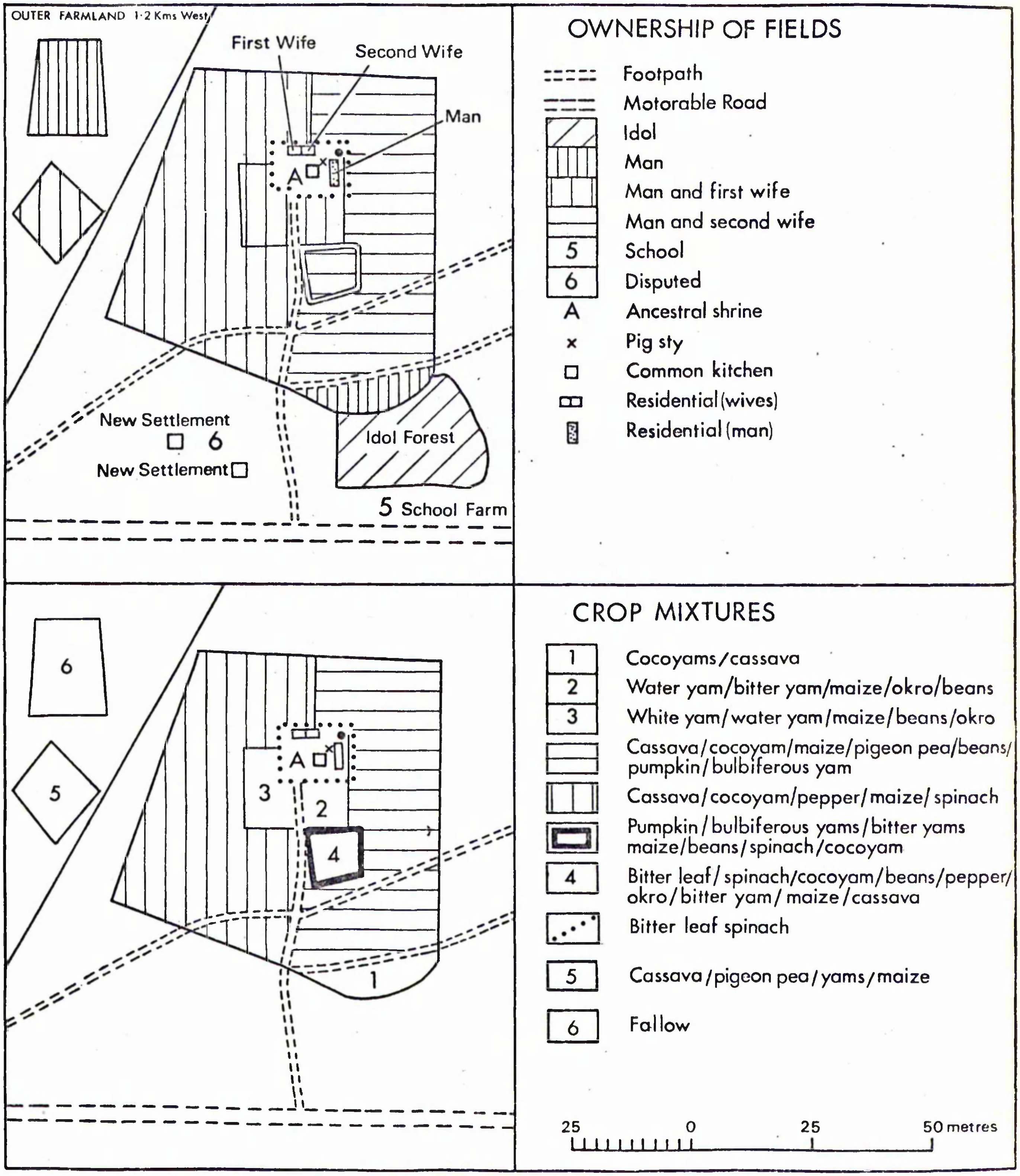


Fig. 9.5(b): Crop Mixtures at Ihe 1977

(Source: Fieldwork)

the compound land. Another crop goes into the soil as one is harvested which is another clear evidence of pressure on the land.

As is usual with most polygynous households, each of the two wives has her own domain, the size of which reflects the number of mouths she feeds, her rank in the matrimonial home and other personal relationships with the husband . The man also has separate sub-plots on which he grows his yams and almost all the other crops also grown by the wives. All the harvest from the subplot goes into his food store and may either be sold or re-distributed among the wives.

In this drier northern half of Igboland, animals, particularly goats, are closely integrated with crop husbandry. They help in the production of much needed farmyard manure on which the cropping system depends. The goats are all stall-fed and a mixture of their droppings and grass is very carefully removed to the plots on the compound land . The farmer and his family recognize the importance of livestock droppings in the agricultural system. Good maize harvest depends on availability of farm yard manure. Each day, therefore, a member of the household goes out in search of grass for livestock. Every adult member of the household has a small shed where he or she keeps the goats. The family under consideration now owns a total of 15 chickens, 6 goats and 1 pig. The number was more before the Civil War. For fear of thieves, animals and men still share a common roof. The building of separate huts for all livestock is alien. Poultry traditionally sleeps under raised platforms on which the farmer and his wives sleep at night. Goats also sleep in the living room at night but the pig stays in his sty located near the doorstep outside. The farmer explained that the pig is a noisy animal and always makes noise to warn him when disturbed by thieves.

In crop choice, factors such as title taking, cost of transport, market demand and cash income from sale of produce are considered unimportant by the farmer, since according to him shortage of good quality farmland limits his productive capacity. The desire to produce as much food as possible for the family is the motive force behind farming. Six main factors therefore appear to have guided his choice of crops. These include size of the family, prestige association, personal knowledge, storage quality, ability of crops to mature during the hungry season and availability of suitable ecological environment for the crop in his area of operation. The farmer considers white yam superior to water yam. To him, it confers an element of prestige. Water yam however matures much more quickly and is better adapted to the shady environmental conditions on the inner farmland, hence the emphasis on its cultivation. As in most parts of Igboland, maize is regarded as a hunger breaking crop and together with pigeon pea, cocoyam and water yam store very well. Maize and cocoyam particularly feature in a traditional Nsukka diet called <u>àgharaghá</u>, a mixture of ground maize, cocoyam, vegetables and spices. Most of the maize harvest are often sun-dried and preserved for this purpose. As in Akokwa, family size, availability of harvest most of the year, including the hungry season, were considered essential in the decision to grow cassava.

Fig.9.5 (b) shows the crop mixtures on the farm. The unwalled courtyard is surrounded by a row of African spinach and bitter leaf, a herbaceous plant whose leaves are greatly priced as vegetable for sauce (Ófe ònugbū). The interesting feature of the diagram is that crops come right to the very edge of the huts, the distance from the walls to the bitter leaf and spinach hedge being only 1.2 metres.

Arrangement of crop mixtures reflect micro-ecological conditions prevailing on each subplot. Thus cocoyam/cassava association occupies the edge of the idol forest. The plot is shaded by overhanging branches from giant trees which shut off the rays from the sun and is considered not suitable for yams. The cassava member of the association strictly speaking does not do well under such conditions. They tend to grow tall thin stems but since the family had enough sticks and more to spare, they are used to 'claim' the land. As a result of high density of oil palm trees, African mango and kola trees, emphasis is on the cultivation of shade tolerant crops such as cocoyam, water yam and some bitter yam. White yam and pigeon pea occur in areas with sufficient sunlight. The farmer allowed fewer trees to grow on the plot directly in front of the farm huts to make room for his yams.

Plot 4, specially manured as a family garden, is enclosed by a ridge planted with six different crops - fluted pumpkin, bulbiferous yams, bitter yams, maize, beans and African spinach. The aim is to create a hedge of useful plants round the garden. There appears to be no cropping sequence or pattern in the garden for the small plot holds 9 different crops at different stages of growth and maturity. These include beans, cocoyam, African spinach, pepper, bitter leaf, okro, bitter yam, maize and cassava. At the time of survey in May, 1977, the farmer was tilling the garden, planting cocoyams and cassava and at the same time harvesting old cassava planted in 1976.

Crop land use on the plots situated on the outer farmland is extensive. Increased distance from the farmhouse increased the cost of supplying them with manure most of which are distributed among the plots in the compound land. Alternate year fallow is used to maintain fertility. However, since the rocks are gravelly with occasional outcrop of bare rock, the soils formed on them are difficult to work.

The crop associations therefore differ very much from those of the compound land and consist mainly of cassava, pigeon pea and maize. Yams occur in isolated pockets of loam soils. The only economic trees of importance are <u>parkia sp</u>. and a few semi-wild stands of oil palm. Seeds from the former serve as spices for sauce.

One major problem facing the family is lack of land to produce enough food to last the whole year. As the farmer put it, "we are more than the land." The family labour force, therefore, is under-utilized. In spite of the high intensity of cropping the compound land using farmyard manure, the family finds it extremely difficult to depend entirely on farming for their livelihood. Consequently, each adult member of the household is engaged in petty trading.

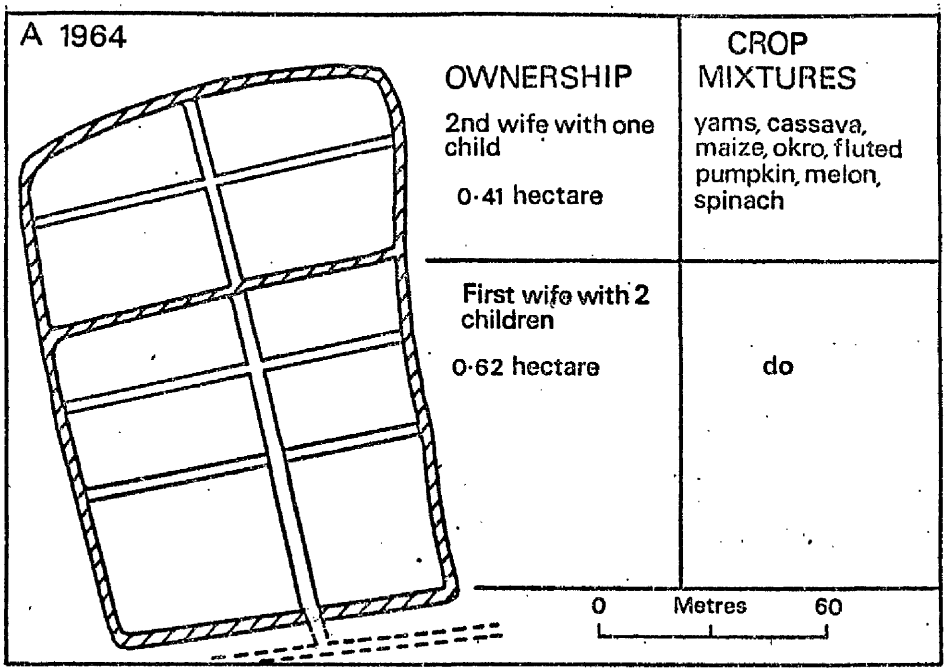
Family Farm at Okehi, Etche.

Unlike the Ihe family just considered, the family at Okehi did not leave their village. They sought refuge in the 'farms' during the Civil War and were then bye-passed by the invading army, a factor which ensured some form of continuity in the agricultural system.

Fig. 9.6 (a) shows the holdings of the polygynous family in Okehi, Etche division in 1963/64 agricultural year. Ecological conditions here differ from those at Akokwa and Ihe. The farmers live in nucleated settlements and cultivate the adjoining land. Favourable man/land ratios allow the communal land tenure system to continue to operate and ensure longer fallow length often exceeding four years. The single blocks of holdings also contrast with the extreme form of fragmentation characteristic of Akokwa.

In the 1963/64 agricultural year, the family which consisted of a man, his two wives and three children, cultivated one large plot measuring 1.3 hectare. The

Fig. 9.6(a): Family Farm at Okehi 1963/64



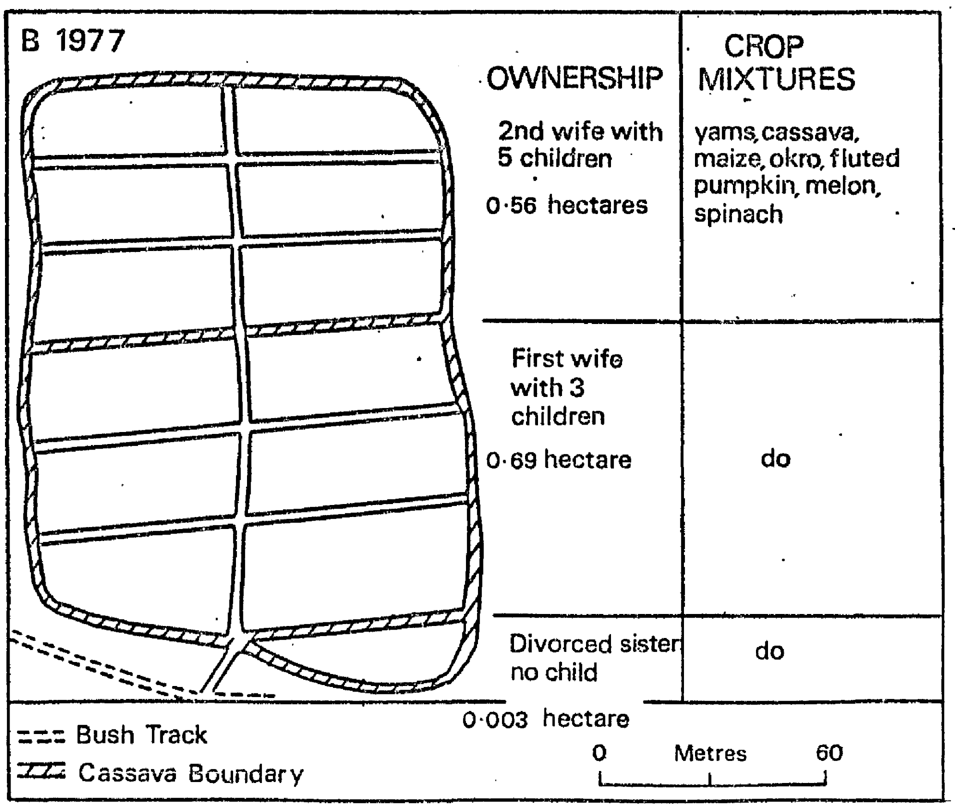


Fig. 9.6(b): Family Farm at Okehi 1976/77
(Source: Fieldwork)

typical Etche boundary type of crop mixture was very much in evidence. The farmer explained that the outer and much wider cassava boundary measuring at times 3 metres ensured that runners from adjoining fallow lands did not impair the normal growth of his yams, a clear evidence that the main objective of farming here is to produce yams.

Four top ranking factors considered by the farmer as affecting his decision to grow yams are mainly socio-personal and include prestige, personal knowledge, good taste of produce, association with ancestors and need to provide the family with good quality food. Availability of suitable labour within the family for the various operations such as clearing the ground, mound making, weeding and harvesting were considered important decision making factors. The farmer encouraged his wives to grow more cassava to ease the pressure on his stock of yams. Family requirements are therefore more important in the choice of cassava than yams.

Yams and cassava are also cash crops but the man relies more on yams to satisfy this need while his wives depend mainly on cassava. People from the over-crowded areas of Owerri and Mbaise visit the market on bicycles and in lorries to buy the produce and the family took advantage of this fact to produce more than normal subsistence surplus. As usual, all the man's yam plots were subdivided among the wives for the planting of cassava, fluted pumpkin, okro, melons, maize and African spinach. The division was not equal but the hectarage shown in the figure reflected the proportion of the family fed from the woman's kitchen, her position in the matrimonial home and the farmer's personal assessment of the wife's value to him. It is necessary to note that there were no separate cassava plots but the 1 - 3 metre cassava boundary ensured that the area under this crop exceeded that of yams.

In 1977 when the family farm was surveyed again, a number of changes had taken place. The size of the family had increased from 6 to 11 and a divorced sister had returned to live with them, bringing the total to 12. Available labour within the family had increased from 3 adults and 2 children to 4 adults and 3 children. This contrasts with the situation in Akokwa where poor health and war reduced the available labour force to one adult who was responsible for feeding two adults and three children.

Another significant change is that the 1963/64 family plot could not be traced and identified with precision. It was under four-year fallow and a portion of it appears to have been incorporated into another family plot for the 1976/77 agricultural year. The family had cleared another plot (1.25 hectare) located about 0.6 km from the old plot or site. The system of cropping, however, showed no marked change but the plot was subdivided in a way that reflected the new internal structure of the family. It is worth noting that the second wife who now has more children than the first gets a slightly smaller area than the first (Fig.9.6(b).

Hierarchy in the matrimonial home takes precedence over the number of mouths fed.

Conclusion.

These three examples illustrate in some detail the profound variations in crop land use among the Igbo-speaking peoples and the complexity of factors which affect farmers agricultural behaviour. Farm holdings are more fragmented at Akokwa located in the Igbo heartland than in the peripheral regions. At Okehi, favourable man/land ratio still makes it possible for the family to cultivate a single but larger block of land. Farmers' choice of crops and systems of production essentially depend on traditional wisdom. All fields are classified according to one or more criteria and these classifications guide productive use of the land. Occasionally, however, the relationship between the classification of a particular piece of land and its actual use seems blurred by socio-personal and other circumstances of the farmer. Whereas at Ihe there still exists a clearcut division of farmland into inner and outer categories, at Akokwa this distinction is fast disappearing following rapid increase in population and more frequent cultivation. At Okehi the distinction is not fully developed yet.

The three farms differ in terms of crop specialization and reasons for such specialization. The family at Okehi grows yams and cassava for both subsistence and cash using extensive systems. The existence of suitable infrastructure like transport facilities and market are taken into consideration along with socio-personal factors in the decision to produce both crops. At Akokwa and Ihe, subsistence production predominates and makes intensive use of farmyard manure to maintain a reasonable measure of fertility. Ecological conditions no longer favour yam cultivation but the crop continues to feature in the agricultural system because it is deeply rooted in the life style of the people. Economic factors of market demand and transport cost therefore do not feature as decision making criteria. In all the villages there is a reasonable degree of crop specialization among the sexes with men being more involved in yam production, and women in cassava. The popularity of the latter relates more to the ease of obtaining planting material and tolerance of poor soils than to any other factor.

The three examples show that political factors especially wars can have different effects on different peoples. At Ihe and Okehi, the farmers were able to adjust rapidly to post-Civil War conditions. At Akokwa, the war had a more lasting effect on the family. The war and other related social issues affected the farmers psychological make-up and hence his agricultural decisions.

Finally, the case studies demonstrate the need to look at every agricultural landscape not only at the macro level but also the micro levels of farm and field. The field as the basic unit of crop land use needs to be examined in a static and a dynamic sense to reveal the temporal nature of most agricultural decisions. Finally, it must be stressed once again that no two farmers are alike either in terms of their socio-personal circumstances or their decision making criteria but the aggregate of the small individual decisions which change with time give character and personality to the agricultural landscape.

SUMMARY, CONCLUSIONS AND IMPLICATIONS FOR LONG-RANGE PLANNING OF AGRICULTURAL DEVELOPMENT

Summary and Conclusions

Evidence from Archaeology, History and oral traditions examined during the course of this study strongly suggests that Igboland has witnessed agricultural colonization from early times and that the Igbo people took part in the domestication of a food crop complex of vegetatively propagated plants, especially yams. Surviving management practices and rituals suggest that the domestication process was not very dramatic but went through a series of evolutionary phases starting with the harvesting of wild roots and fruits, through protection of wild forms by means of religious sanctions, to overt action involving the removal of wild plants to favourable locations near human habitations but still under protective sanctions.

The motive force behind the exercise may have been hunger and uncertainty following desiccation and environmental degradation. Among the crops brought under cultivation were yams, fluted pumpkin, curcubits, African pear, African breadfruit, oil palm and African spinach. Yams were the chief staple. Contrary to earlier beliefs, yams together with wild, semi-wild and protected fruit trees and vegetables appear to have supported the nucleus of the present-day high population density before the arrival of the Asiatic and American complexes. Early agricultural colonizations were however limited to the easily worked, sandy soils of the northern and central uplands. Movement into the southern more humid and forested zone and lowland areas with heavy soils, was speeded up by the acquisition of iron implements perhaps over 1,500 years ago.

Contact with Europe, Asia and America introduced exotic food plants notably water yam, cocoyam, cassava, maize, sweet potatoes, groundnuts, Asian rice, bananas and plantains. The result was an injection of an element of diversity and commercialization into a hitherto predominantly subsistence economy based on a narrower range of crops. By the beginning of the 18th century yams were already playing a vital role as the chief staple and chief export crop of the region. The arrival of the Asiatic and American crop complexes not only diversified the food economy but also challenged the premier position of yams. Cassava particularly has continued to push its frontiers northwards at the expense of yams and other traditional food crops.

Initially, the system of agriculture was shifting cultivation in which virgin forest was cleared cropped for some time and allowed to revert to bush. With increase in population there has been a continuous reappraisal of environment and environmental opportunities. Over much of the region, shifting cultivation has given way to various forms of bush fallowing, grass fallowing and continuous cultivation.

Attitudes to land, the premier agricultural resource have not changed as much. Land is still regarded as belonging to past, present and future generations and requires the performance of certain rituals before it can be alienated permanently. Existing tenure systems are flexible enough to accommodate subsistence production of a number of basic annual root crops but tend to limit use for large scale commercial food or cash crop production by enterprising farmers. However, increase in population and the problems of communal control have introduced some modifications to traditional attitudes to land especially in the densely populated heartland. These modifications are gradually spreading into peripheral regions where more favourable man/land ratios still prevail.

Farm implements consist mainly of hoes, digging sticks and matchets which vary in size and number according to ecological conditions. Prevalence of subsistence and near-subsistence production also implies that each family possesses a complete set of implements and members know the correct use of tools relevant to their operations in the farm. In spite of phenomenal increase in the total population, the number of non-agricultural workers and the need to produce more food, farm implements have not changed much. They are still simple tools adapted to working the various soils at subsistence levels.

Size of farms and degree of fragmentation vary considerably between the densely populated heartland and the peripheral regions. Farms in the heartland are generally small and highly fragmented as opposed to the large single blocks of the peripheral regions. Methods of clearing the land, cultivation techniques, time and sequence of planting management practices and degree of dependence on economic tree crops vary among the different Igbo groups.

Results from the sample village studies show that majority of the farmers are over 35 years of age. Young and energetic men prefer life in the townships to what they regard as the drudgery of farming in the rural areas. As in the past, food production is essentially a family affair using family and extended family labour but unlike the past, labour now poses a problem to increased output. Institutionalised methods of obtaining labour have been shattered by the introduction of monetised economy, western type of education and changing concepts of agricultural labour over the years. The varieties and range of labour source freely available to farmers have been reduced to the immediate family and in a few cases members of the extended family system. Within the family, there still exists a clear cut division of labour among the sexes with the men often performing the more vigorous tasks involving climbing, mound making etc. and women doing the weeding. Much depends on the precise cultural and environmental settings.

Goal orientation in agriculture has not changed much, being primarily concerned with production for family consumption with some surplus for sale to meet periodic and ever increasing needs for cash. Farmers, achieve these objectives 'satisfactorily' rather than 'optimally'. With family security as the overriding influence on food production, there is no real scope for economic optimality in spite of the injection of an element of commercialization into the agricultural system. Real profit maximization concept does not feature very much in the decision making process.

Universal concern for family security implies that there is also no real crop specialization. Farmers grow a wide range of crops required for subsistence. The production systems, crop associations and areas allowed to each association all relate to farmers' preferences, constrained by their subjective and personalised assessment of the suitability of various physical economic, biotic and socio-personal factors in the production process. Annual and perennial tree crops are intercropped and their timing in the cultivation cycle and arrangement in the fields, demonstrate considerable ecological knowledge. Thus holiophitic or light loving plants, such as white yams, are often grown in areas with less dense cover of economic tree crops while shade tolerant crops for example cocoyams are grown under shade.

Generally speaking, food crops so dominate the agricultural economy that livestock play minor roles. Each family keeps a few heads of goats, sheep, pigs and poultry slaughtered mainly during festive occasions. With few exceptions, they are seldom integrated with crop production.

Analysis of production patterns shows that yams, cassava, maize, cocoyam, plantains and rice provide the bulk of the carbohydrates while the oil palm, African mango, curcubits, fluted pumpkin and other vegetables provide much needed proteins and vitamins. However, the role of some perennial tree crops such as African breadfruit and oil bean trees is diminishing in importance especially in the urban areas. Most of the harvests are consumed in the farms.

The pattern of distribution of the indigenous staple, yam, shows that farmers still attach much importance to the crop inspite of declining yields. The present distribution pattern owes much to farmers ability to select and develop varieties adapted to their local environments and the traditional association of the crop with prestige and status. The main areas of production now lie in the Cross River and Niger-Anambra-Ase basins areas with more favourable soil environments.

Cassava has displaced yams as the chief staple in the south and south-east and over much of the heartland and Nsukka-Udi uplands. Cocoyam, a shade-loving crop, requiring humid conditions assumes importance in the oil palm belt and southern half of the region. Like yams, it is gradually losing ground to cassava except in areas with very dense cover of oil palm bush. Of all the grains cultivated in the region, maize has the widest distribution. Its short growing season of about 3 months, suitability for mixed cropping with the major staples and use as hunger breaking crop gives it an advantage over the other grains. Its distribution therefore broadly correlates with that of population density. In contrast, rice is still limited to the hydromorphic and alluvial soils of Abakaliki, Afikpo Adani, Niger-Ase and small area of delta south of Aboh.

One significant development since the civil war is that the area under rice, cassava and sweet potatoes has been increasing in Abakaliki, Afikpo and Adani. The three crops are gradually working their way into these areas once dominated by yams but as in other parts of tropical Africa (Hodder, 1968, p. 104) large scale adoption of rice in Abakaliki and Afikpo is still hampered by lack of cultural infrastructure and traditional attachment to yams.

Cognition underlies all aspects of crop production in Igboland. Pre-colonial and early colonial production systems related in complex ways to the group's cognitive structures, religious beliefs, political and kingship systems. Changes within these systems following contact with Europe have affected crop production but have not altered these relationships completely. Consequently, decision making processes and their spatial expression are still influenced by a multiplicity of factors dating from the past. The physical environment broadly defines the crop options open to the farmers but actual choices can be explained mainly in terms of socio-personal considerations. Many of the farmers' agricultural decisions and their expression on the landscape are therefore not random, chaotic and irrational as they often appear but rigidly ordered according to traditional norms based on ethnobotanical knowledge. The evidence is revealed in the case studies of actual family farms and fields.

Implications for Agricultural Development.

This study has emphasized views from the inside. These views have considerable significance for long-range planning of agricultural development since agricultural research and development schemes are aimed at improving the wellbeing of the farmers, it is vitally important that their preferences, aspirations and ideas concerning the proper constitution of a successful agricultural enterprise should be taken into consideration in the planning process. A number of annual root crops which farmers value very much have not featured prominently in the agronomic research efforts of the Ministry of Agriculture. There is a case for example for embarking on the production of high yielding cocoyams, African pear, African mango, African breadfruit, curcubits and melons, all of which are not only highly prized but also very nutritious. The current undue emphasis on cassava and rice is called into question by farmers aspirations.

Farmers' measure of success in agriculture does not always relate to economic considerations alone but to a host of other considerations including balance and diversity in agricultural systems in which many crops perform complementary functions and in which emphasis is on satisfying family needs. Those charged with the responsibility of formulating programmes to enhance crop production need to think more in terms of complementary packages which will maintain farm food output and satisfy cultural preferences and demands.

The present official attitude whereby government appeals to farmers to produce more food but pay particular attention to a few starchy staples and direct loans to businessmen posing as farmers who then divert the loans for agriculture into the import trade, needs to be re-examined. Those who actually feed the nation need to be fully involved in the decision making process. Some of the old agricultural institutions, e.g. yam title taking and ikuko contests might form a suitable foundation on which to rebuild the country's food production systems. It is at least arguable that funds lavished on 'elitist' development schemes aimed at school children and university undergraduates (e.g. Operation Feed the Nation) might achieve better results if channelled to groups of yam title holders to enable them to organize ikuko contests and so bring more areas into cultivation through the lively extension of traditional values still preserved by the farming communities in rural areas.

APPENDIX I

MY CHILDHOOD EXPERIENCES OF IGBO TRADITIONAL FARMING SYSTEMS

My familiarity with Igbo traditional agriculture dates from my early childhood when in the late thirties my father, then a young and energetic farmer in his forties maintained five sticks of yams (nso azu nese). As a child it was my duty to open the yam barn to young men bringing in yams in baskets so that they could lay them in heaps to be sorted into sizes later and then tied to sticks. At the age of eleven, I was already accompanying my father to farms over nine kilometres away. I remember very clearly that on one occasion he was reprimanded by the late Mr. Ezeanyim of Umuchu in Aguata Division for taking me to distant farms at such an early age, an incident which was to change my whole life history, for the following year I was sent back to school and lost my first accumulation of 'boys yams' (yams which boys planted, harvested and owned while learning the art of farming.)

One weekend in 1940, I accompanied my father to a farm at Umuobom, some 6 km south east of Akokwa. That particular year he cleared a virgin forest belonging to an idol and after two consecutive years' cropping abandoned it to an indigenous farmer who on his own dared not attempt such a feat. Only Christians like my father with great faith in God dared clear idol forest without fear of reprisal from the juju owners. Even then he insisted on our rubbing our feet with palm oil as a kind of protection. Palm oil is believed to be an antidote against poison or any other evil. I remember roasting some seed yams for consumption against traditional norms and being seriously reprimanded for so doing.

One Saturday in April, 1943, the desire to own some yams, a desire shared by every Igbo, drove me to Isuokpu some 9.6 kilometres away in search of 'volunteer yams' or yam left over after harvest. It was normal practice for children and some adults to search the fields after the first rains, spotting the yams as they sprout and digging them up. In one field I stumbled across a whole heap of about fifty white yams dug up but forgotten by the harvesters. All had sprouted with the first few rains, ready to begin the life cycle again. My heart leaped with joy. It was like picking up gold in the street. That day I went home with a sack full of yams.

As a child, I took an active interest in agricultural innovations involving the trial of new crops such as tomatoes. In 1944 when the crop was introduced in the Mission Farm by Captain Dike of the Salvation Army, I was one of the first to adopt it. My mother was generous enough to allow me to use her farm yard manure while my father made available part of the courtyard garden (usually reserved for early eating-yams) for raising this new crop. The harvest was very good but I soon found myself producing a crop which only I could consume and for which there was no market within a radius of 45 kilometres. That year the family was almost overwhelmed by the odour from decaying tomatoes. They appeared to be in every basket, every pot, on the floor and in the gardens. The chickens fed fat. After a few weeks I could no longer stand the sight of any sauce containing tomatoes. They were too sweet for my liking. At last I decided to look for a market for my new crop. This involved carrying the tomatoes on my head and walking to Onitsha some 48 km away. I remember my team started off at the first cock crow (about 4 a.m.) reaching Onitsha just before sunset. My hands and legs were quite swollen. Above all, the merchandise had all gone bad as a result of friction during the 48 km walk and the frequent need to adjust the load on the head. My tomatoes were finally sold for only 3 pence, just enough to buy three loaves of bread. The innovation was a total failure and had to be abandoned the following year.

At St. Augustines Grammar School, Nkwerre, I founded the Young Farmers Club and was President until I left the school in 1952. At St. Mark's Teachers' Grade II College, I took a course in Rural Science which among other things involved the management of an 0.1 hectare plot, making all the ridges, planting cassava, yams, maize and okro. It was also my responsibility to weed the plot, harvest the crops and transport them on the head to the College kitchen. This course qualified me to take up a post as Rural Science Master in schools, teaching the pupils how to grow crops on ridges instead of mounds, practise crop rotation using compost, and regrettably discouraging the practice of mixed cropping. In fact in 1954, during my first year as a teacher at Umuduru Egbeaguru in Okigwi Division, I planned an 0.8 hectare school farm in a secondary growth rain forest.

That year I made yet another desperate effort at introducing innovation involving the cultivation of tree crops in my village. More than ever convinced that an orchard planned along the lines recommended by the Ministry of Agriculture was the most economic use of the vast area of land inherited from my father, I planted 0.1 hectare initially with oranges, tangerines and grapes. They were to be a major source of cash. All the trees have been fruiting for the past 18 years but have not yielded any cash. Instead they have proved a constant source of friction between my family and our neighbours. They and their children could not see any difference between the fruits in the so-called orchard and other fruit trees growing locally in the village and often help themselves to a harvest without reference to the owner in accordance with traditional practice. Much of the fruits therefore disappear even before they are ripe for harvest. The only exception is the grapes which they consider very bitter. The remaining fruits cannot be marketed profitably. At four for a penny, they are not worth the labour.

It must be stressed however that in spite of my familiarity with Igbo rural life and problems, in the eyes of my extended family I am not regarded as a true Igbo, having spent most of my time at Mission Schools and so was not properly acculstrated. To-day, I cannot climb the oil palm tree and very few who came after me in the village can, a factor which greatly disturbed my father and which led him to doubt my ability and suitability as a successor after his death. My first rather belated attempt at climbing the palm was a total failure in a traditional sense and nearly ended in disaster. To demonstrate to my father that I was going to prove a worthy successor, I decided one afternoon to climb and harvest from a young palm tree (Òpupé) scarcely 10 metres tall. The palm head (Ógbè Akwū) hit my climbing rope on its way down and nearly knocked me off balance. I remember throwing away the matchet, abandoning the rope to circle down, grabbing the tree trunk and rubbing my chest and abdomen on the rough stem all the way down, bleeding profusely. That was my first and last attempt at climbing the oil palm tree. The scars remain to remind me of the day I wanted to be a true Igbo.

I still remember with nostalgia the good old days when children hunted rats, squirrels and snakes and trapped birds with sap from rubber vines; when they accompanied their parents to near and distant farms and were taught the dignity of labour from early childhood; when age grades worked in each other's farms in perfect sporting competition and when after each year's harvest friends and neighbours moved from one house to another inspecting the yam barns and congratulating the owner on reaping a good harvest. Those days of abundant food supply are gone. Things seem to have fallen apart in the realm of food production.

II. PERSONAL/FAMILY DATA

I am interested in learning how you grow food crops and the problems you encounter. So please help me answer the following questions.

(i) What is your approximate age?

(ii) How many wives have you?

(iii) How many children have you?
How many actually live with you now?

(iv) Do your wife/wives help you in farm work?

(v) Do your children help you in farm work?

(vi) How many other dependants live with you?

(vii) What is your relationship with (vi) above? (cousin, friends, son, etc.)

(viii) Are you a yam title holder?

(ix) If so what title?

III. GENERAL FARM DATA

(a) Tell me the main reason why you farm.

(b) Which of these crops do you grow?

(i)	Yams	(vii)	Pigeon pea
(ii)	Cassava	(viii)	Beans
(iii)	Cocoyam	(ix)	Groundnuts/bambara nuts
(iv)	Maize	(x)	Melons
(v)	Rice	(xi)	Fluted pumpkin
(vi)	Bananas/plantains	(xii)	Okro

(c) Which of the above are men's crops and which are women's crops?

(d) Did you use the following sources of labour this year?

(i) Úmụ̀ gí (your children) Yes/No

(ii) Nwúnyè gí/Ndi nwunye gi (your wife/wives)

(iii) Úmùnnē gí (extended family)

(iv) Ógò gí (son/brother-in-law)

(v) Úghǜo óru or Ùghala óru (Labour exchange)

(vi) Íkukō (Cultivation Contest)

(vii) Ákwụ̀ọ̀álaa (pay and go)

(viii) Áruō álaa (work and go)

(ix) Óru ègó (paid labour)

(x) Any others

(e) Name the wild, semi-wild, protected and cultivated tree crops and vegetables you use as food:

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

(f) What is the average length of fallow on your compound land?

(g) What is the average length of fallow on your farmland?

(h) Do you consider your soil better suited to cassava than yams?

(i) How do you arrive at such a decision?

IV. DECISION MAKING QUESTIONNAIRE

English: These questions are about how you decide what crops to grow. Do you take these factors into consideration while deciding to grow the following crops - yams, cassava, cocoyams, maize, bananas/plantains and rice? If you do, please tell me how each factor influences your decision. How important are the factors in your decision to grow the crop and the area allocated to them?

Igbo: Íhe obunà ínako na úgbò gí, eleghi anya, mère íhe kpàtara íjì wé nakoyà. Kówakenerem íhe mere iji we nako ǹrí ndià - Ji, Ji ákpù, ókà, únère, ábrìká ma obu unère, jí óko nà rice. Ìchere échìchē maka íhe ǹ dia ngagúputa tutu gi asi nà íme obì gí nà ígàko nrí ǹdiā. Óburu nà íchēre échìchē maka há, gwàkenem ma ha di mkpa ma ha adísighi, mà ha dinomkpa, ma ha dino mkpa nke úku. Íhe igàzā ma ǹgúpùta íhe obunà bú otu nime ǹdia:

Rating:

0 - not considered at all/Ódighi mkpā ma óli

1 - considered but not really important/Ọdí mkpà ma ọdịsịghị

2 - Important/Ọ́dì mkpā

3 - Very important/Ọ́dìnō mkpā

4 - Extremely important/essential
Ō dìnọ̄ mkpā nke úkwu

Sr. No.	Factors	CROPS Y	C	Cy	Bpl	M	R
1.	Your age						
2.	No. of mouths fed in your family						
3.	General taste (good) of meals prepared from crop.						
4.	Storage quality (good) of produce.						

Sr. No.	Factors	CROPS Y	C	Cy	Bpl	M	R
5.	Availability of harvest most of the year.						
6.	Maturity during hungry season						
7.	Sustainance during hard work (starch content)						
8.	Prestige associated with crop						
9.	Necessity for title taking						
10.	Ancestral connections of crop						
11.	Personal knowledge of crop culture/ experience						
12.	Association with rituals or religious ceremonies						
13.	Market demand (high)						
14.	Cash income from sale of produce						
15.	Availability of labour for: (a) Clearing (b) Making mounds (c) Weeding (d) Harvesting						
16.	Ease of getting supply of planting materials						
17.	Cost of transporting produce to market or farm house						
18.	Government encouragement						
19.	Amount of shade/density of economic trees						
20.	Type of vegetation on the plot						
21.	Suitability of your soil/good yield of crop						
22.	Land Tenure: (a) Pledging (b) Renting (c) Inheritance						
23.	Others						

APPENDIX V : Names of Crops Covered During the Rural Economic Surveys of Igboland 1959-1976

Common Name	Botanical Name	Igbo Name
Yams	Dioscorea species	Jí
Cassava	Manihot species	Jì akpụ̄ or àkpụ
Maize	Zea mays	Ọkà
Cocoyam	Colocasia species	Édè ǹkịtị
Cocoyam	Xanthosoma species	Édè Bèkéè
Rice	Oryza species	Ráịshị or òsikápa
Melons	Citrullus vulgaris	Élili
Okro	Hibiscus esculenta	Ọ́kwụrụ
Pigeon pea	Cajanus cajan	hịọ̄hịọ̄
Fluted pumpkin	Telfairia occidentalis	Úgù
Ground nuts	Arachis hypogea	Úkpala
Bambara groundnuts	Voandozeia subterranea	Òkpa
Sweet potatoes	Ipomea batatas	Jí nwannụ̀ or kúkùndukú
Black papper	Piper nigrum	Ósè
Yam bean	Sphenostylis stenocarpus	Ǹdudu
Millet	Sorghum species	Ókìri, ọ̀kà ájata
Sugar cane	Saccharum officinarum	Ókpète
Banana	Musa sapientum	Únère
Plantain	Musa paradeisaica	Ògēdè, Ụ̀kàm
Coconuts	Cocos nucifera	Ákụ òyibò
Oil palm	Elaeis guineensis	ńkwụ
Rubber	Hevea brasiliensis	Rọbà, éso
Kola	Cola nitida	Ọ̀jí
Cashew	Anacardium occidentalis	Kàsú

APPENDIX VI

Standard Deviation Analysis for Udi, Enugu Province 1959/60

	Mono-Culture	2 CROPS		3 CROPS			4 CROPS				5 CROPS				
	C	C	Y	C	Y	y	C	Y	y	Z	C	Y	y	Z	G
% of total cropland (occupied)	33	33	29	33	29	20	33	29	20	14	33	29	20	14	1
% ideal base curve	100	50	50	33	33	33	25	25	25	25	20	20	20	20	20
Difference	67	17	21	0	4	13	8	4	5	11	13	9	0	6	19
Square of Difference	4489	289	441	0	16	169	64	16	25	121	169	81	0	36	361
Sum of squared difference	4489	730		185			226				647				
Sum ÷ number of crops	4489	365		62			56				129				

Note: C - Cassava, Y - yams, y - cocoyam, Z - maize and G - groundnuts.

APPENDIX VII: Estimated Hectarage and Production of Crops in East Central State 1971-1976

CROP	Area ('000) Hectare Production ('000,000) Kg.	1971/72	1972/73	1973/74	1974/75	1975/76
Yams	Area Production	128 588	164 1,820	172 1,702	193 1,807	187 1,785
Cassava	Area Production	61 258	108 742	54 518	188 936	186 931
Cocoyam	Area Production	34 128	87 515	68 531	41 276	57 314
Maize	Area Production	79 72	210 126	196 123	280 166	203 158
Rice	Area Production	20 59	22 63	16 64	19 62	21 67
Beans	Area Production	13 4	14 5	6 2	7 3	6 3
Melons	Area Production	31 11	79 19	67 21	71 19	66 17

Source: Compiled from Consolidated Results of Crop Estimates 1971-1976.

APPENDIX VIII

Costs and Returns Per Hectare of Rice at Adani 1975/76

A. Costs

(i)	Rent of Land	- 2 gallons of palm at 40k each	N00.80
		Cash payment	6.00
(ii)	Labour and seeds	- Slashing	4.10
		Hoeing	18.00
		Seeds, 7 1/2 tins at N2.50 each	18.75
		Broadcasting of seeds	0.75
		Scarring of birds and rodents	6.00
		Harvesting	16.20
		Threshing	14.30
		Winnowing	3.00
		Packing	5.60
			103.50

B. Returns

24 bags of unmilled rice at N7.8 each	187.20
Profit per hectare	83.70

APPENDIX IX . Constructs, Ideas, Reasons used by Farmers to describe their crops or explain their choice.

	Constructs/Ideas/Reasons	Crops and No. of Times mentioned					
		Y	C	Cy	M	B/ PL	R
1.	Our soil is good for yams	6					
2.	Eaten/planted more due to large family size	2	8				
3.	Women own cassava, cocoyam, maize not yams	8	4	3	1		
4.	Not traditional crop/Is a new comer		1	1			1
5.	Good taste, liked by everybody men, women and children	3					
6.	First crop of the agricultural year				3		
7.	Requires less labour than yams	4	3	1			
8.	Gives good yield under shade (water yam)	1					
9.	Plant more cassava due to shortage of seed yams	1	1				
10.	Planted under shade			7			
11.	Traditional food of ancestor	6	1	2			
12.	Soil too poor for yams	5					
13.	Used for ceremonial purposes	4					
14.	Traditional food for working parties	6					
15.	Does not do well because we are more than the land	1					
16.	Planted on refuse heaps					3	
17.	In the past good farmers got free wives	1					
18.	High cost of labour - mound making	1					

Constructs/Ideas/Reasons	Crops and No. of Times mentioned					
	Y	C	Cy	M	B/ PL	R
19. We old men find yams healthier food than cassava	2	2				
20. Helps in feeding the family all year round		4				
21. Grows big yams round courtyard for prestige.	2					
22. You (Government) asked us to grow more food	2	2		2		
23. Gives us cash	3	1				1
24. You can cut cassava stems from neighbours farm but not yam	1	1				
25. Rent good yam land from distant neighbouring towns.	4					
26. Meals from cocoyam induces good sleep			1			
27. Can you roast cassava and eat?	1	1				
28. Sisters, brothers, wives and children feed easily		1				
29. Not much grown since considered poor man's food		1				
30. Sell to pay tax and school fees	1					
31. 'Eats' manure			1			
32. Does not taste as good as yams	1	1				
33. Yams and cassava can be eaten in many ways	1	1				
34. Preserved harvest to drive off hungry season			2			
35. Not eaten by titled men		1				
36. Grown to take title	2					
37. Not much planting materials, seed yams now eaten up	1					

Construct/Ideas/Reasons	Crops and No. of Times mentioned						
	Y	C	M	Cy	B/ PL	R	m
38. Manure is necessary for maize			1				
39. All yams staked but big stakes difficult to get	1						
40. Not used to entertain important visitors like you		1		1			
41. Presented to cattle rearers (Izii)	3						
42. Have no cash to buy enough seeds	2						
43. Àyi na èrí àla na ufé							
We eat land in the tree vegetation	1			1			
44. People come and buy our produce so no need for transport	1	1					
45. Yams grown at Isuokpu were carried home on the head	1						
46. Not much cocoyam cultivation in land rented in distant farms				1			
48. That section of the farm is too sandy for maize and yams	1	1	1				
49. Cassava said that he had come to mediate in a war between men and hunger and became a victim	1	1					
50. We store our yams in the farm. Transportation is not a problem	1						
51. Much of my land was redeemed so cannot plant much cassava		1					
52. Tégwò Anú Tégwò Ázù, Ogiri bu ógwù ófè							1
53. Ígbuteghi èpe mà ítaghidi okà/ If you do not cut grass you will not eat maize			1				

Constructs/Ideas/Reasons	Crops and No. of Times mentioned						
	Y	C	M	Cy	B/PL	R	m
54. We train future yam farmers as you train children to read and write	1						

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