RESOURCES AND DECISIONS: PEASANT FARMER AGRICULTURAL MANAGEMENT AND ITS RELEVANCE FOR RURAL DEVELOPMENT PLANNING IN KWARA STATE, NIGERIA

by

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ABSTRACT

Many explanations offered for 'traditional' farming in Africa often concern production patterns without a serious attempt at understanding the underlying decision-making process. This study seeks to focus on the factors which influence decision-making in peasant agriculture from an emic perspective. Much of the failure in attempts to induce agricultural change in 'traditional' peasant systems is due to a lack of appreciation that historical, social, cultural and personal factors are as strong as the interplay of economic variables in influencing agricultural production. Understanding of farmers' knowledge and perception of the environment thus becomes a focus of interest in any attempt to structure change in the interests of the rural community. This study attempts to explain what farmers do, and why they do them, from their own perspective. To this end, the behavioural approach is used as the basis of explanation. The method of investigation is centred on the 'triad' strategy of 'observing', 'listening and recording' and 'asking questions' proposed by Whyte (1977) as the proper basis for the study of environmental cognition.

The following are typical of the study's detailed findings.

a) Farmers' goals reflect a response to their 'representational model' of the rural-urban dichotomy in Nigeria.

b) Production systems are governed by an organized system of knowledge (ethnoscience) which is valid.

c) The 'conservative' and 'primitive' image given to 'traditional' farmers is misplaced. Not only is the farming system rational, farmers are eager to accept changes which they consider useful.

d) Evidence suggests that farmers have a lot to teach, and to share with, planners and so-called 'experts'. Rather than being obstacles to rural transformation, partnership with farmers seems to be the best route to agricultural change.

e) When appropriate methodology is used in studying farmers' decisions, they are sources of rich environmental information.

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CHAPTER 1

INTRODUCTION

The purpose of this thesis is twofold. First, to arrive at a better understanding of Third World peasant agriculture, by looking at the physical, economic, social and cultural context in which farming takes place. Secondly, to identify aspects of 'traditional' agricultural systems which are of relevance for future rural transformation.

A. Better understanding of the system

'Traditional' agriculture in Africa has long been a focus of scholarly interest (e.g. Allan, 1965; Collinson, 1972; Oyenuga, 1967; Phillips, 1959, 1961; Ruthenberg, 1971; Webster and Wilson, 1966; Wrigley, 1961). Case studies such as those by Knight (1974), McMaster (1962a), Morgan (1957, 1959), Porter (1965), Richards (1939), Schllippe (1956) and Trapnell and Clothier (1937) among others, have been especially valuable in revealing the workings of subsistence agricultural systems. And yet it is the case that much of the work done on African agriculture has been written either by 'outside' observers (Chambers, 1979) or by Africans trained to look at African situations from the viewpoint of Western civilization. Despite the insights yielded by some of the studies listed above, there is still a regrettable tendency towards an analysis of 'traditional' agriculture and behaviour from the 'we' and 'they' or 'our system' and 'their system' point of view among those engaged in the practice of agricultural transformation. Because it is compared with so-called 'modern' agriculture, there has been a tendency to characterize farming in tropical

Africa as 'primitive', 'irrational', 'wasteful', 'unproductive', 'unscientific' and the like. Observers in this position have often made little attempt at understanding why farming is done the way it is, what the underlying processes of decision-making resulting in the patterns observed are, and the social, cultural, economic and political environments in which these decisions take place and are implemented.

One major objective of this study is to give the African farmer a fair hearing. This is based on the belief that the presentation of the 'insiders'' view (an <u>emic</u> view as opposed to the <u>etic</u> view) of the farming environment is necessary if the system is to be understood and if innovations which will bring about positive change are to be effective. Most of what is presented in this thesis therefore will be from the African farmer's point of view by looking at his/her farming behaviour as he/she sees it. Federal and State Governments in Nigeria have always dictated matters of policy concerning agricultural development in the country while research institutions such as the International Institute of Tropical Agriculture, Ibadan, Nigeria and individuals have determined research interests and have unlimited opportunities to publish research results concerning farming techniques, crop types and new inputs. The whole world hears them and knows what they are doing. 'Traditional' farmers have never been given this opportunity. They have no say in deciding research focuses and priorities, nor a voice in policy. They have no avenue to tell the world the results of their own experimentation and discoveries, nor the underlying factors which determine production decisions. These are done for them by 'outsiders' who may have little or no knowledge of the context of these decisions. This thesis is designed to give farmers a mouthpiece to tell their story the way they see it, with comments of clarification from me where necessary.

To carry out this objective, a holistic approach to analysing 'traditional' farming is attempted rather than the purely economic approach adopted by many scholars (Boserup, 1965; Clark and Haswell, 1964; Lisenmeyer, 1974; Norman, 1972; Spencer, 1972; Young, 1968). In an earlier brief study of agricultural land use pattern in some parts of the present research area, it was found that economic variables alone were insufficient to explain not only land-use patterns, but also the whole spectrum of farming behaviour among Amuro people (Atteh, 1974). Porter (1965) came to the same conclusion with the Pokot and Wakamba of Kenya while Wolpert (1964) in his study of farmers in Central Sweden found that some of the attributes associated with the concept of 'Economic Man' in normative theories are in fact 'superhuman' and argues that a more down-to-earth approach to economic behaviour be attempted. Luning (1967), looking at choices open to farmers in Northern Nigeria concludes that a wide variety of factors, many of them unrelated to economics, influence farm management behaviour. This same conclusion was reached by Collinson (1972) after studying various communities in East Africa and by Knight (1974) among the Nyiha. These writers, among others (Barker, 1977, 1978; Richards, 1977a,b, 1978; Simon, 1955, 1956, 1957; Warren, 1975) have stressed that the role of culture, tradition, beliefs, goals and aspirations, individual personality differences and preferences, political and social conditions are as potent as economic and spatial variables involved in farming behaviour. These non-economic variables define what is meant by 'economic' variables in the various communities concerned. They shape the 'image' of an individual and the community in which he lives, and consequently affect the decision-making process. Since farming systems and land-use patterns reflect the decisions of thousands of individuals and groups, an understanding of the decision-making process becomes vital if one is to have a sound understanding of the spatial and non-spatial aspects of 'traditional' farming.

In this study therefore analysis of the socio-cultural environment and the decision-making process, will be as important as any consideration of economic variables, in seeking a better understanding of 'traditional' farming behaviour.

B. Relevance to Rural Development Planning

Starting with outsiders' assessment of 'traditional' farming mentioned above, much time, research and money has been spent on how to 'improve', 'replace' or even 'obliterate' present 'primitive' farming systems. Many of these attempts have failed because it was assumed that so-called 'primitive' peoples would readily recognise the superiority of the improved system. Freitag (1963) provides a catalogue of the failures which have littered the African agricultural development landscape. Baldwin (1957), in reporting on the failure of the Niger Agricultural Project, puts it more succinctly by acknowledging '... the surprising and fatal ignorance in which the scheme was planned and started'. Experience since the time Freitag and Baldwin wrote indicates little improvement. Chambers (1979), Collinson (1972), McMeekan (1964), Norman (1973a), and Richards (1978), among others have commented critically on attempts by western-trained scientists to establish new technologies and methods in the African agricultural landscape without adequate attempts to understand the merits of the existing systems of cultivation. A central theme in this thesis will therefore be the postulate that a proper understanding of the production process from the farmer's view point is of paramount importance in determining the relevance, practicality and potential success of innovations designed to improve the system. Indigenous environmental knowledge and production systems rather than being treated as obstacles to agricultural improvement might actually prove useful as vehicles for innovation and change.

It is uncontroversial to admit that there are many limitations in present African farming practice especially in relation to the need to cope with the farm population's growing aspirations, and the requirements of the wider world than the village. Nevertheless, African farmers are heirs to a rich store of practical environmental knowledge and rational strategies, much of which will be pointed out in this thesis. To neglect these practices as 'primitive' is a wasted opportunity. Certain aspects must therefore be preserved and improved upon if those who seek to ameliorate the situation are not to be guilty of losing more than they gain. Brown and Parriser (1975) are stating fact when they write "... so called primitive societies developed technologies, techniques and a store of practical environmental knowledge of a wide range of sophistication, by what must be admitted to be the scientific method; and neither their accomplishments and skills, nor those of societies 'en voie de developpements' should be ignored or discounted" (Brown and Parriser, 1975:592-93).

These attributes of 'traditional' farming systems have been ignored and discounted for too long. This thesis is designed to highlight them. It will be shown that farmers have the capacity to respond positively to changes and introduction of new ideas. However, they will hardly respond other than negatively to introductions which, evaluated according to their own criteria, they find illogical. Yet their criteria have been discounted as government officials and research institutions have sought to maintain their privileged position in determining what farmers need, and how these needs should be achieved. The irony is that when farmers reject planners' criteria, the latter accuse them of being conservative and unprogressive. As Knight and Wilcox (1976) rightly point out, "... some observers feel that small-scale traditional farmers, responding to opportunities that are socially and economically and ecologically rational from their perspective, are a positive element in rural development potentials in the non-industrial world". The detailed analyses presented in this thesis are intended to open the eyes of planners and outsiders to this possibility. The study is not designed to provide specific and detailed planning data, but looks into the whole general issue of how such an approach might be introduced into policy formulation and plan implementation.

In pursuance of these objectives, small-scale farmers in Oyi Local Government Area of Kwara State, Nigeria have been chosen, for reasons stated in Section 2B, as the focus of study. This is in the belief that even though research and experience is seldom easily transferable in tropical Africa due to great human and environmental diversity (de Wilde, 1967), the problems facing traditional farmers and the underlying processes of man-environment relations are similar in structure in all parts of Africa though different in detailed content. Micro-study of the farming environment is essential to a full understanding of the experiences of farmers at village and farm level, and since these are the levels at which innovation and change will be implemented, they become the appropriate focus for the present study.

Plan of the Thesis

Special attention is focussed on farmers' knowledge of the physical, social economic and cultural environment in which they live and practice their agriculture. Their goals and aspirations and the internal and external factors which determine them also receive attention. Decision-making in actual crop production systems, and crop marketing are also investigated. Present and possible future trends in the agricultural system are then examined. All these are presented from the farmers' point of view to see how they perceive their occupation and the environment in which farming takes place.

To do this, the thesis is divided into eleven chapters.

Chapter 1 - The introduction examined the main objectives of the study.

Chapter 2 - examines the conceptual framework for the study highlighting a move away from traditional normative and agro-economic approaches to the study of farming systems, to behavioural postulates which influence decision making. Methods of investigation are also discussed.

Chapter 3 - The context of Kabba agriculture provides objective background information about Oyi Local Government

Area (Kabba Division) concerning environments, population, settlement patterns and road networks, occupational structure and land tenure systems. The second part deals with the physical environment of soils, relief, climate and vegetation, and the socio-economic background. These sections are designed to delineate the environment in which the farming system is constructed.

Chapter 4 - The goals and aspirations of farmers are examined in the belief that these influence production practices, crop choices, farm sizes, etc.

Chapter 5 - The farming system itself is described with special emphasis on farmers' understanding of the underlying processes basic to farm practices. Resource allocation is also discussed.

Chapter 6 - Goal satisfaction. How produce resulting from the farming system is used to meet goals identified in Chapter 4. Consumption and marketing patterns are examined.

Chapter 7 - The cultural background defining the farmers' knowledge system ('ethnoscience') is examined. Sources of environmental information about farming and the external world are also discussed.

Chapter 8 - The types of risks and uncertainties which farmers face and the strategies they have developed to cope with them form the major focus of this chapter.

Chapter 9 - Perceived farming problems, with special attention to the way farmers see hinderances to their production are examined in detail.

Chapter 10- Trends in farming, the changes which have occurred and are occurring are examined. Farmers' assessment of the state of their occupation and their attitude to innovation form the central core of this chapter.

Chapter 11 - Conclusions. This provides a summary of major findings, its relevance for rural development planning and areas identified as deserving further research.

CHAPTER 2

CONCEPTUAL FRAMEWORK AND METHODS OF INVESTIGATION

In pursuit of the objectives of this study discussed in the last chapter, a brief discussion of the conceptual framework from which the study is approached and the method of investigation will be the principal focus of this chapter.

A. Conceptual framework

Attempts at finding conceptial frameworks for explaining agricultural production decisions have a long history, starting with Ricardo's concept of 'economic rent' (Ricardo, 1817) and Thunen's 'concentric rings' (Thunen, 1826). Until recently, however, theory development and model construction lagged behind data collection because of what Morgan and Munton (1971) called geographers' obsession with explanation based on the study of the physical environment of soils, climate and slope. Resurgence of interest in agricultural location theories and models occurred with the works of scholars such as Chisholm (1962), Dunn (1954), Garrison and Marble (1957), Grotewold (1959), Harvey (1966), Heady (1952), Henshall (1967), Isard (1956), Johnson (1962), Leontieff (1953), Losch (1954), Ohlin (1933) and a host of others.

The problem with the early theories and models, is that they are normative, i.e. they embody assumptions as to what is normally expectable behaviour in a given environmental context rather than an identification of what actual behaviour is. This concept is built around the abilities of the so-called 'Economic Man' who is supposed to be able to make 'rational' and 'optimal' decisions under conditions of certainty (Heady and Egbert, 1964; Heady and Hall, 1968). Simon (1956, 1957, 1959) and March and Simon (1858) cast the severest doubts on the possibility of ordinary people attaining to the superhuman abilities of the 'Economic-Man'. They argue that decision-makers are behavioural men, who are subject to limitations in information available, have many goals some of which may not be economic, and strive to 'satisfice' rather than optimize some 'utility'. Decision-making under conditions of risk and uncertainty therefore makes explanations, based on normative models, less attractive than once appeared (Rushton, 1969). Game theory, proposed by Newmann and Morgenstern (1944) was designed to incorporate the risk and uncertainty element in decision-making. It has been used in various forms (cf. Chapter 8).

The Behavioural Model

Many geographers have drawn attention to the general dangers of using static or patial equilibrium models in explaining dynamic situations under which decision-making takes place (Rushton, 1969; Myrdal, 1957), because most normative models are based on questionnable assumptions which limit their use in the analysis and explanation of behaviour. Their exclusion of non-economic variables is a major flaw which neglects factors which "range from chance events in some remote historical period to current decisions made for understandable but non-economic reasons" (Harvey, 1966:370). Yet agricultural production in the third world is influenced by procedures grounded in cultural norms and rules. Variables such as beliefs, feelings, attitudes, goals, aspirations and images of the external world work together to structure environmental information and resources into culturally, economically and ecologically rational crop production possibilities. This throws the emphasis on the underlying processes of decision-making rather than on the patterns which behaviour produces. The behavioural postulates which operate at the level of the individual decision-maker must thus be examined. This is because a more logical route to explanation of behaviour in space is to identify the basic behavioural tendencies which produce the spatial patterns we observe instead of trying to explain behaviour through the environment in which it occurs.

The central tenet of this field is the behaviour of man in respect to his environment. His action in the 'real' world takes place on the basis of his perception of the world around him (Huff, 1959). Man's preferences, evaluations, decisions and subsequent behaviour are based on these pictures in his head rather than on the world of objective reality outside him (Lowenthal, 1966). This is what Brookfield (1969) calls 'the environment as perceived' and Boulding (1956) asserts that this imagery is necessary for purposive behaviour to occur. "Given this premise, man's behaviour with respect to the environment becomes the central nexus of the research problem and those forces which contribute to environmental and spatial behaviour, such as past experience, available information, physiological and psychological condition, philosophical traditions, social constraints and communication spheres become the legitimate concern of the geographer " (English and Mayfield, 1972:212).

The main operational words in this concept are perception, cognition/image and attitude. Very briefly described, perception is the immediate sensory reception and mental awareness of environmental stimulii. Its definition has varied with the disciplinary angle from which it is viewed (Abse, 1966; Goodey, 1971; Saarinen, 1966; Vernom, 1962). Perception derives from its Latin origin 'percipere' which simply means awareness (Downs and Stea, 1973; Goodey, 1971; Ittelson, et al., 1974; Katona, 1951; Pocock and Hudson, 1978). To the human geographer, however, interest in perception is concerned with the cognitive structuring of social stimulii (physical and associated social environment) as influenced by the perceiver's genetic structure and cultural characteristics rather than its neurological and physical aspects. Cognition or Image, unlike perception, need not be linked with immediate behaviour and so is not directly related to proximate environments. It is connected with what is past and what is future (Downs and Stea, 1973). It concerns enduring patterns of thought and feeling arising from encultu-ration, innovation and diffusion of knowledge (Porteous, 1977). Stea (1970) sees cognition or image as the product of the process of collecting, coding and evaluation of information from the environment and differs from perception only in degree and focus (Levy, 1970). Attitude gives attributes, value, meaning and preference to perception and cognition, giving indications of likely behaviour. Fishbien (1967), however, warns of the difficulty of linking attitudes with specific behaviour.

Decision-making in 'Traditional' Agriculture

Ruthenberg (1971) defines 'traditional' agriculture as a food producing system that does not use fossil energy subsidies. In addition, it is a farming system which has developed over a long period with little or no transformation into the Western industrial model, for only as it is compared with the industrial agricultural system does this label acquire any meaning. To the practitioners the word 'traditional' has no operational usefulness. All the uses of the word in this thesis bear this in mind. Decision-making involves choice from many alternatives. This is the lynch-pin of purposive behaviour as will be examined later.

The major decisions which face farming communities in Kabba concern the choice of crops and production procedures designed to ensure adequate supply of food for the household and to generate a surplus to be sold for cash. They, therefore, have to make choices a) of suitable land and methods of working that land for maximal production and b) of crop types and varieties which can be used for consumption and for sale. The purpose of farming is, therefore, to meet specific goals. Agricultural production is thus 'satisficing' rather than 'optimizing'. It is postulated that crop choices and production systems in Kabba are influenced by the following factors:

a) Farmers' knowledge of the physical environment - soils, vegetation, climate - through which resources are defined and exploited.

b) Their perceptions of the economic environment including economic factors such as the labour supply dynamics, inputs, the marketing situation and the impact of other non-agricultural sectors of the national economy.

c) Their perceptions of themselves - these concern their perception of the cultural and social milieu in which they live. Assessment of self is made in comparison with other members of the immediate and distant community of which the farmer is aware. This enables farmers to set themselves goals as to what they want to achieve, and what they want to become. This in turn influences the way they make use of the resources available to them.

The central assumption, which runs through the length of the thesis, is that though the Kabba farmer depends to a high degree on the physical environment for crop production (Atteh, 1974), he is not a pawn in the physical environmental forces surrounding him (Mills, 1942). The crude environmental determinism of past scholars (Buckle, 1970; Cressey, 1944; Huntington, 1915; Semple, 1911; Spate, 1957; Taylor, 1951) has been rejected by most geographers (Sonnenfeld, 1967). For the environment to totally dictate to man is possible only if he is divested of the accumulated cultural baggage of the past and lacks concern for the future. Yet many scholars of 'traditional' farming in the third world employ neo-deterministic explanations to man-land relations (Allan, 1965; Boserup, 1965; Cleave and White, 1969; Dumont, 1954; Forde and Scott, 1966; Ruthenberg, 1971 among others).

The cold 'rationalism' which has bedevilled normative models also makes it an inappropriate tool for explaining 'traditional' agriculture. Personal factors, social and cultural requirements, and what happens in other societies all influence farmers' agricultural production decisions. Objects in the physical world, information available to farmers, the cultural systems which filter these information all fashion man's image, and image influences decisions which are expressed on the landscape.

The Decision-making process

The point being made in the last paragraph is illustrated with a schematic diagram showing the process of decision-making (Fig. 2.1). The process of interaction is shown by the directional arrows. It is only possible to make the briefest comments based on this conceptual schema. A fuller discussion has been written up, to be presented as a separate work later on. It must be clear from the onset that no suggestion is being made that the various aspects of the decision-making process can actually be segregated into separate and distinct boxes as the schema shows. It is presented to make discussion of the various aspects easier.

a) The Real World: The process of interaction starts with the real world or environment as a source of information (Bevan, 1958; Forgus, 1966; Katona, 1951). It is from here that individuals receive information (knowledge) about physical objects of land, air, water, buildings, etc. and sees interaction between social and physical components of the environment. The 'village' and its surroundings and the external world of which farmers are aware (Chapters 3 and 7) form the real world for Kabba farmers. Sonnenfeld (1969,p.5) divides this environment into four. First is the objective geographical environment consisting of both 'proximal' and 'distal' elements of man's universe - the world outside man. Within this larger sphere is the operational environment consisting of those portions of the world which impinge on man, influencing his behaviour in one way or the other, whether he is aware of it or not. In the context of Kabba, the overall social and economic environment in the rest of Nigeria falls into this category. That portion of the operational environment of which man is aware

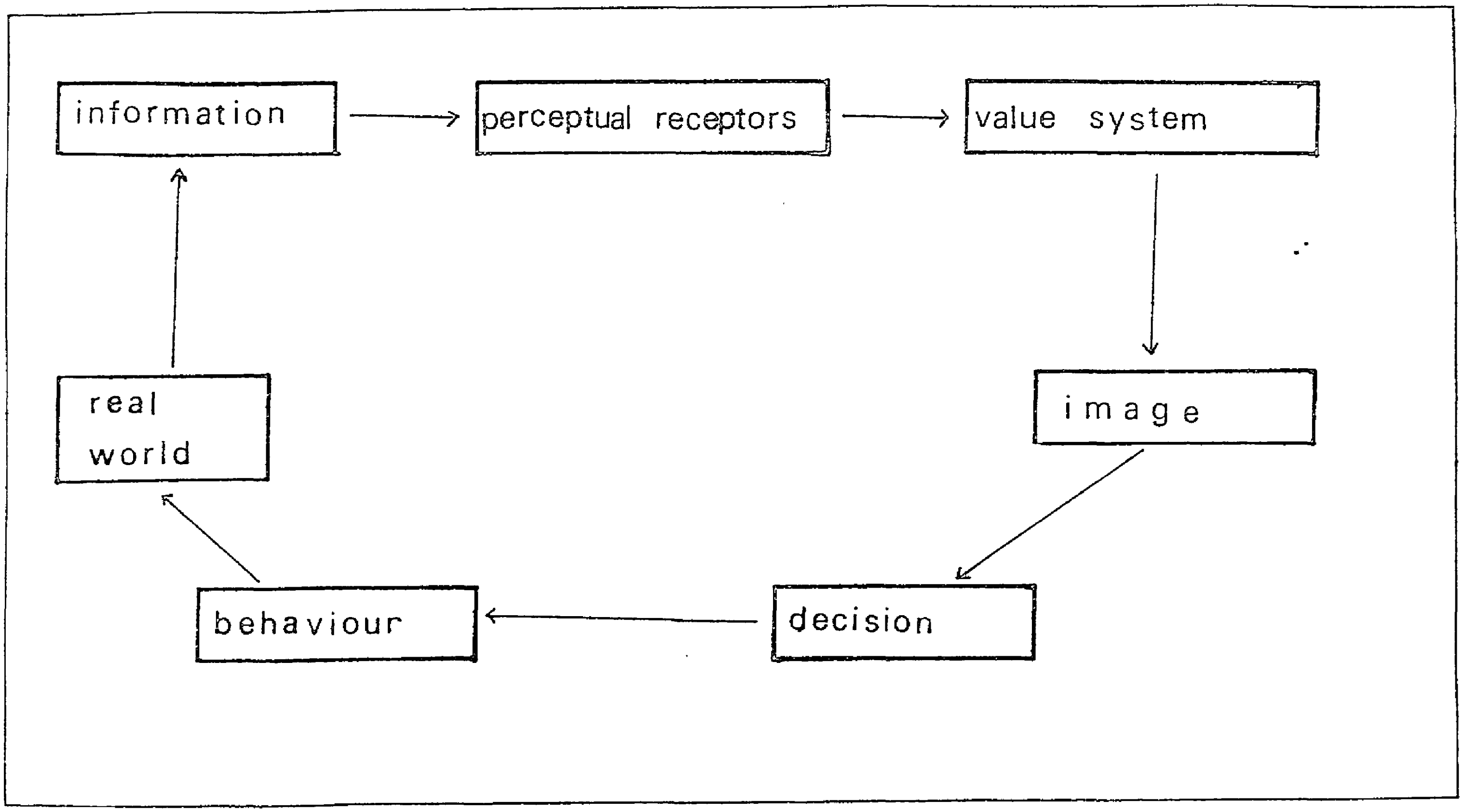

FIG. 2.1 A Conceptual Schema for research into the Decision-Making Process
(after Downs, 1970)

is the <u>perceptual environment</u> which is the image of the world held by an individual. It was first proposed by psychologists Koffka (1935) and Lewin (1936) and have been used extensively by geographers (Craik, 1970; Golledge et al., 1972; Kirk, 1951, 1963). This environment is influenced by the individuals personality, a complex of attitudes, beliefs, dispositions, preferences and values. This storehouse of referable information is an experiential environment because it is built up largely from experiences of the individual (Porteous, 1977). The smallest portion which surrounds the individual, is the <u>behavioural environment</u> which elicits behavioural response or towards which behaviour is directed. This portion is termed 'life space' by Lewin (1951), 'action space' by Wolpert (1964) and 'decision environment' by Simon (1957). It is upon this environment that farmers'productive activities take place (Chapters 5 and 7).

b) <u>Information</u>: The directional arrow moves from the real world to information. A fundamental parameter in the decision-making process and that which influences its outcome, is the type, quality and amount of information available to the decision-maker. This is why farmers' knowledge about the environment is the central nexus of this study. The crucial nature of this factor is emphasized by Kirk, who said "... the greater man's knowledge of the environment, the greater his awareness of its possibilities, the greater not the less, does it influence his actions. This influence is not direct as in the possibilist theories, but operates through and is transformed in the behavioural environment" (Kirk, 1951:160). Information available to the decision-maker is called the 'decision environment' while a complete set of information (usually assumed in normative models) is the 'extended' or 'real' environment (Found, 1971). Acquisition of information involves search which is selective (Berlyne, 1962: Kelly, 1955) and people vary in their acquiring and processing abilities (March and Simon, 1958; Pred, 1967; Simon, 1957). There are two sources of information. Primary sources involve direct contact with the environment which is crucial for the formation of environmental images in childhood and later adulthood. This source of information is treated as the village and its surrounding (cf Chapter 7) and forms the basis upon which the farming system (Chapter 5) is founded. Secondary sources include indirect sources such as the mass media - printed pages, radio, cinema, television, - travel by the farmer, letter writing etc. giving farmers knowledge of what is happening in other parts of the country (Chapters 3 and 7). This knowledge provokes new criteria by which farmers evaluate themselves in relation to the external world, thus redirecting esteem goals (Chapter 4) and leading to changes in the farming system (cf. Chapter 10). The mechanism by which this information spreads is vital to its diffusion and its effects (Benvenuti, 1962; Gould, 1969; Jones, 1963; Rogers, 1962). The impact of new information is taken up in various parts of the thesis.

c) Perceptual Receptors: The senses of touch, smell, sight taste and hearing are the means by which we accept, directly or indirectly, all information emanating from the real world. For the geographer, however, these are no more than passageways that connect the outside world with man's conscious mind, and are therefore, of no special interest. From our point of view of spatial behavioural patterns, psychological filters are more important in variations of spatial patterns. These filters include gestalt seeking functions (Beck, 1967; Kirk, 1963), social class (Williamson, 1962), personal values (Postman et al., 1948), values and needs (Bruner and Goodman, 1947) and culture (Hall, 1959), all of which are vital to decision-making.

d) The Value System: Information received from the environment is passed through the value system or culture, which is the accepted group norms. Kirk (1951) remarks that man's internal environment which conditions behaviour is as much the product of group culture as of the act of observing the physical environment. Methods of upbringing, survival and religious interpretation of the unknown all act as forms in the structuring of individual perceptions. Even though society is alive 'only in the bones, tissues and brains of its members' (Lowenthal, 1966), individuals do not grow up alone, but in a family and a social group or groups which provides that he shares with other members certain information regarding the environment, certain beliefs, attitudes, needs rules, norms, expectations and other commonalities which unite them together. Sharrock (1974) argues that the use of such notions as 'culture', 'perspective', 'ideology' and 'world view' has not only been intended to convey the idea that members' activities are to be construed by reference to some 'corpus' of knowledge but also that this 'corpus' of knowledge itself must be viewed as being in some ways associated with the collectivity in which the actors have membership. This answers some of the criticism of those who hesitate to aggregate individuals because of the idiosyncracies of perception. It is undeniable, however, that much of the individual's image is structured by the value system he has grown up in. This is why responses to opinion questions are presented in the form of tables of frequencies of citation throughout the thesis in the hope that some clusters of opinions will be identifiable.

The idea of cultural impact on the image is aptly put this way "... beliefs, attitudes, preferences and other personality attributes derive not from the individual alone, but are largely coloured by his experiences as a member of family, ethnic, social, class, cultural, national and life-style groups" (Porteous, 1977:143). This point is also elaborately discussed by Hewitt and Hare (1973) who, in tracing cultural transmission report that children move through recognized stages of growth, into particular family and social groups. Training and receptability to meanings, behaviours and attitudes of the group and to its store of knowledge about the environment require a long and elaborate system of education. So culture resides in socially maintained knowledge and meaning which can be passed from brain to brain and thus smoothly from one generation to another. All of these bear relevance to agricultural production in 'traditional' systems because, over generations, a body of knowledge, (termed 'ethnoscience' (Knight, 1974; Warren, 1975) has developed to identify and guide productive behaviour. This is discussed in Chapters 5 and 7 and other parts of the thesis as well.

The role of culture is to ensure that our interaction with the environment arises out of past learning and a continuous dialogue between individuals and groups through socio-cultural media of exchange. This is the essence of geography, for geographers are interested in the ways in which social existence appears on the landscape through spatial behaviour and mappable patterns, because patterns derived from social order are, in turn, 'written' upon the surface of the land (Abler, Adams and Gould, 1971 ; Hewitt and Hare, 1973).

e) Image: As already pointed out, images serve as information storage devices; they also classify, categorize, differentiate between and assign meaning to people, places, things and forms. Three aspects of the image - the designative, appraisive and predictive - have been extensively discussed (Asch, 1952; Creetman, 1966, Ittelson et al., 1974; Osgood et al., 1957; Pocock and Hudson, 1978), as having important implications for behaviour. Farmers' image of themselves, their needs, and of the external world, especially city dwellers and modern socio-economic life in Nigeria have profound effects on agricultural behaviour in Kabba as will be discussed throughout the thesis.

f) Decisions: Decision-making is done within the framework of an individual's image of the 'decision environment'. There is no action without an agent and without imputed goals of an agent. Man determines what he wants and how to get it. The farming system in Kabba must be seen in this light. Most of the patterns observable on the landscape such as settlement patterns, farm plots etc. are the results of thousands of individual and group decisions.

The goals of traditional farmers have often been divided sharply into security goals which concern provision of food for the family and profit maximization goals which concern the sale of crops for profit. Yet, as Wapner et al. (1973) point out "... it is obvious that a real person is not a physio-chemical thing merely, nor is s(he) an ahistorical, asocial conglomerate of experimental variables, reacting directly or passively to his ambience. As a social being, an historical being, a being directed toward the attainment of his ends and values, his transactions with the environment are principally governed by a desire to satisfy or realise these ends and values" (Wapner et al., 1973). Because of this nature of man, most human decision-making whether individual or organizational, is concerned with the discovery and selection of satisfactory alternatives to reaching certain goals (Wolpert, 1964). Activities arise from decisions which are based on the apperception of needs, of the means available to satisfy them and the environment within which they are done, all assessed against expectations of result (Brookfield, 1969). Without goals, interests, motives, purposes or needs, human action will be meaningless, irrelevant and incoherent, for all action must be directed toward some end. Only goal-directed behaviour can unify and integrate human behaviour and experiences. On the one hand, this may have to do with simple physiological requirements to satisfy hunger, sex, thirst and other needs which are tied to immediate situations. On the other hand, they may be far more complex and socially rooted needs of recognition, power, affiliation, achievement, independence, territoriality, privacy, self-esteem and success. These transcend particularly defined situations, requiring for their satisfaction the satisfaction of a host of more instrumental needs.

Aspiration levels, or goals intended, tend to adjust to the attainable, to past achievement levels, to levels achieved by other individuals to which the decision-maker compares himself, to the overall aspiration level of the society in which he lives and to the level of his capability to achieve his goals. Aspiration levels can be set at broad levels, consisting of a general desire to acquire certain objects or achieve a certain status. However, when goals are set, which require action to achieve them, they do not match over all aspiration levels.

In one word, behaviour is influenced and determined by the broader social context in which our relations with other people, social constraints, opportunity, the degree of skill and talent we possess, and the nature of the physical setting, operate to fashion aspirations, because goals are intrinsically tied with instrumentalities or agencies of achieving them, either as inherent biological parts and properties or as extracorporeal instruments or artifacts.

Two important variables in goal determination are attitude and values. In pre-industrial societies, factors which determine them are crucially important because they not only affect present but also future behaviour. Attitudes involve the organization of a set of feelings and beliefs, and in general parlance refer to individual feelings about the attitude object, or more generally, a view of the world. They imply considerable experience and a degree of firmness of opinion and also involve expectation of further experience (Porteous, 1977). Attitudes are components of individual's values which inter-relate with his value system. Values refer to a desirable end state of existence or mode of behaviour, and as generalized standards, they transcend attitudes toward individual objects (Rokeach, 1970). Attitudes always involve a preference, which is attitude's affective component (Rokeach, 1967; White, 1966). Preference is also related to satisfaction, which results from the evaluation of repeated perceptions and the achievement of goals and which in turn becomes an input into attitude formation.

Preferences, attitudes and values vary from one individual to another and change over time. Changes in attitude do not presuppose changes in the location of the decision-maker, but through various experiences such as a religious or political conversion or new information, the whole 'world view' of a man may change. He may then attach new meaning to things, and/or discard old ones; for example, introduction of socialism or communism radically alters attitudes as to resource exploitation. So changes in attitude can be deep-seated and fundamental; leading to re-ordering of values and goals. These concepts are very important for an understanding of the changing goals of peasant farmers in Kabba. This brings us to the theme of man as a cognitive being. Man does far more than see, hear, feel, touch and smell in the simple sense of recording his environment; "...he interpretes it, makes references about it, dreams of it, judges it, imagines it and engages in still other human form of knowing. It is all these forms of knowing that permit the individual to accumulate a past, think on the present, and anticipate the future. The poetry of this human process is the substitution of an 'inner reality' of words, images, ideas, feelings, and still other symbols and representation, for an 'outer reality' of shapes, sizes, objects, movements, sounds, structures and other attributes of the environment" (Ittelson, et al., 1974:85). These factors that enter into man's determination of goals and decision-making in the exploitation and management of agricultural resources strengthen the conviction in this thesis that an agro-economic approach is not sufficient if we are to understand the patterns of farming behaviour in 'traditional' societies.

g) Behaviour: These involve actions which carry out decisions. Behaviour is expressed on the real world and modifies it, producing new information. This enables farmers to operate in the physical environment by monitoring changes which take place as production continues and adjusting production techniques and crops according to this change (cf Chapters 5 and 8). This permits the introduction of learning theories into the decision-making process - an opportunity taken by Golledge (1967) who employed stochastic learning models to throw more light on central place theory and the temporal aspects of decision-making. Learning from previous actions (experience) and their impact on the environment, creates a body of knowledge about such actions which become 'routinized' throughout the society while new situations demand 'problem-solving behaviour' (March and Simon, 1958).

The foregoing brief discussion is designed to throw light on the principles which underlie the approach to this study. Effort has been made to point out factors - other than economic - going into the decision-making process and without which the situation of agriculture in Kabba cannot be fully grasped. In summary, certain personal and situational characteristics are related to peoples' attitude towards their farming operations. Factors such as equity position influences the ability of farmers to take risks and survive. Therefore, farmers' perception of their equity position determines their willingness to change from indigenous production systems to new ones. Other factors such as available working capital, opportunities for efficient diversification and shifting, the time preference in consumption, seasonality of production, institutional restrictions in the national economy and marketing systems and cultural practices imbedded in the farming system all involve farm management decisions. Each of these will be examined in detail in this thesis.

Hypotheses

To facilitate an investigation based on the foregoing postulates the following hypotheses are proposed:

Farmers' agricultural management strategies are based on the following:

a) their knowledge of the physical environment in which they work - soils, vegetation, climate - and the ecological processes involved and the behaviour of these over years of usage.

b) an intimate knowledge of the growth and value characteristics of their crops.

c) the seasonality of production, household food and cash needs

d) the amount of inputs which farmers are able to muster.

e) farmers 'representational model' of the operation of urban-rural relationships in Nigeria through which they evaluate themselves.

f) farmers' grasp of social and economic issues in the nation as a whole through which they learn of external forces which affect their production, and other production alternatives elsewhere.

g) the cultural heritage and indigenous knowledge transmission system.

How all these factors work together will be the focus for the rest of the study from here on.

METHODS OF INVESTIGATION

An appropriate research methodology was elaborated to fit the particular needs of the research as the investigation proceeded, and designed to encompass relevant aspects of human knowledge, spatial and non-spatial behaviour, attitudes, preferences, goals, images of the environment and the like. Rather than using a single method of investigation, a multi-dimensional approach was required in order to obtain mutually reinforcing results from data collection procedures which by themselves might be considered somewhat speculative.

The conventional social-science approach to investigation is the use of standard survey techniques such as outlined by Michelson (1975), Cannell and Kahn (1953), Moser and Kalton (1971), Morans (1975), Lawrence (1966), Lewin (1951) and others. It centres on painstaking attention to sampling, rule-guarded ways of eliciting information such as structured questionnaires, interviewing methods and coding procedures which enable generalizations about a larger population and allows comparability between populations. The present study uses both conventional and non-conventional methods outlined below. This is because the vital focus here is how the farmer abstracts and synthesises the various internal and external variables in his environment in order to make decisions which he can implement as part of his farming practice. This central focus is on how the individual <u>perceives</u> environmental possibilities and constraints, <u>selects</u> goals, and <u>determines</u> satisficing levels within a decision environment (Wolpert 1964). I have therefore used questionnaires, anthropological methods such as unstructured, informal discussions, taped interviews, participant observation and also adapted local games, proverbs, and story-telling as means of investigation. Like many students of behavioural geography, I have also borrowed from psychological research methods to look at certain aspects of the work using Repertory Grid methods (Fransella and Bannister, 1977; cf. Kelly, 1955).

The Area of Study

The area chosen for this investigation is Kabba Division (constituted as Oyi Local Government in the Kwara State local government reform of 1977 (see Chapter 3). For a study focussing on agricultural knowledge and cognitive processes, a good understanding of the language and culture of the area is essential. This is my home area and a close contact has always been maintained even though for the past decade I have been resident in other parts of Nigeria. Being reared within the cultural milieu of the area, and having an insider's understanding of the language is a very special kind of 'participant observation' even if methodological procedures are required to render this experience 'objective' in a social science context.

There are four Yoruba sub-groups of people in Kabba. The Yagba, occupy the Western half and north-western parts, of the Division and account for more than half of the total population. In the east and north-east are found the Bunu people who occupy the second largest area but have the smallest population of the four groups in the Division. The group known as Ijumu, the third in terms of area covered but second in terms of population, occupy the central and south-east parts of Kabba while the Ówé, centred mainly around Kabba township, are concentrated into the south-east corner of the Division (Fig. 3.2). These four sub-groups have, broadly speaking, similar linguistic and cultural backgrounds with only slight differences in dialect and customs.

For the field work investigation itself, four villages were chosen for intensive study. All methods of investigation employed were used in all four villages. However, partial investigation and reconnaissance surveys were also carried out in eleven other villages in the Division. This is to test the applicability of conclusions drawn from data in the four main villages for the area in general. It enables a 'regional' appraisal rather than relying solely on what Richards (1978c) termed the "three-village socio-economic survey" format.

The four villages chosen for intensive study are Takete-Idẹ, Ejuku, Ọllẹ and Iya Gbẹddẹ.

Takete-Ide, 8°10'N 6°015'E, is located in the northern foot-hills of the Afenmai highlands and on the Efo-Amuro-Iluke road. With a population of about 3,500, a third being migrants living in other parts of the country, it is predominantly an agricultural settlement. Apart from primary school teachers and church pastors, virtually every working adult is involved in agriculture. The vegetation around the village is derived southern guinea savanna with a little gallery forest along the Eba and Ọwọwọ Rivers.

Ejuku, 8°032'N 5°45'E, is located in the north-western part of the Division, on the eastern slope of a north-south spur of the Afenmai highlands, and on the Isanlu-Omuo road. It has a population of about 4,000 most of whom are farmers. The vegetation is similar to that in Takete-Ide, some 45 km to the east.

Ọllẹ, 8°03'N, 6°07'E, with a population of 1,600 people nests in a gap between two ridges of the Afenmai highlands in the north-east, 24 km north of Kabba. Unlike the previous two settlements, it is located within the largest area of semi-deciduous forest found in Kabba Division. This forest, some parts possibly undisturbed for several centuries is for its latitude perhaps the best developed example of its kind in central Nigeria. The forest has also been protected by reserve legislation enacted by the old Northern Nigeria government since the beginning of the century. Patches of derived or guinea savanna are found in the eastern and south eastern sectors of the village. Again the major occupation is agriculture.

Iya Gbẹddẹ, 8°03'N 6°00'E, is located on the central plateau of Kabba in a landscape of rolling hills and deep valeys. On most of the slopes and along the numerous stream courses there are large patches of fringing and gallery forest, and derived savanna elsewhere. There are two settlement sites. The newer site is in an open savanna woodland of relatively gentle slope characteristics at the junction of the Kabba-Ilorin and Abugi-Aiyetoro roads, while the old settlement, where 50% of the people still live, is located in a forested depression five miles north of the new site. The sites have a combined population of about 3,500 people (MFED, 1978).

These four villages were chosen for the following reasons:

a) Takete-Ide and Ejuku (both being Yagba villages) are located in relatively flat savanna country while Olle and Iya Gbedde, farther east and south respectively, are located in more hilly and forested physical environments. Olle and

Iya are Bunu and Ijumu villages respectively. It was anticipated that differences in their physical environment and socio-cultural context might also be reflected in farming systems, crops grown and way of life in general.

b) Previous contacts with friends and traditional rulers suggested the likelihood of friendly co-operation in the kind of intimate enquiry this study required. These were also the places where it was easiest to get suitable accommodation for my field assistants.

c) Due to bad roads, and transport constraints, it was not possible to select villages farther afield. The field head-quarter was at Takete-Ide though other villages were all visited at least once a week during the field-work period. Daily visits were made to Ejuku (45 km), Olle (normally 26 km, but increased to 70 km during the rainy season due to lack of a bridge across the Ebba River) and Iya (29km by the motorable road). Olle was included because of the special significance the forest vegetation might have in terms of the local farming practices. This was discovered during the initial reconnaissance survey and it was decided to include the village in the sample despite the fact that on accessibility considerations alone it would have been ignored.

Various additional investigations were also carried out at Iluke, Akutupa, Abugi, Mopa, Aiyegunle, Okoro, Ekinrin Ade, Jege, Ponyan, Odo Ere and Ogbe (Fig.2:2).

Sample Farmers

Thirty (30) farmers were selected in each of the four villages described above, making a total of 120. Both random and subjective methods were used in choosing the sample. In the pre-test, villagers (including non-farmers)

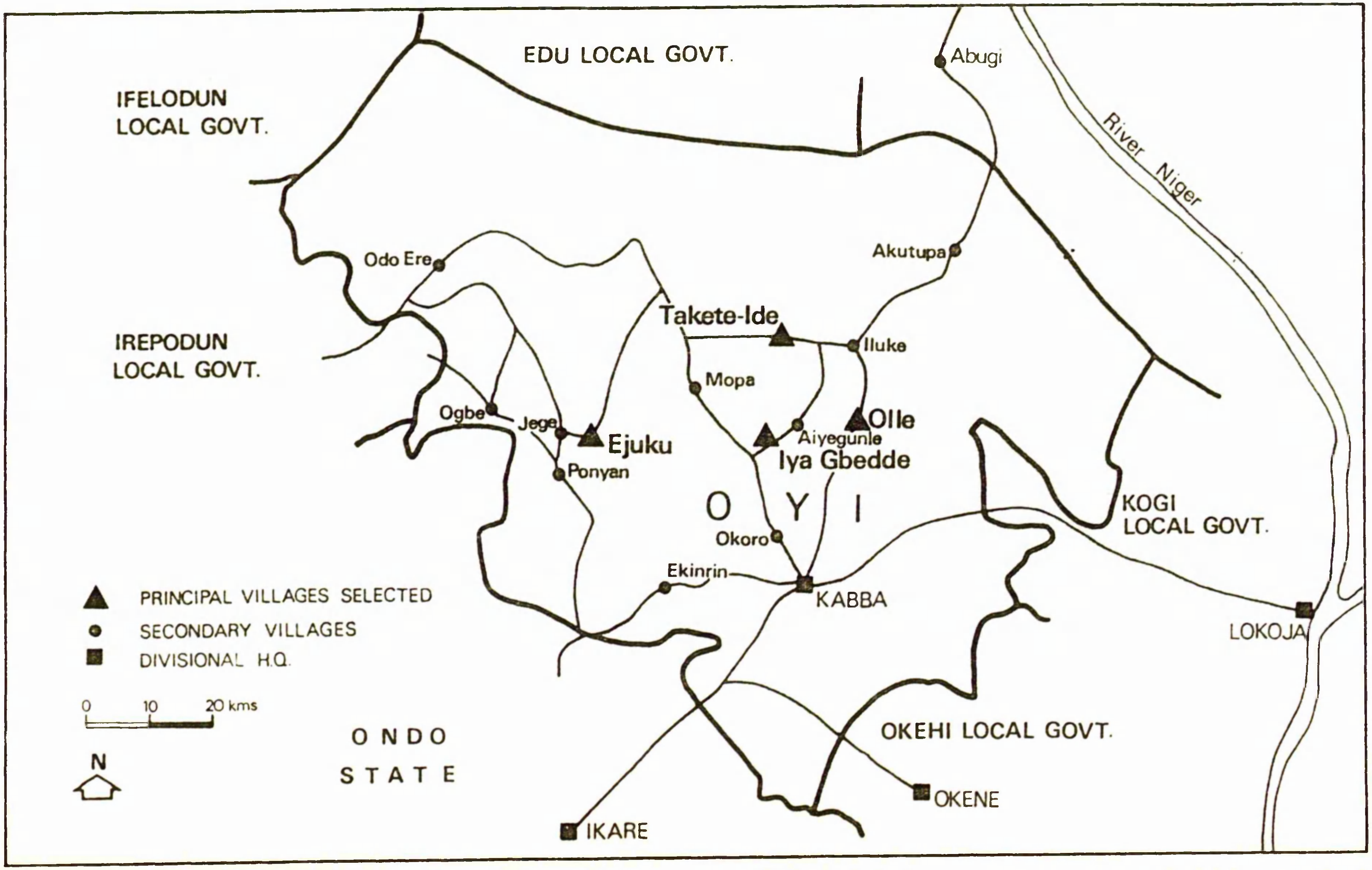

FIG. 2·2 Villages selected for field investigation.

were asked to name the ten most successful farmers in each village. It was discovered that in villages as big as these, it was not difficult for people to point out the best farmers in terms of knowledge about farming, the success of their farm work and how hard they work. The best five, according to the ranking of villagers, were automatically included in the sample in each village. This was done on the grounds that the best and most hardworking farmers are respected and often consulted by other farmers and it is important to try and learn how such farmers think and operate. The remainder were selected randomly. House members were used to construct a sampling frame. Since there are very few cases in this area where a household contains two or more adult men, the difficulty of having to choose whether to interview the household head or another farmer in the house arose only in one case and it was resolved by casting a lot.

Sampling was restricted to males. It was decided that female contribution to agriculture should be the subject of separate investigation at a later period because women do not own farms as discussed in detail in the following chapter and in Chapter 5. All the farmers selected were interviewed to enlist co-operation and only four were unable to take part, and replacements were also randomly chosen. My local connections coupled with the generous help offered by village heads, helped avoid suspicions and antagonism sometimes experienced by 'outside' researchers. On the other hand, everyone agreed to participate in the survey with the anticipation that, at last a politically 'effective' researcher had come to hear their problems and study their farming systems with the aim of improving them. Within weeks of the beginning of the survey, farmers were asking when new seedlings, pesticides etc. would arrive. These expectations, no bad thing in themselves, are certain to have coloured the response to some of the questions asked subsequently. Little could be done to avoid this since all research has a social context. The important issue is to recognise that context in order not to misinterpret responses according to criteria of false objectivity.

Field Assistants: The research was supported by the International Institute of Tropical Agriculture which permitted the employment of four third year undergraduates from the Universities of Ibadan and Lagos as field assistants. They were chosen for their understanding of the language and people of the study area; care was also taken to see that none of them was a student of agriculture, to avoid any confusion between their knowledge and farmers'. Their primary role was helping to administer the questionnaires in the four villages. Interviewing took place on a regular basis throughout a 9-month field-work period and it would not have been possible for a single researcher to cover all four villages simultaneously.

Investigative Techniques

As already mentioned, many different kinds of investigative methods were used.

a) The questionnaire: questionnaires were used as the basic method of survey to collect both primary and background data. The questionnaires were administered from June to September 1978 at a period of very heavy farm work when agricultural issues are uppermost in farmers' minds.

Six questionnaires (A-F) containing a total of 266 questions were used per farmer, and three-quarters of these questions are open-ended, enabling the farmer freedom to structure his responses which were recorded as given.

Aspects dealt with by each questionnaire are as follows:

Questionnaire A: The decision-maker and his goals/aspirations.

B: The farming system

C: Risk and uncertainty; resource allocation

D: The marketing environment (since most of the day-to-day marketing is done by women, a supplementary questionnaire for women was also used and forty market women were interviewed).

E: Farming problems and trends in farming

F: Environmental learning

(A supplementary questionnaire to investigate how much risk farmers were ready to take was also used.)

Most of the questions were designed to lead to discussion between the interviewers and respondents. This is to reduce the serious danger, associated with questionnaire surveys, of the structure and content of responses being fashioned by the interviewer or the questions asked. Chapman (1977), Whyte (1977), Warwick and Osherton (1973), Richards (1978), Oppenheim (1968) and Barker (1978), among others, have warned of this weakness of the questionnaire when used to study behavioural patterns. The researcher inevitably imposes his own model of the farmers' motives, values and needs onto the interview situation by virtue of the way one question or topic leads to another in the schedule. Terminologies and categories may bear no real relation to those of the farmer and the interview designer's conceptualization of the 'problems' and 'processes' of cultivation may also be at odds with the farmer's own. Yet for politeness sake, the interviewee may struggle to operate with the interviewer's language.

In order to counter this weakness, the footloose approach has been used, letting the respondent take the initiative in discussions as much as possible. This is open to the criticism of producing data which are difficult to compare over the whole sample. Faniran (1977), however, argues that structured questionnaires reduce the amount of flexibility in research and constrain data collection to predetermined paths. This is echoed by Warren (1975) and led Whyte (1977) to advocate the use of the 'triad' strategy of observing, listening and recording, and asking questions. Richards (1978c) also warned that unless there is ample opportunity for respondents to specify the dimensionalities and make the interconnections inherent in their environmental knowledge clear, their responses, taken at face value, and as provoked by the contingencies of a tightly structured questionnaire interview, may unwittingly mislead rather than inform. On the other hand, it is wrong to underestimate the ability of the African farmer to respond to questions. It seems to me that the major problem is always in the use of concepts, terminologies and models which do not coincide with the experiences of the farmer. When various methods of measuring farmers' perceptions were tried at Oluwatedo village in Oyo State, Nigeria in July 1978,[1] even though farmers did

1. During field experiments by members of the International Geographical Union Conference at the Univ. of Ibadan, Nigeria in July 1978.

well in using local games and stories to express their perception, most of them still said they preferred to be asked specific questions as in a questionnaire interview. This is not surprising since interviewing is also an African art. In most communities in Kabba, village seminars are held, usually in evenings, in which there is a sole questioner and individuals compete to see how many answers one can give to various topical questions - as a measure of 'expertise'. Towards this end, proverbs (ālọ́) which require questions and answers, are used to train children in reasoning and memory skills.[1] If the right concepts and terminologies are employed (which demands a good knowledge of the language and culture) African farmers can handle questionnaires without problems.

Towards this end, all questions were composed in local dialects, taking relevant local usage of terms into consideration. This, coupled with an emphasis on open-ended questionning, gave a lot of latitude for farmers to discuss. The pay-off comes in terms of increased sensitivity to farmers' viewpoint, despite difficulties of post-hoc coding and analysis (Oppenheim 1968; Reichardt, 1970) which preclude the extensive use of rigorous statistical manipulation.

b) Group Discussions: To reinforce the questionnaire, group and individual discussions were held not only in the four sample villages, but also in the other eleven where all questions in the questionnaire were administered to groups in general discussions. Many of these were tape recorded (tapes A-H) and others were recorded as field notes.

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1. Tape D Alo in Takete-Ide, Nov. 1978.

In many cases discussions on farming in general or attitudes to development and planning, were led by local farmers. The verandahs of generally recognized expert farmers or influential community leaders were often used as a base where other farmers could gather. Richards (1978c) attests that "... luck, persistence, a sixth sense and palm wine are potential antidotes..." to interviews over-dominated by the researcher. This group interview technique provided one of the most successful methods of generating an exciting discussion. The tape recorder or gas lamp in the evenings were useful attractions too.

c) Participant observation: This is a method of learning about a behavioural process by becoming part of the process. It is highly recommended not only by anthropologists, but also sociologists and behavioural geographers (Whyte, 1977; Burton and Kates, 1964; Barker, Oyuntoyinbo and Richards, 1977; Barker, 1978a, Turner, 1978; Gay and Cole, 1967; Reichardt, 1970; Richards, 1975; Warren, 1975; Knight, 1974; Townsend, 1977; Warwick, 1973; Crane and Angrosino, 1974; Cole, Gay, Glick and Sharp, 1971).

Since most of the questionnaire administration and group discussions took place in late afternoons and in the evenings, most of the days were spent going to the farm with individual farmers and in group work. In this way, I took part in every type of farm work in most of the villages chosen. In the process of walking to the farm and working beside the farmer on the farm, hundreds of questions about the farming system, crop combinations, farm operations and farming problems were asked in informal situations. It was possible to experience what farmers experienced day by day. The opportunity to ask questions was not the only advantage of this method. Observing what was being done and listening to what was being said provided real means of uncovering what people know and think of their environment. The interplay of language, symbol, ideas and action was easily observed. Field notebooks were kept to record all things learnt in this exercise. Using project transport to convey market women to periodic markets also provided a convenient basis for learning about many of their attitudes especially about prices.

d) Use of local games: A serious attempt was made to use familiar social situations and settings to record local agricultural knowledge ('ethnoscience'). I therefore took every opportunity to take part in story-telling sessions and to record proverbs, poetry, songs and 'wise sayings' all of which are ways in which environmental views and knowledge are codified and transmitted. This method, used by Gay (1967) in his study of the Kpele of Liberia, enables the researcher to efface himself and hand over the initiative to the respondent in a way not feasible in a conventional questionnaire interview. Various local games were also used to aid elicitation of information. In cases where questions involved random selection, the demdì game was used. This is a winner - takes all game in which either coins or seeds were used to pose a set of choices to people. It is a game similar to the raffle draw in which the player who picks the right card gets all the reward. This game was familiar to all farmers and their responses were enthusiastic.

Another very important game used is the Ayo game. This is a variation of the mancala game widely played among the Yorubas of Nigeria. For a historical account of the origin, spread and rules of this game, see Murray (1952), and Barker (1978). It was first adopted for field investigation when the holes on the ayo board were used to calculate various kinds of proportions by farmers (Atteh, 1974). During field-work for the present study it was used to enable farmers to choose between expected returns to investment, the relative success of various farming techniques, and to estimate yield variations from year to year likely to be obtained under different environmental or input contexts (this method is used extensively in Chapter 8). Not only did this allow for 'factual' information to be obtained, but also provided a conducive environment for asking questions and generating general discussions. This is because the game itself is highly exciting and competitive, involving two people trying to outmanouvre each other. The use of the board does not follow the rules of the game, but is sufficient to generate an interesting competitive edge to the question and answer process. It also draws a large crowd of people who watch and comment. Even more to the point is the fact that strategies employed in ayo are in general terms the same kind of 'cyclical probability' calculations as farmers employ in solving their real life problems arising from seasonally-based environmental hazards (Gould, 1963).

e) Repertory Grid Analysis: This is a technique used in investigating the way people evaluate the elements of their social or physical environment. Kelly (1955), Bannister and Mair (1968), Hudson (1974, 1976), Pocock and Hudson (1978) have given detailed descriptions of the technique (and its background in personal construct theory). This assumes that people express their perception of objects, things or situations in bi-polar terms such as good/bad, light/darkness, long/short, etc. Categorization into these bi-polar constructs can be analysed to uncover the underlying attitude or perception of a given situation. For example, this method was used to elicit information about various local varieties of white yam. A sample consisting of the fifteen most widely planted varieties was obtained, labelled 1-15. These numbers were then written, each on a small card. Three cards were then picked randomly and the yam varieties cores-ponding to the number on the cards brought out. Each farmer was then asked in what way two of the three yams are similar (construct of similarity) and at the same time different from the third (construct of dissimilarity). They were then asked to categorize the other twelve into these two constructs. The three cards are replaced and a random selection of three cards are made and the same process repeated until all the constructs a farmer can remember are exhausted. A statistical analysis of this is possible using multi-dimensional scaling and other methods. This method was also used in obtaining information about farming problems. The statistical analysis was not attempted because of the constraint of time. However, the constructs used for yam, presented in Chapter 5 provide an interesting insight into farmers' perception of the utility of yam varieties. Full analysis of this data will be the focus of further study. However, the use of this method provides a very useful means of eliciting information without imposing the views of researchers since all constructs are provided by the respondents. It also provides the context of very useful follow-up discussion. The major short-coming of the repertory grid is that it consumes an enormous amount of time, and since it can only handle a restricted subject topic at any one time, it is too cumbersome for general use in a large study such as this, hence its use for yam variety and farming problem aspects of the study.

Analysis

Many of the data gathered, because of the nature of the study, are not variables which can be mathematically manipulated without destruction of what one is looking for. Many of the responses to open-ended questions have been coded into categories and presented in tables of frequencies. This itself may obscure much subtle information but is necessary as a first attempt at description. The original responses are available for future analysis. Tape interviews have been transcribed and information from this source and from field notes is included in the text. Again, the original sources are a repository of much detailed material which it has not been possible to incorporate into this thesis.

Problems with the Investigation

a) A serious shortage of climatic data hampered an objective comparison with farmers' perceptions of climatic variation. Only Kabba has a long-established weather station while Isanlu and Abugi stations have been operational for only fifteen years. Most of the climatic data in other villages were recorded by primary schools, with gaps during holidays, and in some cases uninterested Headmasters leaving them unattended for years.

b) Problem of input/output measurement - studies of individual crops, their labour requirements, areas planted, yields, and response in different environments present problems because of the 'traditional' practice of inter cropping or mixed cropping. The crops thus mixed in one field include tubers, grains, legumes and vegetables. The time of planting, spatial arrangements and stand densities also vary. Extensive use has been made of farmers' own means of measurement and estimation procedures, suitably cross-checked where possible to provide conversion to standard area, volume and weight measures.

c) One of the main problems faced in any investigation of this kind is that farmers have no written record of farm inputs, outputs, operations, amount of sales and other farm information. All that is given is from memory and where used directly, it should be treated with caution. Associated with this difficulty is the secondary problem that some farmers refuse to give exact figures even where these are known. The reasons may be cultural, economic or personal. Sensitive information in this category includes farm size data, number of plots and amounts sold. Among some groups, a man must not count the number of children for outsiders. As much as possible, estimates, ranks and proportions were used instead of exact figures.

d) Affecting the study more intimately is the problem of verbalizing day to day experiences. Not all underlying principles which guide decision-making and behaviour can be verbalized especially at the moment a question is put to the farmer for the first time. His responses are those which come to mind during the time of questioning. Some issues are verbalized in local discourse. Others may be new and the first response may not be the same as a considered reflective reply. Answers received cannot, therefore, be treated as an unproblematic representation of what a farmer knows when he responds to a question. They are, therefore, treated as 'indicators' to be matched against the investigator's own 'participant' knowledge and judged in the light of my assessment of the social context within which the question was put.

e) Not enough time and resources were available to collect the scientific names of all plants, insects etc. mentioned or encountered in the course of interviews or participant observation. Local names are therefore transcribed and further and separate studies on this interesting topic will be necessary. Similarly, it has not been possible to collect and analyse examples of all the soil types identified by farmers. Again, this is a matter for follow-up study.

CHAPTER 3

THE CONTEXT OF KABBA AGRICULTURE

Geographical Details

The Oyi Local Government Area is one of twelve administrative divisions in Kwara State, Nigeria. It is an area of Yoruba speaking people within the old Kabba Province of Northern Nigeria and lies between $7^{o}10'$-$8^{o}30'$N and $5^{o}20'$-$6^{o}25'$E (Fig. 3.1). Until recently, this local government area was known as Kabba Division and it is still referred to by this designation in the rest of this thesis. Under the colonial administration, it was divided into four Native Authorities - Yagba, Ijumu, Bunu-Ikiri and Owe - which are now known as districts (Fig. 3.2).

Area

Kabba Division is 7,270 sq. km in area, being the second largest administrative unit in Kwara State after Borgu, and it extends from the northern fringes of the Yoruba and Afenmai hills to the southern plains of the Niger valley.

Population

Kabba Division, with a projected population of 227,813 in 1977 (MFED, 1978), is the third largest in Kwara State. With a population of 110,325 in 1952, the number of inhabitants has grown very fast indeed in the past twenty

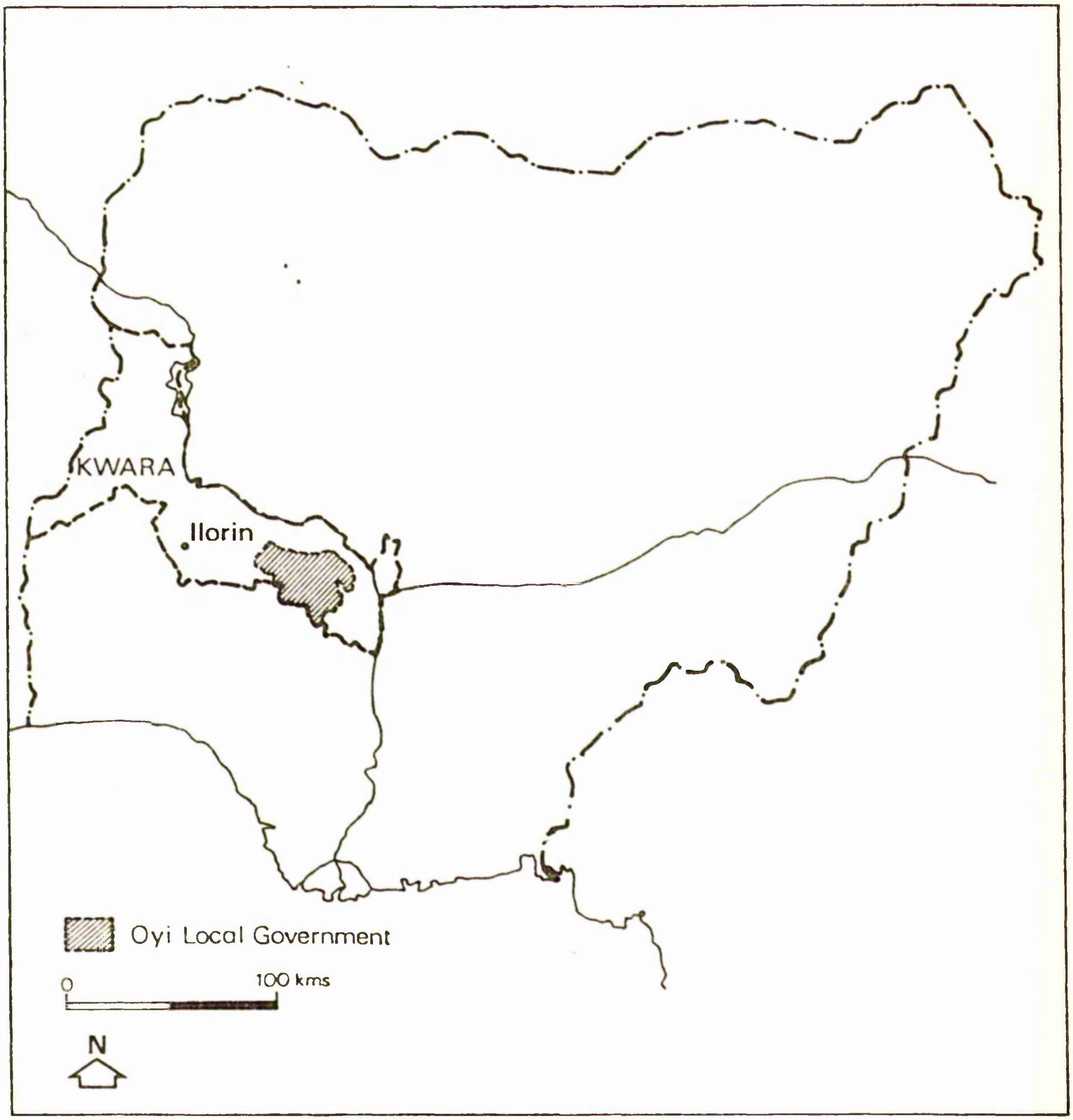


Fig. 3·1. Position of Oyi Local Government in Kwara State and Nigeria.

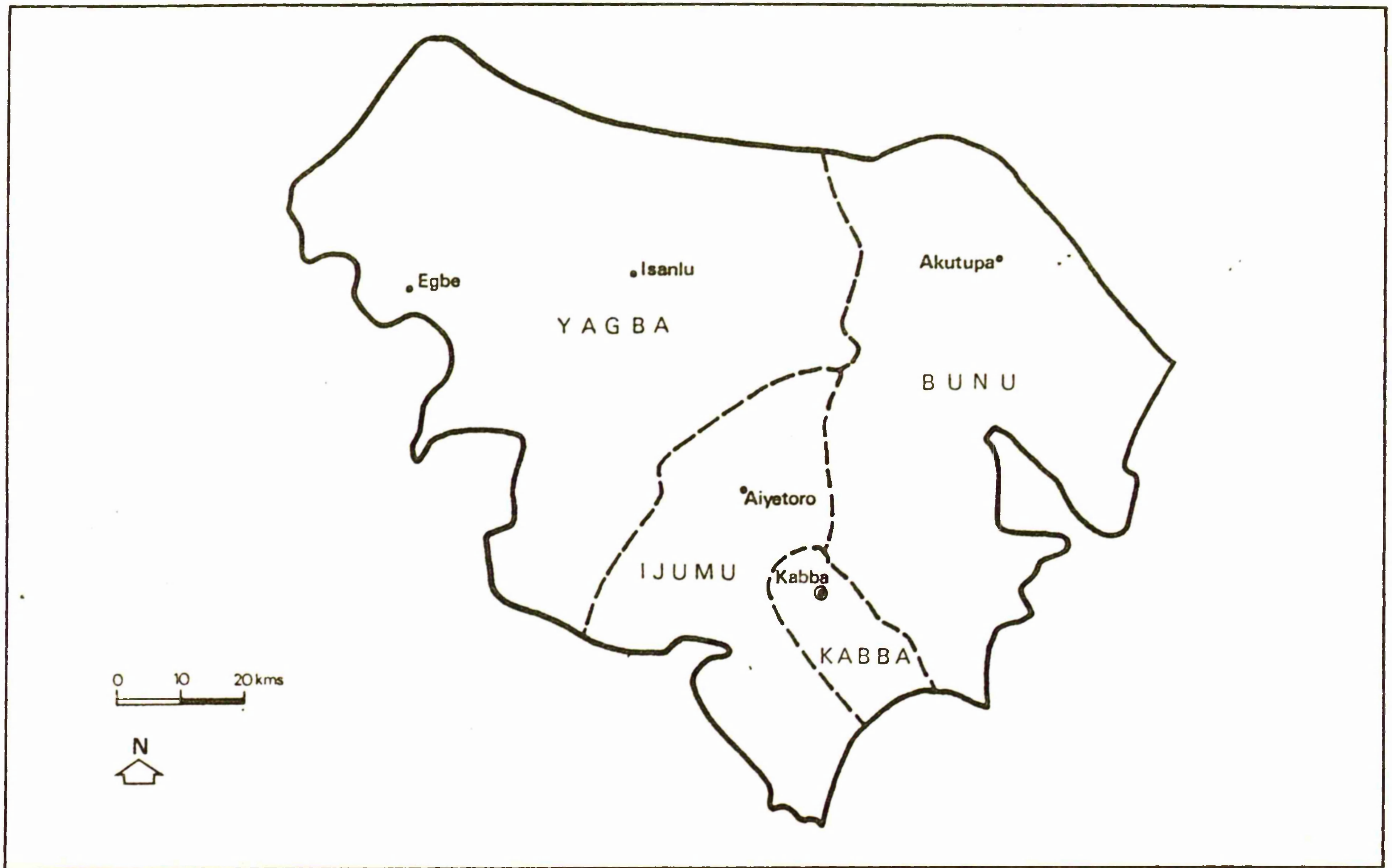


FIG. 3·2. Administrative Divisions within Oyi.

years. Although Nigeria population data are difficult to interpret due to a succession of census problems it is nevertheless likely that this growth rate of 4.8% is faster than the national average of 2.8% (Europa, 1978). The 1963 census, despite its reported excessive over-count, is now virtually accepted as basis for population projections in lieu of an accurate count. It is suggested that there was an undercount of between 8 and 15% in the 1952 census (KWSG, MLSE, 1976) and the overcount of 1963 was not as high as first suggested. Furthermore, a growth rate of 2.5% was assumed for the state and all projections from the 1963 census have been at this rate for settlements below 20,000 people while a growth rate of 5% have been used for those above (MFED, 1978). Population figures must therefore be treated with caution.

Historical evidence (Oral; Temple, 1922) suggests that population in this region is still recovering from depletion by Nupe slave raiders from the north and north east and Yoruba from the south throughout the 19th century. Nowhere is this more evident than in Bunu District. The area was so badly affected that only a few well-organised and powerful families survived. The subsequent rapid rate of population increase is due principally to natural regrowth since there has been little or no influx of people from outside. In fact, this area, as much as any other part of northern Nigeria has witnessed a high degree of out-migration of people in the 10-35 years age group in search of education and employment in urban areas. This situation partly reflects early penetration of christian missions, establishment of schools and consequently a high percentage of literates with formal educational qualifications - far higher than for any other Division in the former Northern Nigeria except Zaria (Table 3.1). These educational advances were not matched by provision of employment opportunities, transport, social and health facilities. The end result is a low rural population density heavily weighted towards children below 10, women, and men above 45 years. Fig. 3.3, based on 1952 census data shows that almost half the population of Kabba Division were below 15 years old. The working population (34% aged 15-59) shows a male-female proportion as 15% and 19% respectively.

This picture of rural exodus changes dramatically in December when village migrants return home. The quiet isolated atmosphere is suddenly disrupted by cars, radios and the noise of parties even in very remote villages.

Population density figures are low by Nigerian standards at 41 per km^2 for the Division as a whole in 1979 (cf. 15, 25 and 38 in 1952, 1963 and 1977 respectively). These figures, however, conceal a great deal of local variation. Population density is as high as 100 per km^2 around Kabba, generally between 50 and 60 per km^2 in Yagba and Ijumu but as low as 10 per km^2 in Bunu. The history of Nupe slave raiding is the probable reason for the low population as evidenced by a wide belt of land between Bunu and Nupe and the northern boundary of Yagba remaining virtually uninhabited to this day (Fig. 3.4).

Population and land

Using the less unreliable 1952 population census,

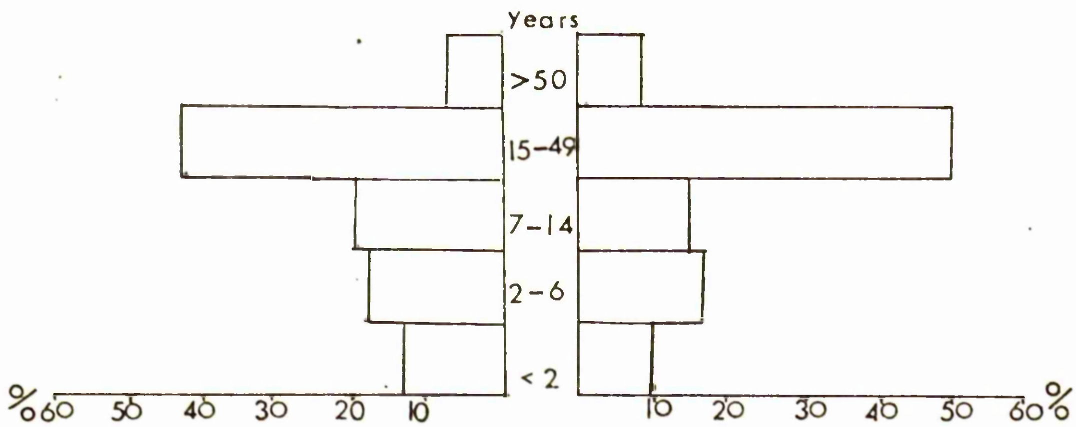
Table 3.1

DISTRIBUTION OF EDUCATIONAL ATTAINMENT IN NORTHERN NIGERIA, 1952, USING THE TOP 12 ADMINISTRATIVE DIVISIONS

Administrative Divisions	% of pop. above 7 yrs who attained Elementary IV and over	other types of literacy	Total % of literates
Argungu	0.8	1.4	2.2
Bida	1.3	2.4	3.7
Biu	1.0	1.0	2.0
Gombe	0.9	1.5	2.4
Ilorin	3.7	2.8	6.5
Jemaa	4.4	4.1	8.5
Kabba	4.3	7.8	12.1
Kano	0.5	0.4	0.9
Katsina	0.5	1.0	1.5
Lafia	1.1	1.4	2.5
Numan	1.1	5.2	6.3
Zaria	2.7	2.5	5.2
Northern Nigeria as a whole	0.9	1.1	2.0

Source: Population Census, Northern Nigeria, 1952.

(a)



(b)

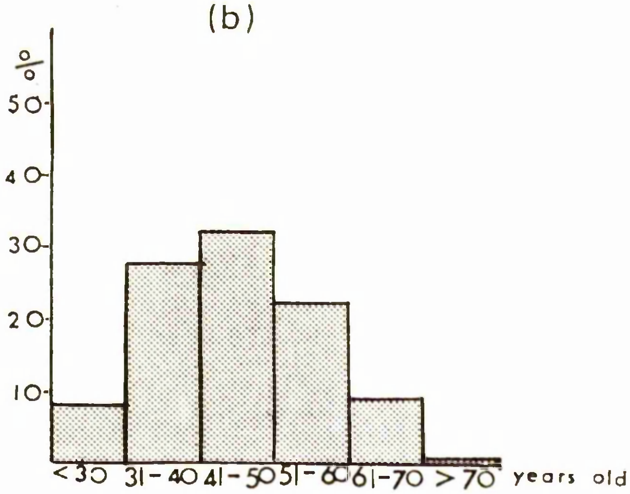


FIG- 3·3 (a) Population distribution in Kabba (1952 census)

(b) Age Distribution of Sample Farmers, 1978 -

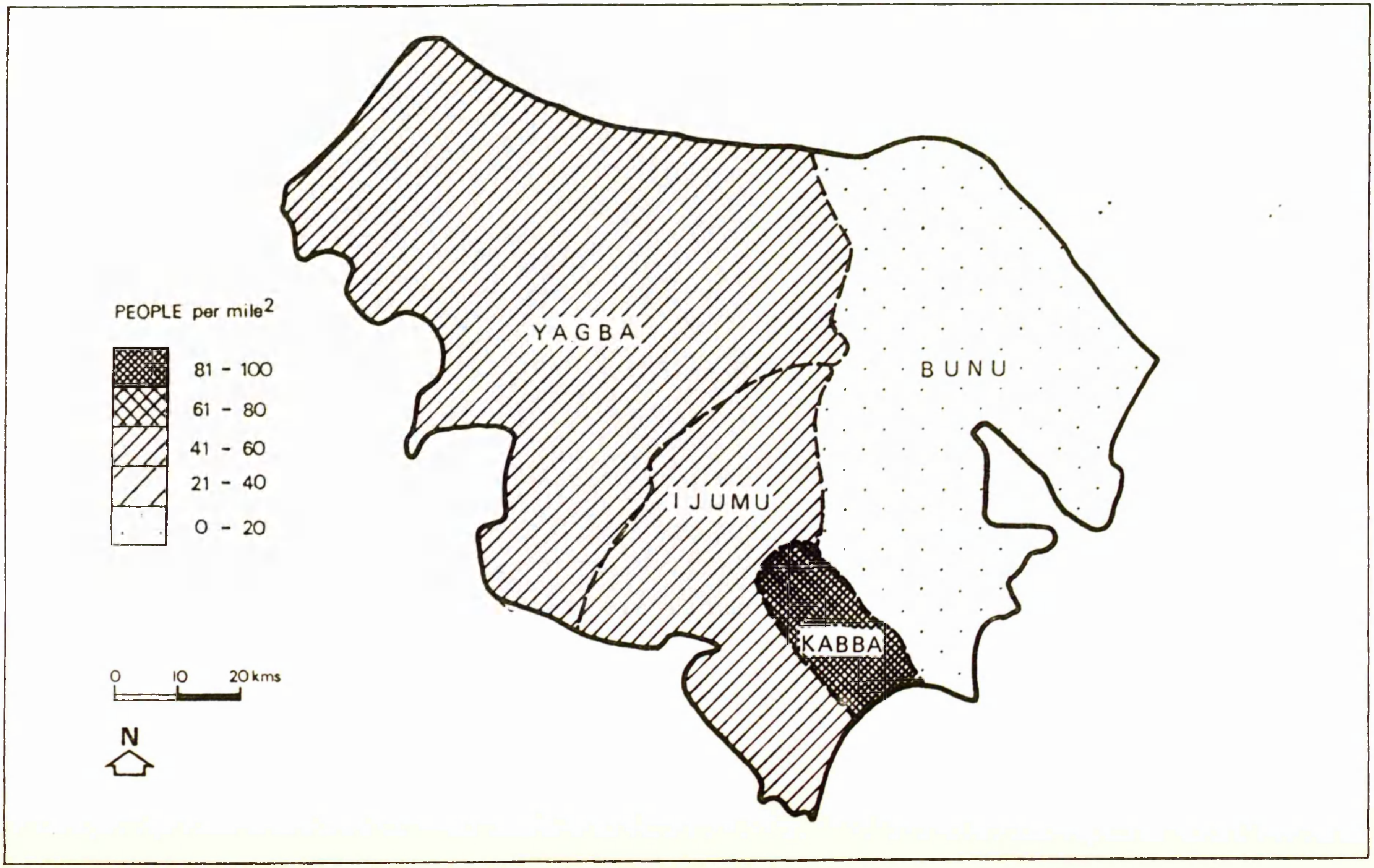


Fig. 3·4. Population density over the four Native authorities.

the main work force constitutes 34% of the working population (16-59). When this is divided by sex, male farmers comprise only 15.1% of the total population. Contrary to the situation in some parts of Africa, women only work on their husband's plots and do not have farm plots of their own. If the 1977 rural population was distributed in roughly the same proportion as in 1952, then allowing for the small areas occupied by settlements, steep slopes and forest reserve, there is an average of 6.2 farmers per km^2 of farm land. Moreover, since women are more concerned with trade than working the land, and many men between 15 and 40 no longer farm (average age of farmers in the sample being 50.5, 47.1, 44.1 and 45.3 yrs. in Takete Ide, Ejuku, Olle and Iya Obedde respectively), there is abundant supply of land for cultivation.

Land is, therefore, not a limiting factor in agricultural production anywhere in Kabba. In fact vast areas in the northern parts of the Division have not been farmed for upwards of one hundred years.

Settlements.

All settlements in Kabba Division are nucleated and based on the "village" (details in Ch. 7). Village housing units are spatially contiguous and permanent; nowhere does settlement move with farm plots. Due to the availability of adequate land for cultivation and Yoruba preference for 'town'life, there are very few farm camps. The few which exist are for the cultivation of tree crops (cocoa and coffee) for which suitable land is scarce.

Farm camps of this nature are sufficiently far from the village to make it impossible for people to return home each day. In all other cases farmers go to the fields in the morning and return home by late afternoon or evening for social and family activities. Journey to work is a relevant variable in production as farm plots are located at various distances within commuting range. The availability of the bicycle and motorcycle in the past twenty years has extended the range of these journeys.

Villages range from small hamlets such as Imela, Ijagbe and Okebukun with populations of less than two hundred people, to larger towns such as Kabba, Isanlu and Egbe with populations of 40,208, 28,896, and 26,023 respectively in 1977 (MFED, 1978; projections). Villages of less than 1000 inhabitants comprise less than 23% of the total number of settlements. Those with inhabitants of 1000 to 10,000 constitute 68% while those above 10,000 comprise only 9% of the total number of settlements.

Most of the settlements are strung out along the network of major roads. At least 60% of the population of Kabba lives along the Egbe-Kabba-Omuo-Oke and Ijowa-Omuo Oke roads while other important settlement axes are the Amuro-Takete-Ide-Iluke-Abugi, Iluke-Olle-Kabba and Aiyetoro-Iluke roads. Isolated pockets of settlement are found at Ogga and Okere in West Yagba and Ogidi and Ayere on the Kabba-Ikare road (Fig. 3.5).

Colonial conquest of this area brought about a major re-alignment in the settlement pattern beginning in the 1920's. From this time onwards, many settlements formerly located in the hills for security reasons during

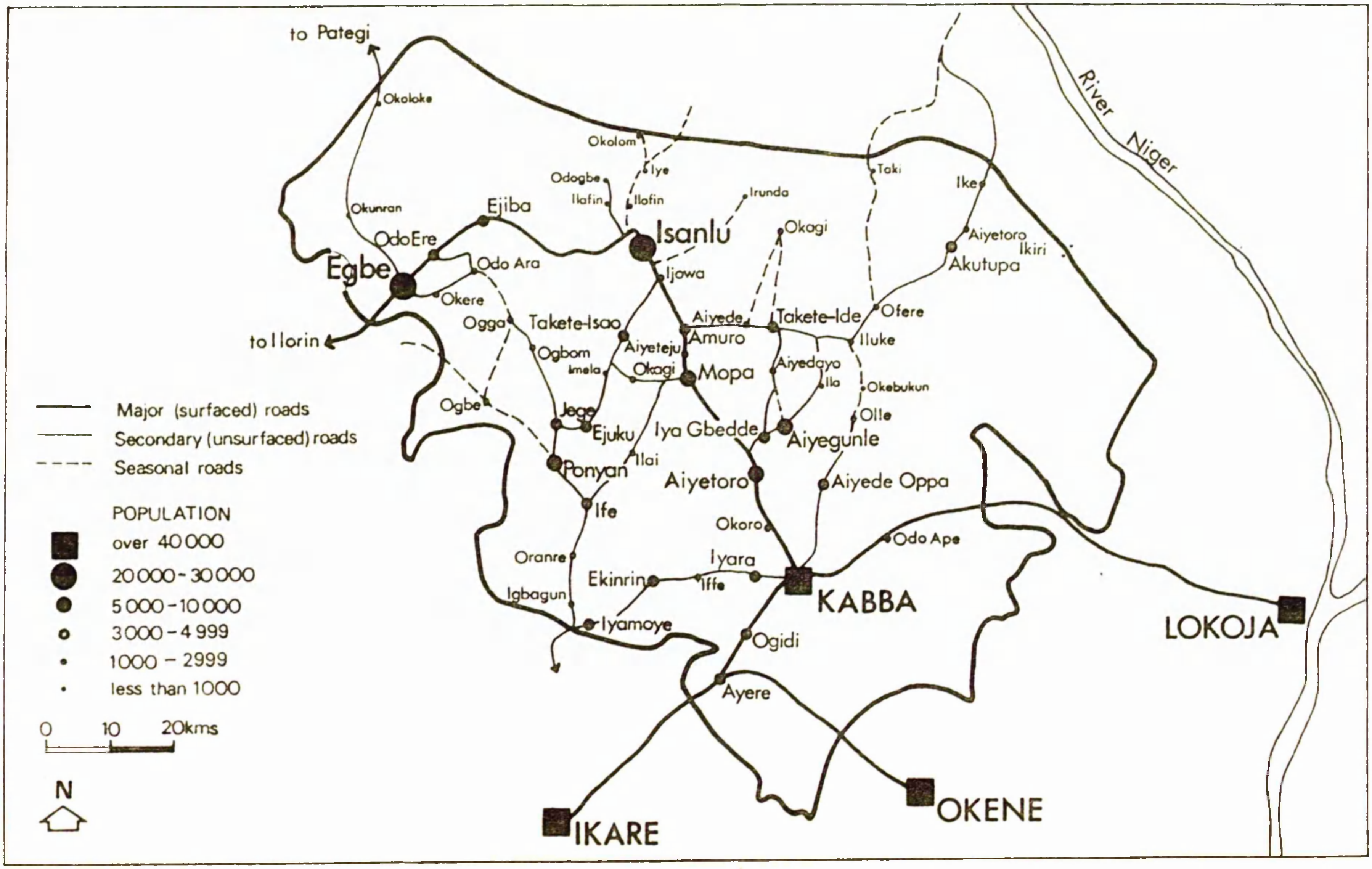


Fig. 3·5. **Transport network and main settlements.**

local wars were relocated in lowland areas within relevant village territory. This historical factor explains why many villages are situated close to or are backed by mountainous topography. The present sites have been chosen to facilitate farming (Atteh, 1974). Many of the settlements have subsequently undergone a move from secondary sites to road sides. Village communities saw the road as an important opening to other areas. Distance of movement to the road ranged from three to fifteen miles and also involves an individual component. In cases where villages did not move to the road, individual households have migrated to road-side settlements. Examples of villages moving from original sites to road sides include Efo Amuro, Aiyetoro, Aiyeteju, Isanlu, Oke-Eri and Odo-Ere (Fig. 3.5).

In sum, the present settlement pattern is a product of various processes: warfare and its aftermath, the move to areas where farming is facilitated, social and economic advancement through contact with the outside world and cultural heritage, (i.e., land ownership and 'sense of place'). Although many of the present settlements are young, their inhabitants belong to social groups which have been in existence over a much longer period. In the case of Amuro and Isanlu, the diverse processes affecting settlement have resulted in many sub-groups first of all breaking into fractions in the past and then regrouping in recent years in new agglomerated units on the roads in order to capitalize on the economic and social advantages offered. The settlement pattern is therefore a result, in some way, of responding to social and economic changes in other parts of the country and the world at large.

Transport Network

The Ilorin-Kabba road has been the main transport artery in Kabba Division for forty years. There are, however, numerous feeder roads connecting most of the settlements to the main road. The main road was constructed in the 1930's but was not tarred until 1974-77 and to date is the only tarred road running east-west in the State. Until the creation of Kwara State in 1967 it was also the only local road constructed and maintained in Kabba by the Northern Regional Government. All others were constructed and maintained either by Native Authorities or by various community self-help groups. As such most of these roads are still no more than single line bush tracks. Consequently, several small villages are accessible by road only in the wet season.

During the period before 1970 only four passenger lorries regularly plied the Kabba-Ilorin road between Egbe and Kabba. There was little economic interchange, which was limited to those rural periodic markets to which people could walk. The transport situation was drastically altered by the tarring of the Ilorin-Kabba road between 1974 and 1977. The ten to fifteen hour journey from Kabba to Ilorin was reduced to less than four hours so that a lot of traffic from Ondo and Bendel States of Nigeria, which formerly used the better roads in the old Western Nigeria to Ilorin and the north, was diverted to this new road and the two to four vehicles per day grew to between one and two hundred. This period saw a rapid rise in the ownership of passenger cars and buses and the disappearance of the big passenger wagons. Numerous villages embarked on community work to make their roads motorable to the main road all year round, by building bridges and culverts. The number of all weather roads has multiplied to cover most of the division especially in Yagba, Ijumu and Owe areas. Because population is sparse in both north Yagba and Bunu District, road density is still extremely low. The major roads are shown in Fig. 3.5.

With the construction of these laterite feeder roads, passenger cars (taxis) reach almost every section of the Division, with the exception of the rugged Aiyeguule Gbedde - Abugi road. Though much of the network remains untarred and needs improvement, the road transport position over the past eight years is much improved compared to the inactivity and consequent economic stagnation of the previous thirty years with the result that the economy which De Haan (1959: 17) described as "local, isolated and self-dependent" has considerably opened up. Contact between peasant farmers and the outside world has therefore increased considerably over the last few years. One problem in this, however, is that passenger lorries are increasingly rare on all roads except Abugi road and farmers have difficulty in finding transport for their farm produce, thus reducing their earning power despite increased local purchases of food.

Occupational Structure

The early colonial officials Byng Hall and James reported that the people of Bunu 'are good farmers, fishermen and potters, and in Kabba Province are famed for the excellence of their weaving and particularly their burial shrouds', and of the Yagba of Western and Northern Kabba they found that '... the women wear good cloth, but agriculture is the main occupation' of the men (quoted in Temple, 1922: 71, 368). Now as then, Kabba people are still engaged predominantly in farming. While the fishing expertise of the Bunu people is debatable, in view of the very few rivers in their area, and their fear of rivers (they are known never to cross a river on their own except they can clearly see the bed), their concentration on farming is still clearly evident. Cloth weaving and pottery by men have apparently completely disappeared but women in all parts of Kabba, especially in East Yagba are still excellent weavers, designing many patterns in silk. Pottery is still important at Otafun and Ogga, while blacksmithing, from which all farm and hunting implements used in the past were made, is engaged in by very few people today.

Available population figures and tax data in the local government headquarters indicate that perhaps 90% of all working men in Kabba are farmers and the figure may be even higher when rural areas alone are considered. These data indicate a figure as low as 60% in Kabba township and 75-85% in Isanlu and Egbe. The remainder are government and private workers in schools, colleges, hospitals, traders, and a host of others. The percentage of the latter group has increased in the last ten years as a result of the formation of the Kwara State administration. Before then, those who did not wish to farm migrated to towns and cities all over the country but especially to the major middle-belt centre of Ilorin.

It is important to point out here, that in this area, women help their husbands on the farm with planting and harvesting of crops and with the evacuation of farm products. It is forbidden by custom for a woman to have her own plot while her husband lives. It is equally unacceptable for such women to work with the hoe. Their activities, on their husband's farms, are therefore limited to planting grains and harvesting. Clearing, heap making, crop care and all types of work involving the hoe and cutlass, are men's jobs. A few widows own farm plots but even then they employ labour rather than do the tedious work themselves. Women's major activities outside the house focus on produce processing and selling crops. In this strongly male-focussed culture, nothing is more shameful than for a man to be unable to produce enough food for his family. For the woman to produce food to support the man is culturally unacceptable. When confronted with such a possibility, a frequent reply is:

<u>ikú yà j'ẹ̀sìn</u>

(death/better/than shame)

With the advent of western education and modern sector jobs, the occupational structure of this area now includes trading, tailoring, carpentry, bricklaying, bicycle repairing, house painting, driving and many others in addition to the 'traditional' crafts cited earlier. Many farmers learn these trades as young boys before they start farming, and then finding that farming fails to meet their monetary requirements, they revert to their craft as a way of supplementing their earnings. It is noteworthy that in Yagba area 43% of farmers now have secondary occupations. The figure is 50% in Bunu District and 33% in Ohe development area (Table 3.2). Most of these, for example tailoring, bicycle repairing and male hair dressing are done in the evening after farm work is finished and earnings are used to buy small day-to-day items such as matches, cigarettes, kerosene, sugar, local beer, etc. Others, such as bricklaying, carpentry and sawing timber are done in the dry season between December and April. This coincides not only with a slack in farm work, but also the period during which houses are being built. With more government construction work now reaching rural areas, skilled work is available for bricklayers, carpenters and painters at other times of the year as well.

Of the 120 farmers in the sample, only three planted crops for food alone and claimed no agriculturally derived cash income. Nine others - five carpenters, two brick-layers and two drivers - made between 40% and 60% of their annual cash income from these secondary occupations. A further eight farmers derived up to 20% of their annual cash income, and paid for consumer goods they own, such as radios, watches, beds and mattresses, from remittances returned by children and relatives working in urban areas. The remaining 100 farmers (83%) receive at least 90% of their annual income from the sale of crops (mostly food

Table 3.2

NUMBER OF SAMPLE FARMERS
WITH SECONDARY JOBS IN 1978

Types of Secondary jobs	Takete-Ide	Ejuku	Olle	Iya Gbedde
Bricklaying	4		1	3
Carpentry	3	1		2
Sawyering	1	1		2
Tailoring	3	2		2
Bicycle mechanic	1	–		
Local middleman	1	1	2	
Wine Tapping	1			
Trading		4	4	1
Driver		1		
Hair dressing		2	2	
Native Doctor		2		
Hunting			4	
Weaving			1	
Traditional Ruler			1	
N =	14	12	15	10

Source: Field Work, 1978

crops).

The importance of agriculture as a source of livelihood is clear from the foregoing. Though education and government and secondary jobs have reduced the percentage of farmers considerably, especially among the younger age group, those who remain in the villages are still committed to food-crop agriculture. This area is different therefore, from some parts of rural West Africa where farming is looked upon as a part-time activity for women or the semi-retired (Lagemann, 1977).

Land Tenure

To many anthropologists and agricultural scientists, 'the ownership of land is the main source of economic, political and social power' in rural communities (Feder, 1968, cf. Shanin, 1971:83). Feder goes on to affirm that 'the greater the amount of land owned, the greater the power of its owner. Farm people who have no land whatsoever, have, therefore, no direct economic, political or social power' (ibid.). This idea is no less explicitly expressed by Dore (1965), Huizer (1969), Nyerere (1968), Saul and Woods (1971), Wolf (1959,69) and a host of others. Shanin (1971) submits that 'the holding of land ... acts (along with other factors) as an entrance ticket into the peasantry. Moreover, position in the hierarchy of peasant sub-groups, is to a large extent defined by the amount of land held' (1966:44 , 1971). Implicit in this view is the notion that land ownership is limited to only a small portion of the population, and to quote Feder further 'the power of the landed elite is used precisely to keep the peasantry disorganized, poor and dependent' (Feder, 1968). This operates to varying degrees, ranging from situations where the landed few give land to peasants and share the produce, to those where food grains are 'handed over around harvest time by the indebted or dependent peasant families to the local landlords, merchants, or money-lenders, and subsequently doled back before the next harvest, generally on favourable terms, to the same peasant families' (Thorner, 1962). Poor land tenure system is also said to be one of the major bottlenecks for agricultural development in 'traditional' societies (de Wilde, 1967; Ofori, 1973).

It is against such notions that the land tenure system in Kabba Division will be discussed. The whole area is divided into village territories and people in one village cannot lay claim to land in another village except sometimes in situations where people have migrated. This latter situation arises in villages which have been founded as a result of moving to a road in the last forty years. An example is the present Amuro new site which is on Mopa land. In this case, using land for any purpose must be based on permission from land owners in Mopa. However, many of the inhabitants still have land rights in old settlements of Takete-Ide, Orokere, Aiyede, Agbajogun and others.

Another feature of land tenure here is that sovereignty over land is not held by individuals, nor by the whole community but by village clans. A clan (<u>oríkì</u>) consists of all families (<u>ìdìlé</u>) who trace their ancestry back to a single ancestor. All male and female members of the clan bear the name of that ancestor as an eternal name or <u>oríkì</u>. This clan name is different from both given and surnames and is used mainly for identification by members of the clan. An <u>orīkì</u> name is also the repository of information about the past activities of the 'family tree'. The size of clans varies enormously, ranging from 20 up to 150-200 families (<u>ìdìlé</u>) - a family in this case being taken as an adult male 'head of house, his wife(ves) and children. The family is the nucleus of the residential and farming group. Number of clans per village vary according to settlement size. There are two clans in Imela (a place of about 150 people) but more than ten in Takete-Ide (with a population of about 3,500) and even more in larger settlements. Through intermarriage and migration, clan members may be found in other villages as well, in some cases losing contact with other members of the clan but retaining the name.

It is important to note that not all clans own land. Using the four sample villages as examples, all land in Takete-Ide territory is owned by four out of ten clans, between them comprising only 10% of the village population. Three clans out of nine own land in Iya Gbedde (12% of the population) while five out of ten and two out of eight own land in Ejuku and olle respectively. In Olle, authority over part of the land is vested in the Kwara State Government as a forest reserve area administered by the local forestry officer at Kabba. Overall, it is estimated that only 15% of the population of the Division will belong to land-owning clans.

Land areas were acquired by powerful war-lords during the local wars of the past four centuries and frequently changed hands as a result of fighting. The war-lord, his family, relations, and other people who sought refuge under him lived on such land and defended it. The pacification of the area left the land in the hands of the last war-lords and up till today the land is called by the name of the war-lord or ancestor who acquired it for the last time. Administration of these clan lands is, today, vested in the Head of the clan, assisted by the senior household heads. Land is held communally on behalf of all clan members and this is conceptualized as including the dead, the living and the unborn. When asked why land is not sold, the usual answer is:

> 'bàbà mi kò ní gbà mī l'ọ̀run t'ọmọ ọ̀lā kò bá n'ilè'
> [father my/nót accept/me heaven/if dispossess/ son/tomorrow - or my ancestors will not accept me in heaven if I dispossess the unborn child of his land]

Members of the clan maintain rights over land while under cultivation but not rights of outright ownership. Only clan members can also harvest useful fruits of any naturally growing tree on its land such as palm trees (elaeis guinensis), locust bean trees (parki clappertoniana) and others, including those useful for timber. Clan members are free to choose where and how much to farm without any kind of payment or dues. Farmers from non-land-owning groups have to 'beg' land from heads of land-owning clans. This is done on an individual basis and, except for plots on which tree crops (cocoa, coffee, kolanuts) have been planted, use rights cannot be passed on to the farmer's children. Due to the abundance of land, lease terms are generous even if there are minor differences from clan to clan and village to village. However, in no case is any land sold at all. de Wilde (1967:132-3) notes that there "... is no great demand for a more exact determination of land rights as long as there is plenty of land for all, and every one could get enough of whatsoever land that was needed for cultivation without sacrificing the customary practice of bush fallowing to replenish soil fertility". Such a situation exists here.

In Bunu District and on the northern boundaries of Yagba, holdings are so extensive that it is impossible for a clan to oversee all its land. Some unauthorized farmers use land without detection for years, but when caught he is liable to a local fine of palm oil, salt, kola-nuts and in some cases a goat if tree crops are involved. Some farmers prefer to take this risk rather than go through the traditional process of begging for land, especially if they are not on friendly terms with some persons within the land-holding clan who might block their application.

For those outside the land-owning clans, the normal procedure for acquiring farm land starts with either a search by the farmer, or information from someone else who has found a piece of suitable land. The clan Head is then approached (at times through a friendly intermediary) for permission to use the land. This is granted on condition that a) no one else has asked for the same plot, b) the borrower, his parents or close relations have not committed any serious offence against the clan, c) the borrower is not an undesirable element in the village as a result of violating serious community norms or rules and d) no tree crops will be planted without special permission. This process in most cases is very informal because people know each other well and make few overt distinctions of class or status except in regard to age and 'traditional' office. Payment for usufruct depends on each clan and differs from village to village. Analysis of payment in the four sample villages will serve to illustrate this point.

Land types

There are three broad categories of land in the area and conditions of lease differ according to the type concerned. These are:

a) Òfé - the open loamy savanna plain where 'upland' farming is practised and all types of food crops are grown. About 95% of Yagba, 90% of Gbedde and Kabba and 70% of Bunu District fall into this category (Atteh, 1974, Farmers' estimates).

b) Igbō - forest land for tree cash crops. Forest land is limited. The main concentration is in Bunu District where there is a government forest reserve covering about 200 km^2. The area covered by the Ebba forest reserve in northern Yagba is completely uninhabited and unused, it is therefore of no interest to this study. In other areas, forests are restricted to hill slopes, main river courses and relics of rain forest in S.E. Kabba and Ijumu areas.

c) Àkùrọ̀ - these are pockets of heavy, clayey, hydromorphic soils in valley bottoms and areas of poor drainage. Akuro is used mainly for early yam and comprises less than 1% of farm land in the territories of the sample villages (ibid.). It is in short supply and has to be rationed.

A village by village survey of lease and access conditions follows:

Takete-Ide - Six of the farmers in the sample did not need to 'beg' land because of free access through clan membership. The remaining 80% (24 farmers) required permission but were allowed use of ọ̀fẹ́ land freely. The area to be cultivated was fixed for only one out of the twenty-four but the rest could farm as much as desired, for as long as desired and except for trees could plant any crop. For àkùrọ̀ plots, however, because of short supply, rationing is involved. In 17 out of 24 cases (71%) the size of àkùrọ̀ plots was fixed by the land owner. For the 8 farmers with tree crops and needing to 'beg' land, plot sizes were fixed in advance in all cases. As for payment, much depends on the discretion of the clan Head and the degree of friendship between the owner and borrower. Thus 75% of farmers who begged land were not asked for any 'payment' except kolanuts. One person in the sample paid with a day's labour on the owners farm while five paid cash, ranging from 50k to a maximum of N1.20k. In these cases, the money was for the land owner to buy the kolanuts in lieu of a gift in kind. Needless to say, such sums are nominal and cannot be thought of as 'rent' in any of the usual senses of that term.

<u>Ejuku</u> - Whereas 18 out of 30 farmers (60%) begged farm land, only two had their <u>ọ̀fẹ́</u> plots fixed by the land owner. Àkùrọ̀ plots were restricted in extent in 16 out of 18 cases while tree crop plots were of fixed extent in every case. No access fees are paid in cash. Payment in kind includes salt, palm oil, palm wine and kolanuts as tokens.

<u>Olle</u> - Begging for land occurs in 22 out of 30 cases among farmers in the sample. Eight farmers were given forest reserve plots in which sizes are fixed. Cleared forest plots are allocated to farmers for use for two years only and tree crops must not be planted. The other 14 farmers went through traditional channels. Of these, 11 could farm as much <u>ọ̀fẹ́</u> as they wanted and for as long as required. Among the 22 begging land 17 had their <u>àkùrọ̀</u> and 20 had their tree crop plots fixed by the owner. Payment is the same as in the other villages.

<u>Iya Gbedde</u> - Of the 30 farmers in the sample, 22 begged land. As many as 11 of these had <u>ọ̀fẹ̀</u> plots fixed while 16 had tree crop plots fixed. Due to the topography, <u>àkùrọ̀</u> plots are much more limited than in other villages and plots are fixed for everybody. Token payments to acknowledge ownership are similar to the previous cases discussed.

A few concluding remarks are appropriate here. Except in Iya Gbedde where open savanna is limited by rugged topography, stony soils and forested hillsides, there is virtually no restriction on either farm size, the length of cultivation or the type of food crops which can be planted on <u>ọ̀fẹ́</u> plots. Payment is 'symbolic' rather than corresponding to any notion of cash rent values.

Commodities transferred include palm oil, palm wine, kolanuts, salt and smoked fish. Where tree crop plots involving a long or virtually permanent lease are concerned, payments may be in terms of a pig or goat. These objects are said to be demanded by and acceptable to dead ancestors, living clan members and unborn children. The exchange symbolizes the idea of telling ancestors and living clan members that the land is not being squandered and holding the borrower to usufruct rights only.

One particular aspect of the system is worthy of additional note. This is the system of payment called ìsákọ́lẹ̀. It may involve only a single piece of yam or one cob of maize or ear of sorghum per year given to the land owner. The symbolic significance is the acknowledgement by the farmer that all he produces from the land is by grace of the land-holding clan.

It is clear that in no case does acquiring land for farming cost the farmer more than an average of N5 a year. This level of payment is low enough to call into question any notion of dominance by a land-owning class over a land hungry 'peasantry'. As de Wilde (1967:132) aptly put it '... except in some rather limited areas, land tenure in tropical Africa has not arisen out of concentration of land ownership in the hands of the few, and the relationship of landlords to tenant cultivators'. Nevertheless, it should be noted that whereas the land owning group does not or has not found it possible to extract and utilize surplus output from the 'landless' group, the maintenance of a system for constantly acknowledging ownership (with the threat of refusal to allow access to land if norms are departed from) means that the land-owning group is able to continue to dictate the shaping of social relationships to its advantage. Despite this caveat, land-ownership is not as yet an effective factor in determining social status and power, since it is not yet a scarce economic resource. Everybody (including a stranger so long as a native host can vouch for him) has relatively easy access to as much land as is needed for food crop production. With only a few capital resources - e.g. hoes, cutlasses and planting material, required, it is labour, not land-ownership which is the most critical production factor. This is as true for land-owners as for those who beg land. This explains why land-ownership appears to be irrelevant as a factor in determining who is rated as a successful farmer. In none of the four villages is a clan Head listed in respondents' assessment of who are the best five farmers. None of the ten largest farmers studied (judged by annual output) belongs to a land-owning clan.

Until population pressure on land becomes greater, this flexible system of land tenure may well continue. As of now, few farmers complain of land scarcity. When asked about ideas on land reform (in the light of the National Land Reform Decree of 1975), all but six (i.e. 95%) of the farmers in the total sample wanted the present system to continue (Table 5:1) because they judge it adequate for their needs. There is little doubt, however, that the present system continues to 'work' largely because cash returns to food crop farms have been poor over the last few decades. By comparison with tree-crop farming in parts of southern Nigeria for example (cf the very different land-tenure picture presented in Williams, 1975 and Berry, 1975) demand for land is low because few farmers see it as an investment opportunity. In fact all cash profit made from the land is invested in consumable goods or other non-farm sectors of the local economy. Low population density helps cushion existing tenure arrangements from commercial pressure, but the low degree of commercialization to begin with must be seen in terms of cheap food policies for urban areas pursued by successive Nigerian governments.

The Physical Environment.

As has been pointed out (Chapter 2), an objective description, by experts, of the physical environment in which farming takes place may not be as important as that perceived by the farmers themselves. This is because soils, climate and vegetation play a crucial role in crop production and farmers' success in utilizing these resources for crop growth depend on a crucial understanding of their occurrence, and characteristics. Any meaningful understanding, explanation and evaluation of Kabba farmers' agricultural decisions require a sound knowledge of the physical environment which affect these decisions and upon which the decisions are expressed. Farmers' perception of and reactions to the physical environment and their physical resource use strategies will be discussed extensively in Chapters 5, 7 and 8 while a brief review of the objective physical environment of soils, relief and drainage, vegetation and climate will be made in this section.

Geology and Soils

The crucial role of parent materials in soil formation and its fertility is well documented. The physical and chemical properties and combinations also affect weathering, drainage and topography (Pullan, 1969; Ahn, 1970; Thomas, 1974). Most of Kabba Division is underlain by ancient metamorphic and igneous rocks of the Basement Complex. Hopkins (1971) estimates the age of these pre-Cambrian rocks to be between 500-3000 million years. They include granites, gneisses and migmatites although there are also areas of schists, quartzites and metamorphized derivations of ancient sediments (Kowal and Knabe, 1972). The Basement Complex is overlain in most places by a deep weathered mantle which is characteristic of weathering under tropical conditions (Pedro, 1968; Ruxton and Berry, 1961a; Fournier, 1962; Douglas, 1969). However, there are numerous instances of granitic and quartzitic rocks projecting above the general land surface as angular blocks of bare rock and round-topped inselbergs. Most spectacular of these are the rounded inselbergs between Ogidi and Ayere on the Kabba-Ikare road, granitic hill blocks around Kabba town, the Elekesi near Irunda and the Obasoro and Abi Hills near Takete-Ide where the bare granite rises almost vertically from the general plain of 300m above sea level to a height of around 500-600m.

Crystalline rocks of a granitic or gneissic character constitute by far the largest part of Kabba Division, resulting in a landscape of sandy plains and isolated hills. The northern and north-eastern part of the Division along the Niger River is, however, underlain by sandstones and alluvium. The weathered mantle which covers most of the Division varies, depending on topography and intensity of the deep weathering process, from less than one metre to as deep as 25m (Thomas, 1974). Most of the soils developed in this mantle are zonal ferruginous tropical soils characteristic of a tropical region with appreciable but distinctly seasonal rainfall (Fournier, 1962; Klinkenberg and Higgins, 1968 and Schumm, 1963). These soils are highly laterized with largescale leaching (Keller, 1957; Fieldes and Swindale, 1954; Krauskopf, 1959; Eden and Green, 1971). The process of laterite formation in the tropical soils have also been extensively discussed (Maignien, 1966; Woolnough, 1930; Pullan, 1967; Goudie, 1972; Alexander and Cady, 1962; Dury, 1969, Prescott and Pendleton, 1952 and Moss, 1965). Quite a lot of deterioration in the physical condition of these soils once under crop production is attributed generally to structural degradation (Greenland and Lal, 1977, Ahn, 1968) leading to crusts being formed at the surface and resulting in decreased water entry, increased run-off and erosion, and poorer seedling emergence. In the light of this, heaping to loosen soil surface prior to planting is carefully examined as one of farmers' strategies to overcome the problems of lateritic soils. The influence of soil physical properties on crop growth in the tropics have been extensively discussed by many experts (Lal, 1979;

Greenland, 1979; Falayi and Lal, 1979; Cannel, 1979; and Mansfield, 1979).

The four main soil types are easily recognized in Kabba:

a) Òfé or upland soils consisting mainly of sandy loam or loamy sand cover by far the largest part of Kabba, covering most of the plains except those which fringe the Niger Valley. Because of heavy rainfall these soils are subject to eluviation which drive clay and suspended colloids downwards, resulting in leached soils of coarse texture almost devoid of clay and silt. Illuviation and flocullation of suspended colloids in the sub-soil horizon also produces clay bulges (Smyth and Montgomery, 1962, Ashaye, 1969; Ahn, 1968). Lal (1979) estimates that the silt:clay ratio is higher in the surface horizons but declines gradually to be of constant value one metre below the surface. These soils are characterized by a well-defined gravelly horizon at depths of between 15 and 30 cm possibly due to the intense activity of earthworms and termites (Collinet, 1969; Levegue, 1969; Riguier, 1969; Segalen, 1969). As reported in Chapter 5 many farmers take these biotic activity into consideration in determining soil fertility. The top soil is generally greyish in colour but gives way to the more friable brown coloured gravelly character at about 15 cm. This soil type is utilized for food crop production in Kabba.

b) Igbó or soils under forest. This has a deeper grey colour containing much more clay and silt than the upland soils due to less intense leaching because of the vegetative cover. The humus covered soil mantle gives way to the sandy gravel at more than 30 cm and it is more of loamy sand than sandy loam. This soil type is utilized for tree crops (cocoa, coffee, kolanuts, cashew).

c) Àkùrọ̀ or hydromorphic soils - these are deep greyish soils characterized by seasonal waterlogging and contains the highest clay content of all the soil types. They are best developed on extensive fine-grained sedimentary rocks or weathered materials which have been brought down from the hill sides, when these are underlain by impervious rocks. They are therefore valley-bottom soils and occur in isolated scattered spots of variable extent. These are utilized for the growth of early yàm and rice. Soil depth and seasonal waterlogging makes larger heaps necessary in contrast to smaller heaps in upland loamy soils.

d) Reddish stony soils of Kabba Central Plateau contain a stone content of between 5 and 20% and in some cases too stony to permit cultivation. They are usually found on hillsides and hard to work. Farm sizes on such soils are therefore considerably smaller.

The way in which farmers respond to these soil conditions are examined in greater detail in latter parts of the thesis.

Relief and Drainage

The topography of Kabba Division is predominantly dissected hill country in the south from which the land descends by steps to the Niger River valley in the north and north east with level plains alternating with belts of dissected country (Clayton, 1958). The central part of Kabba forms part of the watershed for rivers flowing northwards as tributaries to the Niger and southward through the coastal plain to the Atlantic. The relief, shown in Fig. 3.6, consists of undulating plains interspersed with isolated hills and inselbergs. The major feature of the landscape includes the central Kabba plateau with peaks of 679 and 643 metres at Abi and Obasoro Hills respectively and covers the major part of central Kabba from Mopa in the west to Olle in the east and Iluke-Amuro line in the north to just north of Kabba town in the south. The Eri Hills in the west also form a large block of highlands. These highlands are used principally for upland coffee cultivation while the intervening slopes and valley bottoms (àtẹ̀kũ) are used for food crop production. A contrasting landscape is found in the northern part of Kabba where the land descends in gentle slopes from 303m along the Isanlu-Takete-Ide-Iluke line in the south to 61m around the Niger valley in the north with gentle plains developed upon lateritic and sedimentary rock. Because the area is sparsely populated (less than 10 per km^2) it is scarcely used for agricultural purposes. Between the Kabba Central Plateau and the northern lowlands all other areas consist of undulating dissected country with isolated inselbergs. The plains, because of the settlement pattern contain the largest number of farms producing the bulk of food and tree crops in the Division.

The major rivers are shown in Fig. 3.7. The

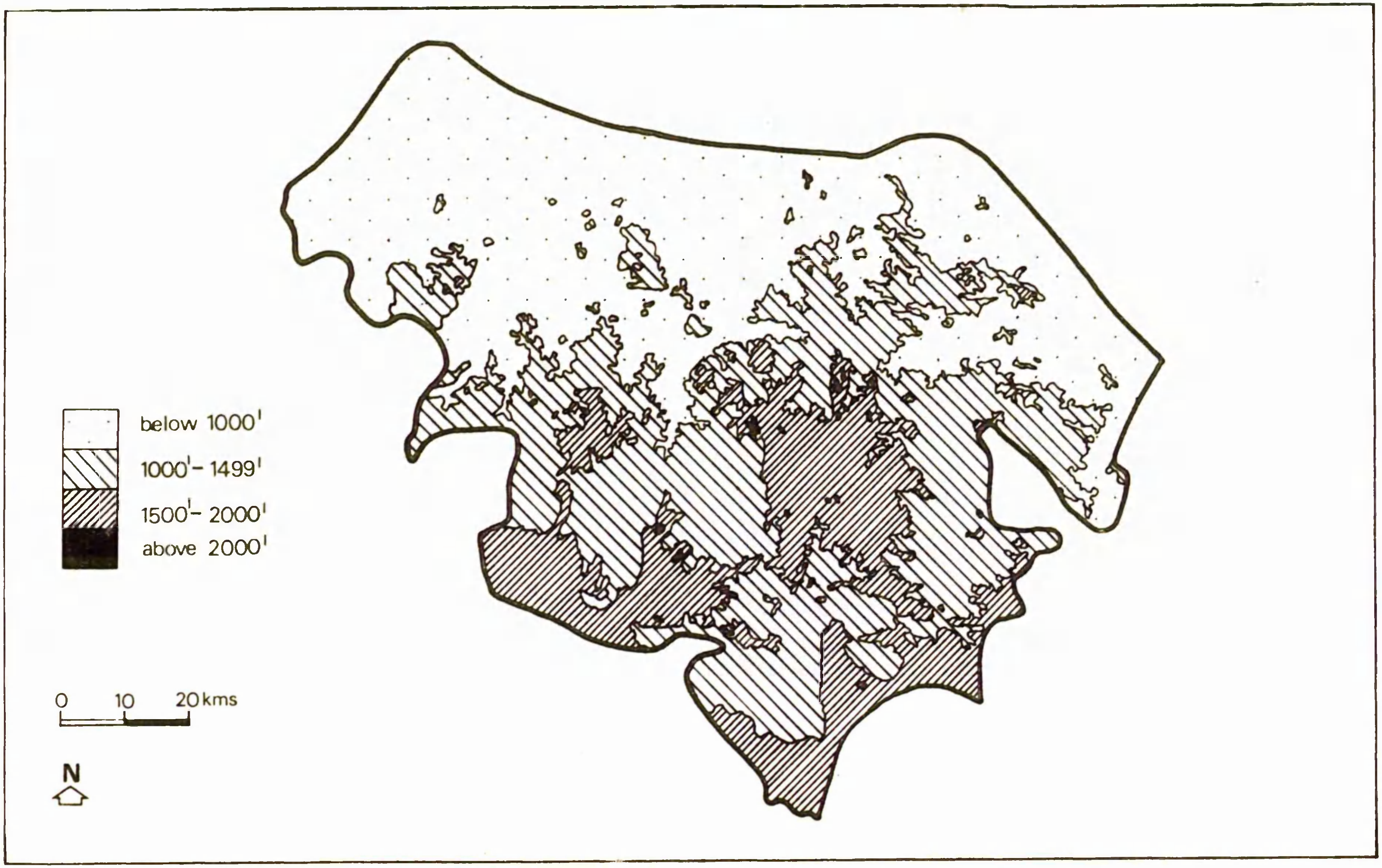


Fig. 3·6. Relief of Kabba.

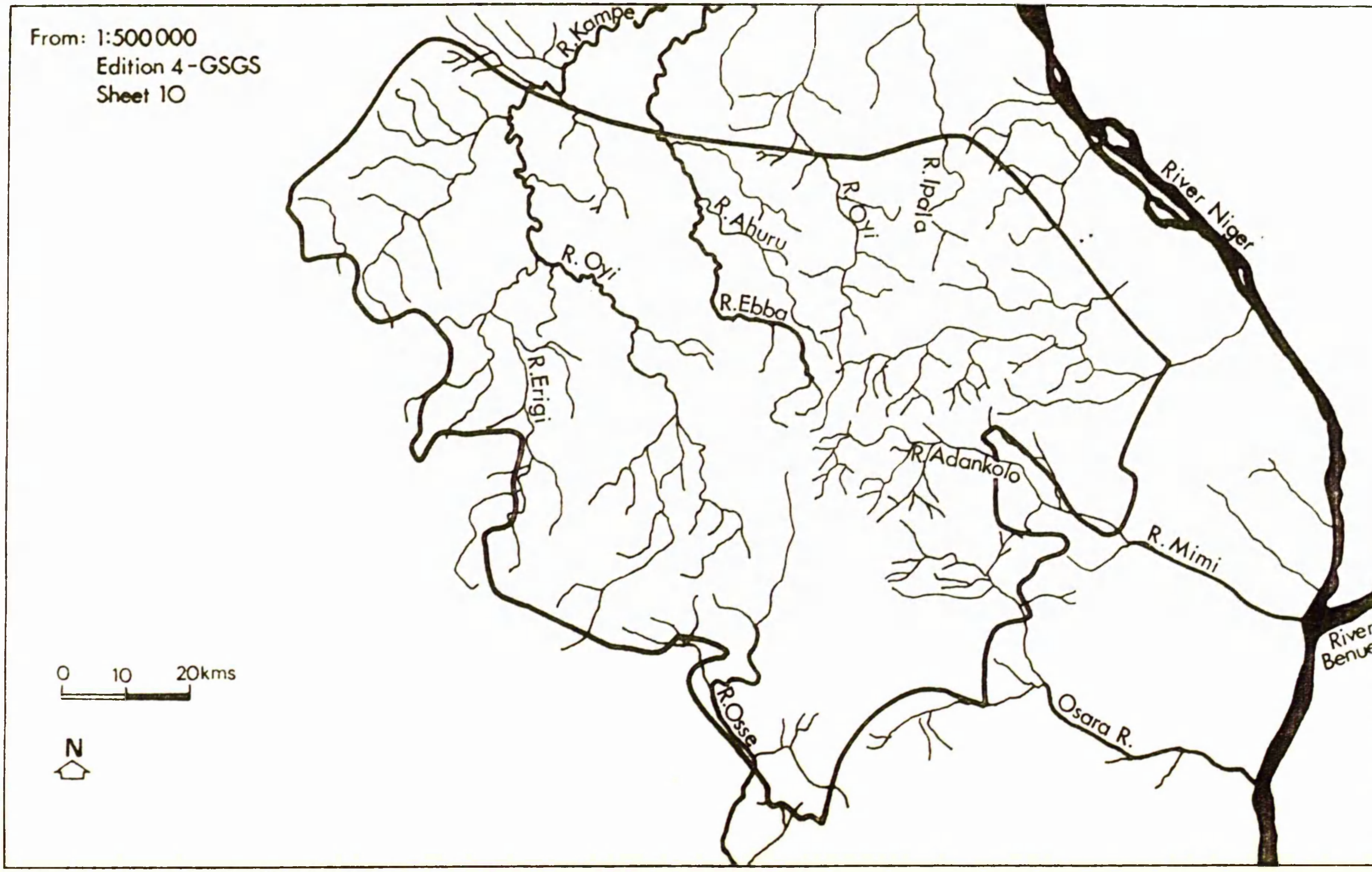


Fig. 3·7. **Major Rivers of Kabba.**

largest are the Oyi and Ebba which both empty into the Kampe which in turn empties into the Niger River in the north east. These rivers are fed by numerous fast flowing tributaries which have proved to be a great hinderance to road building and the development of communications in the area. During the wet season, between June and October, these rivers flood but do not retain much of the water in the dry season due to the steepness of their gradients. Only in the lower sections of the rivers, towards the northern lowlands do the rivers maintain a flow throughout the year. In the rest of central and southern Kabba, all rivers either dry up or break up into small pools in the dry season. As a result, possibilities for irrigation are limited and fishing is never more than a part-time occupation. Moreover, in these central and southern parts, river valleys are deeply incised with little flood plains to utilize except along the larger rivers where fringing forests enable farmers to use the land for tree crop cultivation. It is only in the northern lowlands that the flood plains are sufficiently wide to be of major agricultural use. However, the lower reaches of the Oyi, Ebba and Kampe river courses are virtually uninhabitted. This is partly due to the fact that the area lies next to Nupe territory along the Niger. It was the Nupe, during the wars of the last century who drove northern Kabba people to the hills of the Kabba central highlands. The most useful section, agriculturally, is the northern lowlands where the Kampe River can provide water for irrigation for an extensive area. The Niger Basin Development

Authority (a Federal Government Agricultural Development concern) plans to dam the Kampe and Ebba rivers to provide water for irrigation in these northern parts of Kabba. This venture may change the area completely. For now, however, the numerous rivers and streams are of little agricultural significance except providing drinking water on the farm and as sources of water for domestic purposes.

Climate

The pattern of agriculture is very much dependent on climate in general and rainfall in particular. The study area falls into the west central part of the middle belt of Nigeria (Agboola, 1961; Ireland, 1962; Gleave and White, 1969) and it therefore falls under the belt of tropical savanna climate. The climate is influenced by the two major wind systems which affect the rest of Nigeria - the moist S.W. Trade Winds and the dry north east Trade Winds. An overall account of the climate of Nigeria and the impact of these two wind systems have been documented (Ngozi, 1962; Buchanan and Pugh, 1955; Stafford, 1942; Brooks, 1921; Higgins, 1943; Hodder, 1957; Pugh 1952). Only peculiarities of this area and agricultural effect of climate will be detailed here. Only three weather stations have coherent data for any period of time in the division, but they suffice to highlight the climatic conditions in this area. These are at Kabba (7°43'N 6°06'E), Isanlu (8°15'N 5°47'E) and Abugi (8°33'N 6°13'E). Kabba has an average annual rainfall of 151 cm, Isanlu, 149 cm and Abngi, 110 cm. The mean monthly distribution of rainfall for the three stations is shown in Fig. 3.8 calculated from forty years' record in Kabba, fifteen at Isanlu and nine at Abugi. These emphasize the seasonality of precipitation because more than 95% of annual rainfall is experienced in the period between the end of March and mid-November, while the rest of the year is virtually dry. The wettest periods are experienced in the months of July and September, indicating a double maxima rainfall regime while the driest periods are recorded for the month of January.

Rainfall regimes in most of Kabba Division follow this pattern except in isolated rain shadow areas along the northern slopes of the Central Highlands where the S.W. winds descend steeply into the Niger Basin. In this category are areas in Amuro and Iluke where there could be one or two months without rain at all though the total amount is hardly affected (Atteh, 1974). The climate in the division is divided into two clear seasons. The wet season lasts from March in the south and April in the north to November in the south and October in the north. Most of the rain is the result of convective turbulence associated with the passing of the thermal equator, and also due to orographic effect especially along the north-facing slopes. During the months of the wet season, rainfall is heavy and concentrated, causing floods in rivers and streams accompanied by extensive sheet erosion in the settlements and other exposed surfaces. Due to

FIG- 3-8

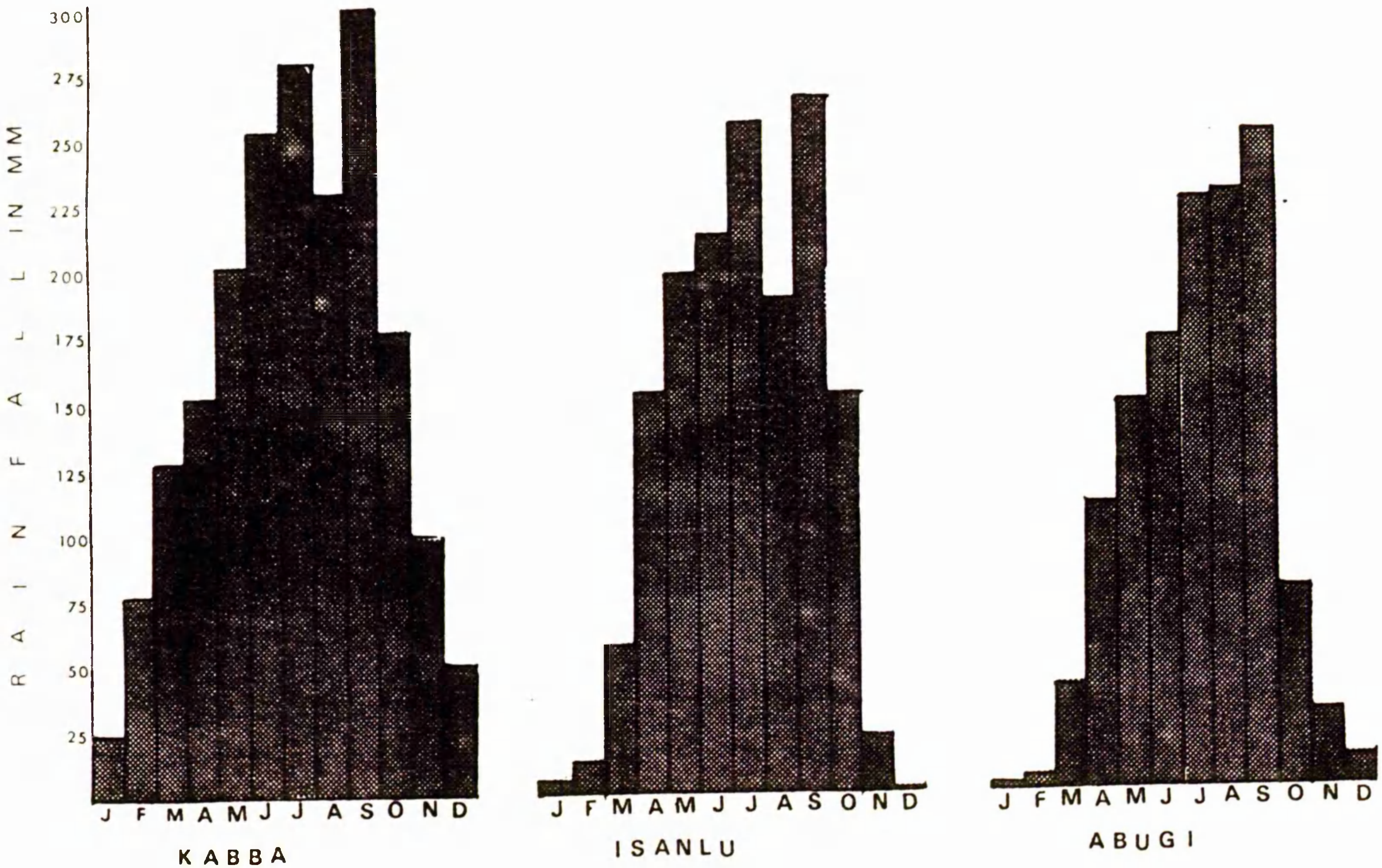


FIG-3-8 RAINFALL REGIMES IN KABBA

thick vegetation at this time, widespread erosion has not occurred, even along the slopes. The dry season lasts from the end of November till March in the south, and to April in the north. There are occasional and isolated showers but normally rainfall does not exceed 80-150mm for the whole season.

Temperatures are high all year round with an average of 25.2°C. Between February and April, however, day temperatures rise to over 30°C due to intense insolation under cloudless skies, making farm work exacting at this period. Between November and January, temperatures are tempered by the invasion of the area by the dry, but dusty and cooler N.E. harmatham winds. These bring night and morning temperatures to between 15°C and 19°C. The relative humidity reflects changes in the seasons being high (80-95%) in the wet season and as low as 45% in the dry season.

Agro-climatic review

Seed-bed preparation, planting, early crop growth stages and crop types which can be planted in sequence are critically dependent on when rains start, the amount and the frequency. As at the beginning of the wet season, the soil profile, and its surface in particular carries a very large soil water deficit, so crops cannot rely on water stored in the soil in their early stages of growth. The value of rainfall to tropical agriculture therefore depends very critically on its distribution, absolute amount and reliability especially at the beginning of the growing season and at the end.

Generally, there is a gradual increase in the amount of precipitation in successive ten day (decade) periods with the advance of the rainy season eventually reaching a peak (Kowal and Knabe, 1972). Rainfall between January and the last 'decade' of March in the south and first 'decade' of April in the north are variable in amount and irregular in frequency. As from the beginning of April, however, when the increase in the amount of precipitation has reached the rate of one inch per 'decade', the frequency and amount increases rapidly per succeeding ten-day period until it becomes reliable and adequate. This happens when there is a surplus of precipitation over evapotranspiration demands. This replenishes the soil water deficit of the dry soil profile. In the study area, soil water deficit replenishment takes place first on àkùrọ̀, àfūnrān, ìbǿ, ọ̀fé and mountain slopes in that order. Farmers appear to have a very good knowledge of this and so use akuro, afunran and ibo plots for early yam, maize and vegetables, the latter two maturing at times before planting time on ọ̀fé plots.

The effective start of the rains is the first 'decade' in the season in which the amount of rainfall is equal to or greater than one inch but with a subsequent 'decade' in which the amount of rainfall is at least equal to half the evapotranspiration demand (ibid.). The beginning of the rains coincide with a high degree of mobilization for agricultural effort. Reliable assessment of the start of the rains contributes to the correct planning of farm operations, and reduces the risk of poor crop establishment or crop failure when early planting is necessary, hence the tendency among farmers to plant early. Correct assessment of the length of the rainy season, which is crucial to a correct matching of crops or crop sequences, also depends on an accurate assessment of its start. The remarkable ability to assess these rainfall characteristics is probably the secret of the success of traditional farmers who do not have weather stations.

Using the direction of the S.W. winds, the starting of rains inland can be forecast by noting its beginning in the south. The correlation co-efficient between latitude and the decade in which the rainy reason 'starts' is +0.88, which indicates that about 81% of the dates on which the rainy season starts can be statistically 'explained' by latitudinal position or distance from the source of the rains. The regression line is $Y3=1.43\ x\ -1.31$ where x is latitude (independent variable) and Y3 is the coded time of the start of the rains in terms of decades (dependent variable). The regression line indicates that the rain belt advances at an average rate of 1.4 decades or about 14 days per degree latitude, equivalent to 8km per day (Kowal and Knabe, 1972). The effective rain starting decades of March 21st-31st in Kabba, 1st-10th April at Isanlu and 11th-20th April at Abugi conform to these findings. Farmers' understanding of this principle of the advance of the rain (Chapters 5 and 7) shows how remarkably they have been able to monitor rainfall characteristics (Oguntoyinbo and Richards, 1977).

The length of the rainy season is also important for agriculture and since rates of potential photosynthesis are virtually the same everywhere in Nigeria, length of rains is a determining factor of productivity differences between areas. This length ranges from 185 days in the south to about 170 days in the northern part of the study area. When rainfall and agriculture are examined together, the water budget of the soil becomes a critical factor. As already pointed out, there is a large soil water deficit at the end of the dry season with soil surface profile very dry. Due to this dessicated surface, the wetting front moves down this profile slowly. The first few showers are often ineffective and are lost to evaporation without contributing much to soil water storage. Actually, precipitation below 12.7 mm per decade at this time is ineffective and of no consequence to agriculture. In hydromorphic soil profiles, soil water deficit is less than in the uplands. This amount of rain therefore contributes enough for farmers to utilize it for crop growing when the upland soils are still too dry.

For agricultural purposes, Cocheme and Franquin (1967) recognized five annual water cycles which are of vital importance in describing the agricultural regimes found in Kabba Division.

a) The Preparatory Period - the start of the rains when precipitation is in excess of evapotranspiration. In Kabba this begins in April and lasts for two to three decades until about the end of April or early May. The average amount of rain during this period is about 102 mm with a range of 91.5 $\pm$ 55.9. This can penetrate the soil to between 15.3 cm and 22.9 cm and thus allows seed bed preparation and the planting of some vegetables and grains such as maize, and preparing seed beds for sorghum. The knowledge and experience of farmers at this time is critical since if crops are planted too early, the amount of water stored in the soil profile might not be sufficient to sustain growth for a long time without replenishment from rain; yet planting late might reduce yields. Farmers' tactics in dealing with this dilema are discussed later.

b) The Moist Period: This represents the period of gradual recharge of the soil profile with water from the decade during which $P \geq E_T$ (P= Precipitation and E_T = evapotranspiration) to the decade when the cumulative excess of P over E_T demands is 102 mm, which is assumed to represent complete recharge of the soil water deficit (Cocheme and Franquin, 1967; Kowal and Knabe, 1972). This is completed by June and represents the period when most crops, except yam are planted, and the beginning of clearing virgin land (áyọ́).

c) The Humid Period: This period extends from the decade in which soil water is completely recharged to the one in which rainfall again falls below E_T demands and generally lasts from June to the end of October or mid-November. The trade mark of the period is heavy rains, serious leaching of the soil and much surface run-off, which causes floods. The water table also reaches the surface in many places where gradient is low and in places where the underlying Basement Complex rocks are close to the surface, with consequent adverse affects on production. Excess water, rather than the lack of it might limit crop growth. Farm operations at this period includes clearing, heaping, weeding and at its tail end, the beginning of yam planting.

d) The Maturity Period: This lasts from the end of October, when precipitation drops below E_T demands until the end of the growing season when soil moisture deficit is 102 mm (Kowal and Knabe, 1972). Crops depend almost entirely on water stored in the soil during this period. It ends in the second 'decade' of November in the north and third 'decade' in the south of Kabba. On hydromorphic soils and in forest zones where tree crops provide shade for the soil, this period may last two or three decades longer - an advantage which farmers utilize. This whole period is when the greatest percentage of yam is planted, when the soil is still moist enough to prevent seed-yam decay but not wet enough to induce early germination. Beans, soya beans, and other grains are also harvested at this period when they are not too dry to scatter, but dry enough to store without decaying.

e) The Dry Season: This is the time when lack of water is the limiting factor for plant growth, so no production without irrigation is possible. This period lasts from the end of October to the first decade of April in Kabba Division. The heavy clayey hydromorphic àkùrọ̀ soils are also an exception. They are wet until January or February and crops of vegetables are possible at this time. Farm work is considerably limited during the dry reason consisting mainly of sorghum harvesting in December, yam harvesting and planting of new yam in both December and

January. Clearing and heaping of akuro plots is also done in January and February. In forested regions such as in Olle and Gbedde areas, forests are cleared for tree crops during this period.

It is remarkable how similar the traditional farming calendar is to Cocheme and Franquins' agro-climatic divisions. This will be discussed in detail in Chapter 5.

The length of the growing season depends absolutely on the availability of water. Assuming that soil water storage after the rains is 102 mm, the length of the growing season ranges from 215 days in the south to 196 days in the north of Kabba. This rules out any water stress (Kowal and Knabe, 1972) and enables the planting of two crops of some vegetables, legumes and cereals per season. It is also important because the longer the growing season, the greater is the potential for dry matter production and the shorter the dry unproductive period. The correlation coefficient between the degree latitude (x) and the length of the growing season (Y_{13}) is $r = -0.88$ (Kowal and Knabe, op. cit.) which indicates that the average change in the length of the growing season could be 'explained' as being due in 77% of the cases, to a variation in distance along the south-north axis. The regression line, assuming a 102 mm water deficit after the end of the rains is $Y_{13} = 42.2 - 1.9\ x$ and that for 204 mm water deficit is $Y_{13} = 39.4 - 1.9\ x$. So with every degree increase in latitude there is a corresponding decrease in the length of the growing season by 1.9 decades or 19 days.

The foregoing agro-climatic review reveals the importance of not only climate to agriculture, but also the need for traditional farmers to have a critical understanding of the climatic conditions in order to utilize the physical environment for crop production.

Vegetation

The study area falls into the southern Guinea savanna vegetation belt of Nigeria. The presence of relics of the rain forest, isolated forest species along rivers, and the wooded nature of the vegetation in areas which have not been disturbed for a long time suggests that the savanna is derived. Jones (1945) and Keay (1953), used the term 'Derived Savanna' to describe the type of vegetation found in Kabba which has been described in detail by Clayton (1962). The latter suggests that the influence of man, on the vegetation in this area has been considerable and that the influence of the vegetation on the soils has been completely obscured by the activities of man. In fact, evidence that more luxuriant forest vegetation existed up till the beginning of this century is given by early colonial officers who reported that Kabba area was covered with thick vegetation and that "the decomposed surface of several belts of platy muscovites, schists and quartze in this area supported luxuriant forest" (Falconer, 1911:77). This suggests that since the end of the local wars of the last century, there has been a lot of vegetation clearing for agricultural purposes, resulting in the present derived savanna. Fast regrowth of vegetation and gradual re-establishment of forest in undisturbed areas seem to reinforce this conclusion.

There are two main vegetation types in Kabba - forest and southern guinea savanna (Fig. 3.9). Hopkins (1971) has given an excellent description of these vegetation types and so these will not be repeated here.

a) Forests: Relics of the rain forest remain scattered over Kabba especially in the S.W. areas bordering Ondo State. Patches of forests also exist along major rivers and on steep hill sides and stony soils unsuited for cultivation and where annual rainfall exceeds 150 cm. Patches are also carefully preserved in the vicinity of towns and villages as exemplified by Kabba town. The largest patches exist in the Olle, Ebba and Kampe Forest Reserves which have been undisturbed for a long time. Apart from these reserves, forests (igbo) have been exploited for planting tree crops such as cocoa, coffee and kolanuts. This is more so in the southern and central part of Kabba than in the north where forests are limited. The composition of forest is similar to that of the secondary forests found around Ibadan (Clayton, 1958, 1962) and a partial list of species including trees and herbs is given in Appendix 1(a).

b) Savanna: A general review of the structure and development of savanna vegetation has been given (Jones, 1945; Keay, 1953, 1959; Hopkins, 1971). Clayton (1962), divides the savanna in Kabba into three broad categories. These are:

(i) The Daniellia/Elaeis Complex which covers a small part of southern Kabba and results from heavy cultivation. Daniellia oliveri is the most common species while numerous

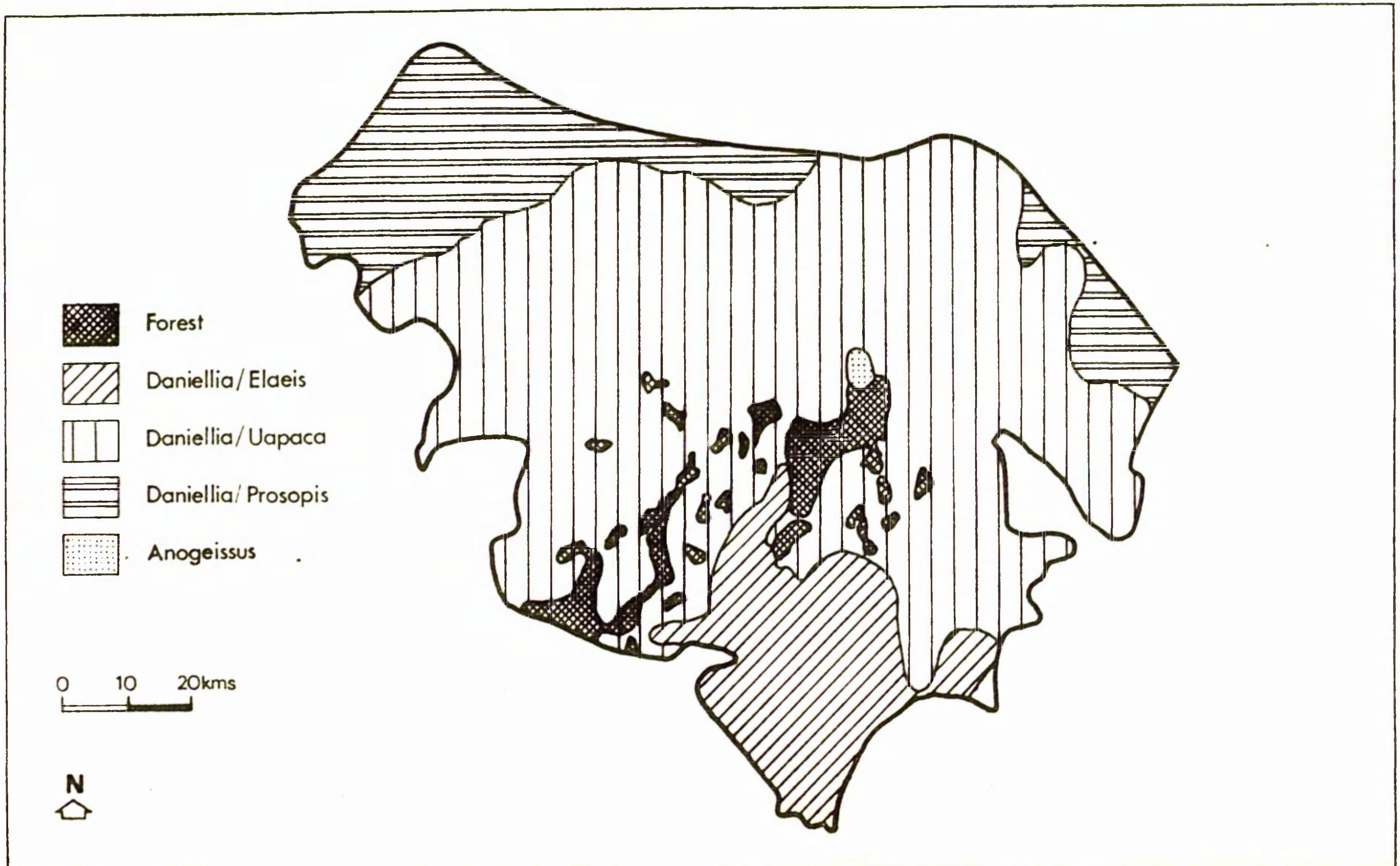


Fig. 3·9. **Vegetation of Kabba.**(after Clayton 1962) elais guineensis are scattered all over the area. A list of associated species is given in Appendix 1(b). In forest patches, forest species such as Alchornea cardifolia, Cleistopholis patens, and Bambusa vulgaris are common.

(ii) Daniellia/Uapaca Complex - covers more than 75% of the total area of Kabba Division, extending from the south where they are interspersed with forest and the elaeis complex to the central and northern parts where they are virtually undiluted, bordering the Daniellia/Prosopis complex on the Niger plains. Uapaca togocensis (ìyá) is the most characteristic species and almost always associated with Detarium microcarpium, Afzlia africana, Afromosia laziflora (àpàsà), Hymenocardia acida (òrùpá), Terminalia laxiflora (ēpēpē), Parki clappertoniana (ìgbá), Butyrospermum parki (ọ̀mí) and Vitrox idioniana (òrírì). Other species in the complex are listed in Appendix 1(c). The grasses are typically Ctenium newtonii, Monocymbium ceresiiforme, Schizachyrium sanguineum and Hyparrhemia chyrysargyrea. Forest species in forest patches include Chlorophora excelsa (iròkò), Blighia sapida (ìsín), Elaeis guineensis (ọ̀pẹ̀) and Ceiba pentandra (fẹrẹ̀gungùn).

(iii) Daniellia/Prosopis Complex - a less dense savanna vegetation found along the northern and north-eastern fringes of Kabba extending from Abugi area in the east to north west Yagba. The dominant species is the Daniellia oliveri while Parinari polyandra is also abundant. The presence of Prosopis africana distinguishes this vegetation from all others. Both trees and grasses are shorter than in the other complexes while the woodland is more open. Though it has a mean annual rainfall of 125 cm it is still part of the guinea savanna (Clayton, 1962). Different communities include those dominated by Afromosia laxiflora on stony slopes or by Borassus aethiopica on some moister soils. The grasses are dominated by Andropogan pseudapricus, Ctenium newtonni, Hyparrhenia chrysargyrea and Schizachyrium sanguineum. Forest species include Acacia sieberiana, Anogeissus leiocarpus, Khaya senegalensis, Syzygium guineense, var. guineense and the palms Borassus aethiopica, Elaeis guineensis and Phoenix reclinata.

These savanna vegetation present a luxuriant cover during the wet season but charred, open, burnt-out outlook during the dry because of annual firing. It is exploited everywhere for food crop production consisting of both root and grains. Because of the fibrous root system of the grasses and the hard soil during the dry season, savanna clearing is done in the wet season. Clearing is, however, less difficult than experienced in forested areas.

Socio-economic Environment

The importance of farming in the occupation and income structure of Kabba have been discussed earlier. Inspite of its importance, farming is practised on small scale, with multiple plots, and based on bush fallowing. It is also based on a poor transportation system in rural areas, small scale marketing in rural periodic markets and a high degree of wastage due to poor preservation and storage facilities. These characteristics of peasant farming have been confirmed in all parts of Africa (Goran, 1971; de Wilde, 1967; Wilson, 1955; Taiwo, 1973; Allan, 1965; Oyenuga, 1967; Saul and Woods, 1971; Uzozie, 1979; Turner, 1978). In fact, Olatunbosun and Olayemi (1973) attribute much of the food problem of Nigeria today to these and other characteristics of peasant economies.

Early Economy

There has been very little basic change in the system of farming for generations except for changes in crop type, use of fertilizer and pesticides. Until the pacification of this area by the British at the end of the last century and early part of this, farming was esentially practised for subsistence - a role which has hardly diminished. The economy and social life was organized around "The Village" which was the fulcrum of the farmers' life. While the majority of the people were farmers, a few were artisans - blacksmiths producing weapons, hoes, cutlasses and other implements, hunters providing meat, weavers (men and women) providing cloth and others, exchanging their skills and wares for food. However, there was little exchange in terms of crop products among the population because all farmers practised and still practise the system of mixed cropping and multicropping. By this management strategy, farmers supply virtually all their subsistence needs. This was supplemented by hunting since small wild life was hunted by all farmers using hunting dogs and traps, while larger animals were hunted by professional hunters. In many villages, wild life and smoked fish still constitute the only source of protein food, beef being non-existent.

During the pre-colonial era, farms and settlements moved from place to place due to inter-tribal wars against the Nupes and not due to the practice of the extreme form of shifting cultivation (Falconer, 1911). Experts in oral tradition could not discover any indication of the movement of settlements with plots in the past two centuries (Atteh, Fanwo and Omoniwa, 1972). During warfare, gathering played a prominent role as villagers were often forced to the hills where farming was not very suitable, while their farms on the plains were plundered by the Nupes. In peace time there was a lot of trade in food crops with the Nupes in the north for cowrie shells and with Yoruba's in the south for guns and ivory. Pottery and weaving were particularly highly developed and remnants of these arts remain especially at Ofafun and Ogga for pottery and Takete-Ide for weaving.

European influence in Kabba

With the establishment of the Protectorate of Northern Nigeria in 1900, this area has been influenced by a new mode of life and economy that is so fundamental as to tear the whole fabric of the old way of life into shreds.

One of the most profound and lasting effects is the introduction of the money economy as a form of exchange. Taxation was and has continued to be a major incentive for rural people to farm more in order to pay. Many new ways of life introduced by Europeans, from institutional education to consumer goods such as clothes, bicycles, glass, shoes and others has had to be bought with money. Acquisition of money therefore became a measure of success in all parts of the country. This had and still has a profound influence on farming as farmers now have to farm not only for subsistence, but to generate enough surplus for sale. The subsistence economy also became a cash economy through the avenues of cash exchange.

Another major introduction is western education. The first government primary school was established in Kabba Town in 1914. By that time, the Sudan Interior Mission had penetrated this area from Pategi, establishing churches in Egbe, Ogga, Ogbe, Mopa, Isanlu and Takete-Ide by 1910. This mission also established primary schools, all these producing a new crop of people educated in a new way of life. Colleges and institutions of higher learning were later established. By 1952, 4.3% of the population of Kabba Division above the age of seven had attained education to Elementary IV level, while a further 7.8% could read making a total of 12.1%. This can be compared with 0.9%, 1.1% and 2% respectively for Northern Nigeria as a whole (1952 Nigerian census). By the 1963 census the figures for Kabba Division had risen to 16%, for those in the first, and 45% for those in the second categories. It was estimated that by 1978, fully 30% of the population above seven had finished primary school and a further 45% could read (MFED, 1978). Each farmer in the sample was given a Yoruba article to read in order to establish literacy. At Takete-Ide 93.3% of the farmers were found to be literate; 71.4% of these had learnt to read at home while 28.6% had actually been to school for some time. At Ejuku, 66.6% of farmers were literate, and 65% of these learnt at home. The lower figure for literacy is probably due to a stronger islamic influence in the village which encouraged Koranic rather than formal education. At Olle, 86% of the farmers were literate, 80.80% of who never went to school, while at Iya Gbedde, the figures were 88.2% and 90% respectively.

From the foregoing figures, it is not difficult to see the impact of western education on the population. This is more so because in most cases those who brought the Christian faith also built schools, hospitals, dispensaries and allowed easier access to better clothing, and housing materials. Most of those who were past the age of schooling learnt to read through adult classes and church Bible study groups. The impact of this European influence becomes more pronounced when it is noted that the average age of farmers in the sample is 46.8 years. This is because the vast majority of those who have acquired at least primary school education did not and do not return to the farm. Instead they went into the cities and into other occupations in the belief that it was retrogressive to return to the farm after a school certificate. Traditional way of life and education could not compete with the new educational system. The weakness of rural people in the face of exogenous organized knowledge and way of life is well recognized and taken as gospel truth in the West and among Africans too. In recent years a few thoughtful academicians have called attention to the dangers of this view (Richards, 1977, 1978 a,b; Barker, 1978, 1979; Gay, 1967; Johnny, 1979). Chambers (1979) put the prevailing view succinctly: "... those with formal education and training believe that their knowledge and skills are superior, and that 'uneducated' and untrained rural people must, by definition, be ignorant and unskilled. From rich country professionals and urban-based professionals in third world countries right down to the lowliest extension workers it is a common assumption that science-based knowledge is sophisticated, advanced and valid and, conversely, that whatever rural people may know will be unsystematic, imprecise, superficial and often plain wrong" (Chambers, 1979:1). This message daily reaches the rural people from their own sons and daughters who are educated, from arrogant government functionaries - the police, the administrative officers, tax collectors, sanitary inspectors, extension officers, from radio broadcasts, and from the dazzle of city life which quite a number of villages have seen on short visits. Not many have recognized nor acclaimed farmers' knowledge and skills nor appreciated the natural and socio -cultural environment in which they operate. Development strategy in third world countries is based on the assumption that farmers are primitive and need to be taught. Rural people have now assimilated much of this view because in material terms, their way of life can be seen to be conspicuously inferior to those who have acquired the 'new life'. The educated and city people dress better, build 'modern houses'; boys of what seemed like yesterday own cars, have record players and above all speak a new language. For the village people, life remains the same. The Christmas and New Year period, when virtually everyone returns to his village for family reunions provides the most vivid contrast between those who remained in the village and the educated city dweller who was born in the village. The polarization of the society which Reddy (1976) talks of becomes very evident. On the surface, using life style as an indicator, the 'new life' is so much easier than farming. Modern education therefore became a "passport" to the 'new life' and the only means of escape; for to remain in the village and farm is seen as the surest way to remain poor, unprogressive, looked down upon and hopeless. Such ideas pervade the whole society and contrast between the old and new life styles dominated most of the informal interviews while the questionnaire interviewees often digressed to point to their abject poverty.

Farm sizes, number of cattle, family size, folk knowledge and other locally defined attributes were means of achieving fame in the past. Nowadays, however, these have been overtaken by indicators such as literacy, and level of education either by the farmer or his offspring (a farmer with a well-educated son or daughter is highly regarded in the village). The extent of one's distant travels and the building of modern houses (either built personally or built for him by his children) and the acquisition of city or modern articles such as transport vehicles, radios, wrist watches etc. are also signs of achievement today. Parents therefore educate their children so that what they could not achieve on their own, they could in their children. This is because, for many farmers, only educated children can bring them city goods and because the success of children always rubs on their parents who struggled to train them. In areas such as this, children have very little to inherit from their parents, instead parents train their children as an investment which will pay off in their old age (see Chapter 4).

Quite a number of farmers and rural people in Kabba have seen the 'affluence' and 'allure' of urban life in contrast to their own destitute lives. This was made possible through travelling and other information transmitting agents discussed in Chapter 7. Such rural people could not but aspire to become like city people or at least desire the same amenities for their villages. This is the root of community development work done in this area to improve the standard of living (full discussion to be made later). In a study conducted by Faniran and Areola in Western Nigeria, people were asked to list the resources found in their local areas, in order to ascertain their concept of resources. They found that most respondents did not mention local resources of land, forests, rivers and the like. They concluded that "... the people are no longer satisfied with the drudgery of rural life and aspire to enjoy the same types of modern amenities and economic life as found in large cities. This longing for a better life beclouds the way they look at, and evaluate the potentialities of their environment" (Faniran and Areola, 1976, :47). Increasingly as is happening in Kabba Division, the economies of rural areas have been heavily tied to that of urban centres, with their farm produce going to the cities while manufactured goods came down to the village through the rural periodic market. However, rural and city goods compete on unequal terms. Just as developing countries are dependent on industrial countries, so are the rural areas dependent on cities which expropriate not only their best labour component, but also their products at such a price that the rural areas cannot purchase city goods. As Prof. Amulya Reddy sums it up: "... the polarization into a dual society (educated urban/rural illiterates) is associated with the evils of rural stagnation and under-employment and mass migration into urban areas" (Reddy, 1976, (bracket contents mine)). The corollary to this is that as more people in the villages become educated and move into the cities, farming declines not only due to the reduced number of farmers, but also reduction in available labour force.

Present Farming Conditions

It has been pointed out that the farming system in this area has not basically changed for generations. It was a system designed to meet subsistence needs, but now has to meet changing demands of a new life style. To meet this contingency, at the end of the 1940s and in the 1950s, farmers here eagerly adopted the cultivation of tree crops - cocoa and coffee - specifically grown for cash. They utilized virtually all pockets of fringing forest and moister soils where relics of the rain forest remain. In the more forested areas of Olle or Bunu Forest Reserve and the central plateau, more extensive areas were devoted to these tree crops. Farmers in the savanna area of Takete-Ide and Ejuku have an average of 0.4 hectares each devoted to tree crop plots on which they spend only 5% of their annual man hours of farm labour, while the figures rise to 1.3 hectares and 45% at Olle and at Iya and Aiyegunle, 0.8 hectares and 30% respectively. While tree crops accounted for 45% of farm income in the savanna area and up to 95% in Olle and Gbedde twenty years ago, due to the slump in cocoa and coffee prices in the 1960s, these figures have reduced to between 1-5% and 40-50% respectively. This was also partly due to the fact that there was very little marketing of food crops twenty years ago as the non-farming segment of the population was very small indeed. However, today, with food shortage in the whole country, coupled with the increase in the non-farming population into the administrative headquarters at Kabba and in colleges, hospitals and other institutions in the Division, demand for food crops is now very high and prices have doubled in the last ten years. This situation is aided by increasing access through better road transport, to population centres of Ikare, Ilorin, Omuo Oke and others. Now, most people who relied on tree crops in the past have virtually abandoned them for food crop production. Generating surpluses from food crop production for sale is therefore the major means of acquiring cash income.

From the foregoing socio-economic review, it is understandable why people in this area compare themselves unfavourably with urban centres and desire a better life; and why young men and women would rather be underemployed and poorly housed in urban centres than be consigned to rural life. It explains why the farming population feel that they have been condemned to poverty because their system of farming, which was designed for subsistance, is being put under severe stress by new demands on it. It is about their only source of income, yet it cannot generate enough capital by itself to enable it to break into the type of farming which will result in higher production and an improvement in the standard of living which farmers desire. It is the perception of the standard of living which others have, and which they too now aspire to have, which is probably the single most crucial factor which might determine the direction of agricultural production in this area. It will either allow for an infusion of life into agriculture in the form of new crops, new techniques, new storage and marketing facilities, or it will sound the death knell of an agricultural system which has many vital and valuable skills and potentials to its credit. This was confirmed by Faniran and Areola who stated that "... in the field of crop production and the management of the soil, the knowledge and experience of local farmers are unrivalled, and no alternative system of food crop production has been found that it has nicely adjusted to the prevailing environmental conditions as the one which has long been practised by the people" (Faniran and Areola, 1976,: 47). An extremely significant development is farmers' realization that the present condition of farming is inadequate to raise their standard of living which make them very eager to try new techniques and methods. The exploitation of this eagerness is possibly the most important opportunity to present itself for agricultural development in Kabba Division's history.

CHAPTER 4

FARMERS' GOALS AND ASPIRATIONS

In the previous chapter the physical and social context of Kabba agriculture was discussed but it is not likely to provide a clear enough insight into the farming system and farmers' resource-use strategies to be discussed between chapters 5 and 10 until farmers' goals and motivations are understood. This is because the exploitation of resources to produce crops, and the use made of the crops produced, can only be understood in the context of the needs which peasant farmers in Kabba want their farming operations to meet. To promote such an understanding is the primary purpose of this chapter. The secondary aim is to point out the effect of economic and social changes in the larger society of Kwara State and Nigeria on the image of Kabba farmers of themselves, and their position in relation to this larger society and how this affects their attitude to resource management and traditional values.

Many lines of argument have been attempted to explain the goals or purposes of farming in 'traditional' societies (Collinson, 1972., Conklin, 1957.,; de Wilde, 1967; Saul and Woods, 1971; Wharton, 1971, Ruthenberg, 1971; Lipton, 1968). At the crudest level, it is argued that people in 'primitive' societies do not go into farming by deliberate occupational choice but simply continue to reproduce the practices of previous generations by virtue of being born into a closed society. How, and to what end this process is initiated within such societies is not explained. In general, it is assumed that the farmers' primary concern with survival or security is sufficient explanation of 'motive'. Farming is therefore undertaken principally to provide food for the family. The reluctance of 'traditional' farmers to adopt specialization, which could help maximize cash income, is attributed to this preoccupation with meeting physiological needs (de Wilde, 1967). At the other end of the spectrum of explanation, the rationale of profit maximization, a central concept in Western capitalist economies, is offered as a major factor in explaining the character of peasant farming enterprises (Hopper, 1965; Shultz, 1964). The majority of 'outside' writers judge the success of African farming enterprises and state by the extent to which it provides monetary income. Both components of goals will be examined in the attempt to understand motivations for farming in Kabba, for only then can we understand their strategies for managing the resources available to them. Moreover the goals pursued by farmers are of fundamental importance in determining attitudes to farming practices, the crops grown and perhaps the ability and willingness to adopt innovations.

Maslow (1954; Lang et al., 1974) put forward a preliminary framework of six needs which underlie behaviour, covering the whole spectrum from basic physiological survival needs to the socially complex needs for achievement and finally to cognitive and aesthetic needs relating to our personal concepts of beauty and our need to learn. Of the six, two categories of needs are of special relevance to goals in the minds of sample farmers. These are physiological needs or 'primary' goals and esteem needs. It has been asserted that "...before productive forces are co-ordinated through the market, allowing for the advantage of specialization, survival dominates the balance; where the farmers have begun to produce for the market, achievement urges are emerging" (Collinson, 1972, : 21; Mellor, 1963). This assertion will be examined for Kabba. It will be shown to be valid at one level of analysis. Farmers do represent their aims in terms of an ideology of survival. Whether Collinson's claim that 'monetization' and production for market serves to generate 'achievement' needs is much more doubtful. The evidence suggests that a strong sense of the need for achievement is present in 'traditional' farming practice. Clearly, economic changes are producing changes in the way this sense of achievement is sustained. This chapter documents some of the ways achievement is expressed. An attempt will be made to show that interpretation of food crop production in terms of either subsistence needs or profit maximization alone is no longer a sufficient explanation for peasant farmers' motivations. This is because non-economic variables such as social and cultural factors play a crucial role in farmers' decision-making and resource use even when subsistence economies do not involve crop sales. In the first part of the chapter, the importance of subsistence in the food crop production economy is examined along with societal and cultural factors which affect motivation in this regard. In the second part, it will be demonstrated that crop sales in the economy is directed not simply to the goal of profit but as a 'new' way of satisfying desires for acceptability, respect or esteem in the larger society both within and outside the village. There is no evidence of farmers trying to improve farming for its own sake; on the contrary, every opportunity to move out into other sectors of the national economy is eagerly sized. This results from the polarization of the society into the 'urban rich' and 'rural poor'. Evidence suggests that the way farmers perceive themselves in relation to urban dwellers plays an important part in motivation for crop production today. Farmers are therefore more pre-occupied with social issues of self-improvement rather than agricultural improvement. Much of the discussion of this second section shows farmers' own perception of the operation of urban-rural relations and how they try to respond to this through food crop production and sale of surpluses. This is clearly shown by the articles which farmers buy and seek to buy and statusses they want to achieve.

Economic, social and cultural motivations are therefore so interwoven that isolation of any one of them as the major goal of agricultural production among peasant farmers is to undermine the crucial interrelationships between economic and non-economic factors involved.

Primary Goals in Peasant Farming

The production of enough food for the family is a primary goal of agricultural enterprise among peasant farmers everywhere. It is important because it assures survival. This primary concern is said to determine the way farmers look at resources, their importance, usefulness and eventually how they select priorities for resource management. In situations where there are few cash crop alternatives, or which are far from markets providing a reliable and remunerative outlet for the sale of farm produce as well as a reliable place to buy needed foodstuff in exchange, it becomes the more important that the farm should produce all the basic foodstuffs required by the family.

Every farmer in the sample mentioned the provision of food for the family as the most important reason for growing crops. As many as 98% (117) also grow crops for cash, and the relative importance of both sectors will be examined. Meanwhile, looking at the importance of household production of food, the major crops used for food, and the proportion grown by the farmer, is appropriate. The list of major types of food crops in household diet, ranked in order of importance (in terms of quantity and frequency of consumption and preference) is presented in Table 4.1. It shows the main crops to be yam, guinea corn, cassava, rice and cocoyam. Other important food crops are beans and maize. Every farmer strives to produce enough of each of the major food crops. Where differences in crops planted occur, ecological conditions are the main determinants. For example, only in Olle area is rice widely grown while cocoyam is widely grown in Gbedde and Olle areas. On the other hand, guinea corn is more important in the savanna areas of west and east Yagba. The proportion of household consumption grown on the family farm will be examined. What this proportion was ten years ago is also discussed because important changes are apparent. Table 4.2.

Table 4.1

RANK OF MAJOR CROPS IN HOUSEHOLD CONSUMPTION

Crops	Takete-Ide					Ejuku					Olle					Iya Gbedde				
	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th
Yam	30	-	-	-	-	28	1	1	-	-	4	16	8	2	-	28	2	-	-	-
Cassava	-	6	17	7	-	-	29	-	1	-	19	9	2	-	-	2	26	2	-	-
Guinea Corn	-	21	8	1	-	2	-	3	5	15	2	2	1	1	4	-	-	2	-	-
Rice	-	2	2	13	8	-	-	25	2	3	1	3	10	8	6	-	1	5	5	8
Maize	-	-	-	2	3	-	-	-	2	5	-	-	2	5	6	-	-	-	17	3
Soyabeans	-	1	1	3	12	-	-	-	1	3	-	-	-	-	-	-	-	-	-	1
Cocoyam	-	-	-	-	-	-	-	-	-	-	1	-	3	8	6	-	1	1	5	15
Beans	-	-	2	4	7	-	-	1	19	4	2	-	4	6	8	-	-	20	3	3

N = 30 in each village. Figures are in number of respondents

Source: Field Work, 1978

Table 4.2

PERCENTAGE OF HOUSEHOLD CONSUMPTION
PURCHASED IN 1968 and 1978

	1968 a	1978 b	% c	1978 % d
Takete Ide				
Yam	4	14	0 - 30	7.7
Guinea Corn	6	17	0 - 100	17.3
Cassava	12	23	0 - 100	25.0
Rice	23	30	90 - 100	98.6
Beans	6	27	0 - 100	68.3
Maize	4	18	0 - 30	6.6
Cocoyam	4	8	80 - 100	88.0
Ejuku				
Yam	3	6	0 - 70	8.5
Guinea Corn	2	6	0 - 80	8.2
Cassava	4	9	0 - 50	7.0
Rice	24	26	90 - 100	87.0
Beans	12	23	0 - 100	66.9
Cocoyam	1	3	0 - 30	3.0
Olle				
Yam	18	18	0 - 40	16.3
Elubo (Yam flour)	19	16	0 - 60	15.0
Cassava	1	11	0 - 50	11.3
Rice	19	28	0 - 100	50.3
Beans	15	28	0 - 100	76.0
Maize	0	3	0 - 30	2.0
Cocoyam	0	8	0 - 70	9.0
Iya Gbedde				
Yam	3	8	0 - 50	8.0
Elubo	1	15	0 - 70	21.0
Cassava	0	10	0 - 70	14.2
Rice	14	28	60 - 100	87.8
Beans	9	24	0 - 80	46.8
Maize	1	12	0 - 40	11.3
Cocoyam	0	6	0 - 80	9.0

N = 30 for each village

a = No. of farmers who bought each crop in 1968

b = No. of farmers who bought each crop in 1978

c = Range of % of household consumption bought in 1978 for each crop

d = Mean of % of household consumption bought in 1978 for each crop

Source: Field Work, 1978

gives a summary of the proportion of foodstuffs purchased in 1968 and 1978 for each of the four villages in the sample. It is clear from the table that only a small fraction of the household consumption is purchased except for rice and beans. This is because the former is grown only in Olle area, so all others have to buy and the latter has been declining in production due to bad weather and pests. On the average, quantity-wise, at least 90% of all household consumption comes from the family farm. Ten years ago, less than 10% of the households in the sample bought foodstuffs. That the number in 1978 doubled that of 1968 points to changes in the condition of food crop production and the overall economic outlook in recent years. While conditions of households cannot be expected to remain the same between 1968 and 1978, the reasons given for purchasing more or less than before (Table 4.2) clearly imply that fundamental changes in the economic landscape account for the changes in purchases more than changes in family composition or buying power between 1968 and 1978. Most of food purchases are made between March and June every year, because previous season's harvests last till March while new harvests start at the end of June. Between July and February, surplus of food exists and there are no purchases except for rice and condiments such as salt, palm oil, meat or fish. A more detailed discussion of the hungry season food purchases is attempted in Chapter 6.

Food requirement is one of the most important factors which determines the amount of land cultivated for each crop. Asked to list the most important factors which determine the size of land sown with each of the major food crops, household food needs, household cash needs, and crop labour requirements in that order, are the most frequently mentioned factors in all villages. Collinson (1972) maintains that whenever the exchange economy is not sufficiently developed to ensure the interdependence of sectors, then concern for security is paramount. In peasant economies, a farmer who specializes in one crop cannot be sure of being able to find enough of other food crops to buy for his family. This is made more serious in Kabba where climatic conditions confine the growing period to one season. To specialize in crops, while labour supply and nature of agricultural implements limit farm size to small plots, is extremely risky. The farmer is therefore compelled to put his own survival in his own hands by making sure that he grows enough food for his family. This special concern is also one of the contributary factors to the practice of multi-cropping and mixed or inter-cropping. As many crops as are ecologically possible and rational, are planted together on the small plots which limited labour resources allow the farmer to cultivate. By this method, the various types of foodstuffs that make up the family diet are readily accessible on the household farm. The pattern of cropping is therefore a direct product of the subsistence nature of the economy.

It is not only the quantity of food, but also its nutritional value, its reliability of supply, its storability and preferred taste which mainly determine the crops that farmers grow. These also account for the varieties of each crop grown. As will be pointed out later, in recent years marketability of crops is becoming an important factor in determining the quantity and varieties of crops planted. In fact, agriculture has declined so considerably in comparison with other sectors of the national economy, that only few farmers will choose to remain in farming if given the opportunity to move to other more 'productive sectors'. Only 10% of farmers in Takete-Ide, 10% in Olle, 23% in Ejuku and 33% in Gbedde preferred farming to other occupations. When asked why, typical responses were given such as: 'catering for the family is more assured by farming'. 'Won't need to buy food - cheaper to maintain family'. 'A civil servant can be sacked, and a business man can lose his enterprise, but not all of a farmer's crops can fail in one year, and crop failure is not every year'.

Storage of food, and conversion of food crops into forms which can be preserved, and the relay system of cropping and harvesting are all part of the farmers' strategies geared towards ensuring provision of food for the 'rainy day' - the dry season period when no production takes place at all.

The foregoing is a clear indication that motivations centred on food supply dominate priorities in the allocation of resources for the productive activity in small-holder agriculture. The operation of rural periodic markets even prior to the introduction of colonial currency is further confirmation of elaborate provisions made to ensure survival. The range of food crops produced, the reliability and expediency of supply, what forms are preferred in consumption and what are strategic reserve crops are all important in understanding farmers' concern with security. These will be examined in detail in other parts of the thesis.

Cultural Aspect of Primary Motives

Vital as survival and security motivations are in subsistence agriculture, social and cultural factors are also crucially important in the motivation of farmers. This is where secondary motives (apart from marketing) are intertwined with the primary motives of providing food for the family. In Kabba as in most parts of Africa, the household is closely tied to the community at large, so community-held values and norms enormously influence household practice including farm management and resource use. Social obligations are also required from farmers, and ability or inability to perform such social obligations, to a great extent determines the position of a person in the community. In societies, such as found in Kabba, ability to adequately feed one's immediate and extended family is important for the prestige of the man. This is the bottom-line of acceptability. For once, de Wilde is right in stating that "inability to produce food sufficient for one's own family and to meet eventual obligations to help out kin is still regarded as a source of shame in most parts of Africa" (de Wilde, 1967, : 22). Feeding one's own family is not enough; 'compassion feeding' is also obligatory. Widows and orphans of relatives and old relatives must be fed by the rest of the family. Frequently, these are brought in to live with the family, since there are no 'old peoples' homes. Traditional norms expect that no one goes hungry, homeless or lonely due to old age. It is therefore imperative that the farmer produces enough food. This complicates efforts to assess household size as there are always discrepancies between the sum of the figures given for the number of wives and children on the one hand, and household size on the other. This is because other members of the extended family often stay with the household. To underestimate the importance of this social obligation by overestimating farmers' concern for survival is to misunderstand the underlying factors which determine farming priorities.

Hard work is taught from childhood to instill a sense of obligation in children because elders say it is only as one faces his own responsibilities can he be relied upon to face that of the community. For example, a young man known to be an ọ̀lẹ́ (lazy or layabout) will not be given a girl to marry because he is said to be unable to accept responsibilities. He will not only be rebuffed by prospective wives, but if he finds a willing girl, the parents of the latter, who have the final say in such matters will refuse her hand in marriage to the boy. In recent years, however, availability of non-farm work has reduced the power of this sanction. A hard-working young man who has a large farm is still well respected and would not have such problems in getting a spouse. Moreover, distribution of village or compound offices in latter life normally takes into account the working life of the men, for a man who cannot successfully run his own farm by hard work and devotion was not expected to run village or compound affairs with such qualities. As a special social shock-treatment, the rule which uses age to determine who chooses first when things are divided is waived to enable younger hardworking men to choose before older lazy men when village or compound property such as palm wine meat food, and kolanuts given during burial ceremonies or house roofing, are divided. This is a most humiliating experience intended to discourage laziness.

The length of time a household can eat yam into the dry season is also an indication of success for the farmer. Yam is the most important crop and pounded yam is the most important food item in the diet. Its importance is exposed in Chapter 6 but a local proverb will suffice to illustrate the impact of culturally held values on farmer motivation. Pounded yam, which is white in colour is said to be:

> <u>òsùpá ábẹ́ ọ̀dẹ̀dẹ̀, à rán má dè 'lē ọ̀lẹ́</u>
>
> moon/under/verandah/that shines/not/reach/house/lazy/
>
> (the moon under the roof, which does not shine in a lazy man's house).

The implication is clear: only hardworking farmers eat pounded yam at will, since yam is the most labour consuming crop in the area. Yam harvesting starts in late June and lasts till February or early March, and becomes scarce from April till mid-July. A man who grows enough yam to last the household till the new harvest is highly regarded. Until recently, cassava or rice in the diet is a clear sign of poverty, signalling that yam had finished in the house. If the household stopped eating yam too early, the farmer is likely to be counted as not working hard enough. To be able to provide pounded yam for visitors, friends or for social functions during the hungry season was a prestigeous accomplishment.

These social and cultural factors, among many others, play almost as important a role in farmer's decisions about farm management and resource utilization, as the clear need for survival. To interpret subsistence farming in terms of food provision alone is therefore not enough. Even in areas where sales are not involved in the economy, desire for acceptability, respect or esteem in the larger society is a crucial factor in crop production. Desire to achieve this is a major source of motivation.

Esteem Goals

Secondary drives, which Collinson identifies with achievement motivations, and which others term 'esteem needs' (Maslow, 1954, Lang, et al, 1974), play almost as crucial a role in farmer's decisions about resource use and agricultural management as does the over-riding concern for an assured food source. These esteem needs are related to personal integrity (self-evaluation) and perceived esteem of others for one's self (Porteous, 1977) and contrary to notions that cash income from production for the market generates these esteem needs, they have existed as basic motivations long before the cash economy was established. Production for the market is therefore a re-direction of means of achieving them. Attention has been drawn to the fundamental changes which have taken place in both the 'world view' and the life style of Kabba people as a result of the colonial experience (Chapter 3) and contact with the outside world (Chapter 7). The situation described has created new life style indicators, acquisition of which increase esteem. Crop production has remained the single most important source of economic power among farmers, to make the acquisitions. This inevitably brings cash profits close to the forefront of farmer motivation.

When asked why they grow crops, 98% of the farmers in the sample mentioned earning money as the second most important purpose of farming while only 2% grow only for food. Fully 57% of the farmers do not receive cash from any other source but crop sale, while crop sales account for an average of 70% of all cash receipt for those who have other sources of cash income. It is clear that the purpose of farming is not simply for subsistence alone. Between 1955 and 1965, tree crops (cocoa and coffee) accounted for more than 90% of all farm income in Olle and Iya Gbedde areas and between 40 and 60% in Takete-Ide and Ejuku areas. In the last decade, however, the reverse has been the case with the sale of surpluses of food crop being the most important source of farm income. This is because of the downward plunge in the price of tree crops and the sky-rocketing of the price of food crops, rising by over 400% in the last decade (Market surveys, 1978 and Atteh, 1974). In 1977, tree crops provided an average of 50% (200 naira), 40% (125 naira), 5% (15 naira) and about 1% (5 naira) of revenue from crops in Olle, Iya Gbedde, Ejuku and Takete-Ide respectively (Field work, 1978). This shows that the major effort in resource use is not only for the production of food crops but also for surpluses of these to feed the growing urban population and gain cash revenue for rural people. Production for the market is therefore embedded in the farming system, as will be discussed in more detail in Chapter 6.

Attention will now focus on what farmers do and may do with the revenue they generate, giving clues as to their goals and aspirations. The main line of household expenditures for 1978 is given in Table 4.3. This is the response to the question of how they intended to spend farm revenues during the year. It shows that payment of school fees to educate children is the single most important expenditure item. This is followed by building or improvement of new houses. Most want to change their mud wall and thatched roof houses into modern cement brick-walled and iron-corrugated roofed ones. Village 'modern' houses consist of a rectangular block divided into four living rooms with two rooms on each side of a passage. Wealthier people have six or eight rooms. The front verandah is obligatory for social occasions, visitors, children's play and place of rest for fresh air. In many cases, few farmers could finish their house with one major effort. Most therefore struggle to put up the walls and roof and over many years put in windows, doors, ceilings and other accessories, as resources become available. Of the one hundred and five farmers in the sample who said that their houses needed improvement, 72 had not been plastered, 34 needed doors, 41 still required windows, 84 had no asbestos ceiling and only 11 had been painted. It is not surprising that house improvement features prominently in household expenditures. Following closely, household articles ranked third, agricultural inputs fourth, food purchases fifth (more important in Olle because of

Table 4.3

RANK OF HOUSEHOLD EXPENDITURE ITEMS IN 1978

	Takete-Ide				Ejuku				Olle				Iya Gbedde			
Expenditure Items	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
To pay school fees	18	7	3	1	14	5	4	3	16	8	2	-	18	3	4	1
Food purchases	2	2	2	5	1	2	4	5	3	12	5	3	2	2	4	4
Agricultural inputs	-	5	8	8	-	4	4	3	1	2	7	2	-	3	5	3
Household articles	-	3	6	7	5	5	5	8	5	6	11	10	2	10	6	8
Clothes	-	-	-	1	-	-	2	3	-	1	1	2	1	2	2	1
Housebuilding or improvement	6	10	8	4	7	8	6	3	5	1	3	10	5	8	8	9
Taxes	2	3	3	3	-	3	3	2	-	-	1	3	1	1	2	-
Other	2	-	-	-	1	-	-	1	-	-	-	-	1	-	-	-

N = 30, figures are frequencies.

Source: Field Work, 1978

greater concentration on tree crops), tax payment sixth and clothes seventh. This shows the pre-occupation of farmers with social issues of self-improvement rather than agricultural improvement.

'Modern' Life Style Indicators and Goals

A preliminary survey showed the items in Table 4.4 as the main articles which people considered worth having to enable them to claim a place in the new way of life pioneered in the cities. The number of farmers in the sample who have acquired each of the articles is shown. Questions about which articles they had acquired was followed by a prognosis of what they intended for the future. This did not vary significantly from the life indicators in Table 4.4. Asked specifically what they wanted to buy in the next two years, the responses show such items as bed and mattresses, building new houses, bicycles, motor cycles, clothes, radio/cassette players, cassava processing machines, setting up bakeries, commercial cars and lorries, trading items, television sets and electricity generator plant for the house. The most frequently mentioned are house building and improvement, motor cycle and radio/cassette in that order. Only 10% said they did not plan any specific purchase in the next two years. A further investigation into the rate of goal achievement was undertaken to see what goals were set five years before, how many of the goals were achieved and how. Farmers' goals five years before 1978 are listed in Table 4.5. The items are consistent with overall goals of

Table 4.4

'MODERN' LIFE INDICATORS

'Modern' Life Style Indicators	Takete-Ide	Ejuku	Olle	Iya Gbedde
Radio	21	22	25	15
Bicycle	23	16	22	19
Motor cycle	4	11	10	9
Car (commercial or private)	1	0	1	1
Wrist watch	20	26	19	22
Cows	7	2	1	1
Bed/Mattress	24	29	24	23
Lorry	0	0	1	0
Iron corrugated roofed house	20	20	26	19

N = 30 for each village.

Source: Field Work, 1978

Table 4.5

SPECIFIC GOALS WHICH FARMERS SET THEMSELVES IN 1973

Goals	Takete-Ide	Ejuku	Olle	Iya Gbedde
Improve house	9	8	2	6
Build a new house	6	14	17	11
Marry	2	2	-	2
Sponsor children in school	10	6	8	7
Buy motor cycle	1	9	2	8
Buy radio / cassette	2	2	2	4
Buy a watch	3	4	6	2
Feed Family	30	30	30	30
Buy Commercial vehicle	1	2	1	1
Buy a bicycle	2	-	1	1
To be rich	-	1	-	-
No specific plans	1	1	-	4

Source: Field Work 1978

N = 30 in each village

Table 4.6

RANKED SOURCES OF RURAL INCOME, 1978

	Takete-Ide			Ejuku			Olle			Iya Gbedde		
Source of Income	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Sale of Crops	20	7	3	18	6	3	29	1	-	25	3	2
Sons and relatives	7	15	8	5	12	10	-	8	2	5	10	-
Off-farm Work	3	8	1	5	6	-	1	10	7	-	5	1
Monthly Salary or pension	-	-	-	-	1	-	-	1	1	-	-	
Trading	-	-	-	2	3	4	-	3	1	-	-	
N = 30												

Source: Field Work 1978

ameliorating their lives. Only six farmers had no objectives and of the other 114, 75 said that their goals have been satisfactorily achieved in the past five years.

More revealing about the secondary goals of farmers is the response to the question: "What are the most important things you are trying to achieve today and why do you have this goal?" While responses to the first part of the question is consistent with earlier answers, the frequency with which the desire to build new houses, improve old ones and to sponsor children in school are cited is striking. Fully half of all farmers in the sample want to sponsor children while the same proportion want to build houses, more so in Olle because cash from tree crops is available and because of the inconvenience caused by mud houses in such a forested area. Apart from the 'modern' life style indicators mentioned earlier, new entrants in the objectives' list include desire to start a modern poultry farm, buying cassava processing machine, establish bakeries, start trading or business, buying grinding machines which will grind maize, sorghum, yam and cassava flour and buying passenger cars or commercial lorries. It is significant to note that these latter set of objectives are economic in nature, but not strictly agricultural, and underlie farmers' anxieties about the ability of farming to sustain social growth in the future.

Without specifically mentioning goals, a sentence completion exercise was conducted to investigate how farmers would invest money if given the chance. Each farmer was asked to complete the following six sentences with only one response for each.

a) If government increased market prices so that I gain N50 more than normal per year, I will ....

b) increased the gain to N100 and re-asked the question.

c) increased the gain to N500 and re-asked the question.

d) If I were to win N50 in a lottery, I will ....

e) increased the win to N100 and re-asked the question.

f) increased the win to N500 and re-asked the question.

Farmers' responses are presented in Table 4.7. While it confirms the goals and aspirations mentioned earlier in direct questions, it also shows the preponderance of the goals which are designed to make the ruralites catch up with urban dwellers in standards of living. It will be noted from the table that school fees, paid quarterly, are priorities when small sums become available, but building new houses or repairing old ones are uppermost when substantial amounts of money become available. The same is true of farm inputs which are cited most frequently as appropriate investments where small sums are involved. The desire to transfer from farming to trade becomes apparent where larger sums are concerned. The surprisingly high number of people who want to save money in the bank suggests that people are not only willing to build up capital, but also want to have back-up insurance for emergencies which demand expenditure. Informal discussions with farmers indicate that a sizeable amount of money in the bank provides a feeling of security.

To enable us to have a better knowledge of underlying motivations for these objectives, the latter will be divided into three categories and farmers' reasons for such goals will be discussed for each.

Table 4.7

ANTICIPATED PATTERN OF INVESTMENT IF CASH IS AVAILABLE

Expenditure Items	a	b	c	d	e	f
School fees or sponsoring children in school	34	35	26	20	19	18
House improvement	9	8	14	6	10	9
Building materials towards building a new house	10	15	33	11	15	34
Buy bicycle/motor cycle	1	2	7	3	2	8
Farming inputs	16	14	6	20	16	6
Buy food for the family	12	7	8	17	12	8
Buy clothes and furniture	12	8	5	9	8	1
Start petty trading	2	2	9	2	3	6
Buy business items (grinding machine, cassava processing machine, bakery etc	3	7	20	2	4	20
Buy radio cassette	–	1	1	1	2	2
Help relatives who are not well to do	1	1	2	4	6	2
Saving to have money in bank	12	22	13	13	11	12
Buy household articles	1	2	3	3	2	–
Pay back loans	–	–	–	3	1	2
Marry a wife	3	2	3	–	2	1
Go for medical care	2	–	–	1	–	–
Buy taxi or passenger lorry	–	1	4	–	1	4
Travel to know other places	–	–	–	–	2	–
Call a party to celeberate				3	1	
Give tithes to the church				1		

N = 120

Source: Field Work, 1978

a) Standard of living improvement goals - virtually every farmer is looking forward to an amelioration of his living conditions. For this reason, plans to buy beds and mattresses to replace mud beds, building of larger houses to relieve overcrowding in poorly ventilated houses, cement block houses with iron corrugated roofs to replace mud walls and thatch roofs which require annual repairs to reduce troublesome leaks during the wet season, plastered walls, cemented roofs and ceiled rooms all feature prominently in farmers' objectives. So also are plans to buy clothes, shoes, wrist watches, radios and bicycles. Most farmers in all income groups consider these as basic needs. For example, among those who wanted to build new houses, 75% said it was because they wanted better places to live in, while 42% were trying to build new houses or improving old ones to provide better housing for sons and relatives living in cities, when they come home on leave or holiday. This is because too poor housing prevents city dwellers from coming home and this denies many good things for the home family (Fig. 4.1) as will be pointed out in the next section. As many as 17% of the farmers aim to buy motorcycles. Invariably, reasons given for this objective include better transportation both to the farm and visiting friends. Those who had this goal are 'middle peasants' many of whom have gone through primary school and are successful farmers or have non-farm jobs such as carpentry, bricklaying and vehicle mechanics. Three of the farmers in the sample plan to buy electricity generator plants and television sets for their houses. These three were the biggest farmers in the sample. Another thing common to all three is that they had worked in government service before returning home to farm while one of them is highly educated and left government service to take up the prestigeous job of District Head. He and another have travelled widely in Europe. All three have the basic amenities of life and their aspirations are much higher than those of farmers who have never left home. Their education, experience, and wide travel not only enabled them to pool resources together to have big farms but evidently influenced their tastes and aspirations beyond those of farmers who never left home. Moreover, other farmers, who would love TV sets and electricity generator plants did not mention these as specific goals because for them they were unattainable goals considering their present economic power. For these three farmers acquisition of these items were seen as evidence of a higher standard of living. To poorer farmers surrounding them it was a sign of wealth, prestige and wonder, and initiation of higher aspirations as they increase in buying power. The foregoing reflects the desire of village people to bring their living standards to a semblance of what city dwellers enjoy.

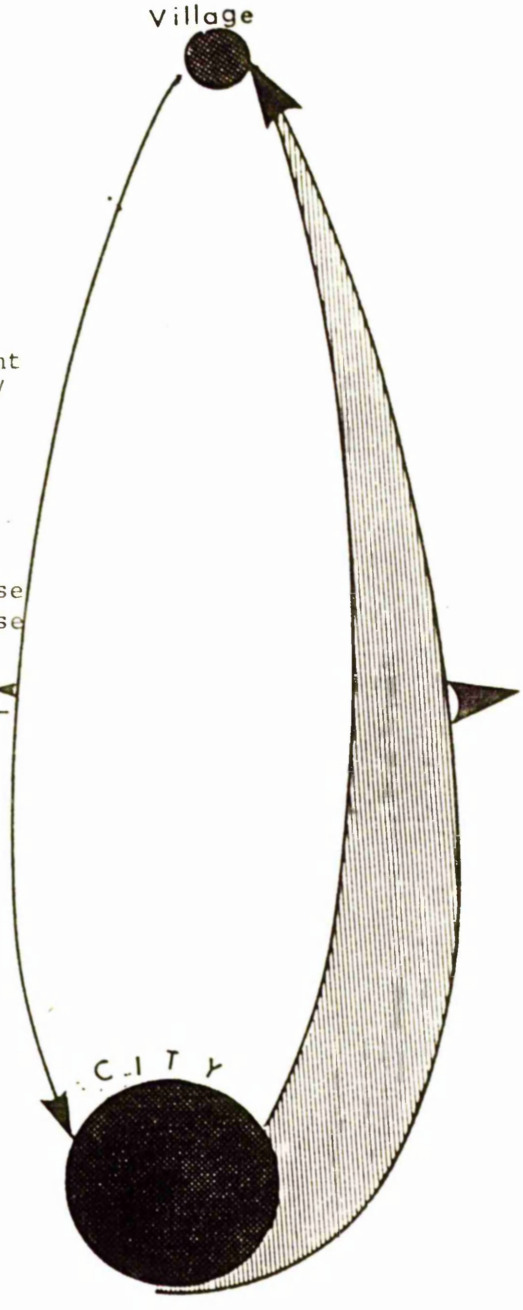
b) Prestige or esteem goals - Goals under this section cut across all social groups and income levels in the society and concern housing and sponsorship of children. In essence, they are also associated with both betterment of life goals discussed under a) and enterprise goals to be discussed under c). Of those who want to build new houses, 26% embarked on this objective because of one or more of the following reasons, in their own words:

"I want one like my colleagues" or "this house is unfit for my status", or "a beautiful house will give me prestige". One's own esteem of himself and others' esteem of him is thus a significant contributor to goal formation with important consequences for resource use. We find that aspiration levels are determined mostly by the environment one lives in. Another reason given for house building is cultural. Many farmers feel that building a house is "a big future asset" because it prevents the scattering of children, a notion rooted in the past. A man who does not have suitable housing was likely to find that the male children leave home as they grow up. They lose their labour and family cohesion, and a household with women only will be looked down upon. With better housing, they are encouraged to stay and develop a greater 'sense of place' and subsequently to build their own houses near the parents' own. In this way, many villages consist of a series of contiguous compounds consisting of a father's house, surrounded, in a circle, semi-circle or rectangular form, by houses of his children, grand-children and relatives and the compound is called by his name. It is seen frequently that people seek to build new and modern houses in less densely built areas where there is enough room for such development. For this reason, a house is seen as a cultural asset. In this area, as in most parts of Nigeria, absolutely no one has ever contemplated selling his house. Houses are therefore not on the market in Nigeria except for renting. To build a personal house is therefore of much more value than just a better place to live. It is also an immovable cultural asset.

The most important goal in this section is the desire to sponsor children in secondary and post-secondary schools. This, more than any other, is the most frequently mentioned goal that farmers are trying to achieve today. 50% of the farmers wanted to sponsor children in school in 1978, double the 1974 figure (Atteh, 1974). Attention has already been drawn to the role of education and to the changing values that this entails in the study area (Chapter 3). Here, the role of educated children and relatives will be examined briefly in their contribution to household living standards (their role in community and rural development will be examined later).
Next to cash from crop sales, sons and relatives in non-farm jobs in towns and cities constitute the most important source of village income. Asking farmers the exact amount being supplied by their sons abroad was akin to entering a mine field. Other methods of assessing their contribution were therefore designed. Farmers were asked to rank their sources of actual cash income annually in the order of how much cash each source supplied. The responses are given in Table 4.6. It shows that except in Olle, where 'Western' education took root only recently, children and relatives in town provided a good part of rural income especially in Takete-Ide, Mopa, Isanlu and other towns which had a head-start in educational facilities, and where a large segment of the working population has migrated to urban areas. Regular remittances of money to one's parents is common if not obligatory, especially between March and June when villagers have very little to sell and when food is scarce. These remittances have begun to

cushion the impact of the hungry season in recent years. Apart from cash income, quite a large proportion of consumer goods in the villages come through the younger generation resident in towns or outside the village. Further ways of assessing their role was to ask farmers their source of funds to buy what they had bought and how to finance future objectives. A good number of farmers reported that articles listed in Table 4.4 were gifts from children and relatives 'abroad' while they also looked forward to help from children and relations as the only way to realise future objectives. For example, 53% of radios, 12% of bicycles, 6% of motorcycles, 60% of wrist watches and 44% of beds and mattresses owned by farmers in the sample (Table 4.4) were gifts from children and other relatives. Among those who built 'modern' houses in the past fifteen years, more than 70% of farmers did so with assistance from children and relatives whose economic power was greater than their own. In most cases children were totally responsible for the purchase of building materials which had to be obtained from city suppliers while the parents at home organized the local labour for the job. In return for these remittances, the villagers send food stuffs to their children in towns which significantly facilitates urban residence, especially in the early stages of migration when unemployment is often the norm. A large proportion of food consumed in towns therefore does not go through market channels. For example, in a small follow-up survey based on a sample of 15 people from the study area living in Ilorin it was discovered that the proportion of their total food consumption (yam, èlùbọ́, maize, gàrí, melon etc.) coming from village-based relatives ranges from 2% to 25% with an average of about 11%. This excludes condiments such as salt, meat, fish and palm oil which are more readily available in Ilorin than in Kabba villages. In times of financial difficulties, foodstuffs from the village also keep migrants going, although this is dependent to a degree on the distance of the village from the town. For example, it was the common practice of the author to travel to his village in Kabba from Ilorin during the latter part of each month when the salary is exhausted to bring a car load of yam, èlùbọ́, gàrí and other foodstuff. At market prices in Ilorin between 1975 and 1977 the car load of village food was worth between N25 and N40 at the cost of N5-8 worth of petrol and gifts to take home. Such trips, apart from those which were not strictly intended for the purpose took place at least ten times each year. This amounts to between N300 and 400 a year in foodstuffs originating from the village being consumed in my house alone. Thousands of others among the elite group of senior civil servants, university lecturers, medical officers and company executives in Ilorin and other towns do the same, aided by government car loans. If 1,500 people in Ilorin do this for example, between N600,000 and N800,000 worth of food will be consumed in Ilorin annually without going through the market. This contribution makes it imperative for government to maintain rural roads as a way of reducing the urban food problem. The role of food from home is more important at the beginning of urban residence while the migrant is still looking for work. Further research is required to bring out the full importance of this aspect of rural-urban relationships. The parents and relations also provide the initial payment for educating or training in crafts while the village community provides security, a sense of place and 'roots' for these 'sons abroad' in contrast to the impersonality of the towns. For a full list of items involved in this two-way transaction, see Fig. 4.1. It shows the flow between the village and the city (not village-city exchange, but exchange at household level between members who live in the city, and those in the village).

The foregoing shows, clearly, the importance of sponsoring children in schools because what they would provide, the farmers could not hope to get on their own. Moreover, because of close family ties (which is characteristic of Yoruba social structure) most city dwellers see themselves as pilgrims in the cities with allegiance to the village of origin. This is why most city dwellers build personal houses in their home villages first, even though they are not resident there for more than a few weeks per year, before they envisage building one in towns where they work, because on retirement they go back home, as most people prefer to die at home and be buried at home. For example the best houses in most villages are owned by this group of people. Moreover, whatever glory and success achieved in the cities, is seen as achievement for the village of origin as will be discussed in Chapter 7. It often costs struggles and sweat for poor peasant farmers to educate their children, who later feel an obligation to help the parents in gratitude. Other villagers and colleagues look out for what children do



1. Initial payment for education/ training in trades.
2. Food stuffs
3. Wives
4. Security, sense of place, sense of belonging, support, welcome acceptance.

1. Consumer goods
   - radios
   - wrist watches
   - money
   - bicycles
   - motor cycles
   - house building materials
   - clothes and shoes
   - beds and mattresses
   - agricultural inputs
   - trading materials
   - vehicle transport
2. Information
   - about city life, distant places.
   - about agricultural change and innovation.
   - encourage travel to towns.
3. Sense of pride, achievement and importance for the village. Feeling of satisfaction that sons and relatives are in the important places, in the centre of the 'new world'.

FIG. 4.1 Interaction between Parents in Villages and Sons and Relatives in Cities for their parents and those children who refuse to cater for their parents lose respect. It is also part of the cultural and emotional make-up of the society that forces the city dweller to seek to improve the life of his people who are backward compared to the dazzle of city life.

Since the economic base of small-holder farming is so small, farmers see their trained children as a means of breaking from old to the 'new life'. Education is therefore seen as power and influence. It is great pride for parents when their children come home with cars, land big government jobs, or build new houses at home. They see these as the reward of their labour and they, almost more than their sons, get the glory and respect. Such parents become a class by themselves in the village as villages arrogate to them the knowledge of their sons. They are thought to know what is going on in the bigger world because they have sons there to inform them according to the addage "<u>ẹnì</u> <u>tō</u> <u>l̀ènìā</u> <u>lábẹ́</u> <u>ọ̀sán</u> <u>kì</u> <u>kán</u> <u>dùdù</u>" meaning, if your son is in charge of the fruit tree, you will never get unripe fruits. This desire for higher social standing or esteem is pervasive in all the reasons given for seeking to sponsor children. These reasons are listed in Table 4.8. Also prominent among the reasons given is farmers' desire to ensure old age security, since all children must take care of their old, retired parents. So the more successful the sons are, the more comfortable in old age the farmer expects to be. It is seen as an old age insurance against poverty since many rural farmers have no source of subsistence when they become too old to farm. It also shows that they owe

TABLE 4.8 GIVEN REASONS FOR EDUCATING CHILDREN

Reasons	Takete-Ide	Ejuku	Olle	Iya Gbedde
''they will take care of me in old age''	14	12	11	15
''their success will give me prestige''	8	6	6	4
''I want my children to be better than me'' or ''I don't want them to be farmers''	16	10	12	15
''they can provide with better life''	14	16	4	12

Source: Field Work, 1978

a large part of their household articles to children. This frees them to sell more of their farm products for daily needs such as food condiments, kerosene, boxes of matches and others. Moreover, in bad years, they can keep more farm produce for household consumption while looking to sons to help with cash needs. It is also common practice that once the eldest child is trained, he or she takes over the training of the younger children. This heightens urban drift because younger family members use their elders in the cities as stepping-stones to city life. They first go to established elders and relatives who help either in sending them to school, finding jobs for them or sending them out as apprentices. Many farmers also said that help from their children had enabled them to travel to large cities as it is normal practice either for parents to visit children or children to come home at least once a year. Finally, almost half of the farmers said they do not want their children to return to the farm. They want them to live better lives. This is the result of the conviction that farming cannot compete with other sectors of the economy and so they do not want to consign their children to the 'poor' lives they see themselves leading. This complex of social, cultural and economic considerations underlies farmers' determination to send their children to school, going through much struggle and agony in the process.

c) Enterprise goals - as already mentioned, 5% of the farmers have goals such as starting poultry farms, bakeries, buying commercial grinding machines for village use, buying commercial vehicles or starting business or trading. These, along with secondary occupations are attempts to diversify the peasant economy and find other sources of income. A few also said they would build houses for commercial purposes. Most of the people with these goals are the most successful farmers with a cash income of over N1,500 a year.

The situation described in this chapter is not unique to the four sample villages. Individual and group discussions in these and eleven other villages show the same trend (Tapes A-F). The 'world view' of farmers has continued to undergo change as a result of increased contact with city life discussed here and elsewhere. Aspirations and other secondary goals have therefore continued to grow. Education and increased cash revenues from sale of crops and other secondary occupations, have been targeted by farmers as the passports to achieving these goals. Farming still provides the principal part of rural income, though it is increasingly unable to satisfy the aspirations of the people. This cannot but have vital implications on the farming system and resource use. Need for cash will affect farmers' willingness to accept changes in agricultural management strategies. Changes in that direction in the past and those likely to take place in the future are discussed in the following chapters.

It is clear from the foregoing, that both economic and non-economic goals enter into farmers' motivations and decision-making. As will be argued later, the goals discussed in this chapter are a 'representational model' held by the majority of Kabba farmers of how the rural-urban system operates in Nigeria. It is not necessarily how this system actually operates. But it reflects an important and influential rural ideology which must not be discounted in the formulation of development plans. With most government money, including the taxes of rural people, spent in urban areas, and the deliberate policy of keeping urban food prices down to head off political agitation, at the expense of the rural food producers, the gap between urban and rural areas is seen to grow larger (Olatunbosun, 1975). Perception of this gap by farmers has led to a reassessment of their own position vis a vis urban dwellers, and the re-direction of ways of achieving the esteem goals discussed in this chapter from the old to the 'modern' methods, can be seen in this light. With little hope of generating capital and consequent economic power comparable to that of urban dwellers, most farmers are concerned to build stocks of symbolic or cultural capital in order to bridge the urban-rural gap and therefore share in urban progress even if only at second hand. Agricultural production is no longer undertaken in its own terms for its subsistence potential but as a means to the larger end of remotely participating in a world of 'development' to which, as a result of recent policies, farmers have been denied access.

CHAPTER 5

THE FARMING SYSTEM

In the last chapter, it was pointed out that crop production is the major source of crop produce and cash to meet the goals which farmers have identified. Strategies employed to manage resources towards that end will be examined in this chapter. Special attention will also be paid to farmers' understanding of underlying ecological processes involved in crop production. The role of cultural and social factors in the crop production practices will also be examined.

This chapter is undeniably long. The aim at first was to split it into two or three but I decided against this because the sub-topics discussed all run together. Moreover, since this is the central chapter, stradling the concepts discussed both before and after it, it was decided to leave it as one. It is, however, divided into three distinct sections:

I. The first deals with land-use, focusing on farm plot location, plot fragmentation and farm sizes, crops planted and varieties of each crop. Factors affecting decisions are also discussed in each case.

II. The second section deals with farm operations and timing, focussing on land preparation, crop planting, crop care, crop harvesting and storage, plot patterns and crop rotation systems and finally, fallows.

III. Thirdly, the resource situation is examined as the sub-topic of resource allocation. Here various inputs and how they affect crop production are examined in some detail.

It is hoped that these three sections will jointly present a 'whole' view of the farming system.

Combining various resources to produce crops is the most important means of achieving the goals which farmers set for themselves (Chapter 4). The farming system is therefore directed to the wider ends of ensuring the survival of the household and community and also to meet the living standards demanded by the larger society. Because it was rooted, initially, in household requirements, local farming practice is deeply embedded within the cultural and social milieu. The food production system functions on the basis of a store of information comprising knowledge of crops and livestock varieties, soil and vegetation and social data that may be referred to as folk science or ethnoscience (Chapters 2 and 7). Gregory Knight, who argues the 'rationality' of the traditional farming system, asserts that the 'ecological functioning' and 'inherent rationality' of these systems are based upon perceptions and cognitions of the environment and on decision-making built from 'cultural rules' for agricultural behaviour (Knight, 1977). The traditional food production system is also seen by Collinson (1972) to be the outcome of cultural adaptation to environmental situations. Kabba farming communities, like all others, are rooted within and dependent upon the natural or physical environment. This provides matter and energy essential for survival because the flow of matter and energy are required by the living metabolism of the system,providing the requisite linkages by which the human system interacts with the environment. The major task of the farmer is to channel these environmental resources to provide physiologically, and culturally defined requisites for household and community life. The farming system can therefore be seen as a reflection of the structure and dynamics of an adaptive man-environment system since its success depends on ecological rationality. It must successfully 'articulate' environmental processes and use these in crop production, using available technology for human well-being. The ability of traditional farmers to do this has been recognized in recent years (Igbozurike, 1971; Knight, 1974; Porter, 1965; Richards, 1977) though many scientists still have blinkered eyes (e.g. Foh, 1977). The description of farming operations, cropping systems and crop care, farmers' articulation of environmental processes involved in their decisions, and their deployment of labour, equipment and other resources to implement these decisions, will be the focus of this chapter.

Knight and Wilcox (1976) listed fourteen main features of all food supply systems, from isolated hunting and gathering systems to complex, regionally specialized and industrialized agro-business (See Appendix 2). All of them consist of processes which gather solar energy and make it available to man. Geographically, food production is dispersed in space whereas food consumption is clustered at points. In addition, seasonality and variability mean that food production is concentrated in time while consumption is continuous. Thus a food supply system channels solar energy, linking food production and food consumption across tensions of time and space.

Peasant communities in Kabba, based on individual villages (Chapter 7) operate under similar edaphic, ecological and climatic exisgencies which must be exploited to create a food supply system. As the individual seeks to satisfy needs from the surrounding environment, he comes into competition with other individuals in the same predicament. Social organization then results from a conflict-resolution process. Ways of exploiting such environments in the form of agricultural practices thus become standardized over time. Approach to the environment and its exploitation become cultural, so are problems and their solutions. Farmers have learnt over time (internalization) to adapt to various environmental exisgencies and the group culture then becomes the repository of knowledge gained, and of problem-solving processes acquired from trial and error, and passed down generations through the cultural learning process. For this reason, a great degree of farm practices have become 'routinized' and are common to all farmers. In essence the farming system is the same for everybody in the community making it easy to share information about crops, farm operations, farm problems and solutions. It also allows for the sharing of labour resources since each farmer can perform every farm task. On individual farmer basis, however, 'routinized' behaviour does not solve all problems because of the soil catena, and micro-ecological situations on which each farm plot is located. Each farmer therefore adopts various 'problem-solving' behaviour processes to solve the myriad of specific problems which face his production operations, or to exploit specific opportunities which his unique environment offers.

Sets of common sense and theoretically based rules (Chapter 7) govern the application of environmental knowledge to agricultural decision-making practice. Simple linkages of crops to soils, agricultural techniques to land types, and cultivated areas and crop types to food and cash needs suggest the basis upon which formal rules or informal conventions tie environmental elements together. The 'traditional' farming system is thus a complex balance between practices which have evolved to meet subsistence priorities, the natural resources peculiar to the area and the resources available to the farmer. It is therefore impossible to describe the farming system in such societies without recourse to the ethno-ecological perspective of man-environment relations.

I. Shifting cultivation

The major feature of the agricultural system is its practice of bush fallowing or land rotation or shifting cultivation. Under this system, farmers in Kabba use a piece of land for between two and six years, abandon it for between ten and forty years to allow natural ecological succession to restore soil fertility, and then the land is reused either by the same, or another farmer. In Kabba, settlements are not only permanent, but also nucleated into large villages (see Chapter 3) with farmers commuting between the village and the farm daily.

The practice of, and underlying reasons for, bush fallowing or shifting cultivation, its operation, advantages and disadvantages have been extensively documented (Carrier, 1923; Gras, 1925; Sauer, 1941; Nadel, 1942; Clarke, 1947; Weibel, 1950; Davies, 1952; Mead, 1953; Montelius, 1953; Wilson, 1955; de Schlippe, 1956; FAO, 1957, 1974; Conklin, 1957; Morgan, 1957, 1959, 1969; De Haan, 1959; Nye and Greenland, 1960; McMaster, 1962(a);

Clark and Haswell, 1964; Allan, 1965; Spencer, 1966; Baum, 1968; Netting, 1968; Morgan and Moss, 1970; Walters, 1971; Prothero, 1972; Richards, 1977). A prolonged repetition here is therefore uncalled for. Where land is plentiful, as in Kabba, the demands on the land under bush fallowing exists in a state of equilibrium with the natural environment. The system is therefore a working relationship between the population and the environment. It consists of making use for a brief period, of soil fertility built up under the natural vegetation. Before that fertility has fallen to a low level, and before weed competition becomes such as to prejudice crop development, the cultivator has moved to another plot. He then allows the former plot (whose soil was not damaged by a too intensive use) to revert rapidly to its original vegetative cover, taking advantage of rapid plant growth due to high rainfall and temperatures. In the course of a few years, soil fertility is once more built up by minerals brought to the surface in organic form by deep rooting plants. The physical condition of the soil is enhanced by its vegetative cover, and root and microbiological activity. With scattered plots constantly changing over a wide area, there is little chance of tropical rain and sun causing permanent damage or erosion to the soil once fallows are long enough (cf. fallows in this chapter and ecological rationality in Chapter 9).

Many writers have pointed to the extensive and wasteful nature of this system (Spate, 1945; Foh, 1977; FAO, 1957), but others (Clark and Haswell, 1964; Netting, 1968; Benneh, 1974) have argued that the system allows for higher yields per unit of labour, moreover, in ecological terms, it is a system which causes the least change in the natural ecosystem. Its system of multicropping simulates the original vegetation while it also exhibits basic properties in common with all other systems such as structure, function, equilibrium and change (Stoddart, 1965 and Emery, 1969). Inspite of criticism of the system by 'outsiders', its advantages are appreciated by farmers in such a way that only a clear demonstration of the advantages of proposed alternatives will convince the farmers to give it up. During field investigation, each farmer was given a choice between bush fallowing and permanent cultivation where each will be allocated land and will not be able to shift. 94.2% (113 out of 120) of farmers in the sample preferred the bush fallowing system. At first, adherence to tradition was assumed to be the reason for this choice, but when they were asked to give specific reasons for their choice, farmers' responses (Table 5.1) show sound reasoning on the part of people who operate under many constraints. Among their reasons is the flexibility of the system which allows moving to another place if adverse conditions such as serious pest damage and weeds, or unanticipated poor soil performance should occur. It also enables them to maintain high yields without the use of fertilizer since a new plot is cropped every year and most tropical soils are known to give very good yields in the first two years of cultivation (Benneh, 1974, Oyenuga, 1967). Permanent cultivation would involve a major investment in fertilizer, pesticides and herbicides and these people do not have the capital (see Chapter 9), so they move to avoid yield decline, pests and weeds. Other responses involve the chance to spread

Table 5.1

REASONS WHY FARMERS PREFER BUSH FALLOWING
TO PERMANENT LAND OWNERSHIP AND PERMANENT CULTIVATION

Reason	No. of Respondents
Opportunity to move for various reasons	76
Can maintain high yields	80
No money to buy fertilizer to stay in one place	27
To avoid weed and pest build up	20
Allows for variety of land types for various crops	31
Fertility in soil is not uniform (allows finding good soil)	40
Can cultivate as much land as have power to	8
N = 120	

Source: Field Work Questionnaire Survey 1978 risk by making plots in different micro-climatic zones or ecological niches. On the whole, this system allows for flexibility on the part of farmers who otherwise have little control over natural environmental factors, and shows why it is unlikely to be willingly abandoned or extensively modified in the near future until all its latent possibilities have been exhausted, population pressure on land becomes too great or a clearly better alternative from the farmers' perspective is introduced (Flinn, Jellema and Robinson, 1974; Richards, 1977, Knight and Wilcox, 1976).

A. Farm Plot Location

Space for farming is allocated through a traditional land tenure system characterized by right of usufruct rather than outright land ownership (Chapter 3) and as pointed out above, only 5.8% (7) of farmers in the sample would prefer a permanent tenurial arrangement. The specific siting of plots is therefore our primary concern in this section. For many farmers, this is not a major decision faced annually as the new plot is cleared next to the previous year's plot thus extending the farm for as long as there is enough good land in the area without the sort of pests or weeds which will drive the farmer away. In this way, a farmer can and often remains in the same area for up to between ten and twenty years until good land is exhausted. The whole farm is then shifted over a period of three to four years to a completely different location (this is discussed in greater detail later, under Plot Rotation). A small pocket of good land in òfé (upland) areas is never used if it is not large enough for the farmer for a period of up to six or ten years' use.

To elicit information about how the farmer finds farm sites (not identifying good land), they were asked how they knew for the first time that good farm land existed in their present plot location and the responses show a combination of chance, deliberate problem-solving search and the operation of social or cultural ties. 58% (70) of farmers in the sample found their farm plots by deliberate search - taking days out to walk round to identify alternative good farm land and choosing the best based on criteria which will be discussed later. One sixth (20) of the farmers were told of good plot locations by friends or relatives who invite such farmers to take the plot not too far from them. All over the Division, many farmers sited their plots near those of their parents or guardians who brought them up so that advice and help can be near at hand until they are fully able to stand on their own. 27% (8) of Olle farmers did not need any search at all because plots were allocated to them from cleared forestry department land. The remaining 18% (22) of the farmers found their farm land while not looking for it. This happened while hunting, gathering house- building materials or while on communal labour to another farmer's farm.

Knowledge of farmers as to what constitutes good farm land is widespread and there are indicators which are universally recognized. Individual variations, which further cross-check and reinforce general indicators also abound depending on the experience of each farmer. "Experience and oral tradition direct the farmers to the soils that are most fertile, easiest to cultivate, or best suited to particular crops; the concept of a catena did not escape them" (Mouttapa, 1973:37). The state of the vegetation is the most obvious indicator of soil quality. All farmers in the sample mentioned use of this indicator, examining not only the luxuriance but also the physiognomy of the vegetation. In addition, 86% (103) of the farmers said that they look out for specific tree and grass species and listed names of trees and grasses on the major soil types whose presence indicate good soil (Appendix 3). They also identified trees which indicate bad soil and where crops such as yam are likely to do very badly. Many writers underestimate farmers' concern about the soil itself once they are impressed by the vegetation but fully 90% (108) of the farmers said that they actually examine the soil before deciding finally on its quality. Soil texture, colour, depth and water retaining capacity are the major attributes examined. Many farmers dip their cutlasses into the ground or examine the tap roots of fallen trees to examine soil profile. Slope of land was mentioned by twelve farmers as a determinant of soil quality. Other special indicators examined include earth worm casts. 36% (43/120) said they examine earthworm mounds to note what lies beneath the surface. Another fifteen of them (incidentally all above 50 years old) said they do not cultivate a plot where termite hills are not plentiful. Both earthworms and termites are used as indicators of microbiological activities in the soil. Six farmers, again all of them above 50 years of age also taste soil to reinforce other indicators. They claimed to be able to distinguish between levels of soil fertility because they taste differently. Finally, seven farmers reported that by walking through the land and coming back to examine their foot prints, they can determine not only soil characteristics but also fix boundaries of soil types even when very small variations are involved. No qualitative assessment of soil quality is made, but a thorough subjective analysis is carried out which is cheap, fast, and efficient and in the farmers' view valid and effective. Any uncertainty is taken care of by using strategies which will eliminate or reduce the impact of mistakes made at this stage as fully discussed in Chapter 8.

Ascertaining that land is good for farming does not mean that it will be farmed. Other determinants, which include distance from the village, are taken into account. Since all farmers commute to the farm daily, field distances must be such that too much time will not be spent to journey to work. 18% (22) of the farmers have at one time or the other abandoned farm areas because they found them taking too much of the working hours in transit. At the same time siting farms too near to the village is impossible, because of cattle and domestic animals (goats and sheep mainly) without expensive fencing effort (Atteh, 1974). Virtually all plots located near the villages are either àkùrọ̀ (hydromorphic) yam plots or tree crops. The advantages of akuro in this regard are the fact that they are avoided by cattle, goats and sheep because they are waterlogged and that they are within easy reach during cultivation (January and February) so that farmers can work there in the morning and evenings while resting at home in the hot afternoons. Moreover, at the height of the wet season, yam is harvested from these plots on days when river floods do not allow farmers to go to farther farms. Distance of main plots owned by sample farmers from the village in each of the four sample villages is as follows:

	Nearest	Farthest	$\bar{x}$	σ
Takete-Ide	1.6 km	6.4 km	3.8 km	1.5
Ejuku	1.1 "	9.9 "	3.7 "	1.8
Olle	0.8 "	6.4 "	3.1 "	1.8
Iya Gbedde	0.8 "	9.9 "	4.3 "	2.1

N = 30 in each village.
Source: Field work, 1978.

Most of the farmers who have plots beyond 4 km have bicycles to reduce journey time. 68% (81) of the farmers use bicycles both for social travelling and journey to work. Typical journey time (one way) from village to farm plot in the four villages is as follows:

	Shortest	Longest	$\bar{x}$	σ
Takete-Ide	15 minutes	70 minutes	38.3 m	16.3
Ejuku	15 "	120 "	38.5	19.9
Olle	10 "	80 "	30.8	20.6
Iya Gbedde	15 "	90 "	35.8	18.0

N = 30 in each village

Another important determinant of farm location is avoidance of isolation. Every farmer locates farm plots within shouting distance of at least one other farmer. There is a special farm call (sounding <u>õũ õŭ ŏŭ</u>) never used inside villages which farmers use to call each other on the farm and usually between three and five farmers are within ear-shot of each other. Reasons for this are both strategic and social. If a plot is too isolated it is too quiet and there will be more pests and animals to damage crops, but when plots are close together risks are spread between farmers. For this reason plots lie side by side in parallel rectangular strips in each area. In case of danger, emergency or accidents on the farms, it is also important to have someone nearby to call on for help. Socializing through hunting together, eating together, offers of help, for example if one has no means of starting a fire, or sharing of farm huts during heavy downpours are also prominent among reasons given. Moreover, when a farmer cannot go to the farm, neighbouring farmers help look after his plot to guard against theft and disasters such as fires, and the farmer can send children to the farm when adults are on nearby farms. Finally, those who have farms in the same area usually start off to the farm together in the morning and in the evening converge through the 'farm call' and come home together, exchanging information about farm or crop situations, farm problems, new ideas or general small talk. A lot of social and economic advantages are thus gained by the grouping of plots together.

Adequacy of water supply, especially during the dry season is also a determining factor in farm plot location. Trekking long distances to fetch water for use on the farm wastes valuable labour time especially now that children who used to perform this task are no longer on the farm but in school.

B. Plot Fragmentation and Farm Sizes

One of the principal features of the farming system is the fragmentation of farm plots (a plot being a single area cleared for crops). The following table shows the

the number of farmers in the sample who have one or more food crop plots.

	1	2	3	4	plots
Takete-Ide	1	10	16	3	N = 30
Ejuku	4	15	10	1	N = 30
Olle	1	10	13	6	N = 30
Iya Gbedde	3	8	12	7	N = 30

Thus only 7.5% (9) of farmers in the sample limit themselves to only one plot. Those farmers with two or more plots do so not in ignorance of the advantages of scale but as a deliberate practice designed to minimize risk and uncertainty (see Chapter 8), because each plot is located in a different ecological zone, enabling the farmer to exploit a broad range of conditions in the different environments. The different plots vary not only in their water retention and soil characteristics but also in crop production capabilities (Luning, 1967). By this method serious problems on one plot, such as weeds, pests or even drought will still leave another plot to provide food for the household. The empirical knowledge of soils gained by Kabba farmers is such that each major land type has its own name, descriptive of soil and vegetation character, through which fertility, physical character (e.g. moisture retention capability) and its suitability for certain crops is recognised. The major land types are:

a) The ọ̀fẹ́ area - ọ̀fẹ́ means 'plain' or 'open land' consisting mainly of southern guinea savanna woodland vegetation. It is the main farm land. Near water courses, the soil is heavier, deeper and wetter especially on flood plains. This is called íbọ̀ or literally 'heavy soil'. Where ọ̀fẹ́ is underlain by clayey impervious layers, pockets of wet soggy soils develop called àfùnrán, literally meaning 'bathing' or drinking ground for animals because animals in the savanna use such places as drinking holes during the dry season.

b) Ìgbó (forest land) - as described in Chapter 3, occurring largely in the Olle, Ebba and Kampe Forest Reserve areas, along river courses and mountain slopes and in S.E. Kabba where the rain forest extends to this area.

c) Àkùrọ̀ areas - àkùrọ̀ literally means 'remains of rains' because these are pockets of heavy, clayey hydromorphic soils formed from aluvial deposition and which remains water-logged for two months after the end of the rains and where soil moisture is replenished a month or two earlier than in ọ̀fẹ́ areas. Another name for àkùrọ̀ is ọ̀kẹ̀tẹ̀ literally meaning 'waterlogged' or 'messy'. It is used principally for early yam which matures faster than in any other soil type. Its major advantages are firstly due to water-logging, this area is not cleared and heaped until mid-January till February ending, when farmers are freed from labour on ofe plots and secondly, the yam on akuro matures by June, a full month and a half ahead of the upland plots.

d) Ìlẹ̀kūtá or steep slope stony soil - distinguished by the stone content is widespread on the central plateau of Kabba with the àtẹ̀kú (slopes) utilized for crops such as cocoyam, tobacco, cotton, and coffee wherever they are forested.

These major land types are distinguished by the vegetation cover (both physiognomy and species types) and soil characteristics but hardly is an individual required to make the effort of distinguishing them because by the time a child grows up in the environment he has all but unconsciously acquired the knowledge. Major crop types, planted in each of the soil types are presented in Table 5.2.

A typical farmer in any one year makes plots in at least two of these areas, an ọ̀fẹ́ plot as the main plot and smaller àkùrọ̀ or ìbọ̀ plots. Every ọ̀fẹ́ plot (as will be discussed later) has between two and four segments under first, second, third and fourth years of cropping each devoted to special crop combinations. In this way, food crop needs are adequately taken care of. Land under tree crops (cocoa and coffee) is also planted with food crops in scattered, unheaped form to cater for subsistence. Crops planted in this way include coco-yam, beans, bananas and plantains. Inevitably, fragmentation is opposed to scale economies which would accrue if farmers concentrated all efforts in one place; but with weather uncertainties, incidence of weeds and pests and the seasonality of production of different crop combinations, fragmentation is an effective strategy.

Farm sizes cannot but be small in farming systems which depend strictly on muscle power. While plot sizes are easy to calculate, the area devoted to each crop is extremely difficult to fathom because of the practice of multicropping and mixed cropping. No attempt has been made to estimate these proportions with any degree of accuracy. Farmers were asked to state the three most important factors they considered determine the area of land they clear for each major food crop. The responses (Table 5.3) indicate

Table 5.2

MATCHING OF CROP TYPES WITH SOIL TYPES

Mountain slopes stony soils	Lowland swamp (akuro)	Upland grass-land 'ofe'	Heavy upland ibo	Forest land igbo
Coffee	Yam	Yam	Rice	Yam
Cotton	Maize	Cassava	Yam	Maize
Pepper	Okro	Guinea Corn		Pepper
Beans	Sugar Cane	Pepper	Okro	Cocoa
Soyabeans	Rice	Beans	Potatoes	Coffee
Tobacco	Water melon	Soyabeans	Tobacco	Citrus
	Aerial Yam	Aerial Yam	Cocoyam	Cocoyam
		Maize	Water yam	Yellow yam
		Okro	Cotton	Kolanuts
		Melon	Sugar cane	Cashew
		Cotton		Rice
		Walnuts		Banana/Plantains
		Water yam		Water leaf
		Yellow yam		
		Cotton		Oil palm
		Vegetables		Walnuts
		Groundnuts		Vegetables

Source: Field Work, 1978

Farmers' Reports and Field Notes from Visits to farms in all the Land type areas.

Table 5.3

FACTORS WHICH DETERMINE CROP AREA PLANTED

Factors	Upland Yam	Akuro Yam	Guinea Corn	Cassava	Rice	Maize	Cocoyam	Beans
Total land available	36	67	6	20	3	28	6	13
Land Quality	38	42	18	22	20	36	26	47
Crop Labour Needs	58	73	19	23	20	23	12	15
Household food Needs	113	110	91	111	16	114	61	43
Household Cash Needs	90	39	60	90	11	74	15	22
Available Planting Material	9	9	3	7	-	7	8	7
Time available for Operations	10	4	12	13	4	10	25	4
Food Preferences	13	13	9	20	-	20	15	4
Market Prices	1	-	-	3	-	3	1	4
No. of Yam Heaps	-	-	53	28	-	34	-	-

Figures represent number of farmers who gave each factor for each crop.

Source: Field Work, 1978

household food requirements, cash needs and crop labour needs to be central factors, while total land available is of significance only in Olle and Iya Gbedde where deciduous forest vegetation and rugged topography limit the area of òfé which is used for these food crops.

Average size of total food crop plots (all fragments added together) in the four sample villages range from 0.9 ha in Olle to 2.4 ha in Ejuku:

	Smallest	Largest	$\bar{x}$	σ
Takete-Ide	0.5 ha	5.5 ha	1.6 ha	1.2
Ejuku	0.4 "	9.5 "	2.4 "	1.9
Olle	0.1 "	5.1 "	0.9 "	1.1
Iya Gbedde	0.1 "	5.8 "	1.4 "	1.1

These farm size estimates were based on farmers' reports of yam heaps cleared with some field checking. The conversion of 'heaps' to hectares is discussed as part of the wider topic of 'village mathematics' in Chapter 7.

The data suggests that on average, food crop farms are larger in Ejuku and Takete-Ide (situated in the savanna) than in Olle, Gbedde and southern Kabba where forest vegetation and topography result in smaller farms. In part this is because forest vegetation is more difficult to clear, and its soils appear to give higher yields. The òfé plots are the largest and form the hub of the food crop economy. This is because òfé land is the most extensive type available and is also easiest to clear and work. Òfé plots also permit the widest variety of crops to be cultivated. Infact only rice and sugar cane are not planted on òfé plots among all food crops grown in Kabba. Àkùrò plots are the most restricted in size (see table below) for the following reasons. Firstly, there is little of this kind of land and its use has to be rationed. Infact, 13 farmers (11%) in the sample did not have an àkùrọ̀ plot in 1978. Five of these said they did not need it because their upland plots were so large that they did not have the extra labour and time to make àkùrọ̀ plots. The other eight, however, could not get àkùrọ̀ land because all available plots had been carved up by the time they tried to select theirs. Except those who belong to land-owning clans, each farmer is given àkùrọ̀ plots on a first come-first served basis though level of social relationship between the farmer and the land owner can alter this, as well as the size of plot given out. Secondly, because of water-logging, and the heavy nature of the soil, it is extremely difficult to work and labour consuming. Even if plenty of àkùrọ̀ plots were available, labour demand would limit the area cultivated. Finally, it is suited only to cultivation of yam, soyabeans, rice, sugar cane and some vegetables. The full range of household food needs cannot thus be met from akuro land. Average plot size in the three main land types are as follows.

	Akuro		Ibo		Ofe	
	Range	$\bar{x}$	Range	$\bar{x}$	Range	$\bar{x}$
Takete-Ide	0-0.3ha	0.10	0-1.0ha	0.11	0.5-5.5ha	1.4
Ejuku	0-0.8"	0.15	0-0.5"	0.12	0.4-5.8"	2.1
Olle	0-0.1"	0.16	0-3.3"	0.11	0.1-4.5"	0.61
Iya Gbedde	0-1.5"	0.17	0-2.0"	0.35	0.1-3.2"	0.9

These data suggest large inequalities in the size of farm cultivated by each farmer in the sample. This inference is strengthened by figures in Table 5.4 showing that the top 20% of the farmers in the sample own 44%, 48%, 59%, 45% of total food crop hectarage in Takete-Ide, Ejuku, Olle and Iya Gbedde

Table 5.4

CONCENTRATION OF FOOD CROP FARMS
AND LABOUR AND HOUSEHOLD SIZE FACTORS

	Takete-Ide			Ejuku			Olle			Iya Gbedde		
	A	B	C	A	B	C	A	B	C	A	B	C
Top 1st 20%	44	38	34	48	48	31	59	48	29	45	43	30
2nd 20%	22	25	26	27	23	27	24	24	27	28	29	21
3rd 20%	15	19	14	14	14	17	10	16	15	14	16	18
4th 20%	11	12	14	6	10	12	4	9	12	9	9	18
Bottom 5th 20%	8	6	10	5	5	13	3	3	17	4	3	13

A = % of Farm Area Owned

B = % of Hired Labour employed

C = % of Household Size owned

N = Figures show % of the total area under food crop in 1978 (among sample farmers) owned by the six largest farmers right down to the six smallest farmers in each of the sample villages.

Source: Calculated from Field Work Data on Farm Size, Hired Labour Supply and Household Size, 1978 respectively. When the second 20% is added the figures rise to 66%, 75%, 83% and 73% respectively. This shows that of the total area sown with food crops by the 120 farmers in the sample 1978, 74% on the average was owned by 40% (48) of the farmers. This arouses of lot of interest in a situation where each farmer has access to as much òfẹ́ land as he can farm. Two major factors suspected to be responsible for this variation - labour and household size - were further investigated. Both figures are also shown on Table 5.4. The top 20% of farmers accounted for 38%, 48%, 48% and 43% of all hired labour among the sample in Takete-Ide, Ejuku, Olle, and Iya Gbedde respectively while the top 40% accounted for 63%, 71%, 72%, 72% respectively, or an average of 70% for the total sample. The amount of labour that a farmer can hire in addition to his personal input seems to have significant influence on farm size though this does not explain everything. The figures for household size in the table shows less importance than that of labour for reasons explained in detail in Chapter 9. Age of farmers seem to contribute significantly to farm size because throughout the sample, the smallest twenty farms were owned by farmers above 58 years old while the top 40% of the farmers discussed above fall within the age group of 35 to 50 years old except for two. These factors are therefore very important in the farming system.

Òfẹ́ plots account for 88%, 89%, 70% and 63% of all food crop hectarage in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively. The low figure in the latter two villages results from the restriction of open savanna land because of rugged topography. The other kinds of plots are used principally for support and spreading of risk except in Iya Gbedde where they constitute a sizeable percentage of the food crop area. Food plot estimates are incomplete without adding food crops such as banana, plantains, cocoyam and cassava which are planted under tree crops. As noted before, this is especially significant in Olle, Iya Gbedde and other villages such as Oranre, Alugbagun and other areas of S.E. Kabba. In the past this situation enabled farmers to concentrate on tree crops without making elaborate separate plots for their food crop needs. It is the collapse of tree crops, as will be discussed later, which turned farmers to food crops. This accounts for the significant percentage of total food crop hectarage owned by the top 20% of Olle farmers. In addition to the factors discussed earlier, it was discovered during follow-up discussions, that these farmers realised the impending collapse of the tree crop economy more quickly than others and thus quickly reinvested their resources in food crop production.

Tree crops (cocoa, coffee) also play a significant though declining role in the local farming system especially in areas of forested land in the southern part of Kabba. The decline in tree-crop cultivation over the last fifteen years is discussed fully in chapters 6 and 8. However, in 1978, in addition to food crop plots, all farmers in Olle and Iya Gbedde, and 33% (10) and 37% (11) of those in Takete-Ide and Ejuku respectively, had tree-crop plots. Tree crop holdings differ from village to village (principally reflecting the availability of suitable land), as shown below:

	Range	x
Takete-Ide	0.0-2.5ha	0.28 ha
Ejuku	0.0-6.5ha	0.35 ha
Olle	0.3-7.5 ha	1.70 ha
Iya Gbedde	0.2-4.5 ha	0.95 ha

These were estimated in the same way as food crop plots. When both food and tree crop plots are combined, average farm size per farmer becomes 1.89 ha, 2.8 ha, 2.6 ha and 2.4 ha in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively.

Thus far then, attention has been drawn to the small-scale nature of peasant farming in Kabba. This is in spite of extensive areas of useable land available. The type and quantity of labour supply (part 111 of this chapter) is the limiting in production. The nature of social relations of production, for example the non-existence of a class of landless labourers ensures that the range of farm sizes remains within fairly narrow limits.

C. Crop Types Planted

The subsistence nature of traditional farming, whereby the household grows as much of its food needs as possible, and the seasonality of production, whereby all the food consumed throughout the year is produced in six or seven months of the rainy season, determine the types of crops which farmers plant. Adequate and varied food types are always sought while lack of storage facilities forces the household to seek a continuous supply of fresh food. Moreover, preferred taste, nutritional value and reliability of supply govern not just the types of crops grown, but also the different varieties of each crop.

The four most important crops, ranked in order of importance, planted in 1978 are listed in Table 5.5. This shows a combination of root, tree and cereal crops in the farming system. Because this area is situated in the Middle Belt of Nigeria (Pullan, 1962; Ireland, 1962; Gleave and White, 1969) farmers combine the root and tree economy of the south such as yam, cassava, cocoyam, water yam, tree crops, sweet potatoes, vegetables, plantain and bananas and the grain economy of the north such as guinea corn, cotton beans, groundnuts and melon. Crops which grow in both south and north are also important.

Major food crops (yam, guinea corn, maize, beans, cassava and others) and support crops especially those used in soup making (pepper, melon, okro, bitter and water leaves, éwẽdũ etc) are planted by all farmers. Thus a farmer plants as many as eight to twelve different crops on the food crop farm each growing season. (For a list of the major crops planted, including common, Yoruba and botanical names, see Appendix 4). Details of the number of farmers who planted each of the main crops are given in Table 5.6, where a significant number of variations can be seen. The small number of people who planted guinea corn in Olle and Iya Gbedde, reflects the unsuitability of the forest vegetation and rugged topography for this crop. Even though the environment is suitable for soyabeans everywhere in Kabba, it does not feature prominently in Olle and Iya Gbedde because people don't eat it. Few farmers grow cocoyam and plantain and bananas in the savanna areas of Takete-Ide and Ejuku because land is unsuitable. Heavy, waterlogged soils suitable for the growth of rice also occur extensively only in Olle, hence it is widely grown there. In addition

Table 5.5

THE MOST IMPORTANT CROPS, RANKED IN ORDER OF IMPORTANCE IN TERMS OF FOOD AND CASH REVENUE

Crops	Takete-Ide				Ejuku				Olle				Iya Gbedde			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Yam	28	2	–	–	28	2	–	–	14	12	2	–	13	15	2	–
Guinea Corn	1	22	4	3	–	12	12	6	–	–	–	1	–	–	–	–
Cassava	1	5	19	2	2	11	14	2	–	12	6	4	15	10	4	1
Maize	–	–	4	10	–	3	3	14	–	–	3	8	–	–	1	–
Soya beans	–	–	2	4	–	–	–	1	–	–	–	–	–	–	–	–
Aerial yam	–	–	–	2	–	–	–		–	–	–	–	–	–	3	
Beans	–	1	1	2	–	1	1	3	–	–	–	3	–	–	–	5
Coffee	–	–	–	1	–	1	–	1	16	4	3	2	2	5	10	3
Cocoa	–	–	–	1	–	–	–	1	–	–	2	3	–	–	3	2
Melon	–	–	–	5	–	–	–	1	–	–	–		–	–	–	–
Cocoyam	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	6
Tobacco	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	5
Rice	–	–	–	–	–	–	–	–	–	2	8	3	–	–	–	–
Pepper	–	–	–	–	–	–	–	–	–	–	6	4	–	–	6	8

N = 30 in each village.

Source: Field Work Survey, 1978 (April - December)

Table 5.6

NUMBER OF FARMERS IN THE SAMPLE PLANTING EACH OF THE MAIN FOOD CROPS

Crops	Takete-Ide	Ejuku	Olle	Iya Gbedde
White Yam	30	30	30	30
Guinea Corn	30	30	13	18
Cassava	30	30	30	30
Maize	30	30	30	30
Soya beans	22	16	8	5
Water Yam	16	12	14	10
Aerial Yam	18	11	3	13
Yellow Yam	7	6	10	12
Cocoyam	1	2	23	30
Beans	19	24	27	23
Rice	1	2	26	5
Groundnuts	5	7	11	8
Plantains and Banana	4	8	27	23
Okro	30	30	30	30
Melon	30	30	18	21
Pepper	30	30	30	30
N = 30				

Source: Field Work 1978

to this factor the close social and trading links between Olle and Abugi (a rice growing area along the Niger River) facilitated the adoption of rice for food in the former while most other areas adopted rice in the diet only very recently.

Another major feature in crop-planting decisions is the use of many varieties of the same crop, depending on their different qualities and characteristics, to meet both food and cash needs. Dietary patterns and preferences, and seasonality of production seem to influence the choice of the varieties which farmers plant. A list of the varieties of each crop, the qualities and characteristics of each, <u>óríkìs</u> (epithets) assigned to some important white yam varieties, and taxonomic characteristics important in determining varietal separation, are presented in Appendix 5. A short discussion of the strategic significance of varietal use is appropriate here, especially for the major food crops.

<u>Crop varieties</u>

In Appendix 4, five types of yam - white yam, yellow yam, water yam, coco yam and aerial yam - are listed. Table 5.6 reveals that while all farmers grow white yam, the others (except for coco yam which is widely grown in places like Olle and Gbedde where favourable soils exist) are planted by only a few farmers. The main concern here will be with white yam, and cassava.

(i) <u>White Yam</u> (Dioscorea rotundata) - Twenty-two varieties were recorded during field work but only fifteen main varieties are widely planted in Kabba. The varieties have different names in different areas and only the most widely used names are listed here. Knowledge of yam varieties is widespread. Up to 70% (80) of the farmers in the sample listed as many as fifteen varieties each while no farmer, whatever his age, listed less than ten. The number of varieties of yam and other crops actually planted varies from farmer to farmer ranging from a minimum of three to a maximum of thirteen each year (Table 5.7). The number of varieties of each crop in each village seems to reflect the importance of the crops in the different areas. Takete-Ide is widely known throughout Kabba and even the northern areas of Ondo State, as an important yam growing village. More than 67% of the farmers in Takete planted at least six varieties of white yam in 1978 compared with Olle and Iya Gbedde (noted for tree crops) with 23% and 7% respectively. Ejuku, also a yam growing village has 60%. The same pattern is also true for guinea corn and melon but the reverse, for the same reasons is the case with maize and beans.

Generally, yam varieties are differentiated by:

a) appearance and growth characteristics such as thread of stem (whether clockwise or anticlockwise); thickness and colour of stem and whether thorns or seeds are present; the shape, colour (shade of green) and pattern of leaves; the size, shape and appearance of tuber; the surface appearance of tuber when cut; whether tuber breaks the soil or not.

b) utility of tuber such as palatability, cooking qualities, poundability, storability and whether it matures early or late. Combination of varieties on the farmer's farm is determined mainly by these utility characteristics. In a

Table 5.7

NUMBER OF VARIETIES OF EACH MAJOR CROP PLANTED BY FARMERS, IN 1978

Crop	No. of Varieties Planted	No. of farmers in each category			
		Takete-Ide	Ejuku	Olle	Iya Gbedde
White Yam	2	0	0	5	6
	3	1	6	7	10
	4	6	4	3	7
	5	3	2	8	5
	6	7	6	4	1
	7	7	4	2	-
	8	1	4	1	1
	9	1	3	-	-
	10	3	1	-	-
	13	1	0	-	-
$\bar{x}$ Planted =		6.4	5.9	4.3	3.6
Cassava	2	2	6	4	3
	3	4	11	8	11
	4	22	10	14	12
	5	2	3	4	4
$\bar{x}$ Planted =		3.8	3.3	3.6	3.6
Guinea Corn	1	5	13	10	6
	2	24	11	2	10
	3	1	6	1	2
$\bar{x}$ Planted=		2.03	1.8	1.3	1.8
Maize	1	14	12	5	3
	2	11	12	10	21
	3	4	4	10	6
	4	1	2	5	-
$\bar{x}$ Planted=		1.7	1.9	2.5	2.1
Beans	1	-	6	5	3
	2	8	11	10	14
	3	10	5	12	5
	4	1	2	-	1
$\bar{x}$ Planted=		1.7	2.1	2.3	2.2

Crop	No. of Varieties Planted	No. of farmers in each category			
		Takete-Ide	Ejuku	Olle	Iya Gbedde
Melon	1	4	8	6	10
	2	16	14	10	9
	3	5	6	1	1
	4	4	2	1	1
	5	1	0	-	-
$\bar{x}$ Planted =		2.4	2.1	1.8	1.7
Pepper	1	4	8	1	2
	2	15	14	10	14
	3	10	7	13	12
	4	1	1	6	2
$\bar{x}$ Planted =		2.3	2.03	2.8	2.5
Cocoyam	1	1	2	14	11
	2	-	0	9	19
$\bar{x}$ Planted =		1	1	1.4	1.6
Okro	1	4	5	2	3
	2	14	15	9	7
	3	8	4	12	14
	4	4	5	6	5
	5	-	1	1	1
$\bar{x}$ Planted =		2.4	2.4	2.8	3.03

Source: Field Work 1978

repertory grid exercise (see Chapter 2 for description) farmers were asked to classify the fifteen most widely grown varieties according to constructs of similarity and dissimilarity. The constructs used by the farmers both in the sample and outside include:

good for eating boiled meal	- not good for eating boiled
good for pounded yam	- not good for pounded yam
stores well	- does not store well
watery surface when cut	- dry, fresh surface
sells well	- does not attract good prices
matures quickly	- matures late
yields big tubers	- yields small tubers
easy to pound (cohesive)	- difficult to pound (brittle)
easy to harvest	- difficult to harvest
withstands disease	- susceptible to disease damage
grows on sandy soil	- grows on heavier swamp soil
cracks the heap during growth	- no heap crack
fine smooth tuber skin	- rough tuber skin
tuber is white when cut	- coloured surface of cut tuber
branching tuber head	- single tuber head
tuber skin has big eyes	- tuber skin has small eyes
tendril bears fruit (female yam)	- does not bear fruit (male yam)
old variety	- new variety

These utility characteristics are taken into account in determining which varieties to grow and how much of each to plant. Some varieties are good mainly for boiled or roasted meal, thus providing mid-day food on the farm throughout the year. Others are especially good for _ìyán_ (pounded yam), which is the main meal and is considered the 'king of foods' (Table 6.2). Some varieties mature early, and meet food needs toward the end of the hungry season (the end of June to the end of July), especially early enough for the yam eating festival. These are selectively harvested and are exhausted by early August. They are never planted in large quantities because they can neither remain in the soil for long nor store well after harvest. By the beginning of August, many other varieties are nearing harvest and by October all but a few varieties have matured. The late maturing types are important because they survive longer in the soil unharvested and store longest after harvesting, meeting food and cash needs up to March or April. For those who plant large enough numbers, these varieties provide yam throughout the hungry season (see cf. Chapter 4). The cash component in each household's budget is met by varieties which are considered to be most readily marketable due to the qualities spelt out in Appendix 5 and in the following discussion. All these characteristics have a part to play in decisions as to what varieties to plant and each farmer tries to plant at least one variety corresponding to each category of utility. Some varieties cover more than one characteristic simultaneously. For example, kẹ̀rẹ̀gẹ̀ or àjìbọ́kínì combines the greatest number of utility characteristics. It is, not surprisingly, the most widely grown and occupies the largest proportion of all yam plots. Below is a listing of the varieties corresponding to each of the principal utility characteristics reported by sample farmers, with the best varieties starred.

1. Good for boiled meal - sem̃sũ*, ìkì*, ẹsín*, ẹ́fẹ́*, ẹwàsìkò*, kam̀pí*, bọ́bọ̄*, p̀aósà, ọ̀lọ̀fẹ́rẹ́

2. Good for pounded yam - kẹ̀rẹ̀gẹ̀*, ọ̀gùnmọ̀*, àrọ́*, ẹwàsìkò*,

Sells well - kẹ̀rẹ̀gẹ̀*, ìkì*, ọ̀gùnmọ̀*, àrō, ẹ̀wàsìkọ̀, ẹgīn,

3. Stores well - iki, ẹsin, ọ̀gùnmọ̀*, kam̄pi*, bōbō*

4. Sells well - kẹ̀rẹ̀gẹ̀*, ìkì*, ọ̀gùnmọ̀*, àrō, ẹ̀wàsìkọ̀, ẹgīn, pàósà*

5. Matures quickly - sem̄sū́*, kẹ̀rẹ̀gẹ̀, ēfḗ*, ẹ̀wàsìkọ̀*, ẹgīn*, ọ̀lọ̀féré*, pàósà*

6. Late maturing - ẹsīn, ọ̀gùnmọ̀*, àrō, pápárá*, kàm̄pī*, bōbō*

7. Yields big tubers - kẹ̀rẹ̀gẹ̀*, ìkì*, ẹsīn, ọ̀gùnmọ̀*, arō*, pàósà*, ẹ̀wàsìkọ̀*, ọ̀lọ̀féré*, pàpàrà

8. Withstands disease - sēmsū, ẹsīn, éfé, ọ̀gùnmọ̀*, arō*, pápárá, kàm̄pī, bōbō*, ọ̀lọ̀féré*

These are the factors then, which help determine farmers' decisions concerning resource allocation to different white yam types (in terms of land, labour, seedlings). Each farmer seeks to plant varieties which cover all the categories of need outlined in the eight utility constructs above. This is designed not only to ensure reliability of supply but also to cater for food and cash needs. These considerations should not be ignored in efforts to improve crop varieties and the farming system as a whole.

(ii) Cassava (Manihot esculenta). In the past few decades cassava has been widely adopted in this area and like in many other parts of Nigeria has been increasing in importance and displacing yam (Agboola, 1968; Mabogunje and Gleave, 1964; Ekandem, 1962). Cassava started appearing in southern Kabba along the boundary with the old Western Region in the 1930s but did not reach the northern part until during the 2nd World War which was accompanied with famine in this area (fuller discussion in Chapter 7). Farmers remember clearly that planting material was distributed by the

Divisional Office between 1939 and 1946. Between then and the late 1960s cassava was grown mainly for sale and few people included it in the diet (Chapters 6 and 8). Many varieties have been adopted and dropped as new types become available, depending on farmers' perception of their utility. Twenty-two varieties (many very similar) were listed during field work in 1978 (see Appendix 5), but unlike yam not many varieties are planted at the same time because the role of the crop in the diet is not so vital as yam and the end product, <u>gàrí</u>, is not so differentiated in taste and quality terms as the products derived from yam. The steep decline in yam planting has increased the cassava component of the household diet in recent years. The number of varieties planted in 1978 ranged from two to five (Table 5.7). The local names given to each variety reflect farmers' perceptions of their utility, their physical growth characteristics and geographical origin of the crop. For example, 13 of the varieties are named according to perceived usefulness, six according to perceived origin and three according to physical growth characteristics. While a fuller interpretation of local names for each variety is given in Appendix 5, a few illustrations are given below:

a) Varieties named to reflect their utility:

- <u>Olisuté</u> ['the yam owner is humiliated']: because this variety does very well and is good for both food and cash, it enables the grower to challenge the yam grower's dominant position in the economy.
- <u>Oliyan̄</u> ['the poundable cassava']: named after its poundable quality either on its own or in combination with yam (see Table 6.2).

- gbolokógb'àlà ['saviour of the farmer']: withstands both weeds, drought, can do well in poor soils, and requires very little labour. It also does well with small or no heaps at all. The ease of cultivation saves the farmer from the strain and burden of yam cultivation where there is labour shortage. It has become a valuable supplement to yam.
- d'ónìgb'èsè n'ìjọ̀ ['give your creditor a date']: this variety does so well and grows so reliably that the farmer is sure of a good and steady harvest. Moreover, it is the first variety adopted to mature in one year instead of one and a half or two. So when planted, the farmer is said to be able to give his creditor a date to come back for his money because this variety is harvested and sold within one year.
- bábá óyin ['superior to honey']: derived from the distinctly sweet taste of the boiled or roasted tuber.
- éléwùró [the bitter type] 'éwùrō' is Vernonia amygdalina which is bitter, so this bitter variety's name is derived from it.

b) Varieties named by point or direction of origin:

- ọ̀bà ègbìrà [the Chief of Igbira]: the most widely grown variety in Igbira Division around Okene (see map) from where it originates. It was brought in by a migrant in the mid-1960s.
- Ghana [from the Republic of Ghana]: it was brought to the area by some migrants deported from Ghana in 1972 and has spread widely since.

c) Varieties named according to physical growth characteristics:

- àlàbá [the branching type]: a variety which branches extensively like the àbá [the raised platform on which grains such as guinea corn, beans, soyabeans etc are stored before threshing-
- àsánrére [spreading or flowing type]: marked by low spreading branches.

The bracketed figures indicate the number of varieties of other crops (which farmers planted) encountered during field work: Guinea corn (4), Beans (7), Maize (7), Cocoyam (2), Pepper (5), Pepper (5), water yam (3), melon (5), okro (7) and efo (4). The number of varieties which farmers planted in 1978 are given in Table 5.7. The same broad principles which govern decisions about which yam varieties to plant also govern other planting decisions. The different varieties grow at different rates, for different periods, have various uses, vary in taste and are of varying reliability. Farmers judiciously seek to balance as many relevant factors as possible, reflecting consumption needs, dietary preferences, soil catena, seasonality of production and cash needs. The genetically controlled phenology of crops is thus effectively exploited to match production with needs and soil, vegetation and climatic conditions within the context of available technology. These conditions determine not only the types of crops which a farmer decides to plant, but also the varieties of each crop grown. Throughout, it is possible to discern that the farmers' paramount concern is for stability of supply. The degree of diversification is both rational and impressive. The importance of this strategy in coping with risk and uncertainty is discussed fully in Chapter 8.

11. Farm Operations and their timing

All farm operations are affected by seasonality in climate. Climatic rhythms lead to distinct cycles of plant growth in response. Farm operations, planting and harvesting of crops are greatly influenced by the length of the wet season and the intensity of rainfall. Farm operations fall into four main temporal categories:

i. Land preparation

ii. Crop planting

iii. Crop care

iv. Crop harvesting and storage

(i) Land preparation involves clearing and burning of virgin and/or secondary vegetation, and heaping.

a) Clearing:The preparatory period begins in April when the previous season's plot (2nd, 3rd or 4th year of use), if it is going to be reused, is cleared of dead plants and dry yam twines. These are usually gathered together and set on fire at fixed points on the farm. By May, initial preparation for the planting of guinea corn, early maize and melon, involves hoeing and making a small mound (about one hoe full) using soil from the previous years' heaps. These new mounds are built up in the previous year's furrow and determine where the current year's heaps will be. This activity is called èsá (or 'rubbish clearing'). Land clearing on a fresh plot is called àyọ́ (or fresh clearing) and takes place in July and August in fully developed southern guinea savanna vegetation. This is different from Nadel's observations concerning the Nupe that farmers avoid clearing virgin land during the wet season because of heavy labour demands and that clearing takes place in the dry season after fire is used to reduce the vegetation (Nadel, 1942). The practice described by Nadel is restricted to swamp land (àkùrọ̀) and forested areas. In the open guinea savanna, clearing takes place when the vegetation is fully developed, namely at the height of the rains. This is because the system of clearing, which involves inserting the hoe under each grass bunch half an inch below the soil surface is impossible during the dry season because of hard top soils. During clearing, and between clearing and heaping, large trees are killed by ringing with fire while smaller ones (1 1/2 - 3 m) are lopped and left as yam stakes. After two to three weeks, depending on how quickly the grasses dry up (planned to coincide with the dry August month) the cleared plot, called àgí (plot under first year of use), is set on fire, burning all the grasses and other rubbish but leaving grass stumps.

Interviewed about reasons for burning, farmers' answers reveal a keen awareness of its advantages. The three most frequently mentioned factors are: first, to ease the making of heaps (since the presence of tall dry grass will certainly impede the operation); second, burning is said to reduce weeds and pests especially in the first year of cropping and finally almost every farmer said that burning creates ash 'manure' for plant growth. While the underlying process (as for example described by Nye and Greenland, 1960) is unclear to farmers, the end effect is understood. Asked how they know, most said that experience taught them that crops do much better on spots on the farm where things have been burnt than on others. For this reason, rubbish is gathered into scattered heaps all over the farm and burnt. Nye and Greenland (1960) and Mouttapa (1974) have shown that an "analysis of soil after burning shows a substantial increase in exchangeable cations in the soil and a corresponding rise in pH" (Mouttappa, 1974). Thus, clearing and burning are used by Kabba farmers to incorporate or release nutrients accumulated in the vegetative cover into the soil in the form of ash. Such released nutrients include carbonates, phosphates and silicates (Phillips, 1959). In effect, then, wood 'ash' is an effective fertilizer providing significant amounts of potassium (Richards, 1977). Though much of the nitrogen, sulphur and carbon in the vegetation is lost into the atmosphere during burning, soil humus has already been built up by conversion of litter. Burning reduces microbiological soil populations initially, but these re-develop rapidly by the time heaping and planting of crops take place some weeks later.

b) Heaping - between one and four weeks after clearing and burning, the plot is heaped. The literature uses the term 'mounds' to describe this process of bringing top soil together into discrete units in contrast to the term 'ridge making' which refers to linear soil structures (Wilson, 1955; Morgan, 1957). My own preference is to use 'heaps' and 'heaping' instead of 'mounds' and 'mound-making' because in Kabba the word most readily translated 'mounds' refers to piles of sand used for non-agricultural purposes. The ecological functions of heap making have been discussed by a number of authorities (Morgan, 1957; Sauer, 1959; Eder, 1965; Webster, 1966; Knight, 1974). The focus here is on farmers' understanding concerning this practice.

The big hoe (àkṍtún - new from the blacksmith and made for the purpose) is the implement for heap making. Heaping takes place from the end of July till early October on upland farms and in January/February in Àkùrọ̀. Heaping is usually done in two stages. The first step is to produce a series of half size heaps known as eka (or pattern making), and is appropriate on virgin land (àgī) where fallow is so long that all previous heaping patterns have been obliterated. On plots which are being used for the second, third or fourth consecutive season this first stage is called àlàtì (or 'heap for support') because soil is usually gathered under and around the guinea corn crop planted on the ẹ̀sá plot (as discussed previously).

During the first stage of heaping, especially for ẹ́ká on àgí, the pattern of heaping established is intended to last not only for that year but for all subsequent years of cultivation as well. The farmer uses his judgement to site each heap and this then determines the number of heaps in the field and consequently the number of crops that can be planted. It is a job requiring much experience and young people (under twenty years) are normally not allowed to do this work unless labour is extremely short. It is easier with àlàtì where young sorghum plants post the site of each heap, and where the previous year's heaps are still visible so marking the point from where the soil should be brought down to make the new heap in what were former furrows. The àlàtì is designed to support the guinea corn crop against very strong winds and to keep weeds under control before the full heaps are needed.

Slope of land always guides the direction of heaping with the 'base' (ìdì ébé) of the heap facing down slope and the 'head' (órì ébé) facing the upper part of the slope. Soil is collected onto the heap site from both the base and head but not from the sides because heaps must touch each other side by side. This may be intended as a soil erosion control measure, as with tied ridges. More soil is gathered at the base, which is heaped first, than on the head, because yam, which requires deep soil is planted at the base.

In addition to being used as a weed control measure (the unburnt grass stumps are buried in the heap) the first stage is heaped so that crops of melon, okro and pepper (transferred from nursery) can be planted. Melon is harvested while okro and pepper establish themselves before the second stage of heaping is done. This second stage brings the heap to full size, the process being called 'ẹ́wà' or 'dig deeper'. Children help in this because the pattern is already laid by parents. When labour is very short, or the farmer is late in heaping, the two stages can be combined into one, bringing the heap to full size at once. This process is called àlùkì or àkọ̀kí (meaning, bring to full). This is much easier on plots being cultivated for the second or third times, involving turning over the previous season's heaps into the old furrows, but on àgí plots where no patterns exist, much experience is needed. Àlùkì is therefore less frequent on such plots.

Due to water-logging, heaping on àkùrọ̀ plots does not take place until January or February and usually the two stages are separated by a matter of one to two days or the whole heap is made at a single go. The environment also requires much larger heap sizes so that at all times of the year, the yam in the heap is above the flooded furrows. Because of deep and loose soils, heap sizes are smallest on forest soils in Olle and the south-west of Kabba. Stony soils in southern Kabba also result in smaller heaps. The average upland heap is about 0.6m across and 0.4m high, but on <u>íbọ́</u> plots, they are about 0.8m across and 0.6m high. On <u>àkùrọ̀</u>, however, each heap is about 0.9m across and 0.9m high. To some extent farmers also vary heap sizes to match crop types and even crop varieties, with white yam requiring the biggest heaps, and such crops as cocoyam, beans, maize, melon, potatoes and cotton not requiring heaps at all, especially in areas of forest soils. The pride and care exhibited by farmers in heap making is similar to that reported for Tiv yam farmers by Bohannan (1953).

Farmers' perception of the practical significance of heaps is crucial because this will affect their reactions to the introduction of non-heaping farming methods (see Chapter 10). Their reasons for making heaps are presented in Table 5.8 and these were discussed further in informal individual and group interviews, and during participant observation on the farm, to give farmers more chance to explain the reasons. The major perceived functions are:

a) 'it helps plant growth' - Farmers' explanation incorporates the idea of loosening the soil to enable plant roots to establish themselves more quickly and find 'food' more easily. They also observe that early rains penetrate the heap quicker than on hard ground, thus giving early crops a good start. Farmers say growing yam tubers cannot penetrate hard soil properly so the loose soil of the heap provides an

Table 5.8

PERCEIVED FUNCTIONS OF HEAPING

	Takete-Ide	Ejuku	Olle	Iya Gbedde
It helps plant growth	23	24	30	16
It makes crop roots firm	12	8	10	11
It gathers fertile top soil together	16	17	11	14
Allows good spacing of crops	21	16	19	20
Reduces weeds	9	10	12	7
Allows the planting of many crops	30	26	19	20
Controls erosion	8	4	3	1
Makes planting and harvesting easier	18	12	5	7
Allows air to enter the soil	2	7	3	4
Makes farm boundaries easier	1	-	5	5
N = 30 (average of 4·7, 4·1, 3·9, and 3·5 reasons in each of the four villages.)				

Source: Field Work, 1978

environment for fast downward and sideways growth.

b) 'to make crop roots firm' - this refers mainly to grain crops and guinea corn in particular which need the heap around them to prevent lodging and overbalancing in strong winds.

c) 'it gathers fertile top soil together' - almost every farmer recognises the fact of shallow soils and that the ash black top is the most fertile zone. They said that heaping allows them to gather this thin layer of soil together, enabling them to bury unburnt grass and rubbish and provide more 'food' for the crops.

d) The heaping system acts as a template for crop planting. Spacing of crops becomes an automatic operation once the heaps are in place, thus preventing overcrowding.

e) 'weeds are reduced' - while heaping, each hoe-full is turned over so that weed seeds and roots of potential weeds from the original vegetation are buried in the heap. The first year of cropping is therefore always nearly weed-free.

f) 'it allows the planting of many crops' - the size and shape of each heap provides a range of sites and aspects allowing the planting of many different crops, each suited to an appropriate micro-environment. Each crop has a particular side of the heap where it is normally planted, depending on the number of crops the farmer decides to plant. For example, yam is always planted at the top of the heap, with the sett slanted towards the 'base', while crops to be harvested before the yam, are planted at the two sides on the base (or èsẹ́ ébé) while those which will still be growing when yam is harvested (yam harvesting destroys much of the heap) are planted on the two sides at the 'head'. Other tubers such as water yam or yellow yam are planted opposite yam at the head as àkànmọ̀in (or 'nailed at the back'). Climbing legumes such as soya beans, ìtó and aerial yam are planted between heaps to take advantage of the stakes which are normally pegged between each pair of heaps. This all goes to emphasize that the farming system is centred around yam. Yam cultivation is the key to the various multi-cropping, intercropping, mixed cropping and staggered cropping strategies employed. Consequently, heaping is the lynch-pin of the cropping system.

g) 'for erosion control' - furrows are always made across slopes and because heaps touch each other along the contour, flow of water is reduced. It can be observed that during a rainstorm, excess water does actually flow out of the furrow from the sides of the plot while some water is usefully retained by the hollows (cups) from where soil was drawn to make heaps. This gives a longer period to soak in and helps conserve moisture for the dry interval, often quite lengthy, separating rain storms in the early part of the cultivation season.

h) 'makes planting and harvesting easier and faster' - all seeded crops (maize, okro, guinea corn, beans, pepper) are planted either with one finger or with the heel, an impossibility on hard ground. Cassava planting is also easier, simply requiring the cutting to be thrust into the soft heap. Yam itself is also more easily planted with a dip of the hoe. Moreover, harvesting of yam will involve a major effort without the heap. With the heap, yam tubers are easily exposed even with bare fingers.

i) 'aeration of the soil' - a few farmers said that crops, like other living things, need air, and loosening the soil allows air to enter more readily for crop growth.

j) 'makes farm boundaries clearer' - heaps provide better boundaries in the absence of fences or hedges when many plots lie side by side. They are also useful in marking the farm out into useful working units (see Chapter 7), and in allowing the farmer to readily estimate farm size, the amount of seedlings needed and a rough estimate of likely returns under normal circumstances.

Compared with the functions of heaping discussed by the authorities cited, farmers' understanding of the practice is no less 'scientific' and 'rational'. Some agricultural change agents underestimate the practical effectiveness of farmers' knowledge of processes involved in crop production. This leads to ineffective communication with farmers, and a misunderstanding of the fact that farmers' knowledge constitutes integrated body of experimental data, deduction and practical experience which cannot therefore be replaced in a piece-meal fashion by a 'single innovation approach'to change.

ii. Crop planting

The timing and sequencing of crop planting is much influenced by the seasonal rhythm of the climate. Effective action in this respect depends on a) farmers understanding of the rainfall regime (i.e. the ability to estimate the likely beginning and ending of the rains) and b) a good understanding of the growth characteristics of each crop (e.g. the number of rain days needed for maturation and the post-rain period needed by certain crops for ripening and drying.

a) Seedling Preparation, Planting Units and Planting Methods:

Only 14% (17) of farmers in the sample acquired seedlings of any major crop by purchase. For the vast majority, planting materials are derived from the previous season's harvests. Most are carefully selected and stored separately at the time of harvest so that the farmer is assured of crops to plant in the following season inspite of food difficulties during the hungry season.

Yam: Yam is planted in setts (one sett per heap). The sett (àlàgbẹ̀ - 'slice to plant') is created by slicing yam tubers into pieces of about 15cm long, 5cm wide and 1.3cm thick. Each sett must have one long side with skin (eyes for germination) intact. Small tubers of sett size are planted whole, and sometimes raised deliberately for this purpose. These secondary yam tubers (ègīgī) are generated by replanting the head of yams harvested during the wet season to encourage regrowth, a process known as 'milking'. This secondary tuber is never eaten but used exclusively as planting material. Sett materials, whether from primary or secondary tubers, are gathered together and examined to remove any tubers with signs of disease or damage before they are cut. After cutting, they are arranged singly in a rectangular pit with the fresh-cut surfaces facing up, sprinkled with wood ashes and buried until planting time, by which time the cut surfaces are dry and hard. This is designed to help the setts survive the dry and hot period before germination. They lie buried for between one week and two and a half months. For yam planted in September, when the heap is still wet or moist, setts are planted directly without this prior treatment by burial. Yam planting is carried out with a medium sized hoe. Children and women, or sometimes the farmer himself, place one sett on each heap to be planted and the farmer follows up and buries the sett on the base side of the heap, making sure that setts are planted with skin eyes facing the top for easy germination.

Guinea corn: After harvesting and threshing, guinea corn seed needs very little preparation except for good storage. It must be kept dry and free of insects and the best place is above the hearth in the house. The seedlings are planted by making a hollow with the heel, throwing in between five and fifteen grains and covering this with the side of the foot. Many seeds are planted together because of damage by birds during the first week after planting. Those which survive are thinned to replant on heaps which are damaged.

Cassava: Stalks are simply cut into pieces of about 23cm to30cm long and inserted at the back of the heap (during the last year of yam cropping) or on top of the heap when they are the sole crop. The only precaution is to make sure that the buds face upward when planted.

Beans and Soyabeans: Seeds are stored in pots or gourds and planted in pairs in a hollow made and later covered with a finger at the sides of the heaps and between heaps respectively.

Maize, okro and melon: Maize cobs and okro for planting are allowed to mature and dry on the stalk, while melon seeds are removed from the pod, washed and dried. The first two are strung to ceiling poles above the fireplace, where pests cannot damage them, while melon is stored in covered pots. Seeds are planted in pairs on each heap with the finger, though three at a time is more common with okro because of greater rates of loss during germination.

Pepper: Pepper seeds are occasionally planted in hollows between heaps. More common is the practice of making seed beds in fenced gardens in the village. Tobacco nurseries are also set up in back yard plots. Seedlings of both plants are then transplanted into the main farm, one per heap head.

Rice: Seedlings are either prepared in nurseries and transplanted or scattered and covered on ridges. This and groundnuts are the only crops for which flat-topped ridges (on separate plots) rather than heaps are made.

All of the crops including vegetables, are planted in one or the other of the ways described above. Nowhere are seedlings broadcast on cleared unheaped soil because they will be devoured by birds.

b) Timing of Crop Planting.

During field work farmers were asked to explain the factors which determine the planting and harvesting time for their crops. The two factors mentioned by every farmer interviewed comprised, firstly, the use of a traditional 'calendar' whereby each farmer knows that it is time to plant certain crops; and secondly, experience in the face of rainfall uncertainties. Planting of crops seems to be period rather than date - specific, except for guinea corn which most farmers said must be planted between 18th and 21st May each year. With the availability of fertilizer, however, the period by which this crop must be planted has been extended. Within the generally accepted period for planting each crop, there is a lot of variation in planting time depending on personal judgement in relation to whether or not the rains have really started and become steady, and in terms of how many months of rain each crop is likely to require. Fig. 5.1 \p211\ shows the planting, earliest harvesting and latest harvesting times for each of the major crops while Table 5.9 shows farmers' estimates of number of months of rain required for each crop to do well and the dates between which rain is crucial to the crop. Farmers' understanding of rainfall characteristics (Chapter 7) and crop water requirements enables them to organize planting times for their crops and facilitates planting sequences which permit multicropping, intercropping and staggered cropping. The all-important yam is planted between September ending and January. Just over 70% of farmers do all planting between October and December (except on *àkùrọ̀* plots), even though yam setts do not germinate until March and April. This is in contrast to an area like Okitipupa where planting is always just prior to the rains (Richards, 1977). Farmers' reasons for planting at this time instead of waiting till the beginning of rains from March onwards, are presented in Table 5.10. One outstanding reason is that yam setting and planting takes place at a time when yam is surplus and so the following year's crop is secure in the soil before consumption and sale pressures affect the availability of planting material. Moreover, the better seed yam is said to be more easily recognized at this time. Experience teaches farmers that there is a time when yam tubers prepare to sprout and are said to be 'pregnant'. At this time they can no longer be cut into setts without damaging their germination potential. Certain trees (for example flamboyant and *Iyá*) bud and flower at this time and all farmers know that it is too late to prepare seed yam. So all seek to

Table 5.9

FARMERS' REPORTED ESTIMATES OF NUMBER OF MONTHS OF RAIN REQUIRED BY EACH FOOD CROP TO PRODUCE OPTIMALLY

Crop	No. of months of Rain	No. of Respondents	Average rain months and period of year vital
Yam	4	6	
	5	19	
	6	71	$\bar{x}$= 5.9 from May - October
	7	22	
	8	2	
Guinea Corn	5	21	
	6	61	$\bar{x}$ = 5.9 from May - October
	7	9	
Cassava	6	9	
	7	19	
	8	46	$\bar{x}$ = 8.1 from July - October and May - October
	9	43	
	10	3	
Maize	2	20	
	3	92	$\bar{x}$ = 2.9 April to June 1st crop and July - October 2nd
	4	8	
Beans	3	21	
	4	46	$\bar{x}$ = 4.1 May - Aug. 1st crop August - October 2nd
	5	20	
	6	6	
Soya beans	4	5	
	5	23	$\bar{x}$ = 5.4 May to October
	6	23	
Pepper	4	6	
	5	21	$\bar{x}$ = 6.01 August - October and April - July
	6	59	
	7	34	

Table 5.9 - 2 -

Crop	No. of months of Rain	No. of Respondents	Average rain months and period of year vital
Melon	2 3 4	21 58 29	$\bar{x}$ = 3.4 April - June 1st Crop July - September 2nd
Okro	2 3 4	27 78 15	$\bar{x}$ = 2.9 May - July, July - Sept/October
Cocoyam	5 6 7	13 33 11	$\bar{x}$ = 6.0 May - October
Rice	3 4 5 6	12 13 7 2	$\bar{x}$ = 4.3 May - August

Source: Field Work, 1978

Table 5.10

FARMERS' REASONS FOR PLANTING YAM BETWEEN OCTOBER AND DECEMBER INSTEAD OF MARCH - MAY JUST BEFORE THE RAINS

Reasons	Takete-Ide	Ejuku	Olle	Iya Gbedde
Traditionally done to fit work schedule	10	12	27	13
Good for rain to reach it and make it survive the heat	22	25	17	12
Ground will be too hot for yam planting in March	11	13	8	7
To take advantage of possible early rain	5	4	3	6
Prevents yam decay	12	8	4	8
Yam cannot be cut into selts when pregnant; so safer in Oct. - Dec.	13	9	11	10
Best time to identify and separate healthy and diseased seed yam	11	12	5	8
If I don't plant early I will eat it or sell it.	18	17	12	9

(Average number of reasons per farmer = 3·4 , 3·3, 3·2 , and 2·4 in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively.

N = 30 for each village

Source: Field Work, 1978

make setts before the signal from the trees. Some farmers said that the occasional rains between October and December are necessary for the planted seed yam to enable it to survive the long dormant period of the dry season while a few anticipate catching the earliest rains in this way.

For most other crops which require short growing months, planting times are flexible and many farmers plant two crops of maize, beans, melon, okro and vegetables in staggered sequence, usually planting the second crop before the first is completely harvested. For example the second crop of maize, planted in August, is usually the <u>èlẹ́rùnpẹ̀</u> variety which is small in stature, produces smaller cobs and matures in one and a half months. Two varieties of cow peas - the longer type (<u>érē</u>), and <u>ērē'jò</u> (the smaller rain bean) are also planted at different times of the wet season. The 'rain bean' has a shorter growing period and is planted later than, but harvested, earlier than the normal beans. Because the wet season is two to three weeks longer in southern Kabba than in the north, more people in the south plant two crops than in the north.

<u>Multi-cropping/Mixed cropping/Inter cropping</u>

Even though this is a yam-based farming system, its subsistance nature requires the farmer to grow other crops necessary for household consumption. For this purpose many crops are planted on the same plot during a single growing season. Several terms have been used to describe this mixture of crops on the same plot, such as multicropping, relay cropping, intercropping and sequential cropping (Crowther, 1949; Norman, 1974; Norton, 1975). Mixed cropping, the term adopted in this study, is defined as "the sowing of a piece of land with two or more plant types so that there is a temporal and spatial overlap in the growth and development of some or all the plant types" (Ajibola Taylor, 1977, p. 113). It is adopted because it subsumes most of the other terms used to describe the mixed crop culture of traditional farming. Multiple cropping while it reflects the planting of many crops does not necessarily mean mixed crop culture as a number of crops may be grown one after another on the same plot in a single growing season. Intercropping is the cultivation of a secondary short duration crop which is sown after the main crop and harvested before it, e.g. yam inter-cropped with maize, beans, okro. The selective and staggered harvesting system in Kabba (described below) means that both the major and short duration crops are harvested at the same time, a deviation from inter-cropping in the strict sense of the word.

All farmers in the sample, and those involved in informal interviews reported planting at least six crops on the same plot per cropping season, while as many as ten crops were counted growing on the same plot at the same time (albeit at different stages of growth) in twenty out of forty-five farms visited in the course of field work. The average number of crops planted per season (not varieties of the same crop) on the same plot was eight (results for all four villages combined). A typical ọfẹ́ plot had yam, maize, okro, beans, soyabeans, aerial yam, pepper, yellow yam and other kinds of vegetables, i.e. a combination of grain and root crops growing together. Guinea corn, rice and cassava are the major crops which at one time or the other can be observed in pure stands. Maize and melon are initially intercropped with guinea corn and are both harvested long before the latter matures. Even though yam is planted on the guinea corn plot in the last month or so (the guinea corn stalks provide a trellis for the yam vine) it does not compete since the grain is harvested before the yam starts to germinate. Cassava is planted between June and August on a plot which is being used for yam for the last time. Once yam is harvested, cassava remains as a sole crop until harvest and eventual fallow. Very often, land which has not fallowed long enough for most other crops is adequate for cassava, beans and maize. When extra labour is available such land is cleared, heaped and sown immediately with cassava, maize and beans. Within a few months the maize and beans are harvested leaving cassava as a sole crop. This land is left again to fallow after the cassava is harvested. Such a plot, locally called ēlō (quick fix), is thus used only once unlike the main plots which are used for between three and five years. Except for guinea corn, most other crops are suitable as yam inter-crop even though maize, with its extensive fibrous roots must be scattered judiciously rather than being planted on every heap.

The planting and harvesting of crops at different times, their growth characteristics, physical characteristics of height, leaf formation, and morphology (some stand, others climb or creap, some are short and shrublike while others are tall and grasslike) and the heaping system which allows for good spacing and organization of plants on different parts of the heap constitutes a richly varied ecology with many sound productive advantages.

Many socio-economic, ecological, edaphic and entomological reasons have been advanced for the practice of mixed cropping (e.g. pest control, minimal soil erosion, better use of plant nutrients, reduced incidence of disease) (Ajibola Taylor, 1977; Parker, 1969; Evans, 1960; Allan, 1965; Wrigley, 1961; Webster, 1966; Webster and Wilson, 1966; Morgan, 1957; Ruthenberg, 1971). In this study, each farmer was asked to give the reasons for planting many crops together as he saw it. Their responses are listed in Table 5.11 and only brief comments are necessary here. With the strategy of producing as many household food needs as possible from the household farm, monoculture would involve making a plot for each crop, leaving each farmer with between seven and ten different plots. No household has the human labour resources to make, and look after, so many plots. Most farmers see mixed cropping, therefore, as an efficient way to save labour (cf Kassam, 1973; Norton, 1976). Moreover, in mixed cropping, farm operations such as clearing, heaping and weeding service all crops at the same time. Under an agricultural system which is capital-scarce, and labour-intensive and with a high incidence of pest and disease, mixed cropping is a highly effective management strategy and farmers know it.

The yielding possibility of harvesting the range of different crops required for household consumption, and the availability of these at different times throughout the year is a major perceived advantage. Farmers reason that since the original vegetation before clearing contains different kinds of trees and grasses, the land must be able to take varied crops because different crops take different

Table 5.11

PERCEIVED ADVANTAGES OF MIXED CROPPING

Reasons or Advantages	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Saves labour and land (no labour and land to have plot for each crop)	30	30	30	30
Can have yield for many crops	26	22	25	19
Different crops need different 'food' from the soil so many can be planted together	14	10	11	11
Harvesting is at different times to meet needs	23	19	17	17
Sum total yields bigger than planting single crops	30	30	30	30
Avoid insect and weed build up	6	7	3	3
If pests attack one crop or if some are bad, others will survive	15	13	15	10
Traditionally done	0	1	1	3
Some plants can serve other plants	4	3	4	1
N = 30				

Source: Field Work, 1978

'food' from the soil. The field is therefore a microsm similar in ecological structure to natural biological communities. This is a system of farming in which "a natural forest is transformed into a harvestable forest" (Utomo, 1957:129). All sample farmers and those participating in discussion groups believed that the sum total of crops harvested per season per plot is greater in total value than if they had planted only one crop. Asked if they had mono-cropped to prove the point, most farmers said that common-sense reasoning makes such experimentation unnecessary. Experimentation with sole and mixed cropping confirms farmers' judgement that aggregate yields are better (Bradfield, 1972; Ogunfowora and Norman, 1973; Norman, 1970, 1972, 1973; Ajibola Taylor, 1977).

Other responses include "if the farm is not covered by crops it will be covered by weeds", thus indicating that farmers use mixed cropping as a deliberate weed control measure. A continuous and varied vegetation coverage also reduces the impact of large tropical rain drops on the soil, while plant roots hold the top soil firmly together, thus reducing the incidence of erosion (Harris, 1971; Wilken, 1972; Herrera and Harwood, 1973). As indicated in Table 5.1 pest control also lies at the back of farmers' minds in adopting mixed cropping since it provides a less uniform environment for each pest type (Taylor, 1977; Rarros, 1973; Southwood and Way, 1970; Way, 1973; Herrera, 1975). For example, farmers report that damage done to cassava by the variegated grasshopper (<u>zonocerus variegatus</u>) is more severe after all the other crops have been harvested, leaving the crop in pure stands. For this reason, farmers deliberately replant maize and random clusters of sorghum on the cassava plot until harvest time. By using mixed cropping, farmers clearly attempt to spread risk among many crops (see Chapter 8) because many said "if pest damage some crops, or if some crops are bad, some will still be good".

These responses show that farmers consider mixed cropping an efficient way of harnessing scarce labour and environmental resources to meet consumption needs and providing an insurance policy against pests, crop diseases, and variable precipitation. In other words the traditional methods of crop production just described are typically founded on sound biological principles (Andrews, 1972) and it is clear why similar methods are still widely practised in Africa (Okigbo and Greenland, 1976). They are representative of a valid 'science' which has been systematically undervalued by orthodox agronomy in the past. Agricultural development must take this indigenous scientific tradition into account.

(iii) Crop Care

The major crop care strategies include a) the control of weeds, b) mulching (capping) and staking and training of yam twines, c) thinning guinea corn and rice, and d) insect and rodent pest control, and control of domestic animals.

a) Weed types and their impact on crops are discussed in Chapter 8. Weed control involves the removal of all vegetative species which are not considered useful, and which compete with crops for solar energy, soil water, nutrients and growing space. Removal of weeds, involves the use of the small hoe (<u>ìpégùn</u>) and uprooting grasses by hand, especially on <u>àkùrọ̀</u> plots. Hoeing not only removes weeds, it also enables farmers to partly rebuild heaps washed down by rain, cover crop roots which have been exposed and straighten crops which have fallen. Since crops are mixed, it was not easy to obtain information on the exact number of hoeings needed by each crop between planting and harvest. One hoeing does for all crops on the plot at the same time. The intercropped yam plot is normally hoed three times between April and October (since growing stops then, no hoeing is necessary after October). The first is in early May (called <u>ọ̀kàrà</u> or 'first hoeing') usually designed to break any lumps of soil which have not crumbled since heaping, to train yam vines on stakes and to make a final check on heaps where yam has failed. These are replanted with water yam. The second hoeing takes place in July (depending on how quickly weeds grow) and is called <u>àròlè</u> (or 'hoeing after'). This usually takes place in the interval between the clearing of a new plot and its heaping. The last hoeing, in September/October is called <u>arókẹ̀hìn</u> (or last hoeing) and is undertaken for beans and soyabeans which will be harvested at the end of October and November respectively. The number of times a plot requires hoeing and the precise time to do it depends very much on farmers' assessment of the seriousness of the labour situation and how pressing other labour-demanding activities are. In addition, a separate hoeing, usually in July, is necessary for the plot on which guinea corn has been planted (i.e. plots being cropped for a second or third year). This takes place five to seven weeks after planting and is called <u>éyì</u>.

All weeds are hoed and brought up to the base of each guinea corn stand. They are eventually covered when the first stage of heaping is done, and act as green manure.

(b) Mulching of yam (<u>àpàlè</u> or 'cover the top') is the process of spreading green or dry leaves on top of the heap where yam has been planted and weighting this mulchcap down with soil. This is carried out in January and February when the savanna vegetation, set on fire earlier in the dry season, has developed new leaves. Thus there is an ample supply of leaves within easy reach of the farm. Every farmer interviewed said mulching is done to protect yam setts in the heap from the hot sun and to moderate soil temperatures in the months of February to April. Many farmers (36% (43)) believe that yam will do well even if the wind blows the leaves away one day after mulching. There is, therefore, no way in which they will contemplate not mulching at all. A further important reason, given by 39% (47) of the farmers, is to prevent the development of multiple shoots sapping the energy necessary for the tuber growth. If a shoot penetrates into the hot soil surface without mulch protection they wilt and another shoot starts afresh, resulting in smaller tubers.

(c) Staking (<u>édò</u>, 'branched support') and training of yam tendrils is another important aspect of yam care. Small and medium sized branches are cut, shorn of leaves and pegged between two heaps so that each stake (up to 1 1/2m tall and branched) serves two heaps side by side rather than across furrows. This operation is done between February and April. Stakes are readily available in the savanna woodland surrounding <u>òfě</u> plots and in forested areas. On <u>àkùrò</u> plots, however, a few stakes are brought from the surrounding grassland and then supplemented with the long <u>àkùrọ̀</u> grass called <u>igán</u> which, when trimmed can be 3 1/2m long. These are used to train vines to stakes or trees.

Throughout this period, and up till June, farmers and their children go round the farm to train yam tendrils onto stakes. When asked to give reasons for this practice the responses show a fascinating understanding of environmental factors affecting the welfare of this crop. These are presented in Table 5.12. Farmers argue that staking keeps yam vines clear of hot February-May soil surface, which would otherwise cause the young tendrils to wilt. They also argue that staking exposes the leaves better to sunshine which fosters plant growth and ensures good yields. In fact trees are ringed to remove shade because plants, in the words of one farmer, need to "eat food from the sun". If trees are left intact, farmers say, water will continue to drop on crops for a long time after rains (this is called <u>tòtòlò</u>, i.e. the sound made by regular drops of water). This does not allow leaves to dry quickly. Leaving vines and leaves on the ground causes them to turn yellow and fall too quickly thus reducing yields. Yam is not the only climbing crop on the farm; others such as soyabeans, string beans, aerial yam and gourds also use the same stakes or use yam vines. Guinea corn trellises are also bent in such a way that on <u>ẹ́wà</u> plots they form the only stakes.

(d) Thinning of crops is relevant only to rice and guinea corn. With the latter, four to five stalks are left to each heap while the thinned seedlings are used for replanting on heaps where the crop has failed to germinate.

Table 5.12

PERCEIVED FUNCTIONS OF YAM STAKING

Functions	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
It will not do well if not staked	6	7	9	16
Prevents growing shoots from touching hot ground surface in March - May when sun 'eats' it.	14	13	16	12
Allows sun to shine on leaves better — increased yields	20	11	13	15
If yam leaves are left on the ground in the wet season, they grow yellow, fall early and give in poor yields	22	20	13	19
Gives chance for vigorous growth and full leaf and better yields	12	18	8	10
'Makes yam comfortable since it is a climbing plant'	2	3	3	0
Other climbing plants can use the stakes	10	7	6	5

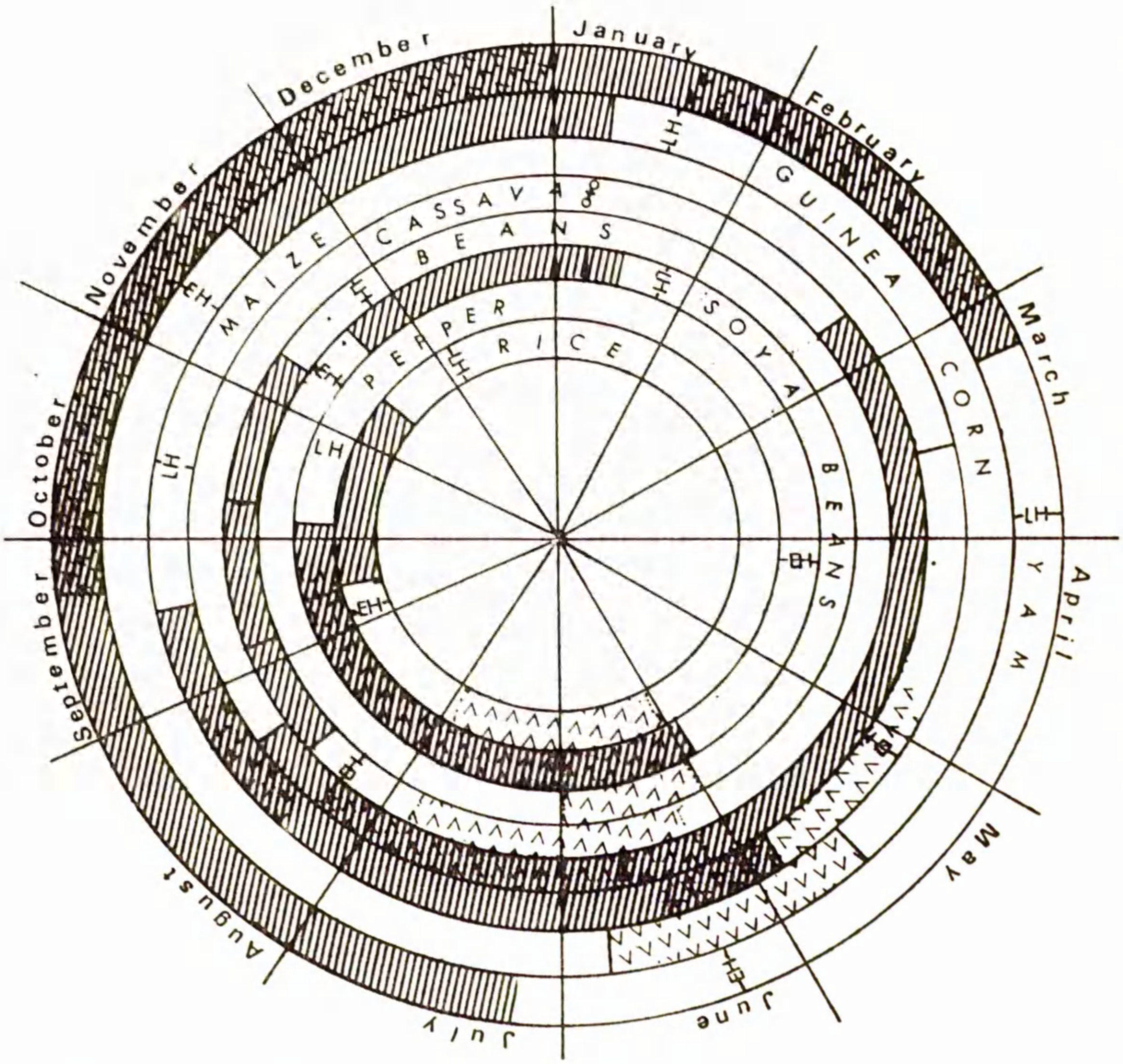
The main pest control methods are discussed in detail in Chapter 8 and will be left until then.

(iv) Crop Harvesting

Harvesting times of the main crop are identified in Fig. 5.1. The interval between the earliest and latest harvesting times indicates the period over which each of the major crops is harvested. This allows a farmer to follow a harvesting schedule designed to meet both consumption and cash needs. Normally, each farmer brings from the farm daily, enough food for the household for the following day or two, while enough for the weekend is brought home on Saturday. This practice frees the farmer from major food storage effort between June and January. Moreover, most of the root crops can stay in the ground unharvested until the end of March, thus providing natural storage for bulky crops.

Selective or staggered harvesting strategies are possible because crops on the same plot, even when the same variety are planted on the same day, mature at different times. This is due to small differences in soil properties within the farm, the genetic properties of each seedling and its planting location, which determines the individual crop's access to solar energy, soil nutrients, soil moisture and air. For each crop, maturation follows an S curve with a few which mature quickly followed by the majority which conform to the 'normal' time for such crops to mature and the last few which mature late. The rate of harvesting follows this curve.

Crops such as guinea corn, soyabeans, rice, aerial



Main Planting Period

Main Harvesting Period

EH Earliest Harvesting Time } for some planting

LH Latest Harvesting Time

for Cassava EH = 1 year later and LH is 2 years later for the same planting.

All other vegetables are planted and harvested between June and October, while reserve crops such as coco-yam, water yam, aerial yam etc. are harvested between March and May each year.

FIG- 5-1 Farm Calendar— Planting and Harvesting of the Major Crops in Kabba yam and melon are all allowed to mature completely before harvesting and are brought in over a period of two to three days. For the others, however, from the earliest harvesting possibility to the time when the final plants have matured farmers selectively harvest by going through the farm to find which individual crops are mature. Even when all the crop is matured, selectivity still operates for such crops as yam, because there are varieties which are harvested as soon as ripe, while others which can be safely left in the ground and harvested late.

a) Yam - Yam crops start to mature by mid-June on lowland swamp soils (<u>àkùrọ̀</u>) but harvesting must not be done openly and new yam must not be seen in public until a stipulated official date in each village (see Chapter 7). Between this earliest harvesting time and the end of September, yam is selectively harvested because some are still in the process of tuber growth right till the end of the wet season. For this reason, all yams harvested before mid-September have the heads replanted to obtain the secondary tuber growth used for seed yam. During this period, mature yams are identified by the appearance of the vines, by cracks on the heap where the tuber is pushing through or by trial and error whereby the farmer carefully exposes the tuber on one side and makes an inspection. If the top third is still white in colour, it still has a good chance of further growth and is covered unharvested. Using experience, and depending on family food needs, the farmer then harvests those he considers mature. This is made easier at the beginning of the harvesting period because he knows which yam varieties mature early and those which do not. From the end of June, through to mid-September, every farmer tries not to harvest varieties such as *ọ̀gùnmọ̀*, *ẹsīn*, *pàpàrà* or *kàmpī*. They prefer to take *sémsú*, *éfé*, *ẹgín*, *pàósà* and other early maturing varieties. Many farmers actually plant each variety contiguously so as to know which variety is where, thereby reducing harvest inspection. By mid-October, no search is required because most yams have stopped growing. Harvesting is then determined entirely by variety, as farmers harvest those varieties which are good for consumption, leaving those which they will sell later in the field and also those which store well unharvested. Between December and March, yam is harvested *en masse* when large- scales sales are made, but strictly according to need where household consumption is concerned.

b) Guinea corn: This crop is allowed to mature and dry before any harvesting takes place. Selective harvesting is impossible because ears of grain are involved. Harvesting time is determined by whether the ears of corn and stalks are sufficiently dry, at the same time taking care to see that they are not too dry either before or during harvest. If the latter is the case many grains drop and are wasted during harvesting. At the same time there is the danger that stalks will snap when the aim is to carefully bend them across the heaps to use them as yam stakes. A long delay in harvesting also exposes the crop to mass destruction by birds. The cool dry harmattan period of December is ideal and most harvesting is done then. Men bend the stalks (usually two to three men per farm) and women cut the ears (the wife brings female friends and neighbours) while children gather the heads into barns specially built for the purpose.

c) Maize: Mature maize is usually identified by three indicators; firstly, when the tassel starts to dry, secondly, when the hair-like brush at the head of the cob turns from silvery white to brown and falls off, and finally by trial and error whereby farmers open the cob to assess whether the seeds are mature or not. They are then selectively harvested. More than 70% of the maize crops is harvested green, both for consumption and for sale. The market for maize is especially vigorous at Kabba, Lokoja and Ikare. If mature maize is undetected, or the cob shawls turn yellow and brown it is too late to harvest green. It becomes <u>pàpàrà</u> (or 'too hard to chew'). All maize going for seed storage, or for sale in dry form, is left to dry on the stalk before harvesting. Early maize is harvested from May till July or August when the 'little dry season' (Ireland, 1962) enables it to dry up. Only 36% of the sample, mostly in the forest areas of Olle and southern Kabba, planted a second maize crop. This is harvested from September till mid October. Rather than planting a distinct separate second crop many farmers prefer a staggered planting strategy sowing some maize in April, some in May, some in June, July and August, so that continuous harvesting from June to the end of the rainy season is possible.

<u>Beans</u>: At the beginning of the harvest a few yellow and dry pods are picked as they mature. The majority of pods mature together and are harvested in bulk over two days to one week in the middle or end of October. Beans (cow peas) are never harvested green.

<u>Okro</u>: This too is harvested bit by bit. Women pick succulent and crisp okro fruits before they harden and become useless.

Pods to be used as seed are allowed to dry on the stalk.

Melon: The main indicator of maturity is that the tendrils shed leaves, dry up and start to snap. The fruits are gathered together, pulped with sticks and covered up for a few days to allow the succulent endocarp to decay. The embedded seeds are removed, washed, dried and stored.

Soyabeans: These mature, and dry en masse and are harvested in a single operation lasting days depending on farm size. This normally takes place in November and early December.

Pepper: These are selectively harvested as fruits turn from green to red. The farmer waits for the moment when it is worth gathering a basket or two before beginning to harvest. Each harvest takes place intermittently over a period of one day to one week, depending on farm size. The red pods are part-boiled, sun dried and stored in baskets, sacks, pots and gourds.

Cassava: Cassava has few external indicators of maturity. Farmers know how long it takes each variety to mature. Harvesting takes place according to household food and cash needs. In recent years, fresh tubers have begun to be sold in large quantities to urban-based middlemen, but in the past the main sales were in the form of gàrí and làfún (cassava flour).

Cocoyam: On maturing the leaves turn yellow, dry and drop. Farmers then harvest them according to food needs. Because it is essentially a dry-season reserve crop, there is little chance of harvesting occurring before all have matured.

The purpose of the above detailed description is to show that harvesting of crops is a complex of strategies deeply embedded within the subsistence food crop economy. Continuous supply of fresh food stuffs, over a long period is assured by these methods. Harvesting all crops at once would not only create serious logistic problems in terms of labour and storage, but would run contrary to the whole purpose of existing farming systems.

So far, individual components of the farming system have been discussed. All these activities are integrated by farmers' calendrical notions. The calendar used to time farming system decisions is actually a farming calendar based on lunar events and ritual occurrences. This calendar has only 8 months of varying number of days, each tied to a specific farming activity. In the old days every farmer knew the appropriate farm operations for each month, but in recent years the Western calendar has tended to override the use of the traditional calendar and many young farmers, though able to name the traditional months, cannot locate them in terms of the Western calendar, nor specify the importance of each. The older calendar is, however, still very much in use among older farmers. The traditional calendar, its correspondance to the Western calendar, and the appropriate farm activities associated with each month are presented in Appendix 6. Labour demand, which depends on this calendar of farm activities, will be discussed under resource allocation.

A significant point to note is that the traditional calendar is squarely based on variations in climatic and ecological conditions over the year, akin to the five-water cycles identified by Cocheme and Franquin. It reflects a long and close interaction between community and environment.

This historical continuity is a valued element of current agricultural practice, providing a basis for conceptually handling risk (see Chapter 8). Thoughtless or piecemeal disturbance of established ways of timing and integrating farm decisions brought about by insensitive modernization of agriculture is likely to prove harmful in the long run.

V. Plot Patterns and Crop Rotation System

A clearer understanding of land-use in Kabba is possible by looking at the plot patterns and crop rotation system followed by a typical farmer. The process is illustrated in Fig. 5.2 which shows how farms are developed over time and through space. We will take as an example a farmer who began farming in, say, 1976. Plots A-F represent his farming operations since then. In July and August 1976, he clears virgin land plot A (an àgí or new farm) and heaps it in August and September. Immediately after heaping, his wife plants pepper at the head of the heaps while between October and December he plants yam, which starts to germinate from March (1977) onwards. This yam plot will be harvested from mid June 1977 right through till March 1978. From May 1977 secondary crops such as aerial yam, beans, soyabeans and maize are planted on the yam plot and harvested by the end of November. Meanwhile in July 1977, he clears plot B as a new plot, heaps it and plants yam in October to December. About the time when yam on plot B starts to germinate (in March 1978) all 1st year yam has been harvested on plot A and plot A is prepared as ẹ̀sá and sown with guinea corn by May 1978. Between May and December 1978, plot B is under the first year of yam, intercropped with secondary crops,

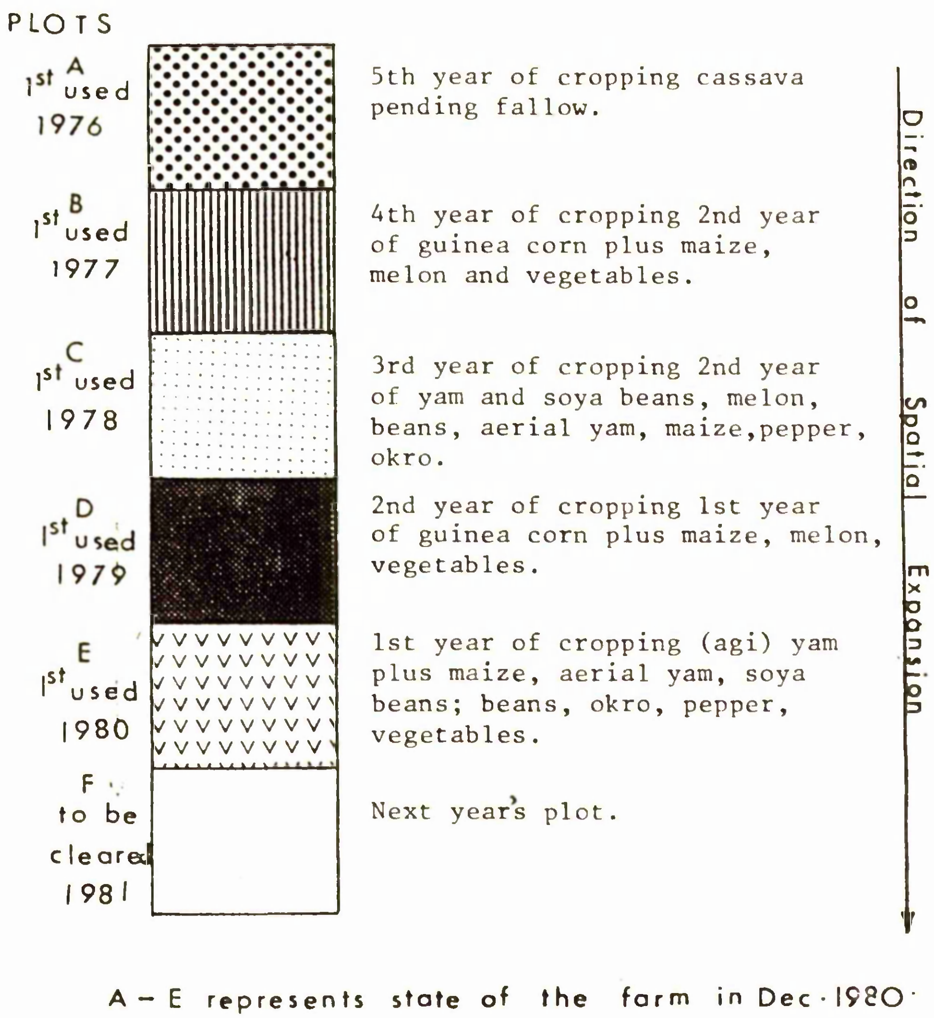


FIG- 5·2 Plot Patterns and Plot Rotation System in Kabba- (Hypothetical Example -1976–1980) while plot A is under its first year of guinea corn, intercropped with maize and melon. These are harvested by July and August, and heaps are made while the guinea corn crop is still standing. Yam is planted under the guinea corn in October and November. This constitutes the 2nd year of yam cropping. The guinea corn is harvested in December. Meanwhile harvesting of all crops takes place on plot B from mid June 1978 ending with yam in March 1979. In July 1978, plot C is cleared as an àgí plot, heaped and sown with yam in October to December. When the first year of yams in plot C starts to germinate in March 1979, harvesting of the yams in plot B is completed. The 2nd yam crop of plot A is also germinating at this time. Plot B is then sown with a first year of guinea corn in May 1979. From May till December 1979, therefore, the farmer has two plots (A and C) of yam and other crop mixtures and one plot (B) under guinea corn, maize and melon. But in July 1979, he clears plot D as a new plot on which he will plant yam for the first time in October to December. He also plants a second crop of yam under guinea corn on plot B. From May to December 1980 the farmer has plot A and C under guinea corn for a second and first years respectively, while plots C and D are under second and first years of yam mixtures respectively. In October to December 1980, plots A and C under guinea corn are sown with third and second years yam respectively and the guinea corn is harvested in December. Meanwhile, plot E has been cleared and sown with yam. From May till December 1981, this farmer has plot A under the third and last crop of yam, with other crops and especially cassava planted, plot C under second year of yam, E under a first crop of yam, while B and D are under second and first crops of guinea corn respectively. Plot F will be the new farm plot in 1981 while plot A is left under cassava and eventually reverts to fallow.

How long each plot is used depends very much on farmers' assessment of how satisfactory the production is. For example if the land is very poor, plot A will not undergo a second or third year of yam cropping before it is sown with cassava and left to fallow after the latter is harvested. The major strategy is for a farmer to have at least one <u>àgí</u> yam plot, one <u>ẹ̀wá</u> (subsequent years of cropping after <u>àgí</u>) yam plot and one <u>ẹ̀wá</u> guinea corn plot. Guinea corn is never planted on a fresh-cleared piece of land unless the fallow is very short, because the soil is not yet able to liberate the kinds of nutrients which farmers identify as being required by this crop. Yam, which needs deeper and richer soils, is first planted to take advantage of new soils.

By this method, farms are extended annually. Fig. 5.2 is schematic. The direction of extension in practice may be sideways, circular or discontinuous. Nevertheless, the principle is always the same, namely that there is a graduated process of plot and crop rotation completely distinct from vulgar textbook versions of shifting cultivation in which land is seen to be used and abandoned in a simple mechanical sequence. With the system just described, a farmer can remain in the same area for between ten and fifteen years until his chances of extending the plot are exhausted either because there is no more good land or because two farmers who have been extending from opposite directions meet. The farmer then shifts completely to another area, re-establishing the same plot pattern over a period of four to five years in the new location. With plentiful supply of land and using this process, it hardly occurs that a farmer in his lifetime has to go back and re-cultivate a plot he has abandoned to fallow.

Table 5.13 lists reasons given by farmers for breaking circles in this manner and moving from one area to another. Thus, for example, severe pest, diseases and weed damage to crops can upset the system described above, and how long each area or plot is used depends on what satisfies individual farmers. Moreover, in Gbedde and southern Kabba, where hilly landscapes and heavy vegetation limit the amount of open savanna woodland available, the 'model' system is heavily truncated.

This description serves to show that previous notions concerning the need to replace 'simple' bush-fallowing by African equivalents of the ' 'Warfolk four-course rotation' are ill-thought out, being based on a gross over-simplification of the realities of the 'quasi-rotational' practices already embodied in shifting cultivation. It should be noted, however, that Kabba farmers have not yet developed a system of permanent cultivation. Once a farm cycle has been worked out, the land is abandoned for upward of a generation.

Fallows

The main determinant of the decision to abandon a farm plot is the decline in yields due to soil exhaustion, and increases in weed and pest damage. These ill-effects build up over the years. Each farmer judges when returns to labour and resources are no longer satisfactory. A fuller list of indicators which farmers recognise as signalling

2 2

Table 5.13

FARMERS' REASONS FOR SHIFTING FROM ONE FARM AREA TO ANOTHER

Reasons	Takete-Ide	Ejuku	Olle	Iya Gbedde
No more fertile land	19	12	22	20
Time permitted by owner expired	0	0	8	3
Poor yields (bad soils)	21	18	19	22
Work of enemies	4	1	4	6
Pest, crop diseases and/or weeds	11	16	19	9
To avoid domestic animals	8	3	-	1
No neighbouring farms any more	3	2	2	1
To avoid flooding rivers	3	1	-	-
To be able to grow cash crops	-	1	-	-
Too far from the village	5	3	4	6
Due to shift of village to new site	-	-	-	12
N = 30				

Source: Field Work 1978

the need to abandon a given plot of land is given in Table 5.14. Length of use before fallow also depends on soil types and these differ from village to village. In part this may reflect differences in man-land ratio. For example, in Takete-Ide, each ọ̀fẹ́ plot is used for three years by 27% (8) of the farmers in the sample, four years by 53% (16) and five years and above by 20% (6)[max. 7 years], while àkùrọ̀ plots are used for only one year at a time by 73% (22) and two years by 27% (8) of the sample. Ìbọ́ plots are used for 1 year by 13% (4), up to three years by 40% (12), and up to five years by 40% (12) and up to 7 years by 7% (2).

The figures for Ejuku are very similar to those from Takete-Ide, as is the case with most villages located in the savanna areas away from the central Kabba Highlands. For Olle and Iya Gbedde and other settlements located near pockets of rain forest and/or hilly topography, the situation is different. In Olle, only 10% (3) of the farmers used upland plots for more than three years. This results from the rule that they could not use land allocated by the Forestry Department for more than two years. Meanwhile as many as 63% (19) used àkùrọ̀ plots for up to three years continuously. In Iya Gbedde, ọ̀fẹ́ plots are used for only one year by 13% (4), two years by 47% (14), three years by 30% (9) and four years by only three of the farmers in the sample. This is due to shortage of ofe land because of rugged topography and extensive forests.

Every farmer in the sample recognizes the function of fallows and that the longer the fallow, the better the chance the land has to regain its fertility. However, length of fallow depends very much on the man/land ratio

Table 5.14

REPORTED INDICATORS OF SOIL EXHAUSTION

Indicators used by farmers	Soil		Types	
	Upland (ofe)	Lowland Swamp (akuro)	Upland Swamp (ibo)	Forest Soil (igbo)
Poor yields	120	88	101	51
Pests and crop diseases	58	10	21	46
Weeds	119	15	86	32
Increased yam decay	28	-	4	12
Tradition	-	28	3	-
Forced to leave (Forestry Dept.)	-	-	-	8
Plants less luxuriant in growth	26	3	17	30
Usual water logging absent	-	36	12	-
Soil turns white	-	42	25	-

N = 120

Source: Field Work, 1978

(usable land). Land availability in Kabba is not as crucial as travelling distance of farm plots in deciding both the size and location of farms. In generalizing for typical tropical environments, Gourou (1965) feels that fallows must last for between 25 and 30 years while Morgan and Pugh (1969) figure 6-8 years to be enough for land to regain adequate fertility naturally. In the savanna areas of northern Kabba, average length of fallow based on farmers' reported estimates, is 29 years in Takete-Ide and 26 years in Ejuku. In these two villages, no farmer in the sample has ever re-cultivated a plot he abandoned in his own life time. Areas exist which have not been cultivated for upward of fifty years (interview with Chiefs Ogbondeminu and Elega, the oldest men in Takete-Ide and Ejuku respectively). This long fallow allows the bush fallowing system to operate efficiently. Due to the shortage of <u>àkùrọ̀</u> land, these swamp lands are only left to fallow for between one and three years.

In Olle and Iya Gbedde, as is the case for most of southern Kabba, the picture is very different. Fallow periods on <u>ọ̀fẹ́</u> plots averaged only 17 and 15 years over the past two or three generations. The principal reason for this is the reduction of land area available for food crops as a consequence of extensive cultivation of tree crops (coffee in particular). All farmers in the samples were asked why they do not leave land to fallow for longer than at present, and only in Olle and Iya Gbedde did a large number of farmers mention shortage of land as a factor. Most farmers have reused fallow land in these areas, while many said that their fallows last from between six and twelve years. Other reasons for shorter fallows include distance to virgin land, and the large amount of labour needed to clear virgin forest. Again, most of these responses came from Olle and Iya Gbedde while most farmers in Takete-Ide and Ejuku said that their fallows are long enough, in fact so long that re-use of the land is not an issue.

To assess whether the length of fallow depended on crop type, farmers were asked to state the minimum length of fallow required for each crop if it were to be planted alone. The responses, presented in Table 5.15, suggest that farmers consider yam, guinea corn, pepper and soyabeans to require the longest fallows. The interesting point that emerges from the table is that farmers' estimates of what the land needs as fallow reflect the realities of their land supply situation. For example, required length of fallow is much shorter in Olle and Iya Gbedde than in the savanna areas of Takete-Ide and Ejuku.

Ownership of land under fallow is the same as before the land is used. Since most farmers exercise usufruct rights over land, it reverts to the land-owning clan once abandoned. To re-use the old plot, nothing is required more than notifying the land owners, but a different farmer will need the consent of the previous user (if he is still alive) and also take full and fresh permission from the land owners on a new contract. A favourable word to the latter from the previous user will ease the situation for the new user.

Table 5.15

FARMERS' ESTIMATES OF MINIMIUM LENGTH OF FALLOW REQUIRED BY EACH CROP IN A MONOCROPPING SITUATION AFTER 4YRS OF LAND USE

Crop	Average Minimium Length of Fallow Required			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Yam (Lowland swamp)	1.8 yrs	3.7 yrs	1.3yrs	2.1 yrs
(Upland)	13.5 "	10.9 "	7.7 "	4.1 "
(ibo)	10.7 "	8.7 "	3.8 "	3.9 "
Guinea Corn	12.2 "	8.3 "	4.9 "	3.5 "
Maize (Lowland Swamp)	1.2 "	1.5 "	2.0 "	1.1 "
(Upland)	11.7 "	9.9 "	3.7 "	3.2 "
Cassava	8.6 "	5.4 "	2.6 "	3.3 "
Beans	6.4 "	4.6 "	3.8 "	3.1 "
Pepper (Upland)	12.1 "	9.8 "	4.8 "	3.5 "
(ibo)	6.1 "	6.7 "	3.2 "	3.1 "
Melon	5.8 "	6.1 "	4.7 "	3.2 "
Soyabeans	6.3 "	5.9 "	3.4 "	3.6 "
Rice	-	-	3.4 "	-
Cocoyam	-	-	4.6 "	3.8 "

All figures are averages calculated from interview responses.

Source: Field Work , 1978

111. Resource Allocation

Land, labour, capital, and the management skills to combine them constitute a familiar system for categorizing inputs to agricultural production (Day, 1962; Dunn, 1954; Harvey, 1966; Found, 1971). It is interesting to try and describe Kabba farming systems in these terms. To some extent, this helps bring out the strengths and weaknesses of existing models in relation to Nigerian material.

A. Land: The man-land ratio and the land tenure system have been described (Chapter 3). Àkùrọ̀, ìbọ́ and ígbó land are in short supply but upland ọ̀fẹ́ is abundant especially in the savanna. No attempt has been made to compute the 'value' of land in capitalist land market terms because all farmers have rights of usufruct without monetary payments or crop sharing arrangements. Under present land tenure systems and population densities, no farmer is limited by availability of land. Nowhere does farm land 'cost' more than N5.00 in access fees. In terms of conventional analysis therefore, land input has to be treated as a 'given' variable.

B. Capital: In the Kabba context, 'capital' available to the farmer constitutes the residual of all other production factors except land, labour and management skills. Included are seedlings for planting, farm implements, fertilizers and pesticides. Actual cash investment in agriculture is very small. As indicated in Table 4.3, spending on agricultural inputs ranked fourth in Takete-Ide, and Olle, fifth at Iya Gbedde and sixth at Ejuku among farmers' list of items of expenditure. Each of the inputs will be examined briefly.

a) Seedlings or Planting material: Only 12% (14) of farmers in the sample bought any food crop planting material in 1978. Most of the planting material is generated from previous season's harvests. Seed yam (especially that used to plant àkùrọ̀ plots in February) constitutes the bulk of the purchases and the amount of money spent ranges from N0 to N50. No farmer spent more than five naira (average N1.70k) on any other type of seed in 1978.

b) Farm implements: The basic farm implements are the hoe and cutlass. All farmers possess small knives (pen knives and long-bladed knives for cutting yam setts and harvesting guinea corn), a basket or two, calabashes for carrying seedlings and produce, pots for cooking on the farm, and containers (gourd or plastic) for carrying drinking water on the farm. Except for the hoe and the cutlass, cash expenditure on all of these implements is small, totalling less than N6 per year.

The number of cutlasses bought per year ranges from one to ten, but all farmers who bought more than two owned tree-crop plots (and all but two came from Olle and Iya Gbedde). For the total sample, mean number of cutlasses bought per year is 1.8 per farmer. The cost of each cutlass ranges from two to four naira depending on the size and use (straight ones with widened heads are required for normal food crop farming and ones with curved heads are used for forest clearing). The average cost of each cutlass in 1978 was N2.58k. So on the average each farmer spent N4.64 on cutlasses in that year. The number of hoes bought ranges from one to five with an average of 2.1 per farmer while the average cost of each hoe, including the handle was N3.05k.

Each farmer in the sample therefore spent on average of N6.41k on hoes in 1978. The hoe referred to so far in this section is the big hoe (4cm across and 3cm long) used for heaping. The life span of these hoes ranges from three to five years. The blade is reduced in size annually through wear and tear. Each farmer therefore has many hoes of different sizes (depending on age) used for different purposes. The three main categories are i) the àkọ́tún (the big new hoe) used mainly for heaping, ii) the medium hoe (in the second year of use, a hoe is reduced in size but still big enough for use in the second stage of heaping and in yam planting) and iii) the small hoe called ìpégùn. By the third and fourth years after purchase, the original àkọ́tún becomes an ìpégùn, used mainly for hoeing or weeding, clearing and harvesting yam. This is the only hoe handled by children under fifteen years old.

Food cultivation implements are indigenous. They have been tested in the local environments, modified and adapted through time. The types of hoes used in Kabba are made by local blacksmiths and are conspicuously different from those used by Igbirra, Kogi, Nupe and Igbomina people who are neighbours to the Kabba. Not only are the hoe blades different in size, shape and morphology, the handles are also different in length and form. It would be interesting subsequently, to pursue the minor differences in farming practice and soil conditions that have given rise to these local variations in the design of farm implements.

c) Fertilizer: In 1978, 97% (29), 90% (27), 60% (18) and 40% (12) of farmers in the sample in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively used chemical fertilizer, a sharp increase in the number who used it at the beginning of the decade (see Chapter 10). It's use is concentrated on the major crops such as yam, guinea corn, maize, beans, soyabeans and rice. With mixed cropping, however, many crops take advantage of the use of fertilizer. The amount of money invested in fertilizer is, however, small as shown by the following figures:

	Range of expenditure	$\bar{x}$	σ
Takete-Ide	N0-28	N8.67	5.72
Ejuku	N0-40	N3.25	7.96
Olle	N0-40	N4.64	6.84
Iya Gbedde	N0-20	N6.00	6.10

On the average each farmer in the sample spent only N5.64k in 1978.

d) Pesticides: Apart from indigenous pest control methods, discussed in Chapter 10, 80% (24), 53% (16), 60% (18) and 47% (14) of sample farmers in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively used modern pesticides in 1978. But like fertilizer, the actual amount of money spent was small, ranging from N2 to N25 per farmer. In the savanna areas where annual food crops are dominant, the only farmers in the sample who spent more than N11 on pesticides were the few having small tree-crop plantations. In Olle and Gbedde where more farmers have cocoa and coffee, an average of N19 and N15 respectively was spent on pesticides to spray trees. For the whole sample, the average amount of cash spent on pesticides in 1978 amounted to N8.42k.

C) Labour: a great deal of attention has been focused on labour supply as the most important single input factor in peasant agricultural production (Goodfellow, 1939; Richards, 1939; Fox, 1953; Heyer, 1965; Pudsey, 1966; Moody, 1970).

Four major sources of labour for farm work are identifiable in Kabba. They are i) household labour - used by all farmers, ii) ọ̀wẹ̀ or communal labour, in which wealthy farmers, or those holding important village or compound titles ask compound members to help on the farm at no cost except to provide food, kolanuts and beer for the workers. It is primarily a mark of respect for certain farmers, but normally, any farmer in the compound who has attained full manhood has the right to call on ọ̀wẹ̀. It is those who have cleared more land than they can hope to heap on their own who call for ọ̀wẹ̀. Only 17.5% (21) of farmers in the sample used owe as a source of labour in 1978.

Ọ̀wẹ̀ also provides an arena for young men to compete at work. In the past wealthy men who called ọ̀wẹ̀ might put a beautiful girl at the end of the job area while all young men worked towards her. The first to finish took her as wife. Others used various gifts of land, cash and even community titles as rewards to young men who excelled at work. A competitive spirit for hard work was thus developed among the people. At the same time these examples show that ọ̀wẹ̀ was also one of the means by which the older generation were able to exact labour from the young.

(iii) a͡arò (joint or co-operative labour), in which farmers group together to help each other during the period of peak labour demand, to cope with such tedious operations as heaping, clearing, and weeding. The size of each group varies from three to as many as nine, and is based on either age or lineage grouping or even personal friendships. Members take turns in working together on each others' farms, with a frequency ranging from daily during heaping to once a week at other times. When the period of peak labour demand is over, these groups disband. 47% (56) of farmers in the sample belonged to a working group in 1978. In the past few years, _ãarò_ co-operative labour has taken a new turn. In many villages groups have started co-operative farming taking one day off each week to work on a joint farm, contributing planting material for the initial cropping season and re-investing all proceeds back into the farm. As far as could be determined, this was an indigenous initiative. As of 1978, only cereals – maize, guinea corn and beans, were involved, planted in pure stands. The joint farm is ridged with the tractor and monocultural while personal farms are heaped and operated on mixed cropping principles. The extension of the _ãarò_ into group farming is similar to the 'labour companies' of northern Sierra Leone (Richards, personal communication).

(iv) Hired labour: 100% (30), 73% (22), 60% (18) and 63% (19) of sample farmers in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively employed hired labour for farm work in 1978 but the numbers thus employed were small. The total number of man-days of labour employed per farmer per year is as follows:

	Range	mean
Takete-Ide	1 - 20	7.1
Ejuku	0 - 40	5.1
Olle	0 - 50	4.2
Iya Gbedde	0 - 10	2.9

Over the total sample this amounts to an average of 4.8 man-days of hired labour per farmer per year. Low utilization of hired labour results from its scarcity and high cost, the causes of which are discussed in Chapter 9. Average labour charges, per man-day of work in 1968 and 1978 are as follows:

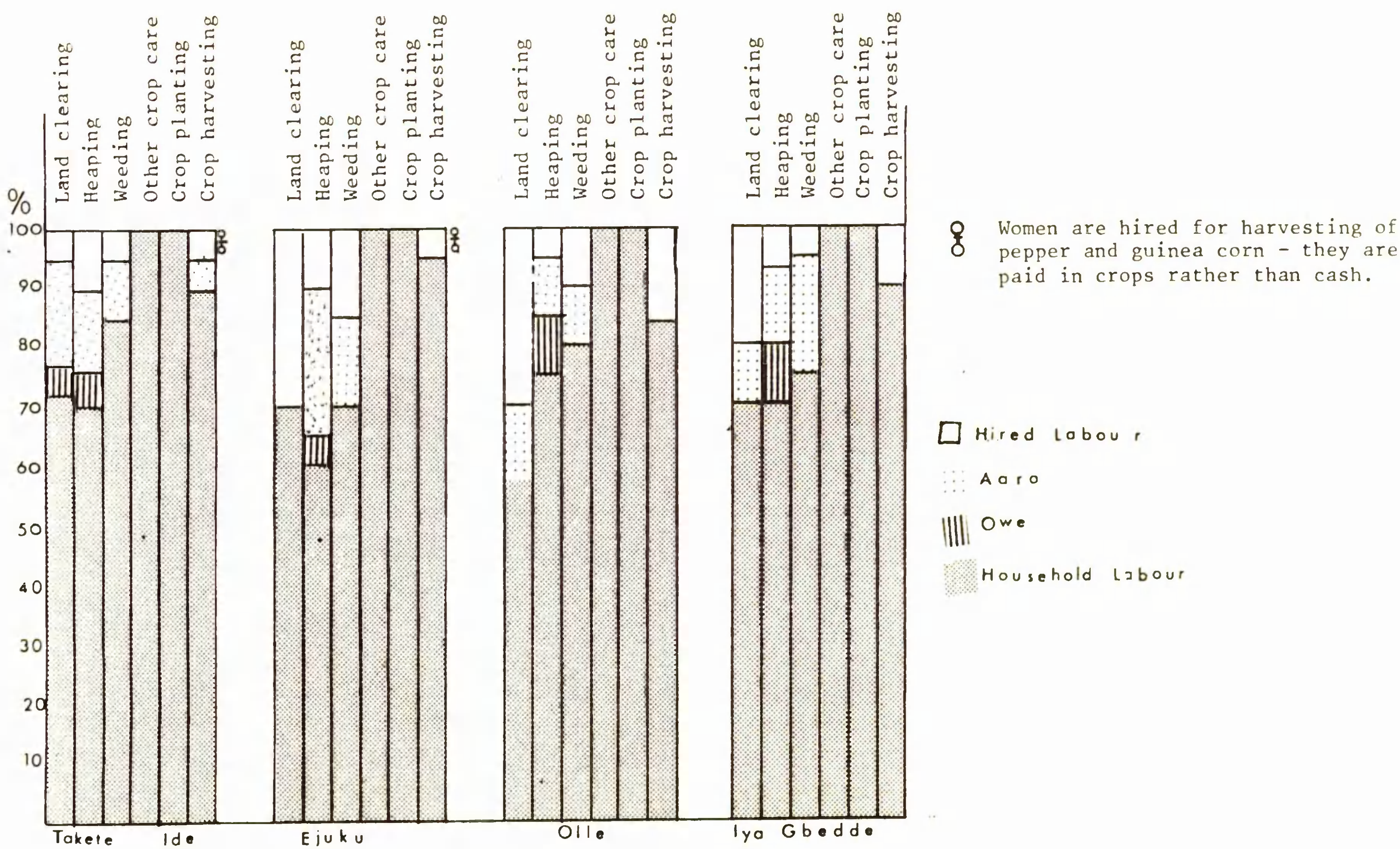
	1968		1978	
	Range	$\bar{x}$	Range	$\bar{x}$
Takete-Ide	25-50k	33.66k	N2.50-4.00	N3.70
Ejuku	20-50k	50k	N3.50-6.50	N5.16
Olle	20-50k	24.16	N1.50-4.00	N3.12
Iya Gbedde	20-70k	39.03k	N2.00-5.00	N3.40

Overall, average man-day labour costs increased from 37.40k in 1968 to N3.81 in 1978 (a rise of almost 9 times). The average labour cost per day, multiplied by the average number of man-days of labour employed shows that farmers spent an average of N15.90k on hired labour in 1978.

It is now possible to make a rough estimate of total cash input into farming per farm in 1978 by adding together the average amounts spent on each of the items already discussed. The result is N44.95 - an extremely small cash investment.

We must now focus on family labour which constitutes the major source of farm labour inputs. Fig. 5.3 categorizes information on the proportion of different labour types used in major farm operations. It shows that family labour predominates in all farm operations except for clearing, heaping, hoeing, forest clearing and harvesting guinea corn and pepper. Family labour comes in the main from the farmer himself, his sons and relatives resident in his house. As will be shown below, women are not involved in any farm operations, except for some planting and harvesting and evacuation of farm produce. Moreover, all adult males have

FIGURE 5.3 Proportion of Labour Types used per Farm Operation



their own farms and even when many men live under the same roof, they each have individual household units with individual household farms. The farming household, therefore, consists of a single male head, his wife (or wives), his children and any children of relatives being brought up by him. In recent years, however, the majority of rural children no longer work the land but attend schools and thereafter move to the towns. Family size no longer correlates with amount of family labour available. The correlation co-efficient between food crop farm size and household sizes is $r = 0.3$, 0.3, 0.5 and 0.4 in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively. The notion that marrying many wives and rearing a large family solves the farm labour supply problem is no longer valid. The labour provided by the farmer himself is therefore the most crucial component in crop production. It is difficult to compute its cost because of the difficulty in determining time opportunity costs in a situation where this type of labour constitutes such a great proportion of the total costs of production (Spencer, 1975). One approach is to treat it as being the same as the going rate for hired labour per man-day in 1978, which was N3.81.

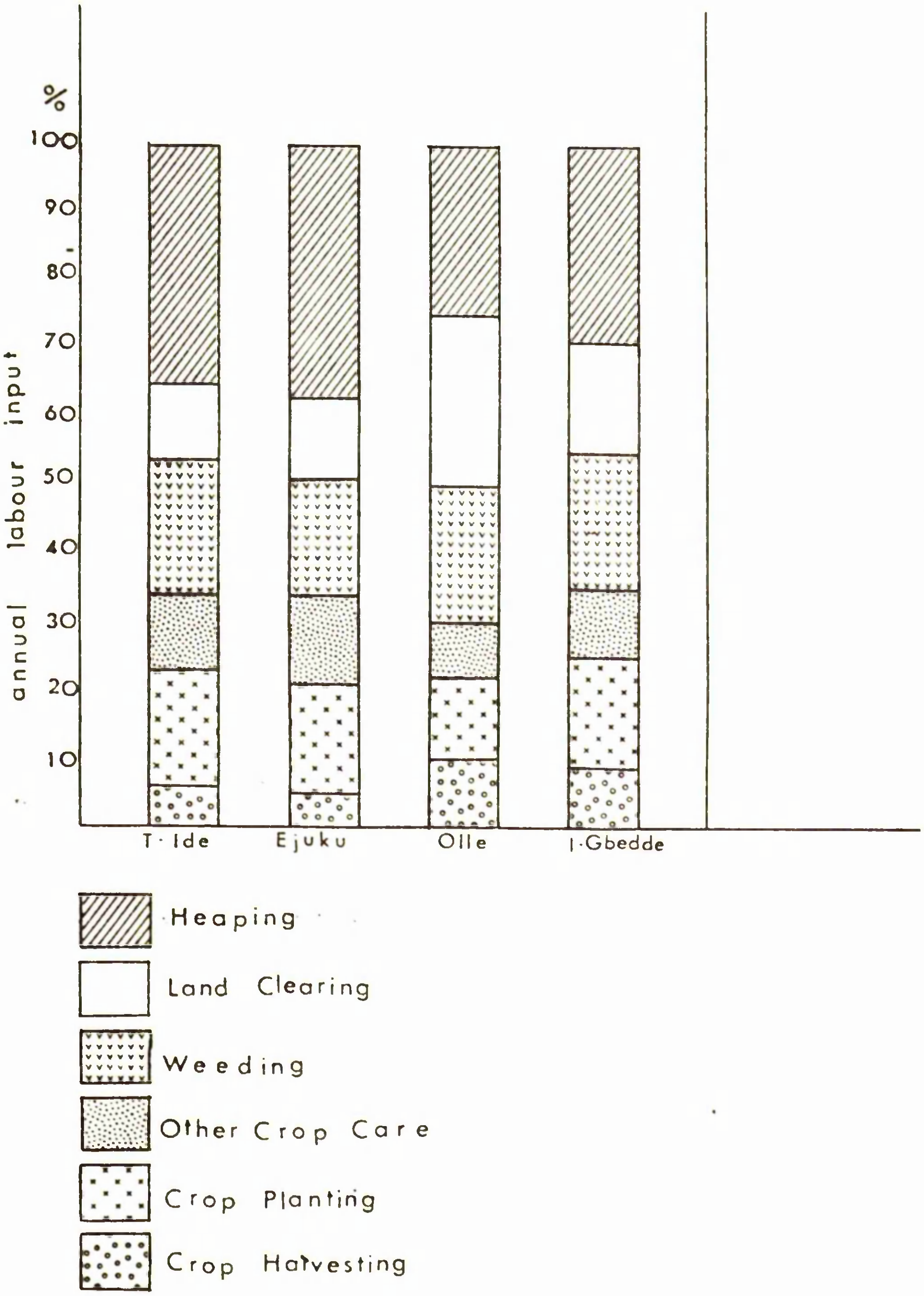
Each farmer was asked to estimate the number of working days during which he was unable to go to the farm in 1978. Adding this to the aggregate number of Sundays and festival holidays and subtracting it from the total number of days in 1978, showed farmers working an average of 201 days for that year. At local rates for hired labour this amounts to N766 worth of personal labour input by each farmer. This can only be an approximate figure and takes no account of variations in the length of the working day. The farmer may spend between eight and ten hours in the farm per day between May and December, but no more than three to four hours from the end of February to mid-April. Supplementary labour, supplied by women, children, or relatives (see Appendix 7 for details of farm operations in which men, women and children are involved) could not be computed because of the irregularity of supply, and time and cost limitations on field work.

Labour demand (by crop type, farm operation type, and the seasonality of demand) is also crucial to our understanding of the farming system and the allocation of resources. Certain crops demand more labour in bed preparation, planting, crop care and harvesting processes. Farmers were asked to rank crops in order of labour demand and the number of responses in each category is given in Table 5.16. In farmers' assessments, yam is the most labour demanding crop. Farmers were also asked to estimate the proportion of annual labour resources devoted to each of the major farm operations and the responses are presented in Fig. 5.4. Heaping, weeding and clearing, in that order, are the most labour intensive operations, accounting for 72% of all labour supply per year between them. They are also activities concentrated between June and October, making this period the most labour-demanding in the year. This shows why other labour sources have to be found to supplement family labour for these three farm operations in the savanna areas, and for forest clearing as well in the forest zone farms.

<u>Seasonality of Labour Demand</u>: Most of the authorities cited (under C - labour), have dealt extensively with the problem of the seasonality of labour use in peasant agriculture.

Table 5.16 CROPS RANKED ACCORDING TO FARMERS ASSESSMENT OF LABOUR DEMAND

	Takete-Ide				Ejuku				Olle				Iya Gbedde			
Crop	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Yam	30	-	-	-	27	2	1	-	26	-	2	2	24	3	3	-
Cassava	-	1	8	10	-	2	5	9	-	-	7	4	-	3	4	1
Guinea corn	-	19	11	-	1	18	7	1	-	-	2	6	-	2	6	4
Maize	-	-	2	6	-	3	10	5	-	12	9	2	-	3	3	6
Okro	-	-	-		-	-			-	-		-				
Beans	-	2	1	3	-	-	2	2	-	-	2	-	-	-	1	3
Coffee	-	2	2	1	-	-	1	1	3	10	-	5	4	8	6	7
Cocoa	-	-	-	1	1	-	1	-	-	-	-	1	-	2	1	2
Melon	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-
Soyabeans	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Rice	-	-	-	1	1	2	-	-	-	1	4	7	-	-	-	2
Tobacco	-	4	-	2	-	2	1	3	-	3	2	1	2	7	3	3
Pepper	-	3	5	6	-	1	2	3	1	4	2	2	-	2	3	2
Cocoyam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



FIG· 5· 4 Farmer estimates of proportion of Annual labour input spent on Major Farm operations

The proportion of labour use varies with the degree of seasonality as a shorter rainy season means sharper seasonal peaks in the labour utilization curve. In climatic terms, the year is divided into the wet (May-Oct/Nov) and dry (Nov-April) seasons. The former is also the peak period for labour while the latter with water the limiting factor in plant growth, and temperatures the limiting factor for labour exertion, is the so-called slack period. Farmers estimate the proportion of labour expended in these two periods average 70% and 30%. Farmers have their own classification of the labour demand periods as follows:

(i) peak demand is from July to early October during which time clearing of new plots, all heaping, and hoeing of existing crops, and much planting are carried out. This is the most crucial period and all labour sources are tapped.

(ii) immediately following this period, is the time for yam seed preparation, yam planting, and harvesting, and harvesting of beans, soyabeans and guinea corn. This second phase lasts from October to December. In Olle and parts of southern Kabba, by contrast, January to March is the second most labour demanding period because this is when the forest is dry enough for clearing. Forest clearing and àkùrọ̀ farming are responsible for intense labour demand at this period.

(iii) The third period of heavy labour demand is split between January/February and May/June in the northern villages. The first is the period for clearing, heaping and planting àkùrọ plots. It is also the period for mulching and staking yam. The latter is seed bed preparation and planting time for maize and guinea corn and also the time for first hoeing of existing plots. In the forested areas the third most busy period is October to December. Apart from these three periods, there is a short interval from March to the end of April when there is very little work on the farm.

Working habits during the wet and dry seasons reflect these patterns of seasonal labour demand. Between May and mid-October, no farmer stays at home on a working day except when prevented from doing so by circumstances beyond his control, e.g. sickness. Farmers arrive on the farm between 6 and 7 in the morning, and work till five or six in the evening, except for a short break for lunch, arriving back in the village after dark. Except on Sundays, virtually all daylight hours are spent on the farm at this time, doing work which is tedious and strenuous. No evidence of what Ruthenberg calls "a marked preference for leisure" (Ruthenberg, 1971:13) is found at this time. 'Armchair farmers' should try to put themselves through the pace of farm work done by farmers at this time before drawing such conclusions. No one could be expected to maintain that pace throughout the year. The relatively slack period which follows from March to the end of April is essential for gathering the farmer's strength again. As Collinson put it "many other workers have demonstrated the phenomenon of seasonality, and while under-employment is marked, in the absence of alternative employment, it cannot be attributed to farmer motivation" (Collinson, 1972:34). This seasonal slack is forced on farmers by the dry and hot weather which bakes the soil into a hard crust and makes it unworkable. Where workable soils occur, farmers are quick to utilize them.

For example, in forested areas, clearing takes place from January till the end of March, while <u>àkùrọ̀</u> plots, because they are too wet to work in the wet season, are cultivated between January and the end of February each year. During the dry period, yam is mulched and staked, and from then on, while requiring less physical exertion of labour, farm work needs vigilance, requiring the farmer to go to the farm daily to train yam vines on stakes. Much effort is also required from tree crop farmers at this time. Weeding is undertaken and a lot of time is taken up watching plots in order to prevent fires from bush burning reaching the farm. Whenever rain is late, tree crops are watered from surrounding streams before the rains arrive. Much farm work at this period takes place between seven and half past eleven in the morning and between four and six in the afternoon because intense insolation under cloudless skies makes work impossible around mid-day. Farmers are therefore fully occupied at this time of year, even though physical output of labour is reduced. Leisure when there is work to do is taboo, as exemplified by the proverb:

> <u>ehòrò kí n'ísẹ́ ǹ'ìlẹ̀ kó sùn l'ọ̀sán</u>
>
> [the hare does not take an afternoon nap when there is work to do].

Non-farm activities, as a component of life in the slack period, have been largely neglected by agricultural economists but as Hey ~~er~~ (1965), Pudsey (1966), and Richards (1939) point out, they are vital in maintaining the social and cultural environment in which farming takes place. Community development work (building of roads, culverts, markets, schools, health centres, village cleaning etc) and other socially productive activities are all timed to take place during this period. House building and repairs also take place between December and May. The 43% (52) of the farmers in the sample with secondary jobs carry this work out during the dry season to supplement cash earnings. Social interaction and almost all travelling outside the village are both especially prominent at this time, increasing farmers' range of social contacts and awareness of other areas. Such awareness creates some of the goals and aspirations discussed earlier and it ultimately brings the kinds of changes in the farming system discussed in Chapter 10.

In this chapter, the allocation of resources and the management of these resources for crop production have been discussed in detail in order to show how the farming system is organised as part of a strategy to meet the goals outlined in the previous chapter. How the produce of the farm is used to meet such goals through consumption and market sales will be the subject of the next chapter.

CHAPTER 6

GOAL SATISFACTION - CONSUMPTION AND MARKETING ASPECT OF PRODUCTION

This chapter presents a picture of what farmers actually do with farm produce in terms of meeting family food requirements and directing crops to the market. It attempts to show that farmers pursue a complex of interrelated aims and objectives and that there are few grounds for supposing that the problems of rural development are in any way connected to farmers ignorance of the workings of the wider regional economy. The first part deals with household feeding strategies while the second focuses on marketing of farm products.

A. How farmers look at household consumption issues

Dietary customs and etiquette govern preparation and ingestion of food in Kabba as in all parts of the world (Simmoons, 1967). They also influence the types and varieties of crops grown and may determine the rate at which farmers are willing to accept introduction of new crops. The main food items are presented in Table 6.1. Farmers were asked to rank these items so as to reflect their order of preference, frequency of consumption and quantity of consumption.

The results confirm pounded yam as the most important item in the diet. Yam is an essential crop for every farmer, therefore, and pounded yam 'the food' for every household. All other food types are deemed to be 'supporters' of pounded yam. In many households, the evening meal (taken between 6 and 8 p.m.) is the major meal of the day as most men are in

Table 6.1

RANKED LIST OF FOOD ITEMS IN HOUSEHOLD DIET, DECEMBER 1978

Food Items		Pounded Yam	Amala	Eba/ gari	Rice	Beans	Soya-beans	Maize	Cocoyam	Aerial yam	Bread	others	
Takete Ide	(1st	30	–	–	–	–	–	–	–	–	–	–	N = 30
	(2nd	–	26	3	–	–	–	1	–	–	–	–	
	(3rd	–	–	16	11	2	–	1	–	–	–	–	
	(4th	–	3	3	11	5	4	3	–	1	–	–	
	(5th	–	1	4	4	7	7	4	–	2	–	1	
	(6th	–	–	–	4	2	5	4	–	5	3	1	
Ejuku	(1st	28	–	2	–	–	–	–	–	–	–	–	N = 30
	(2nd	2	6	13	5	3	–	–	–	–	1	–	
	(3rd	–	6	7	11	3	–	2	1	–	–	–	
	(4th	–	2	7	7	11	–	2	1	–	–	–	
	(5th	–	–	1	6	9	4	6	2	1	–	1	
	(6th	–	1	–	1	4	5	3	4	–	–	–	

Table 6.1 contd.

Food Items		Pounded Yam	Amala	Eba/ gari	Rice	Beans	Soya-beans	Maize	Cocoyam	Aerial yam	Bread	others	
	(1st	28	-	2	-	-	-	-	-	-	-	-	
	(2nd	2	4	14	10	-	-	-	-	-	-	-	
	(3rd	-	8	8	12	-	-	2	-	-	-	-	N = 30
Olle-Bunu	(4th	-	3	4	7	10	-	2	4	-	-	-	
	(5th	-	2	2	1	10	2	5	5	-	2	1	
	(6th	-	1	-	-	8	4	10	6	1	-	-	
	(1st	25	3	2	-	-	-	-	-	-	-	-	
	(2nd	3	16	6	2	2	-	-	1	-	-	-	
	(3rd	2	6	14	6	1	-	-	1	-	-	-	
Iya Gbedde	(4th	-	3	4	8	8	-	1	6	-	-	-	N = 30
	(5th	-	2	2	10	10	-	1	5	-	-	-	
	(6th	-	-	1	3	6	1	4	13	1	1	-	

Source: Field Work, 1978

the fields during the day time. Every farmer wants to have pounded yam in his stomach as he goes to bed, as other food items are eaten as an evening meal only when yam is not available, or because of domestic difficulties cannot be prepared. Most men will try other types of food during the day, but will not compromise over their evening meal being pounded yam. To the farmer, it is his reward for hard work, since pounded yam is not the type of food readily available to the lazy man (see Chapter 4). The secondary or supplementary nature of other food items is apparent from the following proverb.

> iyán l'ońjẹ̀, ọ̀kà ni s'ongbe, ài rí rara ni à ńjẹ ẹ́kọ̀, k'ẹnū mā d'ilẹ̀ ni tì yangàn
>
> [Pounded yam is the food, amala (sorgum flour + yam or + cassava flour paste) is for support, not finding anything to eat at all forces one to eat corn meal, and eating maize is only to keep the mouth from being idle]

Pounded yam is followed by àmàlà (see Table 6.2) in Takete-Ide, Iya Gbedde and ẹ̀bà in Ejuku and Olle, as the second preference. Pounded yam, àmàlà, ẹ̀bà, rice, beans, maize are the most important staples in the household diet all over Kabba. The first three are always eaten with a vegetable soup (okro, ẽwẽdù, melon, ẽfọ́, etc) which includes salt, meat, fish, pepper, palm oil and irù (made from fermented and treated locust bean seeds).

Dietary preference are crucial to decisions as to which crops to plant and changes in either of them can affect the other. There have been considerable dietary modifications in the past twenty to thirty years. After listing the items

Table 6.2

WAYS IN WHICH EACH FOOD CROP IS PREPARED FOR HOUSEHOLD CONSUMPTION

a) Yam (tuber)	peeled and boiled or boiled and peeled, eaten with palm oil and salt or with garden eggs. Roasted in open fire, burnt back scraped, eaten with palm oil, salt and garden eggs. Àsàró (porridge): peeled, cut into small cubes, cooked with beans, palm oil, salt pepper, fish/meat. Pounded yam (íyán) - peeled, cut and boiled, pounded into paste in mortar and eaten with vegetable soup. Eèpà soup - Left overs of boiled yam sliced dried and stored for dry season use, crushed and cooked as soup with condiments to accompany pounded yam, àmàlà or eba. Elùbọ̀: peeled, half boiled soaked in water for one to four days and sun dried. This can store for two years or more. Èlùbọ̀ is crushed and ground into powder, added to boiling water to make paste (ámálá). Some add sorghum flour to the yam flour before paste is made eaten with vegetable soup.
b) Guinea Corn (sorghum grain)	Àkàmù: grain soaked in water overnight and ground into soft paste. This is mixed with boiling water and cooked as porridge, eaten with bean cakes or sugar - usually a breakfast item only, or for babies. Flour: grains ground into flour. This is mixed with yam or cassava flour and made into àmàlà but with greater cohesiveness. Àmàlà made thus is edible the next day without refrigeration. It is cut into large portions and warmed in vegetable soup. Eaten as ìkàhìn (preserved overnight) usually at breakfast time. Èwéí - grain boiled and palm oil, salt and fish, usually taken as mid-day meal. Beer (bùrùkùtù) - grains soaked and left to germinate, then ground and added to gàrí in water. This mixture is left in a sealed pot for a few days to ferment and is then sieved into local beer. Èlèkùté - grains fried to pop corn and ground into powder. Added to cooked beans and deep-fried in oil. Used as a snack. Órí - grain is ground wet. The resulting paste is wrapped in leaves and steamed to make corn cake. Eaten with palm oil.

Table 6.2 contd.

	Boiled or roasted and eaten with palm oil and salt. Peeled, boiled and added to cooked yam to be pounded together as 'pounded yam'. Used as supplement when not enough yam is available.
c) Cassava (Tuber)	Làfún (flour) - peeled,soaked in water for 2 - 4 days and sun-dried. As such it can be stored for between one and three years. For use, the dried cassava is crushed and ground into flour and used in two ways (i) flour mixed with boiling water into white paste as làfún and (ii) mixed with guinea corn first and made into àmàlà. Both are eaten with vegetable soup. Gàrí - most popular form of processed cassava. The tuber is peeled, grated, packed in a basket and left with a heavy stone on top for three days to one week. During this time, the water drains out and slight fermentation takes place (for the reactions involved. See Collard and Levi, 1959) This is then lightly fried in an open bowl and sun dried. Gari is eaten as a snack by soaking it in cold water and adding sugar, or accompany it with meat or fish. Used also as a main meal by mixing it with boiling water to form a thick paste called ẹ̀bà. Eaten with vegetable soup.
Cassava Leaves	Soup - very young cassava leaves (rich in protein but needing special treatment are cooked with condiments to form a soup used to accompany main dishes.
d) Maize	green - boiled or roasted on the cob and eaten (most common use). Dry grain fried for snacks Ẹ̀kọ́ - dry grains soaked and ground wet. The paste is mixed with boiling water to form a thick paste. This may be eaten like porridge as a snack; but more usually, is wrapped in leaves, covered and allowed to cool and harden. It is then eaten with vegetable soup. Ẹ̀kọ́ can be stored for a week in this cooked form.
e) Cocoyam (tuber)	Roasted or boiled and eaten with palm oil and salt. Peeled, boiled and added to yam and pounded as a supplement in 'pounded yam'.
f) Rice	Boiled white and eaten with pepper soup (tomato puree and onions and salt and pepper puree and and palm oil and fish/meat). Jolof - cooked with all condiments added while cooking.

Table 6.2 contd.

	(NB - Bean pods are never harvested green) àsàrò (cf yam) Ẹ̀wá - boiled with palm oil, salt, fish and eaten as a main course.
g) Beans	Cake - ground wet and fried as bean cakes (àkàrà) in oil to accompany porridge for breakfasts. Mọ́inmọ́in - ground wet, palm oil, salt, minced meat and crushed eggs are added. The solution is put in small milk tins or wrapped in leaves and steamed. Used delicacy, usually for ceremonies but also as a household food. Ájighéré: cooked and sprinkled with ēlēkūté (of guinea corn) and deep-fried in palm oil. This is used as snacks and to accompany soaked gàrí. Remains edible in this form for between six months and one year. Gbẹ̀gìrì soup - fried, ground and cooked with condiments as soup to accompany main meals.
h) Soyabeans	boiled soft, palm oil added (hungry season food) fried with salt and used as a snack.
i) Plantain	allowed to ripen, naturally and eaten fresh as fruit. Dòdò - peeled, cut into shapes and fried in oil, eaten with pepper soup. While unripe, it may be peeled, cooked and pounded with yam as a bulk supplement. peeled, halfboiled and sun-dried. In this form it is crushed to flour and used as a supplement to yam and cassava in àmàlà.
j) Banana	Allowed to ripen naturally and eaten fresh as fruit.
k) Water Yam (tuber)	Boiled or roasted in an open fire and scraped clean. Eaten with palm oil, salt or garden eggs.
l) Yellow Yam	Always cooked overnight and used for breakfast Not eaten in any other way.
m) Aerial Yam	Boiled, peeled, and eaten with aplm oil and salt. Boiled, peeled and pounded with yam as a supplement.

Table 6.2 contd.

Vegetables and Soup

All vegetables are cooked into soup to accompany staples. All vegetables are combined with a common set of basic condiments; namely, meat and or fish, salt, palm oil, <u>ìrù</u> (from locust bean fruits) and pepper. They are added at specific points during the cooking process depending on the type of vegetable concerned.

The Main Vegetable Soups include

a) <u>Okro</u> - Fresh fruit cut into small pieces and cooked with condiments.
   - cut and dried to form <u>ọrúnlá</u> (preserves for between one and three years), crushed and cooked with condiments.

b) <u>Efo</u> (<u>tètè</u>, <u>sọ̀kọ̀yọ̀kọ̀tọ̀</u> etc Taken fresh, chopped fine and cooked with condiments; or half boiled, dried, stored for later cooking.
   This same process goes for <u>éwédú</u>, water leaf and bitter leaf.

c) <u>Melon</u>(Ègúsí) - seed ground wet or dry, and cooked with condiments Usually used as a delicacy for important ceremonies and visitors. May be mixed with <u>ẹ̀fọ́</u>, water leaf, bitter leaf and <u>sàñkóró</u>.

No vegetables are eaten without thorough cooking.

<u>Meal times and Food Taken</u>

1. Breakfast may consist of guinea corn porridge, bean cakes and <u>ìkàhìn</u>. Farmers do not often take any breakfast before going to the farm, especially between May and November when farm work is heavy.

2. Mid-day meal - May be taken any time between noon and 3 p.m. Farmers typically eat boiled or roasted yam each day spent on the farm. Those at home may take rice, beans, boiled yam etc.

3. Evening Meal - From 6 p.m. - 8 p.m. Consists mainly of pounded yam (between July and March) and <u>àmàlà</u> or <u>ẹ̀bà</u> (April - June). These are the three types of food for which all vegetable soups are made.

4. Meals consist of one course only. Fruits and snacks are taken at random, distinct from meal times.

Source - Informal Interviews and Participant Observation - 1978 in Table 6.1, farmers were asked if this ranking would be the same as when they were young. 70% (20), 57% (17), 63% (19) and 83% (25) of sample farmers in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively reported changes. Further analysis of the responses showed that only the youngest farmers reported the diet to be the same as before.

Until the last fifteen years, rice and cassava were negligible in the diet. The former was considered the educated man's food and as recently as five years ago, some farmers refused to eat it at all. During informal discussions (Tape B, 1978) many farmers said that they ate rice only as a snack because it was not heavy enough in the stomach for farm work. As for cassava, gàrī, soaked in cold water as an accompaniment to the consumption of 'bush' meat and fish, entered the diet much earlier (at least twenty to thirty years ago) than consumption as ẹ̀bà, a food stuff which because it is closely analogous in physical presentation to pounded yam was until recently entirely shunned. In recent years, however, with increasing difficulty in cultivating yam due to labour shortages, drought and perhaps poorer soils, cassava has been on the ascent in production, sales and local consumption. G̀arī is still the cheapest staple food stuff in the market and within the means of the poorest families. Hence it is called 'the poor man's food' all over the country.

Among recent introductions to rural household diet are bread and semolina, and all indications (see Chapter 10). are that these will continue to increase in importance. It is worth noting, however, that they make no dietary inroads at times of the year when yam is in abundant supply. Their significance is entirely restricted to the hungry season situation. Marked food preferences are typical of rural communities in Kabba as they are in all parts of the world. It will be argued that more than just 'taste' is involved and that these preferences have a rational utilitarian basis (Simoons, 1967).

A better understanding is arrived at by looking at each crop from the point of view of the different ways it can be used for food, in what combinations each is consumed and when in the year it features in the diet. Table 6.2 provides details of types of food derivable from each crop with brief comments on preparation and presentation. An important factor is seasonality of production. Many food preparation techniques reflect sensible utilization of solar energy to process harvested products in such a way that they can be readily stored for the hungry season.

Flexibility and suitability in food preparation and presentation are additional strategies enabling full use to be made of the range of crops grown. The end product is a range of foods with different nutritional qualities, storage capabilities, taste characteristics and different rhythms of availability ensuring a varied diet over as long a period of the year as possible.

Seasonality of household consumption

Between July and March is a surplus period. From March to the beginning of July each year, there is a food deficit or 'hungry' season when the previous season's crops are running low. This seasonal rhythm has significant implications for household diet. Purchases of food are minimal during the surplus period, but the situation is reversed during the deficit period. Fig. 6.1 indicates the period

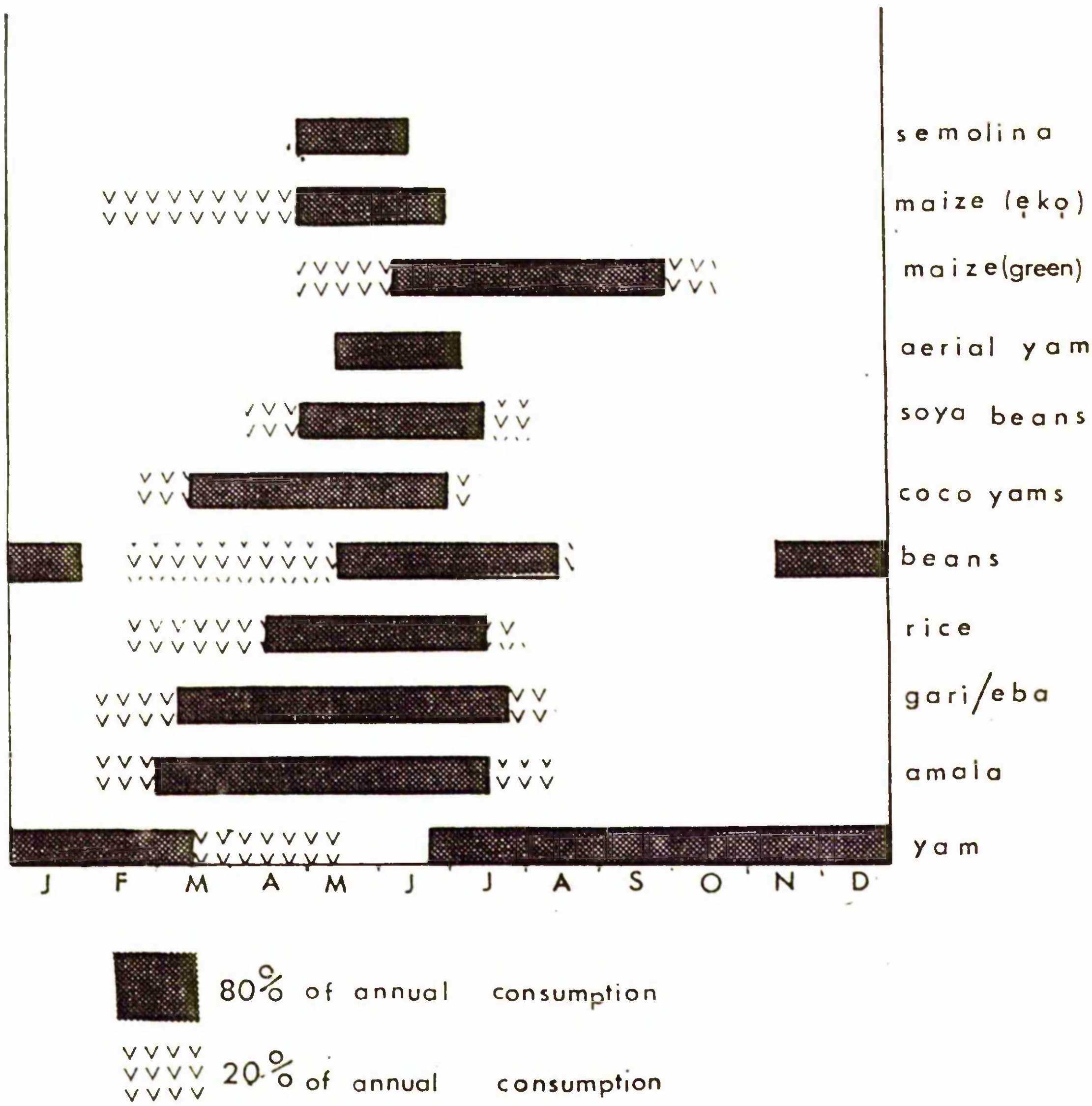


FIG. 6.1 Period of year when each food item is consumed

of the year when each of the major food items is prominent in household diets.

a) The Surplus Period: Even though harvesting of early crops such as maize and vegetables start in June, there is no surplus until mid-July by which time most farmers have enough mature yam to harvest. This surplus period lasts until the end of February for most households though some households manage relatively well beyond this time. All food crops are harvested during this surplus period and as Fig. 6.1 shows, yam is the principal food crop while all other crops such as vegetables are used for support, snacks or stay in the background. The exception is maize which is harvested green and eaten boiled or roasted either as a snack or on the farm. Other foodstuffs, such as rice, beans and bread are occasionally eaten at home as a mid-day meal by household members who are not on the farms, or on Sundays. For the farmer himself, the mid-day meal consists of roasted or boiled yam every day of the year he is on the farm, and pounded yam for evening meal as long as yam is available. The major reason apart from availability is that farmers claim that only yam can support the hard work being done on the farm at this period because it takes longer to digest and provides a lot of energy for work. Many farmers were reluctant to eat other types of food because they feared that they might not be able to do a full day's work on the farm the following day.

None of the sample households bought any yam, or any other major food item except rice during the surplus period. Occasional purchases include cobs of maize, a few mudus of gàrí for snacks and soup ingredients. These accounted for no more than 10% of annual food purchases.

Poor storage facilities, and carelessness during the period of surplus leads to a high degree of crop wastage. In recent years the wastage component has been reduced because new opportunities for crop sales have arisen especially sales to local secondary schools, hospitals, and the growing administrative centre of Kabba town. The food purchasing component in the population of Kabba Division must have increased ten-fold in the past fifteen years. Crop produce which used to rot in the fields and in storage in the past when few people bought food because everybody produced enough, now goes towards feeding this non-farming population.

b) The Deficit Period: This is delineated in Fig. 6.1 by the period when little or no yam is consumed. Various terms have been used to describe this period. Clark and Haswell (1966:18) call it the 'pre-harvest hunger' while others (Johnson and Kilby, 1975:17) have termed it 'seasonal hunger', but by far the commonest name is the 'hunger season' (Morgan and Pugh, 1969:100). By the end of February each year, stocks of yam are drastically reduced, not only due to consumption during the surplus period, but also by large-scale crop sales required to pay secondary school fees for the January term. This is one reason why the hunger season phenomena appears to have intensified in recent years. Households shift to other food items such as cassava, guinea corn and rice which are the principal hungry season staples. By the end of April, only very few households have any fresh yam left. Converted or part-processed food crops (see Table 6.2) are now brought out of stores to cope with the new situation. By late April or early May, special hungry season 'reserve' crops are brought into the diet, e.g. cocoyam in Olle and Gbedde areas, and wateryam, aerial yam and soyabeans in the savanna villages (Takete-Ide and Ejuku). A good meal of soyabeans or aerial yam after mid-day is said by farmers to be enough for the day, so long as water and snack are used as supplements later. Towards the end of May virtually all foodstuffs are exhausted. This is three to six weeks before new harvests are available. This most critical period is locally referred to as:

<u>kò sī n'ìlè, kò sì l'òkò</u>

[none in the house, and none on the farm]

By mid-June, maize crops and some quick-maturing yam varieties planted on <u>àkùrọ̀</u> are harvested (especially in the southern part of the Division) and these begin to reduce the intensity of the hungry season.

Many attempts have been made to explain the phenomenon of seasonal hunger. While some (Miracle, 1958) tend to doubt its empirical validity, others (e.g. White and Gleave, 1975:5) attribute it to "lack of skill in storage" or believe that "insufficient supplies in the store due to poor harvests" is the case (Morgan and Pugh, 1969). These explanations all neglect crucial institutional, environmental and economic strictures under which farmers operate. Explanations offered by farmers' themselves throw more light on the causes of the phenomenon. All farmers in the sample pointed to seasonality of production in contrast to the continuity of consumption. With hand implements and shortage of labour, farmers find it difficult to produce in six months all consumption needs for one year. 53% (64) of farmers in the sample added, without prompting, that they nowadays sell more of their food crops, due to the pressure of various expenses than they ought to, thereby causing household food shortage. When prompted, this figure rose to 84% (101).

Because farmers want to improve their family prospects in the longer run, they have to commit more and more of their farm products to the market. The low prices received for crops are not sufficient to purchase city goods, or pay for education so the farmer is tempted or forced to sell more than is wise.

Poor storage facilities and inadequate production due to growing shortages of labour were also cited as contributing to the hungry season. The storage problem goes beyond 'lack of skill'. Fungi, insects, birds and rodents are the principal enemy, and they abound in this humid tropical environment. It is true that a high proportion of wastage is caused by damage by pests during storage. It is equally true, that local techniques of storage are relatively effective. Moreover, farmers know that they can do better, for example, they report that pesticides will reduce the problem. The critical issue then becomes the fact that until recently low crop prices means that farmers could not readily generate the cash to buy pesticides. The issue is not technology but fairer returns for their efforts. A frequency tabulation of the given reasons is presented below:

TABLE 6.3 Reported Causes of the Hungry Season.

Reasons given	Takete-Ide	Ejuku	Olle	Iya Gbedde
Seasonality of production	30	30	30	30
Sold more than ought to	18	10	17	8
Poor storage	18	14	12	14
No labour to produce more food	25	16	14	18

Source: Field work, 1978.

Since farmers are so clearly aware of the problems of and reasons for the occurrence of the hunger season, they were asked what strategies they normally employ to survive the period. The strategies, listed in Table 6.4 include food storage and part processing of crops (see Table 6.2) and food purchases. More than 90% of annual food purchases take place during the hungry season, more so in Olle because of over-concentration on tree crops in the past. Those farmers who have 'sons abroad' enjoy advantage at this time of year because of cash remittances. Another strategy involves social relationships. Better-placed households help those less fortunate with food, while kinship ties operate to ensure survival of family members (Hill, 1963). On the other hand, it is argued by some that the kind of interdependence and 'indebtedness' thus created may serve to reproduce further cycles of low output and hinge in future seasons.(e.g. Watts, 1978).

The foregoing discussion on how households make use of the produce of the farm to survive is testimony to a highly detailed awareness of crop potentials developed over the years. We are in effect discussing the results of generations of experimentation, innovation, adaptation and organization with respect to diet. This in turn has profound effects on the crop types and varieties which farmers grow and what they might be willing to grow in the future.

B. Marketing

The importance of crop sales to meet various cash needs has been touched on in Chapter 4. The market situation and farmers' awareness and ability to exploit it will be examined here.

Table 6.4

STRATEGIES EMPLOYED TO OVERCOME THE ''HUNGER'' SEASON PROBLEM

Strategies	Takete-Ide	Ejuku	Olle	Iya Gbedde
Store food	30	30	30	29
Buy food	23	13	28	22
Help from sons and relations	10	12	15	14
Do-off-farm work	4	6	14	3
Nothing specific	-	-	-	1

N = 30 for each village.

Olle has been a food deficit area since the 1950's because of concentration on tree (cash) crop production. Hence more people in Olle buy food than in other villages.

Source: Field Work, 1978

<u>Proportion of produce sold</u>: A list of crops, ranked in the order of the amount of money earned, annually is given in Table 6.5 (actual income figures per crop or overall were impossible to collect satisfactorily). The table shows that yam, cassava and guinea corn in that order are the most important revenue earners for farmers in Takete-Ide, Ejuku and most of the other villages situated in the guinea savanna. Coffee, pepper and yam at Olle and coffee, pepper and cassava in Iya Gbedde are the principal sources of cash income, and typical for most villages, where forest vegetation is substantial. It is thus clear that except where pockets of forest land exist, which generate cash through coffee, cocoa and tobacco, food crops are the major cash crops in Kabba Division. The food crop/cash crop dichotomy therefore is a misleading categorization since all crops are planted with an eye to their market possibilities. Table 6.6 provides a rough indication of the proportion of total production of each crop sold and reflects the capabilities of farmers, their ability to command resources, and their overall need for cash. It is important to note, however, that the proportion sold may not mean that a farmer who sells more has a larger farm, for some other farmer may have a larger farm but also a larger non-working family to feed. Moreover, as indicated in Table 6.5, while nearly all farmers sell crops, not every farmer sells all crops. The distribution of the proportion of production sold is highly skewed. Nevertheless, the amount of food crops produced for the market is significant. Except for yam and guinea corn, more than one fifth of all food crop production is sold and the proportion is considerably higher for cassava, pepper, melon and vegetables.

Table 6.5 <u>CROPS RANKED IN THEIR REPORTED ORDER OF IMPORTANCE AS REVENUE EARNERS FOR FARMERS</u>

	Taket-Ide				Ejuku				Olle				Iya Gbedde			
Crops	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Yam	23	1	4	2	24	3	–	–		3	18	8	1	2	5	3
Cassava	2	14	12	2	2	19	3	3	6	4	10	7	4	6	5	4
Guinea Corn	–	12	10	8		3	14	8								
Pepper	–		2	4			2	4	4	14	2	5	8	11	2	3
Melon	–		1	5				2								
Soyabeans	–			2												
Oil palm															1	
Cocoa	2	1		1			1	1		2			3	1	3	2
Coffee	3	2			1	1			17	1		4	11	10	1	
Citrus												1			3	
Kolanuts															4	5
Tobacco						1	2						3		4	4
Rice									2	2	3	2				
Maize				3			3	5	1	4	7	1				1
Beans				2			2	3				1				3
Cocoyam												1			2	5
Vegetables				1				1								
	N = 30				N = 27				N = 30				N = 30			

Source: Field Work, 1978

Table 6.6

PROPORTION OF TOTAL PRODUCTION OF MAJOR CROPS SOLD IN THE 1977/78 SEASON

Crops	% Sold	No. of farmers in each category				
		Takete Ide	Ejuku	Olle	Iya Gbedde	% of farmers in each category
Yam	0 - 20	16	12	23	15	56.4%
	21 - 40	14	12	7	12	38.6%
	41 - 60	-	3	-	3	5%
	61 - 80	-	-	-	-	
	81 - 100	-	-	-	-	
Cassava	0 - 20	12	6	12	12	35.9%
	21 - 40	12	14	5	6	31.6%
	41 - 60	4	5	9	7	21.4%
	61 - 80	2	2	4	4	10.3%
	81 - 100	-	-	-	1	0.8%
Guinea Corn	0 - 20	7	12	24	29	61.5%
	21 - 40	16	9	2	1	23.9%
	41 - 60	7	6	3	-	13.7%
	61 - 80	-	-	1	-	0.9%
	81 - 100	-	-	-	-	
Pepper	0 - 20	15	16	2	6	33.3%
	21 - 40	6	6	3	10	21.4%
	41 - 60	4	3	5	2	12.0%
	61 - 80	4	2	7	3	13.7%
	81 - 100	1	-	13	9	19.6%
Maize	0 - 20	18	11	2	12	36.8%
	21 - 40	8	9	2	10	24.8%
	41 - 60	4	7	8	6	21.4%
	61 - 80	-	-	12	2	12.0%
	81 - 100	-	-	6	-	5.0%

Table 6.6 contd.

Crops	% Sold	No. of farmers in each category				
		Takete-Ide	Ejuku	Olle	Iya Gbedde	% of farmers in each category
Melon	0 - 20	3	12	10	12	40.7%
	21 - 40	10	8	1	4	25.3%
	41 - 60	10	4	1	1	17.6%
	61 - 80	5	2	2	1	11.0%
	81 - 100	2	1	1	1	5.4%
Vegetables	0 - 20	5	13	15	15	41.0%
	21 - 40	10	4	10	8	27.4%
	41 - 60	10	7	5	7	24.8%
	61 - 80	4	3	-	-	6.0%
	81 - 100	1	-	-	-	0.8%
Cocoyam	0 - 20	-	4	16	7	40.3%
	21 - 40	-	3	7	8	26.9%
	41 - 60	-	-	2	9	16.4%
	61 - 80	-	-	5	5	14.9%
	81 - 100	-	-	-	1	1.5%
Rice	0 - 20	-	-	14	2	50.0%
	21 - 40	-	-	10	-	31.3%
	41 - 60	-	-	3	-	9.4%
	61 - 80	-	-	3	-	9.3%
	81 - 100	-	-	-	-	-
		N=30	N=27	N=30	N=30	N=117

Source: Field Work, 1978.
The adapted ayó board was labelled in percentages and farmers asked to place seeds in holes which correspond to the proportion of each crop sold. These were then recorded.

It has often been argued that 'traditional' farmers are 'conservative' and slow to take advantage of market opportunities because of a preoccupation with survival strategies (de Wilde, 1967). Taking the need to produce food for the family into account, this assertion is inapplicable to Kabba as is shown by the rate of increase in market sales over the past fifteen years. Farmers' estimates of proportion of production sold in 1968 and 1978 show an average increase of 150% (rising to 250% in the case of cassava). What Allan (1965) called the 'normal surplus', by which farmers produce more than they need to ensure food supply in bad years, has been used as a launching pad for production for the market. Surplus produce which used to rot on the farm, or was diverted to beer production, is now marketed, reducing the wastage component considerably. As will be shown shortly, not only are farmers acutely aware of the market situation, they are also intent on exploiting the opportunities it offers. Those unable to respond positively to market opportunities mention institutional and financial constraints while those who do, exhibit a high decree of awareness in their reasoning. For example, in Yagba and Gbedde areas of Kabba Division, farming has generally decreased steadily over the past decade (see reasons given in Chapter 10)inspite of rising crop prices. Due to access to education and non-agricultural employment opportunities, people have been moving out of farming in these areas. In Olle, however, farmers' response to market opportunities epitomize the keen awareness of what happens outside the area which farmers have. Because of the abundance of forests in this area, Olle farmers were quick to respond to the introduction of cocoa and later coffee in the early 1950's while neighbouring villages in the guinea savanna had no land to respond adequately. The conversion by Olle people to tree crops was so extensive that the food crop economy was seriously undermined and most households came to depend almost totally on imported food from surrounding areas. The high profits from cocoa and coffee made it possible for them not only to build new houses (Olle has the highest number of houses made of cement blocks per population among the sample villages), buy motorcycles and other consumer items, but they also had enough to buy food. The slump in world prices for cocoa and coffee in the mid-sixties was a catastrophe to these farmers. The coup de grace was delivered by a massive invasion of grasshoppers (Zonocems variegatus) from 1965 onwards which virtually destroyed the coffee crop. The resultant decline in revenue and consequent inability to buy food was so serious that between 1967 and 1970 food aid had to be organized by the state and local governments to prevent outright cases of famine. From the early 1970's, however, due to a high rate of urbanization and a boom in non-agricultural sectors of the economy, Nigeria became an importer of food, due to local scarcity. Prices therefore rose very sharply all over the country. Sensing this change, Olle farmers made an about-face and began to concentrate on food crop production, some actually felling once-valuable tree crops to do so. This account provides little evidence of 'peasant conservatism' in the face of market forces.

The proportion of total farm produce sold has changed considerably over the past decade. While the proportion of yam and guinea corn production sold has declined, cassava, maize, melon, vegetables, pepper and other food crops have increased. Farmers who recall selling less in 1977/78 season than in the 1967/68 season said that they still got more money for their sales than in the previous ten years because of higher prices. Taking food crop production overall, 33% (10), 63% (19), 90% (27) and 50% (15) of farmers in the sample sold more of their out-put in 1977/78 than in 1967/68 in Takete- Ide, Ejuku, Olle and Iya Gbedde respectively. Their own perception of why they sold more or less than in the previous decade is presented in Tables 6.7 and 6.8. The reasons farmers gave for selling more or less than in the previous ten years show that they are keenly aware not only of the socio-economic changes going on around them but also of physical, climatic and production changes. Attributing production decline to the work of 'evil powers', though anathema to scientific explanation, plays powerfully on the minds of those who see themselves thus affected. Atteh (1974) points out measures undertaken to combat this factor, affecting not only farm location, but a wide range of resource allocation decisions.

Changing fortunes of tree crops: A brief review of the state of tree crop cultivation in the rural economy of Kabba will now be attempted. While all farmers in the Olle and Iya Gbedde samples own tree crops, only one third own such plots in Takete- Ide and Ejuku respectively. How they rank in importance is presented in Table 6.9, which shows that coffee, a later crop fetching higher prices than cocoa, is the dominant tree crop in Olle and Gbedde areas, while cocoa had the edge in the savanna country because of shortage of suitable coffee land. Citrus is planted everywhere but especially as village shade trees in the savanna while kolanuts are widely grown

Table 6.7

REASONS GIVEN BY FARMERS FOR SELLING MORE OF THEIR FOOD CROPS IN 1977 THAN THEY DID IN 1967

Reasons Given	Takete-Ide	Ejuku	Olle	Iya Gbedde
More cash needs today than 1967	10	12	13	10
Did not sell some of the crops in 1967	7	2	18	2
Few bought food ten years ago	7	6	1	2
Greater demand - better prices	10	7	13	12
Better production due to better rainfall	2	2	1	7
Better production due to use of fertilizer and pesticides	4	2	-	2
Each farmer is less self-sufficient today	2	1	-	-
	N=10	N=19	N=27	N=15

Source: Field Work, 1978

Table 6.8

REASONS GIVEN BY FARMERS FOR SELLING LESS THAN THEY DID IN 1967

Reasons Given	Takete-Ide	Ejuku	Olle	Iya Gbedde
Unable to farm as before due to old age	7	3	3	6
Less responsibilities because sons help	4	1	-	1
Poorer yields due to less rainfall, poorer land	13	5	3	5
Scarcity and high cost of labour	15	7	3	7
Bigger household to feed	9	5	1	3
We eat more of our cassava than ten years ago	3	-	-	-
Due to better non-farm work	2	2	3	2
Work of enemies to reduce production	4	-	-	-
	N=20	N=11	N=3	N=15

Source: Field Work, 1978

Table 6.9

RANK OF TREE CROPS IN IMPORTANCE FOR CASH EARNINGS IN 1978

Crops	Takete-Ide				Ejuku				Olle				Iya Gbedde			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Cocoa	6	3	-	-	4	6	1	-	2	7	5	3	7	18	3	2
Coffee	3	7	-	-	7	3	1	-	25	3	1	-	23	3	4	-
Citrus (oranges)	1	-	7	1	-	1	8	2	2	8	8	4	-	4	8	8
Cashew	-	-	-	-	-	1		4	-	1	4	-	-	-	4	3
Kolanuts	-	-	1	-	-	-	1	3	1	11	7	2	-	5	10	6
	N = 10				N = 11				N = 30				N = 30			

Source: Field Work, 1978

in Gbedde and Olle areas. The contribution of tree crops to rural income, though still significant in Olle and Gbedde areas, has decreased considerably in the past decade for reasons previously noted. Farmers were asked whether for them coffee and cocoa have increased, decreased or remained of the same importance in the past fifteen years and the responses are as follows:

	Increasing	Decreasing	Same	
Takete-Ide	1	9	0	N = 10
Ejuku	3	8	0	N = 11
Olle	6	24	0	N = 30
Iya Gbedde	10	19	1	N = 30

Informal and general interviews in other villages also reveal the serious decline in the importance of tree crops in the economy inspite of the fact that prices have picked up again. Some farmers in Olle and Iya Gbedde, and in south-west Kabba in general have been able to regain the momentum lost when world prices for tree crop products fell. For farmers in the savanna area who only had small plots of tree crops initially, any attempt at recovery have been abandoned because of 'food crops' are more lucrative. Consequently, most farmers in the area have abandoned the tree crop plots entirely. As usual, farmers' perception of the reasons for the increase or decrease of the importance of tree crops show they are more articulate and sensitive to market forces than they are generally given credit for. The reasons are detailed in Table 6.10 but the main features are as follows: The few farmers who registered increase in their tree crop sales cite better prices and being able to secure government assistance (which is not always equitably available) in the provision of pesticides and spray equipment. All of them

Table 6.10

FARMERS' PERCEPTION OF REASONS FOR INCREASE AND DECREASE OF THE IMPORTANCE OF TREE CROPS

Reasons For Increase	No. of Respondents
Received government assistance for crop care	5
Main source of income	11
Better prices than before	16
Devoting more time to crop care	6
Discovery of suitable land	2
	N = 20
Reasons for Decrease	
Poorer yield of crops - old trees	21
Pest and disease damage	27
Poorer yields due to less rainfall	9
Fire outbreaks destroy farms	7
Better prices for food crops	38
Not a reliable source of income	22
Lack of suitable land - unviable small plots	5
	N = 61

Source: Field Work, 1978

also have an assured sales outlet by membership in the local co-operative union. The majority who registered a decline in the importance of tree crops cited poor productivity due to lower rainfall, pest damage (especially by Zonocerus variegatus) and serious dry-season fires. High food crop prices, coupled with the large amounts of land available for food-crop production were also noted for tree crops losing out. Any crop aid programme not designed to exploit farmers' current market perceptions and assessment of likely future trends will end up being unacceptable to them.

Organization of marketing: Attention will now be turned to the marketing process. The member of the family responsible for crop sales will help determine the markets used and the impact of prices on productivity. It has already been pointed out (Chapter 5) that in Kabba, marketing is primarily the job of women. While there are some crops such as yam, pepper, rice, tobacco, coffee, cocoa, cassava and maize which are sold by both men and women, others such as guinea corn, okro, melon, and all other food crops are the exclusive preserve of women. Farmers are usually involved in whole-selling to middlemen either on the farm or at home, but most retailing of food crops is done by women. This is not an invariable rule because some men allow their wives to do all the sales while others trust their wives less. Yam (above 500 tubers), unprocessed cassava (in pick-up vehicle loads), maize cobs (green or dry, by pick-up loads) are often sold to middlemen on the farm, especially where farms are near the main road. Bags of rice, pepper, coffee, cocoa, kolanuts and bundles of tobacco are sold at home also to middlemen or marketing board agents. Men are usually involved in these largescale sales too. All sales of grains and tubers in smaller quantities than mentioned above are done by farmers' wives. Though not forbidden by any taboo, except male dominance and local notions concerning the division of labour, it is degrading for a man to sell mudus (standard grain measuring bowl) of gàrí, guinea corn, melon, beans, soyabeans, or pepper, nor do men sell okro and vegetables. Another custom, though again not a taboo, is that men never go to the local markets to sell or buy food crops or foodstuffs. Male farmers consider the market site a woman's place and so leave all market place transactions to women. In any case, farmers prefer to do a full day's work on the farm rather than sit behind a basket of okro at the market. So, farm labour requirements exclude men from the market place. For these reasons, a separate questionnaire on markets and market prices was prepared for farmers' wives, even though similar questions were asked of men, to enable us to find out how much of the market situation the man knows. Much of the following discussion combines information obtained from both men and women.

The marketing system: The marketing system operates on a periodic basis. Each village, except those which are too small to provide the economic base, has a four-day market but larger settlements such as Isanlu and Egbe have eight day markets which are serviced by surrounding smaller markets. Kabba, the largest settlement, has a large daily market. The markets will be divided into three categories for the purpose of discussion. a) 'Local markets' in each village, b) the surrounding rural periodic market as 'external markets' and c) 'distant markets' e.g. Kabba and other towns outside the Division.

The local markets convene on every fourth day for the purchase and sale of perishable foodstuffs and soup ingredients not procuced locally, or by everybody, e.g. meat, fish, salt and palm oil. This is also the time to purchase consumer goods such as cloth, bowls and others from itinerant traders. The local markets have been in operation for so long that the names for the days of the week are tied to either the number of days after the last market or before the next one.

Apart from the transactions which take place in the local market place, there is also daily house to house trading in each village. The wife, or, as is more frequent a young girl from the household, carries foodstuffs, such as gàrí, fresh vegetables, meat, fish, and other condiments, cobs of maize or other wares such as kerosene, matches, sweets, etc. around the village shouting her wares. In small villages, word also spreads round about who has what to sell and buyers visit relevant houses to purchase their needs. In this way, urgent food items and petty cash needs are met, while perishable vegetables and produce (such as green maize which must be eaten on day of harvest to enjoy the good taste) are disposed of before they spoil. This system is therefore, designed to meet needs which cannot wait for the day of the periodic market. Middlemen from far distant places such as Ikare, Akure and Owo also come to the villages at any time, often preferring to buy from the household rather than the market place because of personal and credit relationships they build up to secure reliable customers and low prices. In this way women, and farmers, also sell in between market days. The crops most heavily involved in this are yam, cassava, pepper, coffee, cocoa, tobacco, cotton, and rice. At Olle, and Ejuku, most farmers sell these crops to their own farmers' co-operative unions except for yam and cassava. These co-operative unions then sell in bulk to agents of marketing boards and the larger Kwara State Government-owned co-operative companies.

'External' markets, (rural periodic markets in surrounding villages) also feature prominently in the marketing of crops. The main villages set their market days in such a way that there is at least one market each day with an option of two on some days, for every village. Each seller, or buyer makes decisions as to which of the markets to attend, determined mainly by transport costs, the amount of produce available for sale, cash needs, established contact at the other end and movement of market prices. The major markets in the Division are at Kabba, Aiyetoro, Aiyegunle, Gbedde, Mopa, Iluke, Abugi, Takete-Ide, Isanlu, Ife, Ekinrin Ade, Ayere and Egbe (Fig. 6.2). This figure also shows the major rural periodic markets visited by women food produce traders in the four sample villages. It shows that over time, a select group of markets is chosen by most women in each village while others are neglected.

Distant markets are also visited for sale of farm produce and are also the point of origin of middlemen who come into this area to buy. Only a few farmers have enough to sell and enough capital to take their produce (mainly yam, tobacco, pepper, rice, gàrí, cocoa and coffee) to major urban centres in Western Nigeria. Capital to hire a truck and time to accompany the produce to the market, are requirements met by only a few farmers. Fig. 6.3. shows the places where

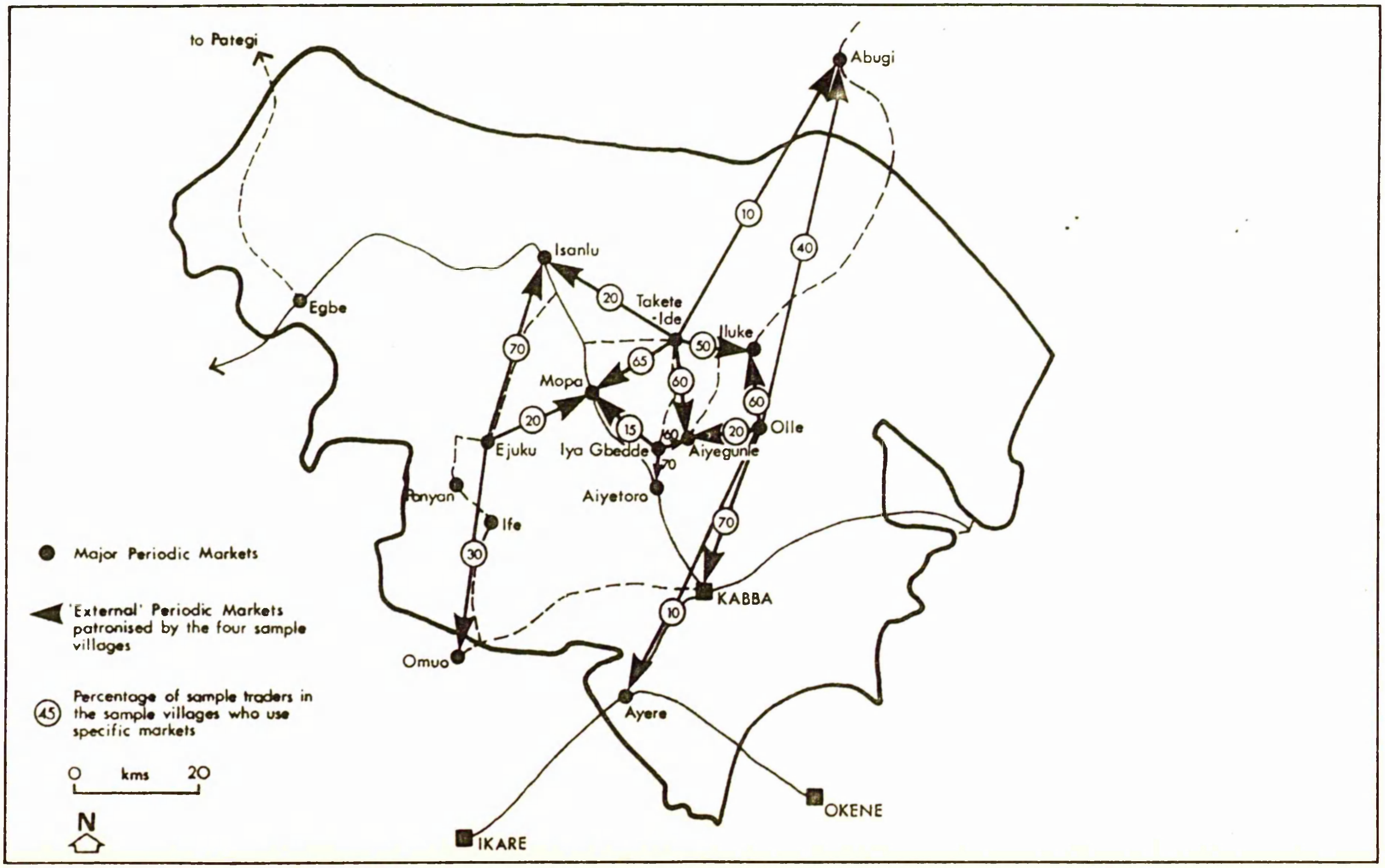


Fig. 6·2. Major Periodic Markets in Oyi Local Government Area.

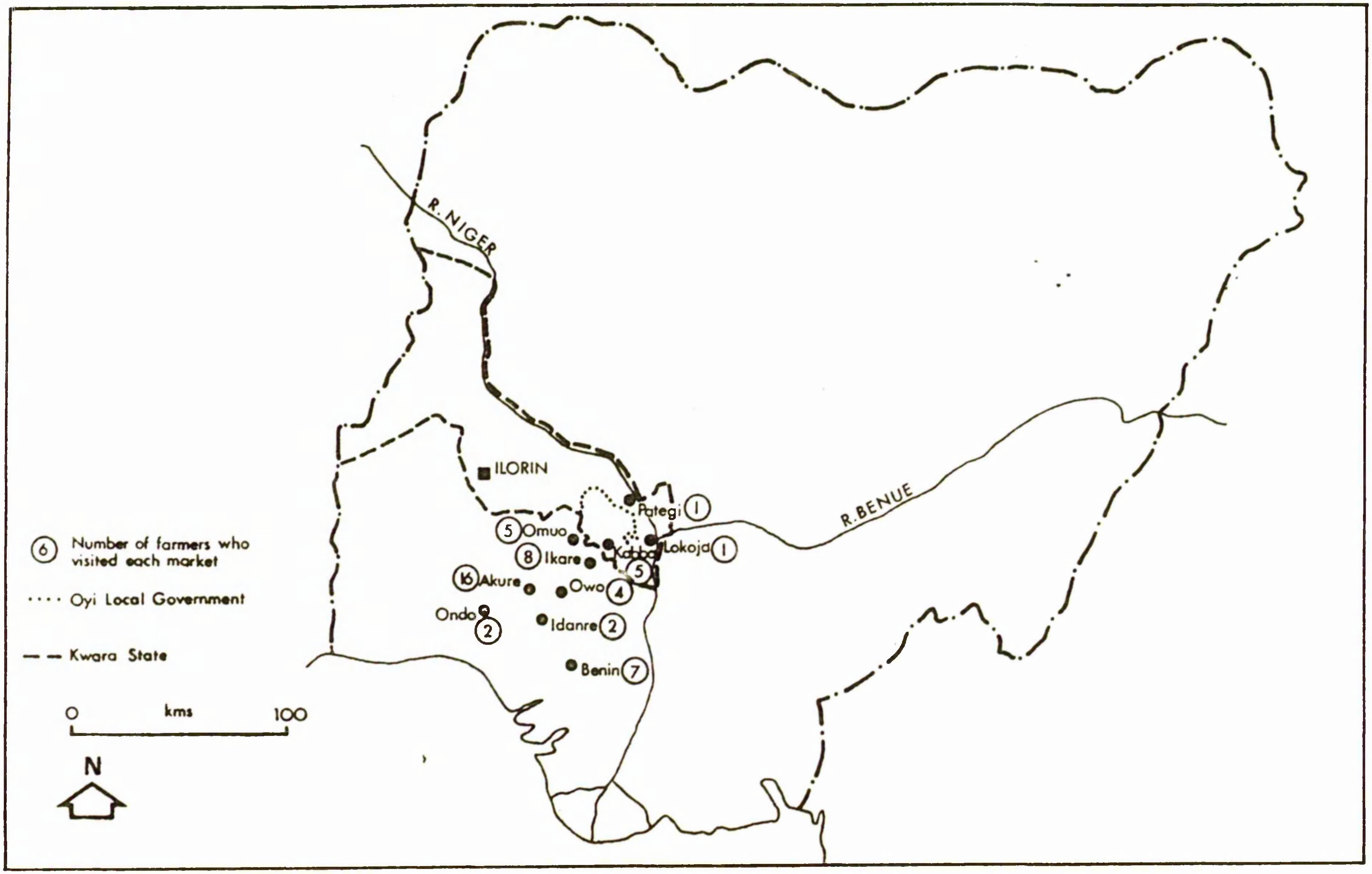


Fig. 6·3. 'External Markets' visited by Kabba Farmers for wholesale crop trading.

farmers report taking their crops to sell.

In recent years, local markets have increased in importance relative to external and distant markets. Fifteen years ago, due to very little local trade, the rural periodic market circuit was very popular as farmers sought to obtain higher prices than were possible in village markets. At that time, accessibility was extremely poor and head porterage was the major means of evacuating produce, not only from the farm to the village, but also to rural periodic markets. The volume of marketing was therefore limited by what each woman could carry or how much money was available to hire porters. This has changed radically in the last ten years through the construction of the Ilorin-Lokoja road, and improvement of rural roads through community effort. Most of the rural areas are now accessible by vehicles. At the same time food shortages in urban centres has forced food contractors for government institutions, schools and middlemen from large urban markets to forage into these rural areas to buy not only in the market place, but also at the house and on the farm. In most areas, farmers said that the volume of trade has gone up in the order of 300% in the past fifteen years, but that relatively the increase in trade has been greatest in local markets. For example, according to farmers' estimates an average of 80%, 15%, 90% and 80% of all farm produce sold in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively went through external markets in the 1967/68 season but by the 1977/78 season these figures had been completely reversed, with 75%, 85%, 90% and 30% sold in the village local markets. The perceptions of farmers as to why this change has taken place are given in Table 6.11 and reveal once again that farmers closely monitor changes

Table 6.11

FARMERS' PERCEPTION OF REASONS FOR THE INCREASE IN THE IMPORTANCE OF LOCAL MARKETS

Reasons Given	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Produce too small to be taken out	6	2	2	0
Increasing purchasing power of villagers	9	6	10	3
High cost of transport to take produce out	13	5	4	2
Outsiders now come here to buy	20	12	19	3
Village law at times forbids taking food out to sell	10	0	2	0
No. of producers reduced so more buy	7	7	10	4
Cannot leave farm work to sell outside	10	6	7	11
Satisfied with prices in the local market	7	3	6	4

N = 30 for each village

Source: Field Work, 1978

both in the social and economic environment. One response from Takete-Ide deserves further comment. This is the one where it is stated that "village law at times forbids taking foodstuffs out to sell". In this case, the village administration has intervened directly many times in the marketing process. Takete-Ide is one of the most important farming communities in Kabba and for years prices of food crops were very low because there was always a big surplus. So rather than sell at home, farmers' wives carried their produce outside the village to sell and the local market collapsed. Village elders, who stand to benefit politically, if not economically from vigorous marketing, intervened by imposing a ban on external trading for a period, threatening dire consequences for violators. The pattern was for the ban to be lifted only when the local market was sufficiently resuscitated. This has happened frequently, the most recent cases being in 1962, 1968 and 1971. A second point worth noting is that the importance of the local market at Iya Gbedde has changed very little over the past ten years. This is because this village is situated close to two larger markets at Aiyetoro and Aiyegunle, with very little transport cost and better prices at the larger markets. So Iya traders have continued to patronise them.

In all the villages, there are farmers who do not sell at home for reasons other than profitability. While some cited the reluctance of local acquaintances to pay promptly in contrast to external customers, others sell outside to hide their true income from neighbours. For the majority of farmers, however, the national 'oil boom' and scarcity of food in urban centres, higher prices, coupled with increased rural accessibility, and reduced transport costs, has resulted in more village sales, thus increasing rural income in the past few years.

Variations in market prices: The movement of market prices and farmers' responses to market situations is sufficiently interesting to deserve further explanation. Four major crops, yam, guinea corn, cassava and maize, have been chosen to illustrate farmers' awareness of the movement of crop prices in the market place over the year. They were asked to identify periods of the year when each of the four crops are cheapest and dearest and at what prices per unit they are sold at both times. The same question was put to women and field survey of markets was also conducted at different times of the year to obtain 'base -line' data. The congruence between responses given by women and the 'base-line' data was not as much of a surprise as a similar congruence for price estimates reported by men, since it is the women who go to the market and are expected to know the prices. Answers given by men as to the period of cheapest and dearest prices were as good as those from women, and both matched actual prices. Responses from men showed a slightly greater variance (scatter) than the women's. Nevertheless, they still reflect a good accurate knowledge of price trends over the year. The results are presented in Table 6.12. Price ranges are complex and single figures per unit are difficult to compute. Price fixing is based on bargain and compromise and is determined by many factors. For example, yam tubers have different sizes and are sold in bunches of three, five, nine or twelve, each called an ìdá. Different varieties attract different prices because of quality, variation such as poundability, storability and taste. Moreover, the amount of pest and/or disease damage is taken

Table 6.12 CROP PRICES AS ESTIMATED BY MEN AND WOMEN, AND BASED ON MARKET SURVEY

		x x x	- - -	
Yam	Prices Range	₦1.00 – 7.00 $\bar{x}$ ₦4.80	50k – ₦2.50 $\bar{x}$ 1.32k	a
	" "	₦1.00 – 6.00 $\bar{x}$ ₦4.20	45k – ₦2.00 $\bar{x}$ 1.00	b
		95k – ₦6.00 $\bar{x}$ 4.10	45k – ₦2.30 $\bar{x}$ 98k	c
Gari	" "	25 – 40k $\bar{x}$ 33.9k	5k – 30k $\bar{x}$ 18.2k	a
		25 – 45k $\bar{x}$ 35k	5k – 20k $\bar{x}$ 10.2k	b
		25 – 45 $\bar{x}$ 32k	5k – 25k $\bar{x}$ 15.3k	c
Guinea Corn		30 – 40k $\bar{x}$ 32.2k	9k – 30k $\bar{x}$ 16.5k	a
		25 – 45k $\bar{x}$ 35k	10 – 25k $\bar{x}$ 15k	b
		25 – 40k $\bar{x}$ 34k	5k – 30k $\bar{x}$ 18k	c
Maize		10 – 12k $\bar{x}$ 10k	½ – 3k $\bar{x}$ 1½k	a
		10k $\bar{x}$ 10k	½ – 4k $\bar{x}$ 1k	b
		7k – 15k $\bar{x}$ 12k	½ – 4k $\bar{x}$ 1.2k	c

J F M A M J J A S O N D

a = Responses of men
b = " of women
c = Result of Field Survey.

Prices for a) 3 yam tubers
b) per mudu
c) " "
d) " cob

Source: Field Work, 1978

into account, while much may depend on the personal rapport between seller and buyer. This complex of determining factors applies to the pricing of all crops though it operates in a less complex manner for grains such as guinea corn, dry maize, gàrí, melon, beans, soyabeans, etc., where a standard measure (the mudu) is used. An important observation is that the ability to assess the state and variety of crop produce is a necessary element in pricing and watching market transactions shows that women have this estimating expertise to a great degree.

The movement of prices over the year shows that all crops are cheapest just after harvest between July and January but dearest between March and June in the 'hungry'season. In explaining price differentials, all respondents cited seasonal fluctuation in supply and demand. Prices do not only differ at different times of the year, but also among markets. This was reported by all women interviewed and by 88% (106 farmers) of male farmers and attributed to differences in the number of buyers in relation to the quantity of crops available for sale. It was noted frequently that shortage of commodities results in high prices on a given market day then inducing people to bring more to the following market so causing a surplus and consequently low prices. A variety of other reasons were also cited (Table 6.13). People are aware that production of some crops is greater in certain areas creating a comparative advantage and regional specialization. For example, more yam is produced in savanna areas than in the southern part of the Division, while the southern zone produces much of the cocoyam consumed in Kwara state. Savanna farmers produce almost all the guinea corn consumed in the Division, while rice from Olle is supplied

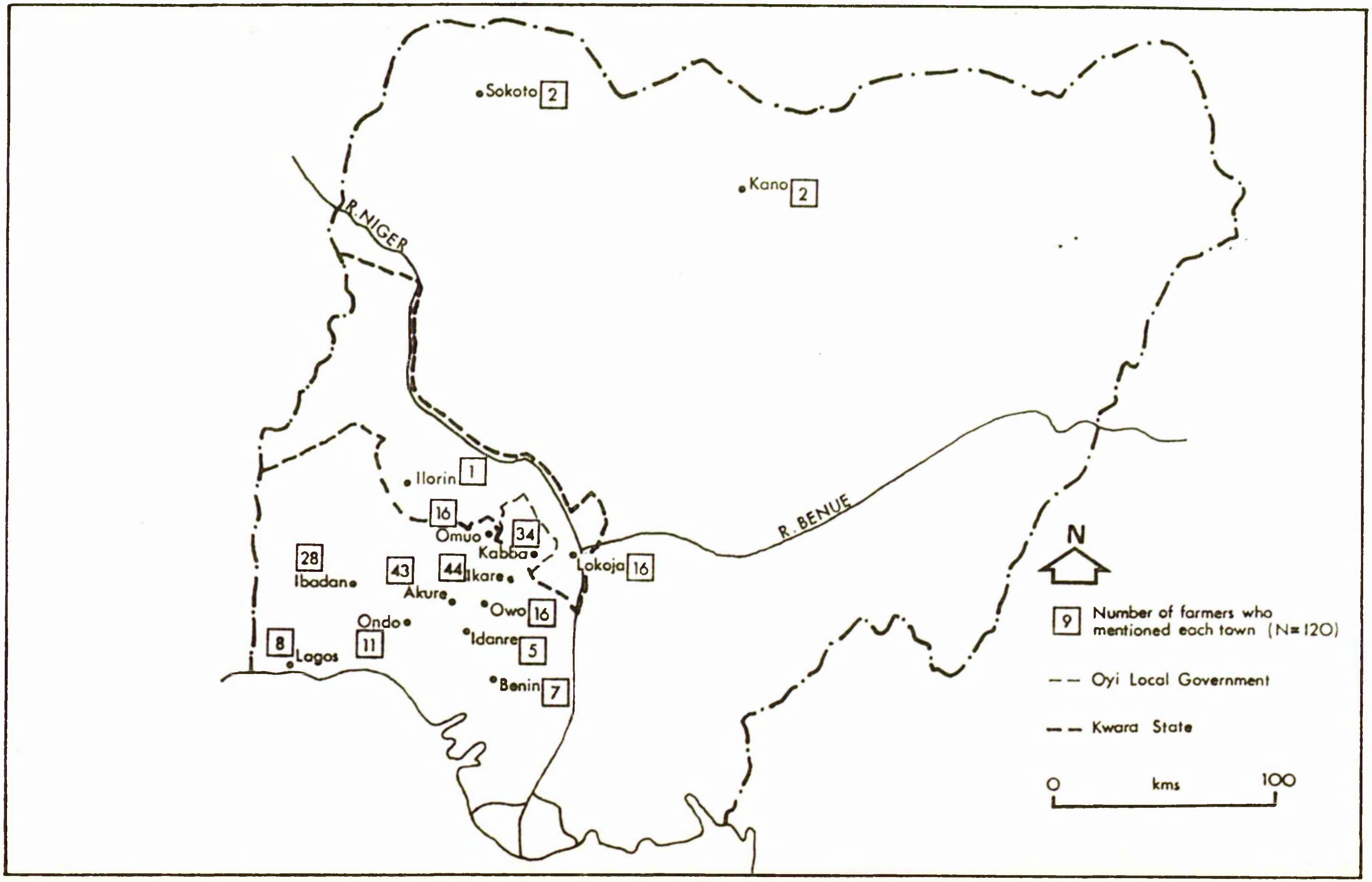


Fig. 6·4. Perceived origin of middle-men, and destination of crops sold to them.

Table 6.13

FARMERS' EXPLANATIONS OF VARIATION IN PRICES BETWEEN MARKETS

Reasons Given	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Number of buyers in the market vary	8	11	7	7
Competition in larger markets	13	10	6	4
Some areas don't grow certain crops	18	12	14	10
Distance and cost of transportation	8	4	2	5
	N=24	N=24	N=18	N=30

Source: Field Work, 1978

to all other areas surveyed. Marketing exploits these 'regional' differences.

Periods of sale: When farmers decide to put their crops on sale depends principally on cash needs and peak periods of crop harvesting. Between June and November, it is the period of heaviest farm labour and attention is concentrated on the farm. There are no major expense-demanding ceremonies during this period. Sales of green cobs of maize, vegetables, beans, bananas and plantains cater for minor household needs, e.g. soup ingredients, kerosene for lighting and other petty items. In recent years, regular crop sales to the increasing number of non-agriculturally employed people in the Division have increased and some sales take place all through the year, therefore. Nevertheless, the bulk of crop sales takes place between December and March each year. Farmers' figures suggest an average of 75% of all crops marketed is sold at this time to cover major expenses such as Christmas, New Year and Easter celebrations (the times of year when members of the household have new clothing) and, for those with children in secondary schools, teacher training colleges and other institutions of higher learning, school fees for the January and April terms. Money has to be put aside at this time to cover the September term as well (a time when there are no crops to sell). In short the amount available for reinvestment in farming is small. Incidental cash demands such as the purchase of consumer goods, or material for house-building or improvements, ceremonies such as burials, weddings, and sickness or emergencies, also determine the quantity and timing of crop sales. A number of farmers specifically reserve some of their produce for the April-June period when crop prices are highest before they sell. Many more would do so if they could.

Sources and Impact of Market Information

This chapter concludes with an examination of how much farmers, who are not normally heavily involved in marketing transactions, know about the market environment and how that knowledge affects crop production. As already pointed out, middlemen from S.W. Nigeria come to this area to buy foodstuffs both on the farm and on a house to house basis. Many of them stay for days at a time and develop close personal and business relationships with many farmers, attempting to fit into the life of the village. It was therefore not surprising that farmers know the destination of the food crops they sell through middlemen, mentioning Lokoja, Akure, Owo, Ondo, Idanre, Benin City, Lagos and Ibadan as the main markets for crops such as pepper cocoa and coffee (Fig. 6.4). Figs. 6.3 and 4 reveal an interesting trading pattern. Most of the trade in Kabba goes to south western Nigeria with little or none going to Ilorin, the state capital or the rest of Kwara State. Pategi, Abugi and Okene are the only towns in Kwara state with strong trading links with Kabba farmers and women traders. This lack of trade links with other parts of the state reflects several factors. Firstly, Ilorin is farther away from Kabba than towns in Ondo State and until 1976 the road between Ilorin and Kabba was very bad. Secondly, there are no major population centres between Kabba and Ilorin and the zone separating the two areas is savanna and produces the same food crops as Kabba farmers. Kabba traders could therefore not hope to compete effectively for the Ilorin foodstuff market. Thirdly, the Ondo State urban centres lie in the forest region with main emphasis on tree crops. Kabba Division is a natural supplier to the food-deficit areas of the cocoa belt, therefore. There is also a return flow of consumer goods and building materials to Kabba from the south. Transport costs and prices are lower than for Ilorin. Until the Kwara State government re-aligns transport and marketing patterns, the relationship between Kabba and the rest of Kwara State will be social and political only with the economy tied to that of Ondo State.

Farmers' knowledge about crop prices in the southern cities where their crops are taken is remarkably accurate. On the average, farmers say that middlemen sell their produce with a mark-up of 80-100%. This compares well with data collected on local prices and regular Federal Office of Statistics' price data for major southern Nigerian cities. Efforts were also made to price foodstuffs in markets situated in the southern urban centres bordering Kabba where I obtained most of my supplies during field work. Farmers' estimates were not far-off at all. Farmers were then asked why they do not take their produce to these markets themselves if they could get so much more. The responses, presented in Table 6.14 show that farmers are aware of this as an opportunity but also of the operational difficulties which would be encountered in the process. They said that the food crop trade in the cities is controlled by marketing organizations and unions to which they do not belong so they are denied the contacts and facilities that would otherwise be necessary. Moreover, the quantities they have to sell were not worth making the effort to join those organizations. Again, virtually every farmer has an idea of the transport cost to the towns per 'guage' of yam, sack of rice, pepper, guinea corn, gari, etc. To pay both the costs of arranging the lorry, and then

Table 6.14

FARMERS' REASONS FOR NOT TAKING CROPS TO CITIES THEMSELVES

Reasons Given	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Do not know the markets - no contacts	11	11	17	10
Buyers are close by since they come here to buy	7	4	4	6
High cost of transportation	14	8	9	9
Satisfied with price paid at home	4	3	2	13
Too small an amount of produce to take out	7	1	3	3
Farm work will lie idle if I take crops out	12	10	9	4
I can collect the money immediately	-	2	-	2

Source: Field Work, 1978

the actual evacuation cost,to find sheds in the towns and a place to stay until crops are sold would be highly troublesome and farmers would trade at a loss. Organizing the whole venture, they said, takes time and farm work would suffer in the process. Apart from these major constraints, the accessibility of Kabba area to foodstuff traders and the higher prices being paid for foodstuffs have proved satisfactory to farmers. Nevertheless, farmers are so aware of market prices that, annually, they identify crops which are increasing or decreasing in prices and when able, they adjust to this movement. For 1978, the majority of farmers identified yam, cassava, maize, guinea corn, pepper and beans as crops whose prices were attractive enough to encourage greater production the following year, while coffee, cocoa, tobacco cotton and soyabeans were mentioned as falling in the opposite category. For this reason, 84% (68 farmers) of those who had tree crops said they had not planted new tree crops in the previous five years while 85% (102) of the farmers in the sample said they had stopped planting cotton and tobacco altogether.

A major source of market information for the farmer is his wife. 92% (108 of 117) of the farmers in the sample said that their wives report to them specifically about crop prices in the market when they bring in money from each sale. Other sources of market information are listed in Table 6.15 and suggest that village information difussion processes are complex but effective. Tightly woven and complex interpersonal relationships in such communities ensure much sharing of information at the local level. Matters quickly become common knowledge and market prices are no exception. However, to make sure, some farmers actually go to the market, not

Table 6.15

SOURCES OF INFORMATION ABOUT MARKET PRICES

Sources of Information	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Talk within town	14	4	4	10
From neighbouring or fellow farmer	8	6	14	8
From buyers	7	5	7	2
Go to market myself to observe	2	3	2	2
From total cash returns (sales)	6	5	5	3
Through Co-operative Union	0	7	8	0
No other way	4	2	3	4

N = 30

Source: Field Work, 1978

to buy or sell, but to observe. Farmers' co-operative unions at Olle and Ejuku provide members with better price information.

An attempt was made to investigate whether market knowledge actually affected farmers' decisions to increase or decrease production of certain crops or to change total farm size. Three categories of responses were received:

a) 43% (50) of the sample claimed to increase output when prices rise and that prices are reflected in how much land they put under cultivation and how much of each crop they grow. Reasons offered include the need for more cash because of increasing family responsibilities. More than half of these farmers want to make enough money either to set up in trading or enter the transport business so that they can quit farming entirely. Many other farmers are responding to a general feeling that prices are rising right across the board so they want to take advantage. A few, however, said they respond only to specific crops which are on a rising price trend.

b) 37% (44) of farmers in the sample who sell crops claimed to increase production irrespective of market prices. Nor will a drop in market prices reduce their farm inputs. Taking weather vagaries, pests and other unforeseen circumstances into consideration, they reasoned, it is important to engage all resources fully at all times. If prices are good, they get good cash returns and if prices are poor, they will at least have enough food for survival, is the general drift of their reasoning.

c) 20% (23) reported no attempt to increase crop production in response to the rise in prices over the last few years even though they agree this might be desirable. Old age and inability to articulate extra labour were cited as the two main reasons. Labour scarcity and its consequent high cost was the predominant consideration. Young men have gone to school and the few who remain charge city rates for a daily wage on the village farm. For this group, they are in effect unable to respond to crop price increases despite a desire to do so. However, 3 farmers in this group might be classified as hard-core conservatives, i.e. farmers in the non-risk-taking category. They claimed they would not increase farm size in specific response to price increases even if they had the means to do so, because they explicitly aim to minimize risks. Their argument is that no one can be certain of crop prices the next year for crops being planted at present. Discussions found them arguing that when prices of certain crops rise, the majority increase production of that crop, as a consequence of which the following year a surplus depresses prices. All three confirmed this had happened to them once. Responding to a very good price of pepper in one year, they had concentrated on pepper to the detriment of other crops only to discover a glut in the market in the following year. Only relatives saved them from famine since they had banked on extra revenue from pepper sales to buy food. Experience had therefore taught them not to take such risks again. Their efforts are now spread among many crops to satisfy basic needs.

Conclusion

The discussion in this chapter shows firstly how farmers view the process of providing food for their households and secondly, how the market environment is seen, comprehended and reacted to. Together this provides a better understanding of the influences which govern farming practices, cropping patterns and resource allocation procedures outlined in Chapter 5. It confirms that farmers, rather than confining themselves to the extremes of subsistence or profit maximization motives, adopt a mixed strategy. Although the provision of food has a certain priority at present, indications are already evident that the market component will increase in the future, because Kabba farmers are now very well-informed about the opportunities in urban markets. Farmers see no reason to continue as second-class citizens any longer. If increased sale of crops is the only means at their disposal to achieve higher living standards, there is no reason to suggest that they will not pursue this route. Thus the notion that rural communities are isolated and insulated from happenings in the wider world, and need to be educated about market opportunities is an irrelevant concept on the part of rural planners. Insularity, in a community so clearly tied to the social, political and economic environment of the wider world is impossible. The problems of rural economic performance do not stem from farmers being 'conservative' or unaware, but lie in a larger national and international economic order which commits farmers to the subsidiary role of servicing and sustaining other sectors of the economy without being adequately compensated. Recent events show that given a chance, rural communities will innovate and respond. Once again, this chapter shows that in agricultural development planning, there is no point in blaming the victim.

CHAPTER 7

CULTURE, ENVIRONMENTAL KNOWLEDGE AND FARMING

This chapter considers farmers' knowledge systems and the cultural context within which farming takes place. A society's 'ethnoscience' - the accumulation and dissemination of knowledge in the form of shared environmental beliefs and rules for productive activities - is vital for the development and maintenance of any agricultural system. Sets of shared terminologies (land types, soil types, plant indicators, climate) and accepted patterns of productive behaviour, form the cognitive framework within which peasant societies operate. Ethnoscience may be seen to comprise a shared cognitive model of the empirical world, plus a set of rules for converting the model into meaningful activity.

Since all societies must cope with a world of universal ecological processes and environmental events, classification of environmental data, structuring of environmental knowledge and transmitting that knowledge so that as large a number of people as possible can commonly use it, is crucial for group survival. The use of linguistic symbols (terminologies), classification (taxonomies) and propositions (theories) to encode this information is the chief method employed by most groups. However, while some types of behaviour or knowledge can be verbalized by the practitioner, others involve non-verbalized abilities and skills learned by experience. A major part of appropriate behaviour in agricultural production is learned as a skill through years of apprenticeship. 'Ethnoscience' identifies resources and prescribes ways of exploiting them. Production systems are therefore integral parts of the cultures which produce them.

In the following discussion, some aspects of Kabba ethnoscience will be discussed to illustrate the influence of culture on production. This is because "neither the world distributions of the various economies, nor their development and relative importance among the particular peoples can be regarded as simple functions of physical conditions and natural resources. Between the physical environment and human activity there is always a middle term, a collection of specific objectives and values, a body of knowledge and beliefs; in other words, a cultural pattern" (Forde, 1949:463). Farmers continually adjust to the environment, or try to fashion the environment to meet their needs. This follows a process of experimentation, adoption and propagation, because new ideas about crops and farming operations are usually adopted only after going through many group and individual filters such as cultural, economic and ecological filters (Firey, 1960). More detailed discussions of adaptation in a cultural context have been attempted by others (e.g. Bajema, 1972; Ormrod, 1974). It is sufficient to point out here, that the farming system-crop varieties, land cultivation practices etc. - described in Chapter 5, result from generations of search, inter-change between groups, experimentation and evolution. This is still in progress. For example, information about new crop varieties, inputs, or farming techniques reach Kabba farmers from either fellow-farmers or from external sources. These are adopted initially on an experimental basis, as is the case when new crop varieties are planted in nurseries near the main farm, near the farm hut and/or on marked heaps where growth characteristics, crop care labour demands and yields can be observed in comparison with crops already adopted. When tractors are hired for heaping, the same approach prevails, and most farmers aim to have one plot cultivated by the new method and others by the old so as to minimize the risks involved in abrupt change, and also to compare results. Only when the farmer is satisfied with the performance of the new crop or techniques in comparison with the established system does he adopt it, and only after the success of the latter does he inform other farmers. Field work revealed evidence of similar experiments in relation to the adoption of fertilizer and pesticides. Every farmer interviewed was discovered to have used this process except in cases where they were able to observe the experiment on neighbouring or friends' farms. As an example of the latter, 40% (34) of farmers in the sample who used fertilizer in 1978 said they first saw fertilizer used by other farmers. Among those whose use of fertilizer had increased since they first applied it to their crops, 88% (76) said it was as a result of their own tests indicating increased yields. Farmers therefore are fully conscious of the notion of experimentation.

Man-land relationships in Kabba are focussed within the context of the 'village' and the surrounding land, for it is here that all production, consumption and most of produce sales take place.

The village

The village is the fulcrum of the farmer's life. The village, more than the house is regarded as home and sayings such as:

Ile l'abo simi oko

home is/return/rest/farm

[The home is the resting place after wanderings] abound in the local language. Everyone wants to die in the village or be buried there and 'sense of place' (Stea, 1965; Sommer and Becker, 1969) is very strong. For this reason, even those who have formal education and who work in towns are regarded as sojourners, because their roots are in the village, where they return frequently, find spouses, build their permanent houses, and to which they finally retire and die. Because the village is the centre of consumption and the enjoyment of the fruits of labour, while the farm is a place where livelihood is found, those who have gone to towns are said to have gone to the farm (òkò) in search of livelihood. It is only when they return with something that they can be deemed to have succeeded. This significantly influences the attitude of villagers to the towns and cities. No one seeks to migrate to them to live permanently, rather, they are seen as centres where one goes to acquire what is not available in the village and to bring such things back.

The village is also the focus of social and cultural relations, and educational development. The division of each village into compounds on kinship lines rather than by administrative convenience, is a major feature of rural life. Each compound is sub-divided into smaller administrative units especially for division of communal duties within the compound. These duties are assigned by the compound officer (Bàlógūn) appointed by the Ìjòyè (titled chiefs) in each village. Compounds also perform communal duties which involve the whole village either by rotation or together depending on the nature of the task. This work is organized by a council consisting of all the Bàlóguns in the village. Overall decision-making as far as development (ìdàgbàsóke) work such as road building, village cleaning and other tasks are concerned, is vested in the Village Council comprised of the Ọ̀bā (village head) and all Ìjòyès (titled chiefs) and all adult males in the village. When necessary citizens of the village living in urban centres are summoned home to give advice and direction about modern community development projects through which the majority of roads, schools and health services in Kabba Division have been built.

Age groups and family ties, however, form the basis of both social and cultural life of the compound and the village. The different adult age groups perform different communal tasks ranging from actual physical labour by the young, to advisory duties performed by the elders. For example, when burying the dead, people in a particular age group (20-35 years old) dig the grave while the middle-aged (35-45) carry the corpse in what is known as the 'coffin dance' and from the house to the grave yard. Only men above fifty are involved in preparing the corpse for burial and handling rituals connected with burial. Cows or rams, food and palm wine, given to the compound by the bereaved family, are divided among age groups according to an established pattern. Another example is communal house building. Different age groups are involved in different operations. Those who make the mud, or carry it, or throw it up to the builders belong to different age groups and during actual roofing, the job is done by men in the 30-40 age group while those below 30 handle the tying of bundles of thatch to poles above the ceiling and men above 40 stay on the ground to give instructions to the thatchers. Those actively involved in village or compound activities are rewarded with titles and positions of respect such as Ìjòyè, Íjàgún, Àpésẹ̀ or Bàlógún (Chief of Staff).

This age grouping system, reinforced by kinship and friendship ties provides the basis for the òwè and ãàró labour types described in Chapter 5. Further links in the social chain are forged within drinking and hunting groups or by neighbouring farmers who live together in the village or have plots side by side in the field. Such social networks have been used as the basis for an effective indigenous extension system as will be discussed in detail later in this chapter.

The village setting also provides a forum for entertainment and educational activities. The late afternoons and evenings are spent either in participation in musical activities, social visits or various adults' and children's games. Among the most important adult games is àyó (mancala) which involves logic, fast mathematics and strategic skills. The game is a social event in its own right as it brings groups of men together to watch as opponents try to outwit each other. Informal discussions and arguments about social or economic issues are involved in these groupings. Story telling (by the old to the young and within groups), debates, proverbs and àlò (puzzles or quizzes), some connected with farming, others not, are social activities in which villagers are also engaged in the evenings. These suggest that information about the historical, cultural and physical environment is incorporated in a variety of mental exercises - activities which themselves are structured by social life. The value attached to skills of oratory also suggests that the creation and expression of formal arguments are vital to the development of the knowledge and theory by which society functions. Participation in all these activities during field work gave valuable insight to the intellectual domain by which Kabba society shapes and reshapes itself.

The village surrounding

After the village, farmers spend more of their time on the farm than anywhere else. Spatial cognition of the elements in the surrounding environment is fundamental to the exploitation of resources for farming. Each village territory is known in great detail by its members. Kabba villages organize their surroundings into a spatial system by naming rivers, land types, mountains, valleys, forests farm areas and even localities where events of historical importance have occurred. Fig. 7.1 shows a map constructed from the material recognized by Takete-Ide farmers though only a few details can be shown. All adult inhabitants interviewed, male or female, were able to locate all elements represented on the map. Moreover, every man interviewed had actually visited all these points in the course of farming, hunting, gathering house building materials, and communal labour in other peoples' farms. Some features of the landscape arouse specific emotions of fear, dislike or attraction. Some areas are linked to enduring tales of events which occurred there long ago, giving rise to feelings of fear, sanctity or pride. Locations where battles were fought, where people died or where former settlements stood all produce such feelings. No emotion is aroused by 'landscape' in the western sense. Words equivalent to 'beauty' or 'good' are never used to qualify statements concerning the physical landscape or a panoramic landscape view. For example, the word ẹ́wà (beautiful) is used only of women; suńwòn ('good', 'nice', 'attractive') can be used for objects such as clothes, cars, chairs, etc.

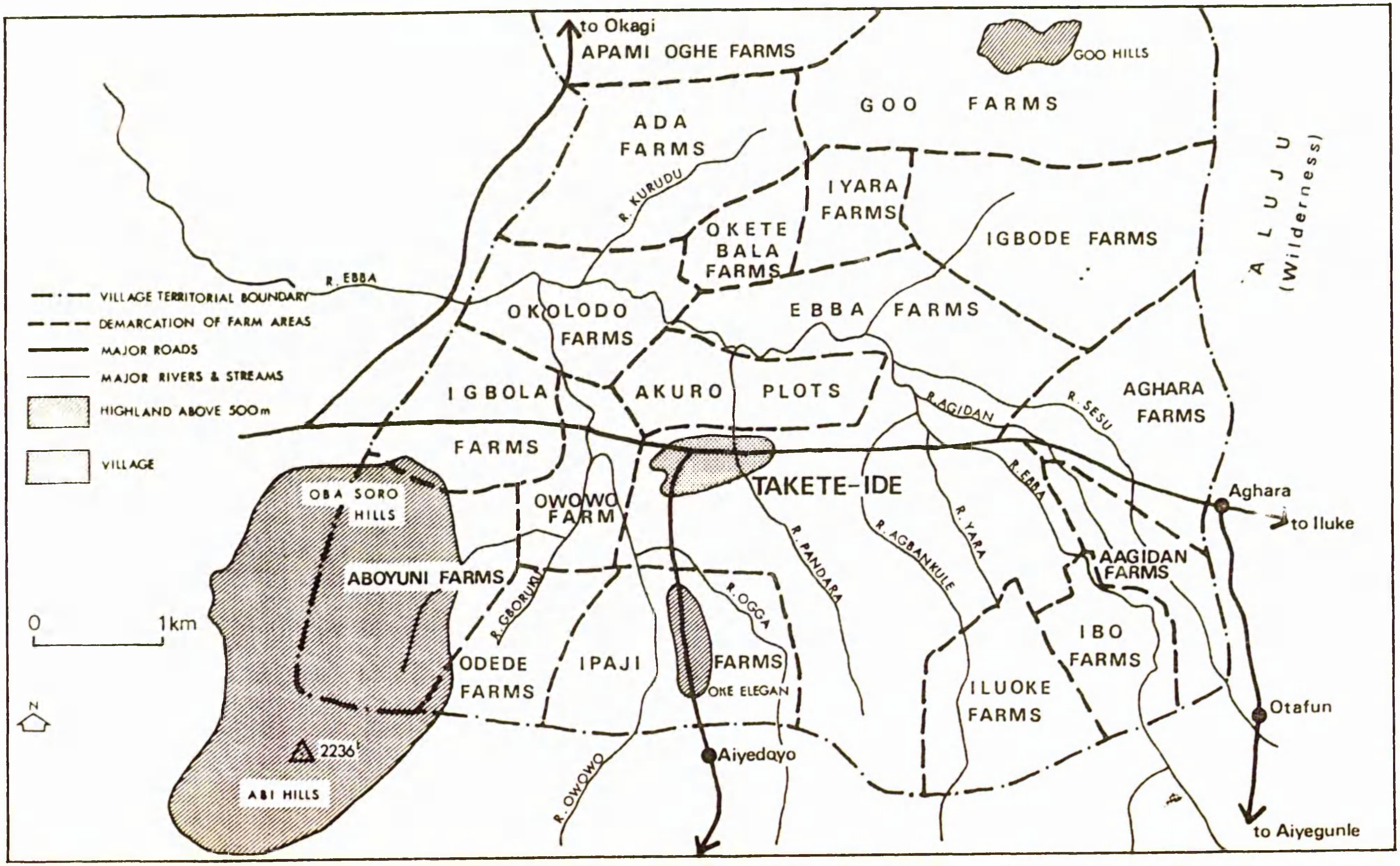


FIG. 7·1. Takete-Ide Village Territory.

but again not for the natural landscape. Nevertheless, this is not to say that localities are uncapable of generating emotions. For example, an area in Aghara near Iluke where a man was murdered over one hundred years ago has not been farmed since because his soul is said to have refused to quit the place.

The village flora

Plants provide one of the richest veins of ethnoscience. The names of most trees and grasses are known to virtually everybody in the village. In tests in several villages in Kabba, women averaged 50 out of 100 when asked to name trees and grass specimens, while men averaged 84. Some men were able to provide Yoruba names for 97 out of 100 specimens. When confined to trees alone, many men were able to name practically all the trees pointed to. In addition, villagers were able to identify trees from their fruits, indicate the soil types on which they usually grow, correctly describe characteristics of rooting systems and specify the general growth characteristics of the plants concerned. From information given it was possible to construct a taxonomy of useful trees and grasses listing, for example, fruits which are edible, where twigs can be used as chewing-stick, and which trees or grasses provide good material for house roofing. Handles for hoes, cutlasses, and axes have to be cut from branches of particular trees and some leaves are never used for capping or mulching yam. Medicinal uses of plants for treating ailments such as stomach ache, headache, malaria, cough, sores and others are known to most people. Some plants are used in homes to keep mosquitoes away, others are burnt as pesticides, and some are planted along the village perimeter to prevent snakes from entering the housing area. Complicated usaged for healing, charming and other specialized functions are also known to some experts, to whom ordinary people go for help. The availability of 'modern' medicine has, however, considerably reduced the use of local herbs and there are now only a few full-time medicine makers. Limitation of space (and the fact that proper identification of specimens still continues) means that much of the information upon which this section is based cannot yet be adequately presented. Nevertheless, it seemed especially important to present some of the data relating to weeds, how farmers classify and describe weeds and the major soil types specific weeds are associate with. This information is presented in Table 7.1.

An important aspect of farmers' vegetation knowledge is its identification of likely cropping potential of various soil types. The vegetation cover, and presence or absence of particular species are used to 'read' the potential performance of the soil under cropping. Crops are matched to natural forms in the vegetation by a process of drawing analogies. For example, in a vegetation association where wild yams (àgbàlà) are numerous, farmers dig the tubers up to judge their performance. This helps determine whether an area will subsequently be planted to yam. The major trees and grasses which farmers associate with good farm land on different soil types are presented in Appendix 2. Most of these 'indicators' are similar to one or the other of the major crops in growth characteristics and in environmental requirements for good growth. Such indicators are invaluable in a farming system where non-quantitative assessment is the main means of identifying good agricultural land.

Table 7.1

MAJOR WEEDS ON DIFFERENT LAND TYPES
(KABBA DIALECTS OF YORUBA)

ÀKÙRỌ̀

1. okùlésú - locust droppings (shaped like) dispersed through the air.
2. ighón ẹ́lá - large oxen tongue-shaped leaf.
3. okùn ìlè - land type, creeping similar to snake of same name.
4. yańyań - (difficult to weed, coils round crops and scratches skin, crawls and climbs).
5. Làbẹ̀làbẹ̀ - cuts skin like a knife.
6. ikín - tall, difficult to uproot (used to make flutes)
7. ágá ọrún - the arrow from heaven (sharp thorny shoot)
8. Ìgbì - short and thick, needs many weeding.

ÌBỌ́

1. Ọ̀bùn - grass with bad smell.
2. ọlọ̀mú gbódó - luxuriant hydrophyte (juicy leaves like breasts)
3. ẹ́kà ẹ́iyẹ́ - bird's sorghum - (or fake sorghum)
4. erìkìmọ́ - gum of imo (a mammal) grows thick and short.
5. ígbà ọ̀pọ̀lọ̀ - toads' beads - (grows like beads formed from frogs laying eggs in difficult to weed)
6. ēré ọ̀bàrùn - fake beans (can deceive farmer into thinking it is real beans during hoeing).
7. sẹ̀gẹ̀ - propagates very quickly.
8. okùlèsù - cf ofe
9. ākìntòlá - cf ofe
10. ọ̀gá mòròwōyá - hard to weed, (demands labourers)

ÒFẸ̄

1. ìgbì - frequent hoeing, (breaks into pieces with each regrowing does not decay. So difficult to weed)
2. òlòjò - 'stranger' (recent invasion spreads fast)
3. Lẹ́mbérẹ̄kù - short, close to the ground (and so watery that after weeding, wet season sun cannot kill it).
4. ōlókō màjàfàrà - 'farm owner don't hesitate' (Needs constant vigilance and hoeing because grows so fast)

Table 7.1 contd.

ỌFÉ

5. Ekíní ódé - 'the hunters needle' (thin needle like seeds which stick to clothes as the farmer walks through).
6. Ẹ́ghọ̀n - 'chain' (tangled nodes grows in all directions close to the ground. Extremely difficult to weed).
7. Sọ̀kódọ̀yá - 'turns the farm to Niger River, being the largest (body of water, nearby - when the mass of the weed flowers, the farm is covered in a continuous white mass like a body of water).
8. akíntólá - (Chromolaena odorata) First appeared during the political troubles of 1963 - 66 in which Chief Akintola featured prominently.
9. ágá - imperata cylindrica
10. gbàgí - nailed pegs - (roots so firm it is difficult to uproot).
11. Gbàjẹ̀dè - thing of the time, (made a sudden appearance almost everywhere at once).
12. wọ̀lọ̀ - spined grass which injures hand.
13. ẹ̀rú tàbà - slave of tobacco (of fake tobacco).
14. òrùwà - tall towering grasses.
15. íròdí - soft grass difficult to hold because it breaks up.
16. ìgún - original grass in vegetation, (used for house roofing).
17. kókó íre - shaped like a cricket.
18. ọ̀kà - giant grass, difficult to uproot.
19. eyìnrìn - carpets the ground, (weeding alone is no solution, it must be carried off-farm).

ÌGBÓ (FOREST)

1. Akìntọ̀lá - (cf ọ̀fẹ́)
2. Ìrùnmọ̀ àgbò - sticks to the fur of rams.
3. Kinpásán - tough / sharp.
4. ẹ́wùró ìjẹ̀bú - counterfeit (Vernonia amygdalina).
5. ẹ̀nì kùnúgbá - eat well before attempting to weed
6. Kásán - small thorns to injure skin.
7. Suìsuí àgbọ̀rín - the harts' dropping - (cause cough during weeding.
8. ókún ílé (cf akuro)
9. Ẹ́fóyájí - exploding pod to scatter seed and propagate wide.
10. Ẹ̀dólè - friend of soil (regrows immediately after weeding).
11. gúre - crisp hydrophyte.

Soil classification

Classification of soil types, and the identification of good farm land were described in Chapter 5. Identification of minute soil catena and the matching of crops to soil types is dependent on the experience and skill of particular farmers. A comment on the more general 'soil knowledge' of the community at large is appropriate here. An ability to classify land at macro scale is evident for most members of the village society including women and children. Interviews with primary school children in various survey villages revealed they readily differentiate between the four main vegetation types - ọ̀fẹ́, àkùrọ̀, ìgbó and ìlẹ̄ ókútà. They are aware that vegetation cover differs in each case and that there are also differences in stone content, colour, water retention capacities and depth, ranging from black clayey soils to light friable loamy soils. This kind of knowledge is considered to be part of any child's birth right and it is interesting that it is still being taught at home to children undergoing formal school education.

Knowledge of climate

Another aspect of the village environment which is of vital interest to farmers is the climate, because it helps to determine the types of crops which can be planted and the traditional calendar of farm operations. A body of knowledge by which they aim to predict climatic characteristics has therefore developed over time. The key to this knowledge is the ability of farmers to correctly identify precursors of climatic events throughout the year, and a good oral historical record of climatic and weather events from year to year. Through historical tradition and associated cultival skills relating to climate, society as a whole is able to build up its best estimate of when the rains are likely to start and stop each season under normal circumstances.

In the main questionnaire survey, farmers were asked how they determine when the rainy reason has started and become steady, each year. Respondents expect occasional irregular showers before March but do not consider these the beginning of the rains. The majority of farmers remembered the date of the first rain in 1978 in all villages and nine farmers reported having made written records of the date of first rains. They had done this for various periods ranging from two to 22 years. Responses show that the beginning and ending of rains are recognized by observing the clouds, configuration of star constellations, arrival of migratory birds and seasonal insects. Times of budding, leaf fall, flowering and fruiting of certain trees are also indicators of climatic changes. The beginning of rains is recognized by indicators listed in Table 7.2. Among the most frequently mentioned indicators is the frequency of showers. Many farmers count the first few rain storms. Between four and seven showers after the beginning of March is generally taken as a clear indication of the onset of rains. Planting of crops such as maize and melon especially along river courses and àkùrọ̀ soils start immediately while land preparation starts on upland plots.

Among those who mentioned natural signs, the appearance and location of certain stars was mentioned by 11 farmers, all of them above 55 years old, as being indicators of the beginning of the rains. The change in the direction of sunrise and sunset was, however, mentioned by the majority of farmers, who indicated in interviews the relevant alignments

Table 7.2

INDICATORS USED BY KABBA FARMERS TO INDICATE THE START OF THE WET SEASON

Indicators	Takete-Ide	Ejuku	Olle	Iya Gbedde
Cloudiness and frequent showers	24	29	20	28
Experience with the climatic calendar	29	19	21	21
Frequent thunder and lightning	12	19	13	16
By counting the first five or six rains	16	6	8	10
Looking at natural signs (e.g. birds, plants, insects)	13	12	9	11
Look at the stars	4	1	3	3

N = 30 in each village

Source: Field Work, 1978

in each village associated with the two seasons. Without being prompted, 38% (45) of farmers in the sample mentioned the observation of other natural signs, but when prompted, most other farmers confirmed they made use of such signs. These include the steady change in the direction of shadows and changes in the length of night and day. Important trees such as ágbá (Chrysophyllum africanum) irókò (Chlorophora excelsa) ìgbá (Parkia clappertoniana) and fẹ̀rẹ̀gùngùn (Ceiba pentandra) are said to shed leaves just before the beginning of rains while the akòkòsó tree (from which Easter flowers are collected) is reported as blossoming with beautiful flowers from two to four weeks before the rains start. It is said to be the single most reliable precursor of rains because it flowers early or late depending on whether rains are early or late respectively. The singing of the àlùlù (literally 'cock of heaven') is also taken to foretell the start of rains while the change in the noise of toads and frogs, the appearance of various insects, e.g. làbẹ̀làdẹ̀, black termites (àkà) and small red millipedes (kọ̀kọ̀nù ẹ̀mù), all indicate that the wet season is becoming established.

Kabba farmers also believe in their forecasting skills. Except for the months of July and September when rain falls almost continuously, 62% (74) of the farmers claimed to be able to predict the likely occurrence of rain over a period of 12 hours or so. When the forecasting period is reduced to between two and five hours, 95% (114) said they could tell if rain would fall or not, with varying degrees of accuracy. The structure and position of clouds, wind direction, and heat eddies are mentioned as indicators of impending rain. Moreover, just before a very heavy rainfall, trees are said to cease rustling. However violent the prerain winds, everything becomes still just before a downpour; tree branches cease to bend, some leaves turn upside down and domestic animals run for cover, especially goats and sheep which are said to be able to anticipate rain much faster than humans. Two farmers said they forecast rain through dreams and one uses an oracle. In Takete-Ide where orographic rainfall is frequent, cloud formation and rain on Ọbàsóró and Àbì hills south east of the village is taken to be a sure sign of rain within ten minutes or so.

Farmers have no means of recording the actual amount of rainfall. The size of rain drops, the duration of the storm, and the size of run off channels are used to describe the intensity of rainfall. Description of rainfall intensity does not go beyond categorization into heavy (tobi), medium (tọ̀wẹ́) and light drizzle (éjíwé). In estimating the amount of rain good enough for various crops, farmers use essentially subjective, qualitative assessments.

The end of the wet season is indicated principally by the reduction in the frequency (though not the intensity) of rainfall. The appearance and regular call of the turtle-dove (àdàbà = Steptopelia senitorquata erythroprys), the disappearance of a maize-eating migratory bird (alasárà), the grasses turning yellow and brighter sunshine all point to the onset of the dry season. The most reliable precursor of the onset of the dry season is the kínkín (literally 'shooting grass') - a species similar to Andropogon newtonni. When dry, it is used by children to make early morning fires to warm themselves during cold harmattan weather which can affect the area from the end of November till the end of January. In fire it produces a crackling noise like a firework (hence its name 'shooting grass'), and is considered especially attractive on Christmas and New Year eves. When this grass becomes 'pregnant' (develops long swollen buds) the dry season is at hand because rain stops within two to four weeks of the buds opening. The 'pregnancy' and 'birth' of these grasses coincides with the similar process of guinea corn setting seed. All segments of the population anticipate the onset of the dry season from this point onwards.

On the basis of these climatic indicators, and the experience of many years, all farmers have a good idea of when rains normally start, become steady and stop. Their estimates of these characteristics of rainfall are presented in Table 7.3. Records in the weather stations in the primary school in each of the four villages corroborate the responses listed in Table 7.3. In 1977, March was the first month when up to three rains (with a total amount of 25mm) fell per month in Takete-Ide and Ejuku, but this amount was recorded in February in Olle and Iya Gbedde. Not more than one rain (2mm) was recorded in December in any of the four villages except Iya Gbedde. The sequential planting and harvesting of crops described earlier (Fig. 5.1) is based on this informal but reliable knowledge of climatic conditions.

Historical climatic events such as drought were also known by older farmers many of whom deliberately committed years of serious drought to memory. They were able to recount in some detail the social and economic hardships arising therefrom. Four farmers in the sample mentioned serious droughts (ọ̀dá) in 1922 and 1933, but the most frequently recalled droughts occurred in 1944-1946, 1949, 1961-1963, 1971 and 1973. The 1944-45 drought was preceded by and accompanied by serious locust invasions which caused the most widespread

Table 7.3

THE ANNUAL RAINFALL REGIME IN KABBA
AS PERCEIVED BY FARMERS

Periods		Takete-Ide	Ejuku	Olle	Iya Gbedde
Rains Start	February	-	-	12	9
	March	12	11	12	15
	April	18	17	6	6
	May	-	2	-	-
Rains become steady	April	-	-	16	2
	May	3	-	10	5
	June	16	18	4	18
	July	11	12	-	5
Rains stop	September	3	2	-	-
	October	17	21	20	4
	November	10	7	10	22
	December	-	-	-	4

N = 30

Source: Field Work, 1978

famine in Kabba to date. This famine, called _iyán ésú_, was attributed more to the locust invasion than to drought, perhaps because the locust damage was a more obvious spectacle. Of recent droughts that of 1961-1963 was said to be the most serious by 81% (97) of farmers while the rest placed the 1973 drought in that category. The former caused such serious famine that farmers resorted to harvesting wild yam (_àgbàlà_) for household consumption. The invasion of the area by the grasshopper, _zonocerus variegatus_, from 1963 onwards was directly attributed to the 1961-1963 dought, just as locust accompanied the 1944-1946 drought. In addition to these specific bad years, however, every farmer above the age of 35 said that rainfall used to be better and more reliable when they were young than today. The "rain is not as good as in the past" proved to be the most common response in a sentence completion exercise where the sentence started with the key word "rain ...". Other responses are listed in Table 7.4 and help emphasize farmers' concern for the vagaries of climate.

Religious beliefs and farming

While natural environmental processes involved in crop production are well appreciated by all farmers in Kabba, credit for crop growth and farm welfare is given to a supernatural entity, in the past _ógún_ or god of iron, and today the Christian or Muslim God. Though various risks and uncertainties such as late rainfall, pest damage or weed infestation are normally expected, excessive severity of these problems is attributed to the work of powers beyond the natural - either the gods are displeased due to sin on the part of the farmer, or the work of 'enemies'. For example, four farmers

Table 7.4

FARMERS' RESPONSES TO A SENTENCE COMPLETION EXERCISE STARTING WITH THE WORD 'RAIN ....'

		% of Respondents
'Rain	gives water to man	60% (72)
	gives water to plants	65% (78)
	we cannot do without it - source of life	28% (34)
	comes from heaven	66% (79)
	not as good now as in the past	69% (83)
	starts in April and stops in October	33% (40)
	damages crops when too much	38% (46)
	causes farmine when too late	43% (52)
	must come at the right time	55% (66)
	determines farm operation	62% (74)
	causes flood	14% (17)
	flows into rivers and to sea	8% (20)
	I can make rain fall	2% (2)

N = 120

Source: Field Work, October 1978

in the sample attributed poor crop performance in 1978 to the work of 'enemies'.

In former times, each farming season started with the <u>ógún</u> festival to seek the blessing and guidance of this god for the performance of complex farming operations approaching. The timing of the festival was determined each year by religious officials who used phases of the moon and the configuration of the constellations for guidance. The ceremony was fixed for the end of <u>òrìkà</u>, the first traditional 'month' (the period from January till March of the Roman calendar). The ceremony continued for a whole lunar month called <u>alebọ̀gún</u> (month of sacrifices to <u>ógún</u>), corresponding to the preparatory period of the farming year. The period after this runs from <u>ẹríndùn</u> or 'fourth moon of the year', beginning in May, and continues to <u>ẹ́wādùn</u> or 'tenth moon of the year' (which is equal to December). This seven period traditional calendar happens to coincide with the seven part annual agricultural season (Appendix 6). The importance of this ceremony was that it reflected the power of a group of religious experts to determine the beginning of the farming season. Even though most aspects of <u>Ógún</u> worship stopped in the 1920s, some legacies are still observed in the form of specific rituals, various rules, and taboos, and in certain ceremonies carried out on the farm.

The major surviving ritual element in farming today is the 'new yam' festival. This is a day set aside to celebrate the arrival of new yam and to give thanks to <u>Ogun</u>. When fully observed harvest of yam was prohibited by law before the set date. On the eve of the ceremony, all farm implements (hoes, cutlasses, knives, pots, gourds, working clothes) were brought home and on festival morning, the first cooked yam placed on these implements together with palm oil, giving Ogun the first taste of the new yam (known as emu or lolonto). Only after this could new yam be eaten or sold in the market. New yam is greeted with the words:

mo riò mè tí kù

I/see you/I no/yet/die

(i.e. I have lived to see your coming)

Nowadays, farm implements are no longer brought home nor is yam 'sacrificed'. People also harvest before the appointed day if need be, albeit secretly. Nevertheless, the new yam festival (9th July in Takete-Ide, 1st July in Ejuku, 3rd June in Olle and 20th June in Iya Gbedde) is still a local holiday and social aspects of the festival are still important. Most importantly, it is still a religious day, in effect a Muslim or Christian harvest festival with thanksgiving to God for making crops do well.

Almost all the rules, prohibitions and taboos are connected with seed yam preparation and planting. The rules and their agricultural significance are presented in Appendix 8. Yam seed preparation and planting are sacred operations and must be approached in a spirit of moral and spiritual purity. For example, all quarrels must be settled and the farmer reconciled with any known enemy before yam seed preparation and planting take place. While of no obvious ecological or agricultural significance, it seems to be designed as an agent of societal harmony since the consequence of disobedience is said to be bad yam harvests, and nobody wants this. It is therefore an effective strategy for ensuring the maximum labour cooperation at planting time. Evidence (from participant observation and group discussions) suggest that farmers still take some of these rules very seriously. Only 46 (38%) of sample farmers claim to disregard them (generally because they are Christians). The fact that the yam crop is subject to religious rules while the practices governing other crops are simply seen as ecological points to the key importance of yam in the traditional food crop economy. The risks and uncertainties attached to the crop and the gravity of failure invoke a supernatural aura of respect.

One rule which concerns all farm operations is the morning invocation. Each day's work on the farm must start with a farm implement being held and the name of God and/or of an ancestor being invoked. Apart from seeking guidance and help for the day's work, protection is also sought against environmental dangers. Some farmers attribute mishaps such as scorpion or wasp bites, or wounds inflicted by working implements or stepping on poisonous thorns to failure to observe this rule. The universal explanation for the practice, however, is acknowledgement of God's control over rain, crop growth and every other aspect of farming practice as epitomized by statements such as 'I plant the crop and go home, but I don't know how it grows; it is God who controls it'. Even though all farmers appreciate the role of water, air, light and soil nutrients for plant growth, they firmly believe that these factors are controlled by God. Human knowledge is also said to be controlled by God in special cases. Some people are said to have 'lucky hands', i.e. whatever they lay hands on to do turns out to be good. Some very successful farmers are therefore said to have God's special gift.

Ethnic mathematics

Like any other social group, Yoruba farmers in Kabba have used numeration ranging from fractions to several thousands, for generations. Assessment by farmers in quantitative terms is therefore an established feature of the farming system. The main focus in this section will be on the measurement of distance, area and farm produce, and how these affect farm operations.

In the past, distances were measured in 'journey days' or fractions of days (in which case the sun's position is used) but today miles are used everywhere. This is made easier because the main rural roads have been marked so farmers estimate farm distances by comparing them with mileage posts on the road. Measurement of short distances, however, is in foot-steps and is used mainly to record distances within the farm.

Of greater importance to farming is the calculation of areas, principally of farms, leading therefore to estimates of the amount of various crops which have to be planted to meet needs. Specific area unit terminologies do not exist in Kabba. Farm sizes are quoted in number of heaps or in monetary estimates. In this respect it is important to note that numeration is closely linked to traditional currency units (in cowrie shells). Counts of 200, 400, 600, etc. in local mathematical terminology also correspond to monetary values. For example 200 is igbā and 2000 is ẹ̀gbẹ̀wā [or 200 in ten places] which is equivalent to 6d in Colonial currency. When cowries ceased to be legal tender in the Yorubaland Protectorate in the 1890s the official exchange rate was pegged at 4000 cowries to the shilling. Farmers quote farm sizes in 'monetary' values rather than in the numerals. For example, a farmer who says that his plot size is 'one shilling' (or nowadays 10 kobo) means he has a farm plot of 400 heaps. Estimates of farm sizes were collected from farmers in this form. This was 'translated' to areal units by using tapes to measure the area covered by 1,000 heaps on sample five plots in each of the sample villages. This was done for the three main categories of soil where heap sizes differ (ọ̀fẹ́, àkùrọ̀ and ibo). The averages of results are as follows:

ofe	- 1000 heaps = 0.125	hectares	or 8000 heaps	= 1 hectare
akuro	- 1000 heaps = 0.33	"	or 3000 "	= 1 "
ibo	- 1000 heaps = 0.17	"	or 6000 "	= 1 "

Even before heaping, farmers make highly accurate estimates of farm sizes by estimating the number of heaps they can put in any cleared plot. During field work farmers were asked in many instances to estimate the number of heaps a cleared plot will have. The number of heaps were then counted after heaping. In ten such cases, difference between estimated and actual number of heaps ranged from only three to fifty heaps. Six of the ten farmers made estimates within 20 heaps of the actual figure. In this way, they know when they have cleared enough land for their needs or in accordance with available labour and input resources for future operations. Sizes of tree crop plots (which are not heaped) are also estimated in the same way.

Another form of quantification, which ties culture and farm operations together, is the division of plots into semi-standard units, clearly visible in the field and forming the basis for the pattern and schedule of farm operations. Fig. 7.2 is based on the study of a typical farmer's plot which was observed from the time of clearing through the

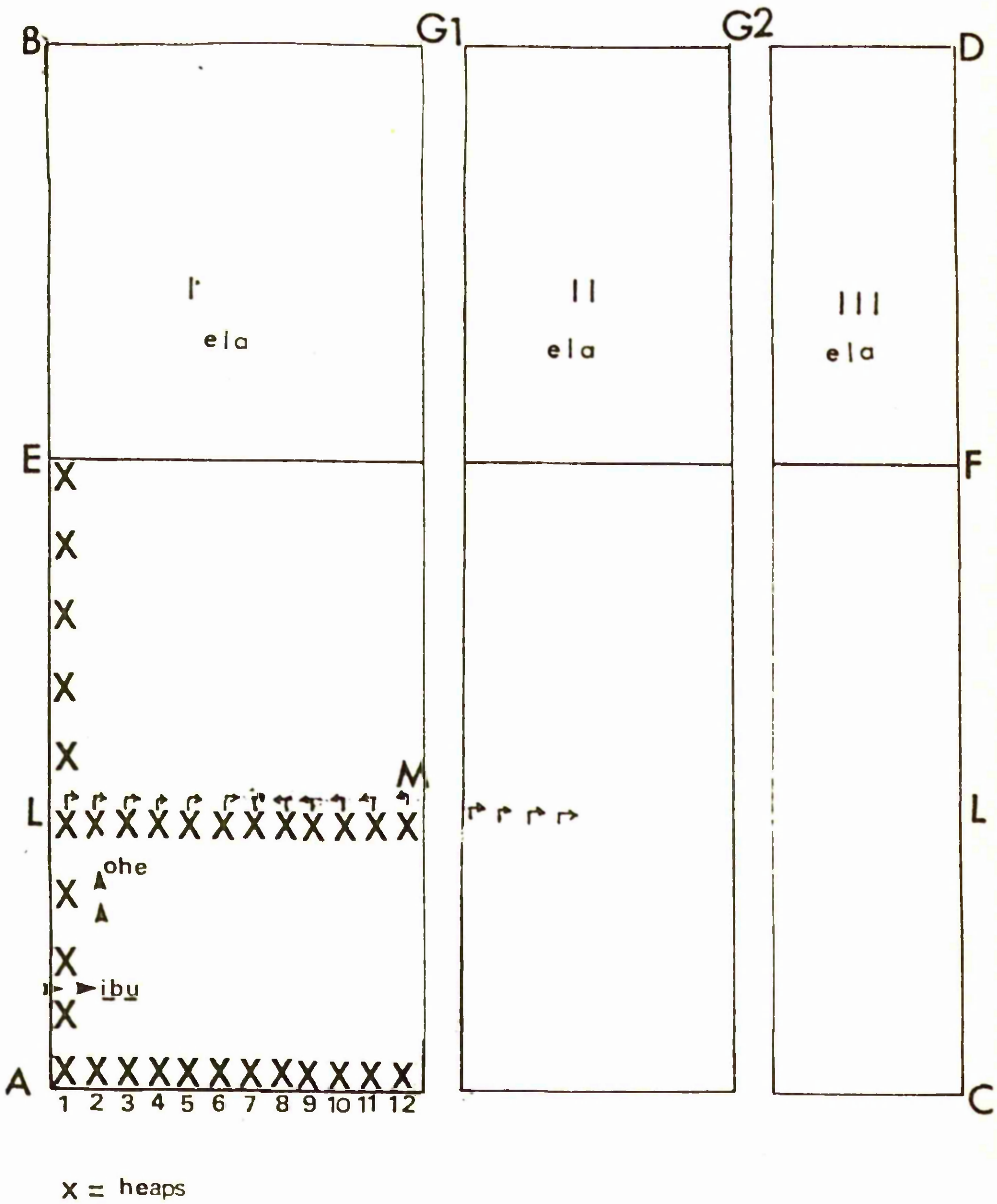


FIG- 7-2 KABBA FIELD MATHEMATICS

heaping operation and forms the basis for the explanation of how this subdivision operates. ABCD is the area cleared by the farmer. Heaping is done along the <u>ọhẹ́</u> (column) from A to E beginning from A_1 and heaping up-slope to E_1. The farmer locates E depending on how far he can heap before standing up to stretch his back. This particular farmer made ten heaps but many go as far as 15 or 20. The longest on record in Kabba is 200 heaps and the farmer who performed this feat acquired the name <u>Asegba</u> (or 'the man who heaped 200'), as a mark of his prowess. He is a living legend because of this nickname which over the years has replaced his original surname. On reaching E, the farmer walks back (as a means of stretching the back) to take the line A_2-E_2. This continues until the whole area of ACEF is heaped. The same process is followed in heaping the area of EFBD. By the time heaping is finished, the EF line is completely obliterated. If more than one heaper is involved, as is mostly the case with this labour demanding operation, they take one <u>ọ̀hẹ́</u> each and heap from A to E. If, however, the farmer who took <u>ohe</u> A_1E_1 is extremely fast, he can come back to take A_3 (if they are only two) and attempt to catch up with the man on A_2E_2 before E_2 is reached. If he succeeds, he must take over A_2 and relegate the other farmer to A_3 since heap E_3 cannot be heaped before E_2 because one finished <u>ọ̀hẹ́</u> provides the pattern for the next one. When this happens, the faster farmer is said to <u>gb'òhé</u> from the slower one - akin to such counts as 17 to 7 in the game of table tennis. A man who achieves this feat frequently, especially during <u>ọ̀wẹ̀</u> operations is acclaimed and respected. The most notable performer of this feat in Takete-Ide, for example, was nicknamed <u>Ogbohe</u> (one who always takes <u>ọ̀hẹ́</u>) and has become so popular over the years that this nickname has surplanted his original surname. In the past, these working units provided avenues for young men to obtain honour through competitiveness. Wealthy farmers were reported to give expensive gifts, including their beautiful daughters in marriage, to the best heaper during ọ̀wẹ̀ operations. Other gifts included tins of palm wine, kolanuts, special hoes, or fine clothing. The gifts, including the girl would be put at the top of the area to be heaped, the man reaching there first claiming the various prizes. These operations are the more important because talking drums and the ọ̀yẹ́ (talking flutes) are used by experts (specially trained in village oral history) to sing the praises of each worker with references to the prowess and achievement of their ancestors. Some of these praises are included in the farming proverbs presented in Appendix 10. So some of the people working put in maximum effort not just for the sake of acquiring a reputation for themselves, but also in defending the name and fame of ancestors invoked by oral historians. Failure to meet standards set by a parent or ancestor is to open oneself to the following taunt:

> kò lè sè bī bábā
>
> cannot/do/like/parent/

This is in effect an allegation as serious as illegitimacy, because it is argued that a true son would work as hard as the ancestor or parent. This is exemplified in the formal insult:

> kìnìun kì lòyūn fī bī ajá ígbó
>
> lion/never/pregnant/to bear/hyena
>
> (the lion does not produce a hyena).

The foregoing rewards and sanctions are in effect a set of methods for instilling hard work and competitiveness among the young generation.

All other farm operations are performed along ìbù (the furrow) rather than ọ̀hẹ̀, working from the AB side to the CD. For this purpose, the field is divided into strips akin to those of medieval European open field systems (Orwin and Orwin, 1966). Each strip (I, II, III) is called ẹ́lá (or 'sub-division') and farm operations take place in them one at a time. They are created by bending guinea corn stalks in both directions as shown by the heap row labelled L in the figure. The first few are bent forward and the last bent backwards and at the boundary, the stalks are bent forward again. The width of ẹ́lá (LM) depends on how far the farmer can work (hoeing, planting, harvesting etc) before straightening his back but consists of rows of 10, 11, 15, 17 or 20 heaps. The boundaries (G_1, G_2) form clearly demarcated gaps used also as pathways on the farm and for excess water to flow out from the furrows. By counting the number of heaps in the ọ̀hẹ́ and ìbù, estimates of daily work output are readily made. This is especially important for hired labourers who prefer to be paid according to work output rather than by a fixed daily wage. Another function of ẹ́lá is to enable farmers to plan how to plant varieties of crops on different parts of the plot.

Measurement of farm produce is the same in Kabba as in other parts of Yorubaland with standard bowls used to measure cereals while yams are counted by tubers. In the past three decades, standard volume bags have been introduced for cocoa, coffee, pepper and other grains while lorry 'gauges' (i.e. partitions) have come to act as a standard measure for large consignments of yams.

One local method of quantitative estimation is worthy of further note. This is a system for counting yam and yam setts when large numbers are involved. 'Control' tubers are put aside after every count of one hundred. At the end of the exercise, the 'control' tubers are counted to know how many hundreds there are in the pack. This is crucial for seed-yam preparation as it enables the farmer to compute when he has made enough setts for his plot. Every farmer then makes a few more setts than required so as to be able to replant failed crops.

The systematic and analytical skills identified briefly in the foregoing discussion result in a body of knowledge(previously termed 'ethnoscience') which is the equivalent of a technical and cultural manual for the effective manipulation of man-land relationships. Only by living in such an environment is it possible to understand the full range of this knowledge system and its educational implications. Peasant farmers, who have lived on and worked the land from childhood are therefore experts in their own right as much, if not more so, than any 'outsider'. It is difficult to justify the continued exclusion of such experts from the rural development planning process. This point is returned to in the conclusion to this thesis.

Environmental learning

It has been pointed out that cultural adaptation or adjustments is dependent on information flow from the environment and the construction of this information as a standardized and systematic set of ideas (generally thought of as education or 'science'). Learning to understand work behaviour, group attitude to the environment, and a given store of knowledge about that environment requires a long and elaborate education. In so-called 'traditional' societies, this education is centred on use of language and technology, social interaction between members of the group, leading to shared knowledge. Direct interaction with the environment in childhood, and means of which relevant environmental images and ideas are constructed by qualified persons for the benefit of the younger generation form part of this educational system. This process has been touched upon briefly in Chapter 2.

In the main questionnaire interview, farmers were asked how they had gained their knowledge about farming. The responses reveal that every farmer learnt through participation - going to the farm with parents, relatives or guardians until they were old enough to have their own farms. The age at which farmers in the sample started their own farms, fully independent of their parents, ranges from 15 to 40 years, with an average of 24.5 years indicating that a long period of apprenticeship is normal. Opportunity to learn about the farming environment is afforded through observation, participation and direct formal education by parents. 73% (88) of the farmers in the sample studied under their own fathers while 13% studied under other relatives and the remaining 14% studied under non-relative guardians. From the age of about 14 years, the boy is given an experimental farm close to that of his father or guardian on which he puts into practice his observations of his mentor's practices. The latter pays regular visits to the experimental plot, listens to questions about problems and gives advice and correction to the learner. Only when the learner is sufficiently competent to manage his own farm is he allowed to set up independently and only after this is he allowed to take a wife. Parents can control a recalcitrant son by withholding bride-wealth and other customary presentations. Such control is ostensibly to ensure that a new home is not set up with inadequate preparation to assume responsibility. In this way every farmer develops a detailed and intimate familiarity with the environment of a high degree of ecological rationality (Morgan and Moss, 1970; Janzen, 1973). While individual idiosyncracies, local innovation or discovery of new knowledge or the diffusion of knowledge into the society may alter ethnoscientific systems, commonly held sets of terminologies, and commonalities of productive behaviour attest to a fundamental core curriculum in the 'traditional' education system. This core curriculum consists of both non-verbalized manual or technical skills and verbalized skills as discussed in the following section.

One major way of learning about farming is through grasping the representation of cognitive regularities concerning the environment contained in proverbs, stories, <u>àlọ̄</u> (riddles) and other verbal skills. Mental skills such as logical 'calculus' and reasoning abilities are inculcated. Creating and expressing formal arguments thus forms an important part of the farm educational system. Evening gatherings of children and adults often provide the forum for exchanging such oral information, in the context of competitions and other demonstrations of skill. The tape recorder and gas lamp offered the best way of recording such exchanges and much time in fieldwork was spent collecting this kind of material. Appendix 9 comprises examples of riddles and other mind games collected in such sessions (Tape D). The assembled group fully debates the logic of every answer, thus providing a fascinating insight into an African oral educational system in action. Proverbs, some dealing with hard work on the farm, others with dietary items and even drought, also reflect the encoding of environmental information, as shown in Appendix 10. The whole environment, social, economic cultural, and physical, is in effect represented in the form of proverbs and riddles which form a repository of village cultural, historical and environmental information. Experts in these oral skills are found in all villages, their verandahs forming the gathering point for evening sessions. They are also the final arbiters when questions arise about the cultural history of the village.

In other words children learn about farming not only through practical participation in farm operations, but also through oral education of the kind just described. This kind of education is referred to by Hatch, writing about peasant farmers in Peru in the following way: "... through a lengthy apprenticeship which begins in childhood, small farmers are taught to use a very complex manual technology... They learn to 'read' the soil, the weather, and the heavens. They learn to study their crops for disease, insect and rodent damage, and water requirements - often on a plant by plant basis. They learn to follow a specialized farm task calendar, meet sequential deadlines and keep a careful count of passing days... They learn resourceful strategies of adjustment to congruencies arising out of weather, labour and cash restraints" (Hatch, 1976:7).

'Indigenous extension'

One major by-product of informal social relationships at village level is the easy diffusion of information. A great deal of knowledge about crops, and other inputs, as well as concerning farming problems, has spread within Kabba through what may be termed an 'indigenous extension network'. Since no society lives in isolation, interaction between villagers and other areas has always been effective, and in Kabba has led to the introduction of many innovations. For example, cocoa was brought to Takete-Ide in the late 1940s, by a villager (Akere) who had seen it on a journey to Ibadan while another (Olowodara) introduced Christianity (1908), pigs and pineapples (1928). The bicycle (by Olukomogbon in 1936) and iron corrugated roofed house (by Ayeni, 1953) were also introduced by villagers who had spent time in neighbouring areas. The greatest local advocate of the planting of tree crops was the Rev. K.P. Titus who preached both the Christian gospel, and the immense wealth accruing to Yoruba farmers in the south west forest region of Nigeria as a result of the adoption of tree crops. Titus encouraged his congregations all over Kabba to plant cocoa (and supplied seedlings to this effect) with the promise of helping to organize contacts for proper marketing of the produce. The importance of inter-personal contacts such as these in agricultural innovation will be discussed in the next section. A key point to note is that since more local people go out into the rest of the country than strangers come in to this area, indigenous people, more than outsiders, are responsible for bringing the changes to be described in Chapter 10.

Sample farmers were asked to list the new crops or crop varieties they had adopted between 1968 and 1978. Of the 74 (62%) who had adopted new varieties, only 9% were introduced to the crop by government extension officers while 70% (52) adopted them from fellow farmers in the same village and the rest (21% or 16) brought them home after a personal visit to other villages. As indicated in Appendix 5, some major varieties of crops have actually acquired the name of the apparent source of the crop. Table 7.5 indicates responses by farmers to a series of questions about their sources of information concerning various aspects of farming. The indigenous extension chain comes out as a very important vehicle for transmitting agricultural information. This informal extension system has been the principal instrument of change since pre-colonial times, facilitating exchange of ideas about crops, farming and the outside world. Each village has a number of well respected 'leaders of thought' and adoption of anything new by these people means a very fast rate of adoption by the rest. Mobilizing such people might be vital for rural change.

The external world

If farmers' environmental knowledge were confined to that of the village and its physical, social and cultural surroundings alone, their image of the world would be restricted and information flow and change limited. It is often suggested that contact with foreigners or with differing cultures is the most significant cause of change (Murdock, 1956). Òlàjú (civilization or enlightenment) is largely the cumulative product of the 'ever-widening process of culture, contact and fusion' (Locke and Stern, 1946). Or as Childe argued, "the most important element in man's environment is his fellow-man, since culture basically grows through the process of borrowing from others" (Childe, 1937:342). As it has been pointed out, however, contact between various groups within and outside Kabba is long established. The range of these contacts has increased since the beginning of the colonial period but there

Table 7.5

SOURCES OF INFORMATION ABOUT SOME FARM OPERATIONS AND INPUTS

a) 67 farmers adopting new improved crop varieties between 1974 and 1978, were asked 'who showed it to you?'

			Respondents
Responses are:	A farmer friend	=	31 (46%)
	My son/relative	=	6 (9%)
	Extension officer	=	28 (42%)

Saw it at farm settlement = 1
Saw it during co-op farming operations = 1

b) In response to the question 'in what other ways do you learn about Market prices?' (apart from his wife) farmers' responses are: -

Talk in the town or from fellow farmers	=	56 (47%)	
From buyers	=	22 (18%)	
From my sales	=	15 (12%)	
Go to market myself	=	8 (7%)	N = 120
Through co-op Union	=	8 (7%)	
No other way	=	11 (9%)	

c) Who told you of the use of fertilizer for the first time?

- a farmer friend	=	55 (46%)	
- Extension officer	=	51 (42%)	N = 120
- My son/relative	=	14 (12%)	

d) Who do you discuss farming problems with?

- fellow farmers	=	103 (53%)
- Extension officer	=	53 (27%)
- My wife	=	28 (14%)
- Co-op Union	=	6 (3%)
- God	=	5 (3%)

N = 195 responses

Table 7.5 contd.

e) If you tried a new method or input on your farm who would you tell if .... (Give only one answer)

	Successful?	If unsuccessful?
Keep it secret	8 (7%)	0
Tell only close friends	28 (23%)	20 (17%)
Tell all other farmers	84 (70%)	66 (55%)
Tell extension officer	0	34 (28%)

N = 120

Source: Field Work, 1978

is no identifiable beginning in this process. These contacts shape peoples' image of themselves and their aspirations (as discussed in Chapter 4) must be treated as an integral part of this process.

Travel is one of the most important means of exposing the farmer to the changes taking place in other parts of the country. Sixty-seven percent (80) of farmers in the sample had spent more than three months resident in other towns or villages. Fig. 7.3 shows that Ondo, Ife, Ikare and other towns located in the cocoa growing area of Western Nigeria were the most frequently mentioned. Most farmers in this category went as labourers on cocoa plantations in the 1950s and 1960s to earn cash. A few farmers from Olle and Ejuku actually set up their own cocoa plots. Four farmers in the Ejuku sample still own cocoa farms near Ile-Ile. Of farmers who had been resident elsewhere 46% (37) said they went to labour to get money for their wedding arrangements. Some farmers (24% (19)) went as apprentices to learn trades such as carpentry, bricklaying, bicycle repairing, etc. A few (7%) were born in the towns or villages mentioned while 10% (8) went for hospital treatment. Thus for various reasons, a majority of farmers has lived among other groups of people and has experienced different life styles at first hand.

Farmers were also asked to list the four largest towns they had visited throughout the country whether for a long or short period. The responses are plotted in Fig. 7.4 while the reasons given for such travels are presented in Table 7.6. It shows that farmers have travelled to all parts of Nigeria and are aware of what is going on in the cities. The most frequently mentioned reason for travel is to visit

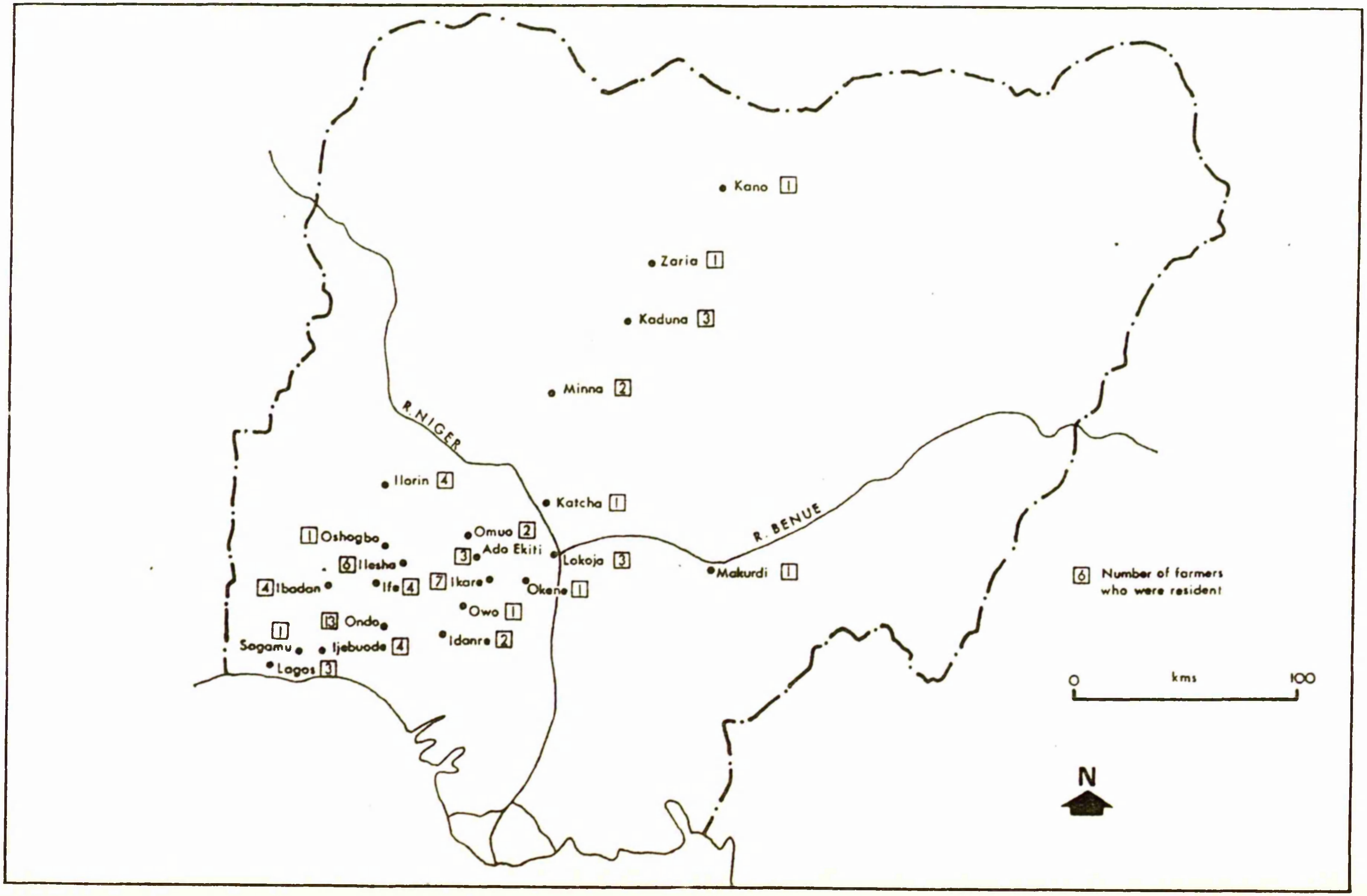


Fig. 7·3. **Places of Residence outside Kabba Division.**

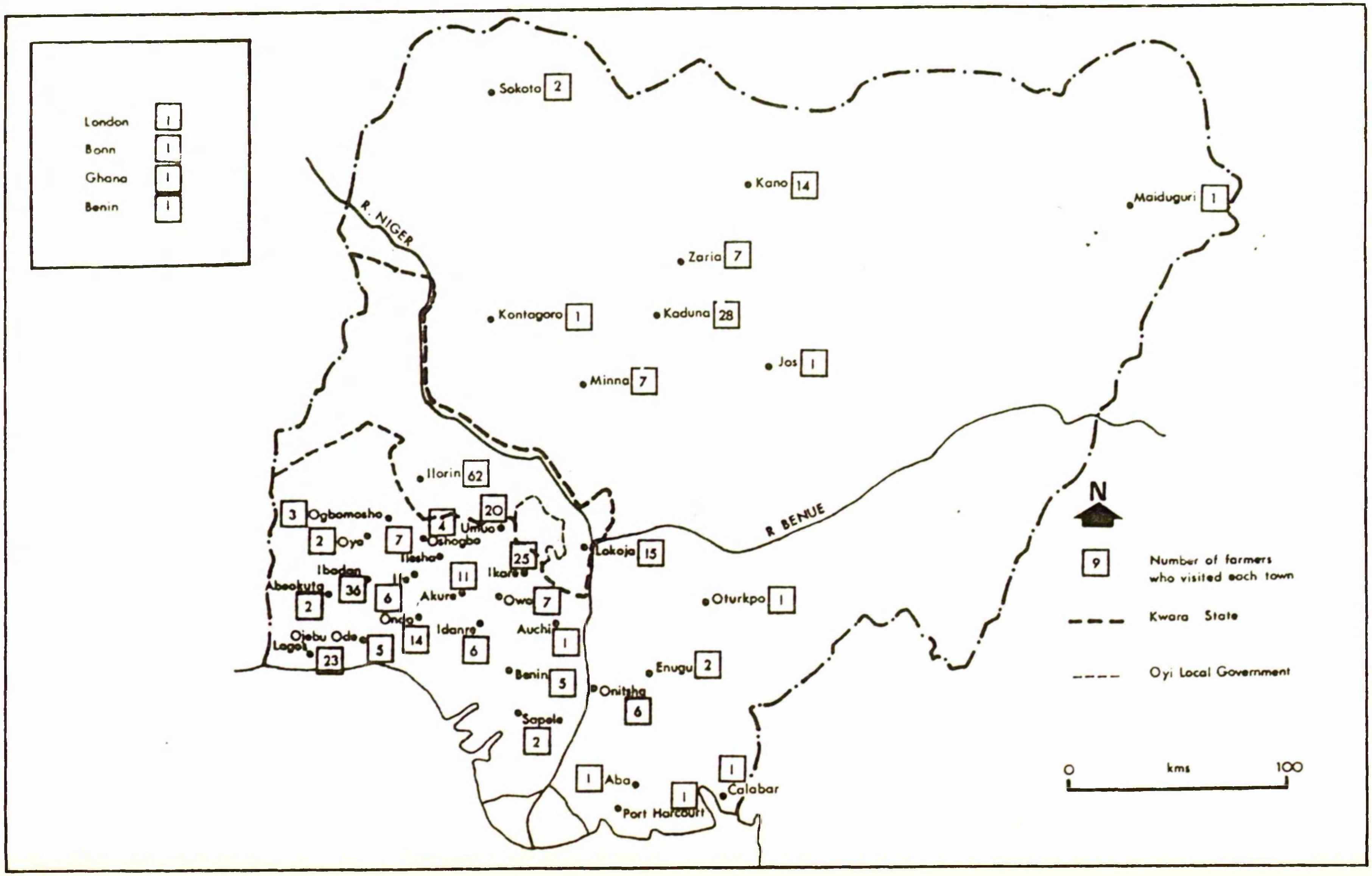


Fig. 7·4. Major Urban Centres visited by Kabba Farmers.

Table 7.6

REASONS GIVEN BY FARMERS FOR THEIR TRIPS TO TOWNS SHOWN IN FIGURE 7.4

	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
To pay visit to children and/or relatives	20	22	22	19
In search of work	6	6	10	8
To buy things unavailable here	9	6	5	4
To repair my machine	1	-	-	-
To sell yam and other crops	7	5	2	2
For medical treatment	3	2	1	2
On holiday (sight seeing)	-	-	1	-
For a religious meeting	-	-	2	-

N = 30 in each village

Source: Field Work Questionnaire Survey - 1978 children and relatives, the importance of which has been discussed in Chapter 4. Exchange of letters between city dwellers and villagers, and stories of life in urban centres told by returning migrants also form a major source of information about the outside world.

The end result of these trips is exposure to other life-styles partly contributing to the farmers' representational model of the operation of rural-urban relationships in Nigeria discussed earlier. These images of the external world cause farmers to re-assess their own life-styles in relation to urban dwellers. Throughout Kabba the result of this re-assessment is that rural life is seen as inferior to the urban as will be discussed in Chapter 10.

External sources of information about farming, especially non-'traditional' aspects, are supplied via the radio, by films, pamphlets and posters prepared by the Ministries of Agriculture and Information (at both Federal and State level), and through extension officers. 73% (88) of farmers in the sample reported having listened to radio programmes which deal specifically with farming. Topics in these programmes include the availability and use of tractors and hire credit facilities, information about new crops and marketing, encouragement to farmers to use fertilizer and pesticides, information on keeping livestock and on a more rhetorical level telling farmers about the dignity of their profession. Much of this activity in recent years has come under the heading of the 'Operation Feed the Nation' Scheme launched by the Head of State in 1976. 36% (43) of farmers in the sample reported having read some of the pamphlets prepared in Yoruba for the 1977/78 cropping season. Films, which farmers also report having seen were also prepared in Yoruba and other languages to demonstrate new farming techniques and operations. One significant additional factor is that educated migrants may secure relevant films and show them to their own village people in addition to government showings. It is also not uncommon for children and relatives living in cities to buy fertilizer and pesticides for parents in the village who might otherwise not have access to them even if they had the money.

Another source of agricultural information is the School of Agriculture at Kabba where extension officers are trained. Plant breeding research is also conducted and improved varieties are sold to farmers. The School has set up sub-stations in a number of villages where new methods of farming, new crops and resource use strategies are demonstrated to farmers. However, beyond the limits of the school and its demonstration plots, villagers continue to use the farming system described in Chapter 5, except for changes such as the use of fertilizer and pesticides and the introduction of new crop varieties. In fact only 10% (3) of sample farmers in each of Takete-Ide and Ejuku, 17% (5) at Iya Gbedde and 57% (17) at Olle had visited the school for any reason by 1978, and many who had done so only went to see trainee relatives. This response to the presence of the school is very similar to the response of peasant farmers living close to the numerous farm settlements set up in Western State in the early 1960s (Ajibola Taylor and Oluwasanmi, 1967). Olle, however, is an exception. All but one of the farmers interviewed had been to examine new farming techniques, to buy seedlings, and to watch and/or take part in the Annual Agricultural Show where yields from different crop varieties and livestock are demonstrated. The greater impact of the School in Olle arises principally from the efforts of the village head who is also the District Head for Bunnu. Extension officers, usually located in the main villages in Kabba and elsewhere in Kwara State, are the main link between the Ministry of Agriculture and the peasant farmer. Their role is to distribute fertilizer, pesticides, seedlings of improved crop varieties and tractors at subsidized rates, and to serve as general advisers to farmers. They are also expected to live among farmers and cultivate a pilot plot as a demonstration for farmers to copy from. The extension service of the Kwara State Ministry of Agriculture is excellent in terms of the number of extension officers posted to villages and in some of the objectives set for them. The following drawbacks make their work less effective than expected: a) the fact that much of their work is based on the assumption of a student-teacher relationship between the farmer and themselves. This is in part a consequence of a training which assumes the primitiveness of indigenous farming systems, and in which extension officers are encouraged to see themselves as the vanguard for a transformation of 'traditional' farming into 'modern' enterprises. Farmers in the sample complained of arrogance on the part of some of these officers and some farmers report refusing to consult with them to avoid being treated as fools. b) a lack of awareness on the part of many extension agents of farmers' motivations and the reasons underlying their resource management strategies and farming practices, c) the crucial fact that there are several cases of extension agents who cultivate their 'pilot plots' exactly as taught in the School of Agriculture, but who then cultivate their own personal plots in the 'traditional' way, making a mockery of what they try to teach farmers. For this reason many farmers refuse to take them seriously, d) periodic non-availability of new inputs (fertilizer, pesticides, seedlings, new crop varieties and tractors) for which the extension service is the only source of supply. Agents teach farmers of the advantages to be gained from using these items and promise to supply them, but for no fault of their own, they are often unable to deliver because supply from the headquarters is irregular and unreliable. Over the years farmers have become cynical about such promises. e) Many extension officers spend much of their time off-station in the larger villages or urban centres because of the difficult conditions in the villages to which they are posted. They are therefore not always available.

In spite of the problems listed above, extension officers play an important role in rural farming landscape. As many as 83% (25), 50% (15), 70% (21) and 60% (18) of sample farmers in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively sought their advice in 1977 and 1978. Types of advice sought are listed in Table 7.7, while other tasks performed by these officers have been listed (Table 7.5). To some degree, the extension service has been responsible for recent minor changes taking place in farming and resource management, and will have an increasing role to play in the future, as will be discussed later.

Conclusion

This chapter has reviewed some aspects of the shared corpus of knowledge about the 'village' and its social, ecological, cultural and economic setting, held by Kabba farmers. It has also identified some of the factors which shape the farmer's view of the outside world and has explored some of

Table 7.7

TYPES OF ADVICE SOUGHT BY FARMERS FROM EXTENSION OFFICERS BETWEEN 1976 AND 1978

Advice	Takete-Ide	Ejuku	Olle	Iya Gbedde
How to use fertilizer	20	10	21	12
How to use pesticides	12	12	21	18
Application for hire of tractor	8	7	8	2
Application for fertilizer and or pesticides	25	14	18	8
Advice on crop processing/storage	3	2	3	-
How to use tractor for cultivation	4	3	1	2
N =	25	15	21	18

Source: Field Work, 1978

of the linkages which make him aware of the changes taking place in other farming and social landscapes. Local knowledge formation, together with outside influences, come together to help create complex farming systems, resource use strategies and the gradual trends towards the adoption of new techniques to be discussed more extensively in Chapter 10.

This chapter is most appropriately concluded with a discussion of the way the data presented informs debate concerning the nature of ethnoscience. It has been argued that Kabba farmers' agricultural knowledge can be regarded both as a detailed educational system (information bank), and as a time-tested, reproduceable store of '<u>system knowledge</u>' about environment and '<u>system behaviour</u>' under local circumstances. It is an adaptive framework providing for a multiplicity of problem definitions, solutions, experiments and eventual answers. The universe of perspectives represented within Kabba agricultural ethnoscience make for a dynamics of constant shifts in the light of new information (Buckley, 1968; Knight and Newman, 1976; Romney and D'Andrade, 1964; Spradley, 1972; Tyler, 1969). Like formal science, the local ethnoscientific system is based on a quest for explanatory theory in accounting for the apparent diversity, complexity, disorder and regularity in the environment. The exploitation of the environment can be seen as the practical manifestation of answers to this quest. Ideas concerning environmental processes and ecological practice are therefore based on 'theories' which abstract, analyse and synthesize, with analogies often providing the basis for explanations (cf Appendix 5, 9 and 10). Moreover, the most important feature of this ethnoscience is the extension of theories to incorporate processes with tangible effects. For example, farmers are keenly aware of the necessity of sunlight for plant growth but are clearly unable to describe the process of photosynthesis. Nevertheless, they develop a cropping system which maximizes the amount of sunlight available to crops. Again, farmers cannot describe the process of osmosis, but each one of them is aware that plants 'drink' water and 'eat food' from the soil. So they develop controlled environments which are designed to maximize the supply of these growth factors. Religious and cosmological explanations are invoked for the operation of processes which cannot be explained at a practical level. As far as the two examples given are concerned, farmers see the hand of God in the use of sunlight by crops and in the plant food ingestion process. Holistic views of the origin and nature of the universe around them are also incorporated into their knowledge system. These major features of ethnoscience are comparable with the underlying features of formal science and technology (Horton, 1967) in that they represent the result of a quest for an explanation paradigm. Ethnoscientific knowledge is more than simply practical or contingent. It has explanatory power and practical outcomes which derive from the operation of its internal logic. A failure to understand this point has meant that the assumption that 'traditional' systems of agriculture are primitive or irrational, has prevailed in the view of outside observers for far too long a time. Nevertheless, despite 'outsiders' misunderstanding, 'traditional' farming survives because it works, at least so far. Thus in Knight's view, "... that the system (and the society using it) persists is one indication of its success; another is 'our' increasing appreciation of the complex cultural-ecological dynamics in such systems and their resilience to environmental stress" (Knight, 1977:22). Schneider, investigating the reasons for the persistence of 'traditional' agricultural practice, has argued that opportunity costs, measured in terms of cultural values lost, are simply unacceptable to East African pastoralists faced with the alternative of keeping indigenous practices or opting for a market orientation (Schneider, 1974). Though Kabba farmers are not immune to market forces (Chapter 6), cultural values still persist as important factors in agricultural production. It is because of an appreciation that there is still good ecological potential in existing farming systems that market forces have not swept all before them.

CHAPTER 8

RISK AND UNCERTAINTY, AND MANAGEMENT STRATEGIES

Farming takes place in social, cultural, economic and physical environments which must be stable to a reasonable extent for the combination of productive factors to operate successfully. Contrary to normative economies, real-life situations are never completely stable, and disruptions in the smooth operation of productive factors are frequent and unpredictable. These disruptions, which affect land-use productivity, income and survival of peasant farmers, are seldom known precisely before they occur and so they introduce an element of risk or uncertainty into farming systems. These uncertainties, farmers' perception of them and the management strategies designed to cope with them are crucial to an understanding of the underlying processes involved in farmers' decision-making. Farming problems, the way decision-makers perceive them and trends in the farming environment are vital ingredients in the information kit necessary for the planner interested in sustained efforts to bring about meaningful change.

A. Risk and Uncertainty

The concepts of risk and uncertainty have been used to describe non-normative situations under which decision-makers operate (March and Simon, 1958; Found, 1971; Hurwicz, 1950; Starr, 1963; Savage, 1951; Neumann and Morgenstern, 1944; and Wald, 1950). This chapter will not be concerned with testing specific theoretical formulations in relation to risk and uncertainty. Its aim is to elucidate the kinds of risks, and uncertainty problems which face farmers in the field, their assessment of these, and the strategies they employ to minimize the impact of these problems. A challenge is also issued to the assumption that farmers are passive or react in some Darwinian 'survival of the fittest' manner in the face of environmental processes which adversely affect their farming operations (cf. de Wilde, 1967).

The use of the term 'risk' assumes that farmers have an estimate of the future behaviour of input factors in crop production, but that their estimate is subject to some error. Rational decision-making under risk is usually described as the selection of that alternative for which the expected utility is greatest. The expected utility is also defined as the average, weighted by the probabilities of occurrence and of the utility attached to all possible consequences of actions taken (March and Simon, 1958). Under situations of uncertainty, however, the farmer has no estimate of the probability of the future events concerned. To avoid decision-making paralysis, it is suggested that decision-makers under uncertainty conditions estimate or impute risk-probabilities in accordance with their own psychological characteristics, past experience and knowledge of the environment in the absence of empirical evidence. Under these circumstances, the decision-maker may assume equal probability of occurrence for all situations (the Laplace or equal-likelihood criterion) or he may assume either the worst or the best situation will occur (the partial optimist criterion of Hurwicz). Or the decision-maker may seek to minimize losses if the unfavourable situation occurs (Savage's regret criterion) or he may play 'games' with environmental variables using either the maximin or minimax strategies (the Wald criterion using game theory, (Found, 1971, Gould, 1963)). Finally, rather than make specific choices from alternatives, farmers in the face of risk and uncertainty, may decide to use mixed strategies to ensure that they will survive if any one or a combination of 'unknown' factors should become operative.

Sources of risk and uncertainty in Kabba farming systems

Uncertainty may be introduced into the farming environment through instability in any of the following areas:

a) Personal factors: For all farmers, personal or family labour is the most important input in production. All factors that affect input of labour are therefore of great concern. Thus farmers report that their state of health is a crucial yet unpredictable element in the way they regard their farming activities. Sicknesses, due to natural causes, are possible, and depending on when they occur, can have serious impact on farmers' ability to work. All farmers also pointed to the possibility of accidents on the farm resulting from the use of implements, stepping on poisonous thorns, stinging by wasps or scorpions, etc. which might demobilise a farmer for anything between a few minutes to several days or even weeks on end. When sicknesses or accidents occur at the peak labour demand periods, such as heaping and weeding times, farm sizes and crop yields are adversely affected. For example, 18% (21 farmers) of farmers in the sample listed sickness as one of the reasons for poor crop yields on their farms in the past ten years. In a ranked list of major production problems experienced in

1978, 15% (18 farmers) of the farmers included sickness or farm accidents which they said reduced the sizes of their farms for the year.

b) Institutional Arrangements: Because a farmer operates in a large institutional environment, many exogenous factors enter into his production environment over which he has little control. Instabilities in these institutional arrangements can and do cause problems. Although Nigerian Federal, State and Local Governments do not in any way directly interfere with peasant farming, their policies and arrangements affect farmers in a number of ways. For example, fertilizer and pesticides are subsidized by government and made available to farmers through the extension services. Moreover, only the State government possesses tractors for ploughing and these are made available to farmers at subsidized hire rates (the farmer clears his own land and the government supplies tractors and their operators). 46% (55 farmers) of farmers in the sample said that during the 1978 cropping season, fertilizer, pesticides and tractors were available too late to be useful due to bureaucratic delays. In addition, inefficient distribution due to poor roads, neglect by some extension agents, and agents selling items at inflated prices, diverting the additional money into their own pockets, make it impossible for farmers to fully utilize the opportunities presented by the availability of these inputs.

Visits by government functionaries also disrupt farm work for many farmers. They have to wait at home when tax collectors, sanitary and forest inspectors visit the village or when Divisional Officers make their rounds. Several valuable man-days of labour may be lost each year in this way.

Social and cultural events also cause uncertainty. Death or serious sickness in the family is the concern of everybody in the compound. People help one another in tending their sick and burying their dead. The death of important or young people keeps virtually everybody in the village at home for days at a time. These occurrences result in new widows or orphans to be fed and catered for by the household. All these events are unpredictable as aptly described by the Kabba proverb:

> <u>íkú 'o d'àjọ̄, ārùn 'o d'òsù</u>
>
> [Death never sets a date, nor sickness a month in advance]

The land tenure system, as part of the village political economy, rests on delicate social relationships. Because land is not bought, the relationship between land 'owner' and 'tenant' farmer is crucial, especially since the owner is not paid anything for the use of his land. A quarrel between the two, or an act of social disgrace by the tenant may lose him his right of usufruct. Such relationships are subject to somewhat unpredictable variations, and have to be tended with care to ensure stability.

The establishment of industries and educational opportunities in towns, and the introduction of health and social amenities in these places, adversely affect farming even when the society benefits overall. These amenities involve much construction work. Rural artisans and unskilled labourers increasingly move out to these jobs seasonally, reducing the number of man-days of labour they put into farming and also reducing the number of hired labourers available. For example, employment of village labour to clear part of the government forest reserve at Olle, and to plant new trees diverts hundreds of man-days of labour from farm work in this village each year. Moreover, the timing of clearing is determined by the Divisional Forestry officer and may co-incide with times when a lot of labour is required on the farm. People still prefer the forestry work because of the attraction of cash wages.

c) The Marketing Structure: Some of the uncertainties associated with marketing have been described earlier (Chapter 6). Rural periodic markets are small, competition is limited, and prices are often quite poor. Until recently, trade in foodstuffs was on a small-scale and confined to within the Division. Where farm produce is sold in large quantities, prices are fixed by middlemen and agents of the marketing boards. Prices of cocoa, coffee, tobacco, pepper and cotton are fixed in this way giving farmers very little say. Farmers are therefore subject to price fluctuations beyond their boundaries and beyond their control. For example, local farmers invested resources in the production of cocoa, coffee, cotton and tobacco in the 1950s and 60s only to experience price fluctations so severe that many farmers in Olle and Gbedde areas were impoverished and have only recently begun to recover by shifting to food crop production. The instability in the marketing system is further enhanced by poor transportation. For example, nearly all farm produce still has to be evacuated from the farm to the village by headloading. As much as 50% of foodstuff to rural periodic markets is carried in the same way, and although all the sample villages connect to Kabba by road, these links are easily disrupted in the rainy season.

d) <u>Physical Factors</u>: Physical factors which affect farming are potentially the most uncertain and most disastrous. The amount of rain and its distribution are factors beyond the control of the farmers and difficult to predict. As often happens, rains can start late, and/or stop too early. Or sometimes they continue for too long. The total amount may also be too small, too high or too highly concentrated. All have adverse effects on crop yields and farm operations. Since various farm operations, from seed-bed preparation, through crop planting to harvesting of each crop depends on the rainfall regime, rainfall uncertainty is a crucial factor. The seasonality of the climate in which the year is divided into wet productive and dry non-productive seasons, is in itself a major source of instability. Inability to find enough food to last beyond the dry season may cause serious nutritional difficulty at crucial times between April and June. The new cropping season starts at this time and involves much hard work. An urgent need for high labour coincides with the period when fresh food supplies are most scarce, and low nutritional levels lower the quality of work done (Knight, 1974; Conklin, 1957; Prothero, 1972).

Apart from the weather, soil performance is not accurately predictable. Choice of soil for production reflects subjective personal and group experience concerning the types of soil which have proven good and useful in the past (identification methods have been described in Chapters 5 and 7). However, there is no pre-test and no guarantee of how the soil will behave after the removal of the original vegetation. The first year of cultivation is therefore an uncertain one; because performance can only be assessed after the crops have been planted and well into the cropping season.

How long the soil can sustain profitable production is another factor which only practice will reveal. Since the annual rate of yield decline is unpredictable, the practice described in Chapter 5 is employed to organise a sequence of plots of different ages and proven capabilities (cf. Fig. 5.2).

The occurrence of pest and weeds, and the intensity of the damage they cause to crops are also unpredictable. Farmers know that these are unavoidable and also are able to make fair guesses as to the types of weeds and pests a given soil type might produce, but they have no reliable way of estimating the intensity of occurrences or their severity. Another uncertainty, especially for tree crop plots is to be found in annual fires at the end of the dry season which may spread from the open bush into the plantation.

As a result of these uncertainties, 63% (75 farmers) of the sample reported complete crop losses or serious yield reduction in one or more crops during the past ten years. For each of the major food crops, farmers were asked to record the number of years they had very good, normal and poor crop yields over the ten year period from 1968 to 1978. To do this, the àyó board (described earlier) was marked with holes corresponding to very good, normal and poor. The farmer was given ten àyó pieces corresponding to ten years and asked to distribute the pieces into the three categories of holes. This was repeated for each crop and answers were recorded. They were also to state the perceived reasons for poor yields if these occurred. The responses, are presented in Table 8.1. The seriousness of these uncertainty factors makes farmers' strategies designed to cope with these of crucial importance in understanding their farming systems. Instability, in any of the foregoing factors is a problem to farmers, and

Table 8.1

YIELD VARIATION REPORTED BY FARMERS BETWEEN 1968 AND 1978

	Takete-Ide			Ejuku			Olle			Iya Gbedde		
	VG	N	P	VG	N	P	VG	N	P	VG	N	P
Yam	2.8	3.4	3.8	0.4	5.3	4.3	3.4	4.5	2.1	2.7	5.8	1.5
Cassava	4.8	4.1	1.1	0.1	8.8	1.1	3.4	5.5	1.1	3.1	6.1	0.8
Guinea Corn	4.5	4.1	1.6	1.2	7.1	1.7	2.8	6.6	0.6	2.0	6.1	1.9
Maize	2.9	3.5	3.6	0.3	6.4	3.3	3.6	4.5	1.9	2.4	6.0	1.6
Rice	-	-	-	0	6.0	3.0	2.6	5.3	1.7	-	-	-
Melon	3.3	3.0	3.7	0	5.4	4.6	0.6	4.9	4.5	2.0	5.8	2.2
Beans	0.7	2.7	6.6	0	1.3	8.7	0.1	1.8	8.1	0.6	2.2	7.2
Cocoyam	-	-	-	0	8.8	1.2	3.3	4.7	2.0	3.8	5.8	0.4
Potato	-	3.1	2.3	-	-	-	2.1	6.8	1.1	-	-	-
Pepper	1.8	5.5	2.7	2.8	4.3	2.9	3.1	4.5	1.4	2.6	4.8	2.6

VG = Very Good, N = Normal Yields P = Poor Yields.

Figures are averages computed from all responses.

Table 8.1 (b) REASONS FOR THE POOR YIELD OF EACH CROP IN BAD YEARS

Reasons for failure	Yam	Cassava	G/Corn	Maize	Rice	Melon	Beans	Cocoyam	Potato	Pepper	Total Responses
Too much rainfall	6	-	1	2	-	5	-	-	-	-	14
Lack/lateness/stopped early insufficient rainfall	62	13	27	34	10	26	10	13	2	11	220
Pest and diseases	15	51	9	30	-	25	27	4	5	-	149
Birds and animals	3	17	4	51	-	13	-	2	-	-	157
Soils or quality of land	23	2	9	7	-	8	-	3	-	-	52
Lack of labour	7	-	3	2	5	2	-	-	-	2	21
Change of plot	1	1	2	1	-	1	-	-	-	-	6
Sickness	9	4	4	1	-	2	-	-	-	-	20
Unable to weed	8	1	3	5	2	8	2	1	-	5	35
Enemies	9	-	1	-	-	-	-	-	-	-	10
Fire out break	-	2	1	-	-	-	-	2	-	-	5
Late mulching of yam	2	-	-	-	-	-	-	-	-	-	2
Late planting	3	2	3	-	-	8	-	-	-	-	16
Weeds	-	-	-	-	-	-	1	-	-	-	1
Don't know	-	-	-	-	-	2	12	1	-	-	15
Overall deteriorating climate	1	-	-	-	-	8	37	-	-	-	46

N = 120 Source: Field Work, 1978

requires specific management strategies.

Management Strategies to reduce Impact of Risk and Uncertainty

All farmers are faced with similar problems, but actual decisions as to responses vary because farmers have different assessments of the problems and their severity. They differ in their goals, level of knowledge and also in their aversion to risk. In some countries, potential sources of uncertainty have been reduced through good soil surveys and weather records, cheap and readily available fertilizer, pesticides, herbicides, mechanization to reduce labour constraints, legal tenancy contracts, social security insurance, credit facilities and crop insurance to reduce the impact of crop failures. Long-term government pricing policies or marketing agreements also ensure secure and profitable marketing channels. All these factors enable farmers in such environments to take the risk of specialization and monocropping. Peasant farmers in Kabba have none of these facilities; their strategies to cope with risk and uncertainty are thus radically different from those of farmers in such countries and should be borne in mind by scientists from countries with well-developed agricultural infrastructures who conclude that 'traditional' farming is a 'primitive' system and inappropriate to Nigeria's current needs. No attempt will be made to describe farmers' strategies in terms used in classical decision-making, theory, because apart from strategies long ago built into the farming system, individual farmers combine a host of mixed strategies to deal with the complex mix of risks and uncertainties which face them.

In coping with risk and uncertainty, stability through diversification is the chief strategy used by Kabba farmers. The established system includes provisions for stability of 'income' which have been built into the farming system through generations of experimentation and cultural ecological adaptation, and also individual strategies based on farmer motivation, past experience and knowledge of the environment (managerial abilities). Strategies built into the farming system are expressed in practices such as shifting of plots, crop planting methods (multi, inter, mixed, staggered and relay cropping), the planting of many varieties of the same crop species, and the various crop care processes described in Chapter 5. Often times in the literature, such practices have been castigated as 'extensive', 'primitive', and 'wasteful' (Spate, 1945; FAO, 1957, Foh, 1977). On the contrary, with plentiful supply of land, and limited resources to combat environmental exisgencies, such farming systems are designed to optimise the limited resources available to the farmer through creating a diversified production system. Moreover, the use of a piece of land for three to four years (with only a seven-month cropping season in each year to achieve harvests of six to seven different crops– an average of 21 harvests in three years) is more intensive than is sometimes realised, even though the land is then left to fallow for an indefinite period. Farmers' reasons for preferring their present farming systems, (Table 5.1) and their analysis of the advantage of these systems (Chapter 5) shows an acute awareness, on their part, of the need to maintain stability through diversity.

Various techniques of risk spreading are practised, though the extent depends on individual farmers. Luning (1967) describes the deliberate fragmentation of staple crop fields in order to off-set or exploit micro-climatic variations and localize weed, pest and disease attacks. Ecological niches both within and between plots are exploited selectively by planting special varieties, or two crops per season in favourable areas. The principles behind the fragmentation of plots have already been discussed (Chapter 5), showing that most farmers have at least two food crop plots located in different soil types, with different water retention capabilities.

Assurance of enough farm produce is also maintained by spreading risks over many crops. Crops differ in their resistance or response to drought, soil conditions, amount of rainfall, weeds and pest types. They also have different growth periods, morphology, planting and harvesting times. By planting them together or sequencially, farmers attempt to avoid disasters which can befall monocropping where adequate social security and financial crop insurance are not available. By using various crop care methods, such as weeding, capping or mulching, thinning and staking, they seek to protect crops against a variety of environmental and production hazards. Moreover, heaping allows the planting of many crops together and their proper spacing in relevant micro-environments with effective erosion control. Replanting of failed crops in the early part of the growing season and staggered planting of crops to ensure maturation at different times provides some measure of security against environmental hazards. On the whole, a careful look at the detailed description of the farming system shows that it is geared towards stability under conditions of uncertainty.

Apart from the foregoing strategies which are built into the farming system, individual farmers take further steps, some major, others minor, depending on the localized conditions on his plots. Conversion of crops into storable and lasting produce (cf. Table 6.2), and storage methods designed for each crop, are designed to beat the shortages experienced during the hungry season. Each farmer also selects and plants a range of crops which are eaten specifically during the hungry season, such as water yam, aerial yam, yellow yam, cocoyam, soyabeans and cassava. Which of these to plant and the quantities to plant are entirely dependent on individual farmer's perception of his needs.

Another example is the strategy of ensuring food on the farm for the farmer during the latter part of the hungry season when seed-bed preparation has to start without adequate food supply. Thus for example in terms of reducing hungry season risks, during the harvesting of yam (from Oct.-Feb.) yam tubers often break leaving the top in the soil. Instead of digging them up, farmers deliberately cover them and leave them there. In addition, farmers bury yam tubers randomly without marking the places. In the months of March to May, when food is scarce, the buried yams, and the tops which remain in the ground (called èsé or 'remainder') reveal themselves by sprouting and are quickly dug up before they develop leaves. The big yam tubers are brought home to supplement household food sources while the èsé provide food for the farmer on the farm.

One of the major responses for variability in the traditional farming system is the use of what Allan (1965) termed the 'normal surplus' whereby farmers produce more than they need for consumption. This is intended to ensure that even in the poorest years, enough food is harvested to supply the family till the next harvest. Each farmer in the sample was able to estimate the farm size which would provide enough food for his family under normal circumstances, but every one of them had larger farms than this estimate. Using the proverb - ẹ̄ dá 'o m'ọ̀lá [no human knows tomorrow], farmers drew attention to uncertainties which might reduce yields. When all these have taken their toll, farmers wanted still to be able to meet consumption demands. In the past, storage of the surplus was the major problem and much wastage occurred even after part-processing into storable forms. Today, however, the ability of surplus production to cushion food shortages has been reduced because much of it is now diverted to the market rather than being stored as reserves. In fact the role of the 'normal surplus' has changed in Kabba because it is now production for the market. The 'normal surplus' accounts for the rapidity with which Kabba farmers have responded to the opportunities offered by the market or money economy, because when marketing opportunities first opened up, the traditional 'normal surplus' was waiting. It was therefore used as a spring board for production for sale. One of the problems of the moment is how to replace this insurance element in the traditional farming system now that it has been appropriated by market forces.

Farmers were asked, as an introduction to discussing risk and uncertainty, what they did when inspite of all their efforts there was a complete failure of certain crops. Answers concerning immediate response to crop failure and what to do to prevent further failures are presented in Tables 8.2 and 8.3. respectively. It will be noted that farmers see themselves reducing these uncertainties by taking to the use of fertilizer, pesticides, new or improved crops and even tractor use on a small scale. The adoption of cocoa and coffee in the 1950s was often undertaken primarily as an outcome of the individual farmer's desire to have a further means of insulating himself against similar uncertainties.

Because of the narrow economic base of peasant farming, non-farm strategies to supplement farm earnings have been taken up by individual farmers. Many farmers invest in cattle (as 'living' bank accounts) which they can sell in times of emergency when they have large cash needs as happens with weddings, deaths, and other responsibilities. Many farmers refused to discuss ownership of cattle so as to hide their economic strength from other people. Moreover, counting the number of cows in the cattle camps in each village was not useful because many farmers put their cows in camps in other villages. It is estimated that a quarter of the farmers own cows and Atteh (1974) has surveyed the ownership of and the impact of cattle on the pattern of agricultural land use in parts of Kabba. Investments in sponsoring children in school and setting up small trading businesses have been detailed in Chapter 4 and provide further indication of the concern by farmers with the increasing uncertainties they face not only in farm production, but also in competition with other sectors of the national economy. Moreover, as already pointed out, 43% (52) of farmers in the sample have secondary occupations such as carpentry, bricklaying, barbing, tailoring and sawyering which they engage in during the dry season. More than half of these learnt their trade after

Table 8.2(a)

NUMBER OF FARMERS WHO EXPERIENCED FAILURE OF
ONE OR MORE OF THE FOLLOWING CROPS BETWEEN 1965 AND 1978

Yam	= 22	Cocoa	= 17
Cassava	= 8	Coffee	= 55 (mainly in Olle & Iya Gbedde)
Guinea Corn	= 6	Melon	= 8
Maize	= 16	Pepper	= 9
Okro	= 4		
Beans	= 48		

N = 75 out of 120 (2.6 crops each)

Table 8.2(b)

STRATEGIES DESIGNED TO COPE WITH CROP FAILURE

	Takete-Ide	Ejuku	Olle	Iya Gbedde
We purchase more food than usual	22	10	13	14
We eat more rice	14	8	3	3
We eat more gari (eba)	14	10	8	6
We eat more aerial yam	9	1	0	0
We eat more amala (yam and guinea corn flour)	6	8	1	7
We eat more soya beans	4	2	0	0
We eat more cocoyam	2	5	1	5
We eat more semorita	3	2	2	2
Borrow for food purchases	0	1	2	0
Do off-farm work	2	1	10	8
Bought new planting material	1	4	0	0
Bought spraying pesticides	-	1	12	7

N = 75

Source: Field Work, 1978

Table 8.3

STRATEGIES ADOPTED TO PREVENT FUTURE CROP FAILURE

Strategies	Yam	Cassava	G/Corn	Maize	Okro	Beans	Cocoa	Coffee	Melon	Pepper
Planted new crops	16	-	4	-	-	12	12	19	-	-
Increased area of durable crops	-	-	2	-	-	6	8	25	-	-
Started Using fertilizer	24	-	6	16	-	8	-	-	-	6
Made farms in different locations	12	-	6	14	-	8	-	-	-	-
Keep livestock	5	3	-	-	-	-	-	4	-	-
Made new storage facilities	2	-	6	-	-	-	-	-	-	-
Stopped planting the crop	-	-	-	-	-	5	28	17	-	-
More crop care	2	-	4	6	4	-		-	4	4
Bought Pesticides	-	20	-	5	-	-	15	30	-	-

N = 76

Source: Field Work, 1978

they started farming because of the inability of farming to provide a sufficiently stable income in the present circumstances.

Community social organisation demands reciprocal responsibilities between the household, the extended family and the group at large. This spreads risk because various groups come to each others' aid at difficult times, such as the food aid between families which Hill (1963) found among a Hausa village in Northern Nigeria.

To further strengthen the argument that farmers are concerned with stability rather than taking serious risks, each farmer was presented with four tests. All monetary returns were marked on the <u>àyó</u> board holes and farmers registered their responses by placing <u>àyó</u> seeds into holes corresponding to their intended responses. The answers were then recorded. The first offered the farmer the choice between two farming systems A and B. The former would produce all food needs and an assured annual cash income of N100 while the latter would provide all food needs and N200 in one year out of two and no cash in one year out of two. 86% (104 out of 120) preferred system A while 13% (16) preferred B. For those who chose A, the assured income was reduced by N20 to N80 and the choice presented again. Those who chose A over B were reduced to 62% (24) but when the assured income in A was reduced to N60, 98% (118) chose system B. For the 16 who originally chose B, the assured income in A was increased by N20 to N120 and six defected to A but when the assured income was increased to N140 all but three farmers chose system A. So at N140, 97.5% (117) chose system A. For village by village details, see Table 8.4a.

A second choice, between two farming systems A and C

Table 8.4

ESTIMATE OF RISKS WHICH PEASANT FARMERS WERE PREPARED TO TAKE

a) Choice between Agricultural Systems A and B with A giving ₦100 income annually in addition to all food needs while B gives ₦200 in one year out of two in addition to all food needs. Record choice.

	Takete-Ide	Ejuku	Olle	Iya Gbedde
i) System A	25	26	25	28
System B	5	4	5	2

ii) For those who chose System A decrease assured income repeating the question until he shifts to System B and record the figure at which he shifts.

	Takete-Ide	Ejuku	Olle	Iya Gbedde
₦80	9	7	6	8
₦60	14	19	19	20
₦40	2	0	0	0

iii) For those who chose System B initially, increase assured income in System A by ₦20, repeating the question until he shifts to System A.

	Takete-Ide	Ejuku	Olle	Iya Gbedde
₦120	-	3	2	1
₦140	3	1	2	1
₦160	2	-	1	-

was also presented to each farmer. System A is the same as above but system C will give the farmer all his food needs and N120 in three years out of four and N40 in one year out of four [total cash involved being the same in both cases]. 80% (97) of the sample farmers still chose system A over C but when the assured income in A was reduced to N80 those who chose A were reduced to 59% (71); when the offer was reduced to N60, however, 78% (94) chose system C. Of the 23 (20%) who originally chose C, all shifted to A when the assured income was raised to N140. [See Table 8.4b] These two examples suggest farmers prefer a secure and regular income even if it is smaller than a higher but less regular one.

A third test was put to farmers. Having been assured of a N50 increase in their yields if they used fertilizer, farmers were asked how much they were willing to spend on fertilizer to obtain this increase. Detailed responses are given in Table 8.5a and shows that 34% (27) were ready to spend only N10 while 33% (39) will spend N15. 24% (29) will spend N20 and 15% (18) will spend N25. Only 7 farmers will spend beyond N25, three of whom will be prepared to spend N35 and above. When the choice was re-presented with the N50 increase unassured but expected, 47% (56) were prepared to spend only N5, 32% (38) were prepared to spend N10 while the remaining 22% (26) were prepared to go up to N15 (Table 8.5b).

Finally, farmers were asked to say how much they would spend to prevent a N50 reduction in crop yields if they were reliably told that pests were going to damage their crops. The vast majority (73% or 88 farmers) were prepared

Table 8.4 contd.

b) The choice is between System A and C with the latter giving ₦120 in three years out of and ₦40 in one year out of four in addition to all food needs. Record choice.

	Takete-Ide	Ejuku	Olle	Iya Gbedde
i) System A	22	23	26	26
System C	8	7	4	4

ii) For those who choose A, decrease steady income by ₦20 repeating the question until he shifts to C. Record the figure at which he shifts.

	Takete-Ide	Ejuku	Olle	Iya Gbedde
₦80	16	17	18	20
₦60	6	6	8	6

iii) For those who initially chose C, increase steady income in A by ₦20 repeating the question until he shifts to A.

₦120	4	4	2	3
₦140	4	2	2	1

N = 30

Source: Field Work, 1978

Table 8.5

RISK ASSESSMENT AMONG FARMERS

a) Record of how much money farmers are prepared to spend on fertilizer to get a ₦50 in yields. Record No. of farmers who chose each.

Amount of Money	Takete-Ide	Ejuku	Olle	Iya Gbedde
₦10	1	10	7	9
₦15	5	9	13	12
₦20	10	6	6	7
₦25	8	4	4	2
₦30	3	1	-	-
₦35	2	-	-	-
₦40	1	-	-	-

b) Farmers were given a one in two chance of reaping an extra ₦50 in yields if they should spend money in inputs. They were asked how much they would spend to get that extra, starting with ₦5 and raising the ante by ₦5 until he says 'no more.'

Responses				
₦ 5	10	12	18	16
₦10	11	10	10	7
₦15	9	8	2	7

c) How much farmers will spend to prevent a ₦50 damage by pests.

Responses			
₦15	20	25	22
₦20	6	5	6
₦25	4	0	2

N = 30

Source: Field Work, 1978

to spend as much as N15 while 21% (25) will spend N20 and only 6% were prepared to go as far as N25 (Table 8.5c).

These responses confirm that farmers literally 'play safe' under conditions of risk and uncertainty. They also confirm a second most important point, namely, that strategies will adjust to the circumstances as they present themselves. Where Kabba farmers adopt a 'minimax' type of strategy, it is by conscious design and not through the evolution of some traditional collective consciousness. This is contrary to Gould's (1963) view, that such adjustments could only represent some long term processes of trial and error of a 'social Darwinist' kind.

Other strategies evolved to cope with uncertainties will be discussed under trends in agriculture, but the foregoing clearly show that farmers are aware of the uncertainties which their occupation engenders and are perfectly capable of continuously adjusting management strategies to cope. Whether they will continue to do so in future depends on the scale and pace of changing conditions in the larger national economic and institutional environment in which they operate, creating new goals, aspirations and demands which the system cannot, and was not designed to meet without structural changes. Some of these trends and problems are discussed in the next chapter.

CHAPTER 9

PERCEIVED FARMING PROBLEMS

Many problems experienced by farmers arise out of the uncertainties discussed in the previous chapter. It is a mistake to try and identify production problems which face farmers without recource to what farmers perceive these problems to be. Development agencies and extension programmes are often major offenders in this regard. In an attempt to plan for farmers, they have, in the words of Johnny, "... assumed the role of 'development doctors'; they diagnose the ills of the 'traditional' farmers, 'prescribe' and 'administer' the 'antidotes'. Their diagnosis, however, is based on preconceived notions of what their patients' problems are" (Johnny, 1979:126). So-called experts, after the most perfunctory contact with farmers, presume to know and interpret a reality whose complexity is even now only partially grasped by farmers who have spent their lives attempting to comprehend it. Our argument, therefore, is that it is the farmers who should identify the problems and determine the priorities in terms of finding solutions. The perceived problems of Kabba farmers will form the focus of attention in this chapter.

A list of farming problems, ranked in order in which farmers perceive their severity in 1978 is presented in Table 9.1. Labour shortage, cost of labour, weather uncertainty and pest damage are the four most important farming problems. Weeds, old age (which amounts to reduced labour input), outbreaks of fire and crop disease, poor health of the farmer, lack of seedlings and restricted availability of some types of land (specifically <u>àkùrò̩</u>) are also mentioned.

Table 9.1

RANKED LIST OF PERCEIVED FARMING PROBLEMS

	Takete-Ide				Ejuku				Olle				Iya Gbedde			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Rain concentrated		2	2		–	–	–	6	–	–	–	–	1	2	–	–
Scarcity of Labour	15	10	4	1	16	10	2	2	16	9	–	–	13	6	5	3
Weeds	–	–	–	5	–	–	–	4	–	–	4	2		5	2	4
Pests	8	8	6	6	8	6	15	–	–	3	12	11	6	8	12	4
Plant Diseases	3	3	3	4	1	2	1	2	–	2	–	–	1	2	2	4
Sickness	2	–	4	–		1		2	–	2	–	1	1	2	1	1
Inadequate or late rain	2	5	4	8	3	7	1	5	11	8	9	–	6	4	–	7
Fire	–	–	–	2	–	1	3	–	–	–	–	2	1	1	2	2
Old age	–	2	–	2	1	–	2	1	2	2	3	1	1	–	2	–
Lack of Seedlings	–	1	2	–	1	–	3	2	–	1	–	3	–	–	3	2
Restriction on Land	–	–	–	–	–	–	–	–	–	–	2	2	–	–	1	2
Lack of Tractor	–	–	1	–	–	–	1	2	1	3	–	–	–	–	–	–
Lack of fertilizer and Pesticide	–	–	2	–	–	2	2	4	–	–	–	3	–	–	–	–
Completition from off-farm work	–	–	2	–	–	1	–	3	–	–	–	5	–	–	–	1
Theft of yam	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–

N = 30 in each village.

Source: Field Work, 1978

Non-farm employment, which creates problems by reducing attention paid to farm work, also features in some replies. This is especially true among farmers in Olle who are employed to clear the government forest reserve and those who have secondary occupations such as bricklaying, carpentry and others.

In follow-up group discussions, farmers grouped these problems into two - those which reduce farm size and those which reduce yields. Falling into the former category are problems such as scarcity and cost of labour, old age, poor health, lack of seedlings, restrictions on land, availability and the diversion by off-farm work. Erratic rainfall, pest and weed damage, plant diseases, outbreak of fire and poor soils were listed as causing reduction in crop yields. Both aspects will be discussed in greater detail in the following sections.

Labour shortage

One half (50% or 60) of the farmers in the sample listed the labour problem as the most important single difficulty they had in 1978, while 52 (43%) others mentioned it as a problem. In other words 93% of farmers in the sample reported some sort of difficulties with labour supply. Apart from the questionnaire survey, individual and group interviews and participant observation all helped confirm scarcity of labour as the most important problem which farmers face. Primarily, this affected heaping, clearing and weeding. Farmers said they were able, generally, to cope with the other farm operations except these three. Most of the work is tedious and strenuous, under very harsh weather conditions. Older people are unable to expend the requisite energy on the farm while younger people avoid farm work, if possible, seeking refuge in schooling and other non-farm activities.

In order to record farmers' perceptions of this particular problem, the survey posed the question whether it was more or less difficult to obtain both family and hired labour in 1978 than in 1968 and then followed up with the question why. Every farmer said labour was now more difficult to find than ten years ago. Their explanations for this increased difficulty are listed in Table 9.2. Availability of educational and non-farm job opportunities feature prominently among these reasons. Migration to urban centres, because of the attractions which they present is seen as the most important reason for labour shortage after education. Acquisition of education or the life style of town dwellers is termed <u>ọ̀làjú</u> or civilization, which is the way in which farmers categorize the rural-urban dichotomy, and the race to urban centres is seen in this context as was discussed in Chapter 3. Apart from being aware of the general process of 'urban bias', many farmers were able to point to additional time-specific events contributing to labour shortage. Some farmers referred to the Nigeria Civil War (1967-70) as one such event. Before the crisis, there was less contact with the towns and young men who left primary school often stayed behind to work as farm labourers for cash because they were too young to set up their own farms. Many of these joined the armed forces at the beginning of the civil war. Over the period of 1966-1970, the armed forces increased from 10,000 to over a quarter of a million men. This was a massive drain on the labour pool in rural areas throughout Nigeria and farmers felt the impact in the 1968/69 cropping season and onwards.

Table 9.2

PERCEIVED CAUSES OF LABOUR SHORTAGE

Reasons	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Education takes away farm labour	29	22	13	18
Non-farm work move readily available	11	12	23	4
Young people regard farming as difficult and dirty	10	10	11	12
Working population left behind is old and weak	5	3	4	4
Civilization/Migration to urban centres	19	14	12	17
Lack of money to pay high cost of labour	6	1	3	1
Those remaining have their own farm	3	5	4	4
Nigerian Civil War took many workers away	8	5	2	3

N = 30 for each village

Source: Field Work, 1978

The impact of labour shortage on the farming landscape has been marked. The responses in Table 9.3 are where farmers elaborated on the theme "this is what labour scarcity is doing to us".

A major by-product of labour scarcity is the high cost of hired labour, discussed in Chapter 5. This has increased nine-fold in the last ten years. In the years between 1968 and 1978, only 34% (41) of the farmers report having been able to increase the size of their farms at any stage. In fact, the cost of hiring labour has increased beyond the reach of many farmers. The average age of the sample farmers, at 46.9 years (range 28-72, σ 10.6) is evidence of an ageing farming population at a time when family labour is scarce and hired labour costly. With younger people not replacing the older ones on the land, the farming population decreases year by year, portending a grave future for farming in the area. This is discussed in more detail in the next chapter.

Rainfall problems

Weather uncertainties (irregular or inadequate rain, late rain, rain stopping early or too concentrated) was mentioned as the most important farming problem by 17% (20) of farmers in the sample. Many others listed it as a secondary problem. All farmers in the sample report having to delay planting some crops at some time or the other because of late rains while 48% (58) said that this was the reason they did not plant some crops at all in some years. The vagaries of the weather also take their toll of farmers trying to assess whether the rainy season had finally come or not (see Chapter 7). Sample farmers were asked if they had ever planted crops on the

Table 9.3

PERCEIVED EFFECT OF SCARCITY AND HIGH COST OF LABOUR

Impact	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Reduction in farm size	29	23	30	26
Heavy burden of work on family	10	7	11	12
Lack of progress (unable to increase income)	8	6	10	6
Fewer crops grown	5	-	2	-
Shortage of food	7	6	6	4
High cost of living	3	2	3	1
Poor farm output	5	7	-	-

N = 30 for each village

Source: Field Work, 1978

assumption that the rains had started only to discover that they planted too early. As many as 88% (105) of those interviewed were familiar with this experience especially in the case of early maize and guinea corn. Failure of seed yam to germinate was also attributed to late rains by many farmers. 83% (87) of those who had experienced misjudging the start of rain had incurred the extra expense of acquiring extra seedlings for replanting. The rest reported not replanting either because they lacked seedlings or because they realized their mistake too late. Years when rainfall stopped too early to allow crops to mature or continued too long to allow ripening to take place are also common experiences. In the latter case, continued rain destroys beans, soyabeans and guinea corn which need the fairly dry period of October and November to ripen and dry before harvesting. As farmers are quick to point out, crop failure or serious reduction in yields are the natural consequences of the rainfall variations just discussed (cf Table 8.1).

Too much rain earlier on in the year is also said to have adverse effects on crops and farming operations. Some of these are listed in Table 9.4. Apart from the difficulty of working in waterlogged soils, many working days are lost when farmers are forced to remain indoors by excessively heavy down pours. While on the farm, they take shelter in farm huts, but if the downpour occurs overnight, many farmers whose farms are not on main roads are cut off from the farm by flooded rivers. As Fox (1953) and Moody (1970) have stressed, events such as these reduce labour at a time when it is most vital. Moreover, since excessive rain is said to cause too much weed growth, this adds to the labour shortage problem. Growing yam tubers are exposed if heaps are washed

Table 9.4

PERCEIVED ADVERSE EFFECTS OF TOO MUCH RAINFALL

Bad Effects	No. of Respondents			
	Takete-Ide	Ejuku	Olle	Iya Gbedde
Most farm work is difficult in wet soil	24	27	29	16
Cold in the body reduces effectiveness of labour	10	8	10	17
Floods keep one away from the farm	14	2	-	9
Staying at home (or on the hut on the farm reduces) labour imputs	22	10	11	23
Heaps are washed down leading to poor yam yields	8	7	5	11
Makes yams rot	7	13	8	5
Leads to many weeds	15	12	9	9
When plot is weeded, weeds regrow quickly	10	3	7	10

N = 30

Source: Field Work, 1978

down by heavy rain, and sometimes, so farmers report, excessive rain raises the water table to a point where yam tuber tips may become immersed in water. Leaves turn yellow as a result and fall early, leading to rotting of the tuber. Rain can negate one of the most important functions of the heap, namely to provide the yam with a loose and well drained soil environment. Farmers also report unpredictable flash floods destroying crops planted in akuro farms and ibo plots where they are near river flood plains.

Pests

Pests, crop diseases and weeds constitute a third major group of farming problems identified by farmers. Interview results reveal a detailed knowledge of insect and weed ecology and careful categorization and assessment of types and severity of damage (cf Barker, Oguntoyinbo and Richards, 1977). A list of pests damaging crops in 1978, and the number of farmers who mentioned each is given in Table 9.5. Pests ranked in the order of farmers' assessed severity of damage are listed in Table 9.6; showing that grasshoppers, termites, and animals got the greatest mention. Further details on pests and diseases and the crops which they damage are presented below, though entomological identification of the pests was not possible because of problems identified in Chapter 2 (B).

Pests/Diseases	Crops attacked in order of severest damage
Birds	Maize (pick planted seeds, eat cobs); guinea corn (pick planted seeds, destroy maturing ears); yam (eat tuber); beans (pods and seed).
Okùkù	Yam (tuber)
Okùyẹ́	Yam (tuber); cassava (stalk).
Inùrìn (termites)	Yam (tuber and setts); cassava (stalk; guinea corn (stored ears before threshing); maize (stored dry grains); beans (pods and seeds in storage).

Table 9.5

FARMERS' REPORTING OF PEST DAMAGE ON CROPS IN 1978

Pests	Takete-Ide	Ejuku	Olle	Iya Gbedde
Birds	11	7	9	5
Okuye	5	2	4	-
Okuku	7	5	-	1
Termites	22	15	24	10
Oromina (beetle - 'fire fly')	17	5	3	4
Aropile (aeroplane beetle - named from sound when flying)	9	5	11	9
Amusukum (spittle worm)	1	-	-	-
Grasshoppers (Zonourus Variegatus)	24	30	30	28
Ihobu	6	1	3	-
Bees	1	1	-	-
Yam beetles (Heteroligus meles and H. claudius)	5	7	4	3
Stalk borer (Buseola fusca and Sesamia)	10	6	3	1
Keke (Kolanut worm)	-	2	21	17
Animals (rodents, monkeys, toads, grasscutter)	7	8	12	14
Crickets	1	1	14	7

Identification of Pests still to be completed

Source: Field Work, 1978

Table 9.6

RANK OF PESTS IN THE ORDER OF SEVERITY OF CROP DAMAGE

	Takete-Ide			Ejuku			Olle			Iya Gbedde		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Birds	4	6	1	-	4	3	-	6	4		2	3
Okuye	1	2	2	-	1		-	-	3			
Nematodes	-	6	2	-	-	5	-	-	-			
Oromina	-	-	2	-	-	2	-	1	-	1	1	2
Aropile	-	-	1	-	-	1	-	-	-		5	2
Grasshoppers	8	12	10	24	6	-	28	2	-	25	3	-
Termites	17	4	1	6	9	10	2	13	4	3	4	3
Ihobu	-	-	-	-	-	-	-	-	-			
Yam Beetle	-	-	1	-	1	-	-	-	-			2
Stalkborer	-	-	2	-	2	3	-	-	-	1		1
Keke	-	-	-	-	1	-	-	3	8		2	11
Animals	-	-	6	-	5	2	-	-	4		12	2
Crickets	-	-	2	-	1	1	-	5	4		1	4

Identification of pests to be completed.

Source: Field Work, 1978.

Orominà (firefly) okro (flowers and fruit); melon (flowers); beans (flowers and pods).

Aròpìlé beans (flowers and pods); okro (flowers).

Amùsùkùn (spittle worm) Yam (leaves and twines).

Grasshopper (Zonocerus variegatus)
Takete-Ide, Ejuku and Savanna areas - Cassava (leaves and stalk); citrus (leaves, flowers); yam (sprouting shoots); coffee (leaves and flowers); banana (leaves and flowers).
Olle, Iya Gbedde and forested areas - Coffee, cassava, citrus, banana, cocoyam (leaves and stalk).

Ghàrìwò (yam beetle - Heteroligus meles and H. claudius) - Yam (tuber)

Bees Guinea corn and maize (leaves turn yellow, the plant dies).

Ihọ̀bú disease (swollen corn ears) - Guinea corn (ears prevented from maturing).

Stalk borer (Buseola fusca) - Maize (stem and cob); guinea corn (stem).

Kẹ́kẹ̀ (kolanut worm) - Kolanuts (fruit).

Kòrí Kòrí and Black pod - cocoa (pods).

Cricket Yam (tuber and twines), maize (young stem), beans (young stem).

Toads Melon seeds (seeds during harvesting and planting).

Rats (Arvicanthis Abyssinicus) - all crops (except soyabeans) especially produce in storage.

Monkeys Maize (green cobs).

Ọ̀yà (cane rat) Yam (twines); rice (stalks); cassava (tuber and stalk); maize and guinea corn (stalks).

Virtually all crops are subject to damage by pests and careful selection of crops for mixed cropping and interplanting is a strategy used by farmers to prevent the building up of single pest types.

Apart from being able to clearly identify a range of pests and accurately describe the types of damage they do, farmers were also willing and able to scale yield losses resulting from pests, weeds and other kinds of farming problems.

Problems which farmers reported to be responsible for reduction in crop yields are presented in the latter part of the investigation. Farmers were then asked to estimate the percentage yield reduction caused by the worst case of each problem they personally experienced during the 1977/78 cropping season. From the responses, the figures presented in Table 9.7 have been calculated. Richards (1978) has presented evidence suggesting that such estimates are often realistic. These figures show how much of crop yields which should normally accrue to farmers are destroyed by climatic, edaphic, entomological, anthropogenic and ecological problems. The important point here, in a study directed to the presentation of the farmers' version of his environmental problems, is that such estimates are made at all. Right or wrong, they must affect subsequent farming decisions.

Weeds

Weeds, which reduce yields by competing with crops for available solar energy, water, air, soil nutrients and ground space, also greatly strain available labour resources. With the shorter fallows especially in Ijumu and Owe areas, weeds are an increasing problem. In the period between 1968 and 1978, 38% (46) of farmers in the sample reported experiencing at least one instance of the complete failure of a crop because of inability to organize sufficient labour to weed the plot. Weeding takes over a quarter (26%) of the total labour resources of the farmer and his hired work force per year (cf. Chapter 5). As pointed out in Chapter 7 farmers have little difficulty in identifying major weed types and specifying the land types on which each is a problem.Classification of weeds is, however, more in terms of the labour required to remove them, and their

Table 9.7

FARMERS ESTIMATES OF EFFECT OF VARIOUS HAZARDS ON CROP YIELD IN 1978

Problem	Crops Affected	No. of Respondents	% Yield Reduction	
			Range	Mean
Concentrated rain	Yam	31	20 - 40	25
Too much rain	Maize	2	40 - 80	60
Lack of rain, or late rain	All crops	53	20 - 80	54
	Yam	8	20 - 50	31
	Maize	8	40 - 80	68
	Pepper	6	40 - 80	63
	Melon	2	20 - 30	25
Sickness	Yam	5	20 - 60	31
	Pepper	1	40	40
	Guinea Corn	3	20 - 50	38
	Coffee	6	40 - 90	73
Fire Outbreak	Coffee	13	70 - 100	90
	Cocoa	8	30 - 90	70
	Kolanuts	4	20 - 40	25
	Cassava	5	40 - 80	65
	Guinea Corn	2	50 - 90	70
Weeds (unable to hoe)	Yam	21	30 - 60	50
	Guinea Corn	13	10 - 30	26
	Maize	25	40 - 80	66
	Melon	4	10 - 40	23
	Rice	9	25 - 50	41
	Beans	12	20 - 60	36
	Pepper	3	10 - 30	25
	All Crops	15	30 - 80	65

Table 9.7 contd

Problem	Crops Affected	No. of Respondents	% Yield Reduction	
			Range	Mean
Pests	Yam	46	10 - 60	41
	Cassava	51	40 - 70	62
	Guinea Corn	9	10 - 60	18
	Maize	28	40 - 70	57
	Melon	6	10 - 20	16
	Beans	23	25 - 60	46
	Okro	16	10 - 40	21
	Cocoa	24	10 - 30	17
	Coffee	58	25 - 90	72
	Citrus	9	25 - 70	50
	Kolanuts	5	10 - 35	19
Crop Diseases	Yam	70	10 - 80	64
	Guinea Corn	32	10 - 25	13
	Okro	21	10 - 30	22
	Citrus	16	10 - 70	48
	Kolanuts	3	10 - 40	27
	Cocoa	28	40 - 90	74

Source: Field Work, 1978

impact on yields rather than in terms of strict botanical morphology. This has important implications for the way in which extension agents, researchers and planners communicate with farmers because ways of describing or categorizing things may be different between the former and their subjects as briefly discussed in Chapter 2 (B). For example, one of the most troublesome weeds in Kabba is called òlòkò mà jáfàrá literally meaning "farmer, do not delay", referring to the need to weed it promptly in order to prevent it from taking over the farm. This example, in addition to those cited earlier on as to how farmers name yam and cassava varieties (see Chapter 5) makes it imperative for extension agents, planners and outsiders to master local names if they are to be effective in communicating with farmers.

Weed control measures include mixed cropping to cover as much ground with crops as possible to deny space to weeds. Evidence suggests that farmers are consciously aware of the ecological principles involved. As farmers put it, 'if crops don't cover the ground, weeds will'. Apart from constant hoeing, and uprooting of weeds farmers also resort to the use of herbal concoctions to poison hoe blades in order to kill troublesome weeds. The preparations used are still being collected and their chemical analysis is a matter for further research at IIIA.

Shortage of seedlings

Shortage of planting material is a recent but growing problem reported by farmers. This specially concerns seed yam though other major crops are also affected. In the past, when crop sales were limited, farmers claim, there was always enough surplus to store for the hungry season and then to provide adequate supplies of planting material. Better marketing opportunities, shortage of labour and an increasing aged rural population have eaten into this surplus. Shortage of seedlings result with consequences in reduced farm sizes. Even the practice of planting yam at a time when there is surplus produce (described in Chapter 5) is proving insufficient to deal with this problem.

Cash shortage and seasonality of farm operations

Every farmer taking part in the survey cited the shortage of money with which to buy improved seedlings, employ labour, buy fertilizers and pesticides and to hire tractors to plough the land as one of the major farming problems. This problem is probably one of the vital keys to the future progress or decline of farming in this area. Even though these items, except for hired labour, are subsidized by the State government, farmers are still short of capital to acquire them. Explanations for this shortage of capital range from inadequate marketing facilities and over-emphasis on subsistence production (de Wilde, 1967), to refusal to invest due to farmers' preference for leisure (Ruthenberg, 1971). Lack of motivation and incorrect assessment of priorities on the part of farmers have also been cited. The real situation, at least in Kabba, is different. The response of farmers, given the alternative of investment and spending of money presented in Table 9.8, seems to show that if opportunities do arise, farmers are prepared to invest in better production and assume the responsibilities associated with credit. (Even so, as pointed out earlier, there is still a problem in that many plan to accumulate enough capital to invest in non-farm occupations later on). The only

Table 9.8

FARMERS' PREFERENCES WHEN PRESENTED WITH PAIR OF EXPENDITURE ALTERNATIVES

EITHER	No. of Resp.	OR	No. of Resp.
1. Produce all family food needs	93	Produce maximum cash crops	27
2. Owe no debt	25	Take loan to invest in farming	95
3. Plant as soon as rains permit	120	Delay planting to meet social obligations	0
4. Build a new house	58	Invest the money on the farm	62
5. Pay children's school fees	103	Build a house	17
6. Hire more labourers	98	Maintain cash reserves (savings)	22
7. Invest on the farm	71	" " "	49
8. Minimize use of hired labour	0	Maximize land cultivated	120
9. Have steady cash income all year round	88	Have a large yearly income but seasonal	32
10. Concentrate on one crop	0	Grow a variety of crops	120
11. Buy a motor cycle	18	Invest on the farm	102
12. Buy fertilizer	120	Buy beer or local drinks	0
13. Store crops to time of highest price	108	Sell crops at harvest time for immediate cash needs	12
14. Buy fertilizer	77	Buy insecticides	43
15. Invest in livestock	41	Invest on the farm	79
16. Children help on the farm	0	Children attend school	120
17. Owe no debt	0	Pay children's school fees	120
18. Wife help on the farm ♀	86	Wife has her own occupation	34

♀ Refer to Chapter 5 Women plant and harvest certain crops. They are therefore indespensable on the farm but farming is not a full-time job, So all farmers want women available when the need arises on the farm, but want them to have other occupations, eg trading, weaving, baking, which they can do at other times.

Source: Field Work, 1978

expenditure item which takes precedence over the agricultural input alternatives in this table is the sponsoring of children in schools (the reasons for which were explained in Chapter 4).

The cash shortage problem appears in fact to be a cash flow problem deriving from the seasonality of the farming system. More than 90% of all crop sales take place between November and March. This is a time when cash from produce sales cannot be re-invested immediately in farming because the following cropping season does not start until May. Moreover, those farm operations which demand hired labour (clearing, heaping and weeding) do not start until late June or July. Application of fertilizers and pesticides also has to wait until this period. While cash cannot be usefully invested in agriculture between February and May, other expenditure demands are present, especially the meeting of the 'secondary' goals described in Chapter 4. Farmers have to pay school fees for the January and April terms, while saving enough money for the September term because there is no more crop sales between May and September. In addition, the dry season from December onwards is the time when farmers build new houses, or improve old ones (e.g. the replacement of mud thatch houses with new ones made of cement blocks and iron corrugated roofs). The dry season is also the time of year when most money is spent on clothes and other consumer goods, and to celebrate the major festivals (Christmas, New Year and Easter). By the time the cropping season starts in earnest, accumulated capital is exhausted. Between May and November, which is the most active cropping season, farmers have nothing to sell to generate capital with which to employ labour and acquire other farming inputs. An alternative strategy would be at least to buy and store fertilizer and pesticides during the dry season. However, the government is the chief custodian and distributor and does not release supplies on to the market until the cropping season when the farmers lack money (the former turns round to blame farmers for being primitive by refusing to buy agricultural inputs). A vicious circle thus operates whereby cash is available at a time when it cannot be re-invested in farming while other pressing needs demand expenditure, then when farming demands investment, the cash capital is exhausted. Until a supervised credit scheme can be introduced which is arranged to finance farm inputs alone, i.e. by making credit available in kind, or specifically during the cropping season, major improvements in the agricultural system may be impossible.

Institutional obstacles

Among other reported problems, the unreliable distribution of tractors, fertilizer and pesticides caused concern to those farmers who could afford them. Stories of how farmers clear land and wait in vain for extension officers to bring in tractors to plough were told in many villages visited on field work. Most farmers then said they would rather continue to heap with the hoe than risk waiting for the tractor and it then not arriving at all. The same problem of reliability in supplying inputs goes for fertilizer and pesticides.

Interference of non-farm work

The issue of non-farm work interfering with farm production has already been touched upon. In the past all secondary jobs were done during the slack period between December and May, but in recent years, government projects which attract artisans such as bricklayers, carpenters and house painters no longer wait for the dry season. Because of the immediate cash which such opportunities provide, they attract farmers with the requisite skills and also would-be hired labourers.

Land tenure problems

Some difficulties relating to land tenure and adverse environment were reported by farmers from Iya Gbedde and Olle. In the former case, the location of the settlement on hilly stony ground with extensive patches of gallery forest limits the amount of open grassland (ọ̀fẹ́) available for food crop production unless unacceptably high travel 'costs' in time and effort are to be incurred. This has resulted in reduction of fallows and declining yields. In Olle, the extensive Government forest reserve restricts the amount of ọ̀fẹ́ land near the village. Even when parts of the forest are cleared and allocated to farmers by the government on the taungya system, not all farmers are able to get plots and not all who do receive plots which are satisfactory both in size and location. Moreover, they are allowed to use the plot for a maximum of two years. The fact that the land is cleared at government expense makes such plots, though small, more attractive than going long distances to find open grassland.

Concluding Remarks

This formidable array of problems faces virtually every farmer in Kabba. The way they assess and articulate them explains many of the management strategies they employ to reduce the impact of uncertainties involved (Chapters 5 and 8). The foregoing discussion also suggest what farmers' priorities are likely to be if they were to be consulted about appropriate rural development planning strategies.

The point to be made in conclusion is that farmers have a good understanding of their problems and as the following chapter will show, of the process of agricultural change affecting them. The refusal of planners to consider that farmers have valid ideas about development and to develop ways of incorporating these ideas at the earliest stage of the national agricultural planning exercise entrenches bureaucratic 'privilege' and increases rural 'alienation'. The kind of analysis outlined in this chapter will need to be undertaken on a much larger scale if the 'language' of the people is to be reinstated and given an authentic as opposed to token role in the development dialogue.

CHAPTER 10

TRENDS IN FARMING

A widely held idea about 'traditional' societies is that they are not innovative; and that farming methods and practices, once having developed, have remained static for generations. Farming systems may be beautifully adjusted to social requirements and environmental circumstances (Alexander, 1964) but they are outmoded, it is supposed. The evidence given is that tools, farm operations, crop combinations and the farming rhythm appear not to have changed over a long time. This is part of a set of assumptions which have given rise to so-called 'appropriate' or 'intermediate' technology - technology fit for the condition of the people. The presumption is that pre-industrial economies are not able to absorb dramatic innovation or to change easily and quickly. They then should be given technology that 'slots' into existing social and economic structures readily. For the 'traditional' farmers, 'small' is said to be beautiful, while in industrial societies, 'large' has been the lynch-pin of better productivity, higher crop output and better material standards of living.

Application of 'modern' technology brings dramatic and substantial changes, but it must be stated very clearly, that innovation and change, however slow, are normal features of 'traditional' farming (Knight, 1974, 1977; Collinson, 1972; Ruthenberg, 1971). Without a continuous series of experiments, adjustments and modifications, present farming systems could never have been devised and maintained. It is the purpose of this chapter to show that 'traditional' farming is in fact a dynamic business. The capability of Kabba farmers to identify and respond to innovations, when these are within their power is remarkable. The limits to change are not determined by lack of motivation, farmers' ignorance or conservative nature but by bureaucratic, technical and financial institutions which by privileging their own analysis and language rob the farmer of precisely the initiative he is supposed to lack. This chapter will examine how farmers see and structure changes in crops grown and farm operations, farm inputs, and consider their assessments of the future of farming in this area.

Two major points stand out clearly from farmers' views of change which are presented below. a) In the thesis, so far, attention has been focussed on the remarkable achievement of farmers in developing a successful farming system, their competent use of resources, and their deep knowledge of the underlying processes involved in their production system. The facts presented in this chapter reveal that farmers still have fundamental faith in the utility and advantages of this farming system because no one of them seriously considered a change in its basic features. b) Farmers' view of the changes taking place, and the fortune of their occupation in the future is in complete contrast to the competence which they had demonstrated in the farming strategies and in coping with farming problems using indigenous methods. The sense of gloom with which farmers talked about their prospects was palpable. One could not help concluding that they had lost complete confidence in a system they were once proud to point out as their achievement. They in fact used 'outsiders' assessment of their production system to describe themselves; calling their production system 'primitive', new imported inputs 'modern' and their own methods of coping with risk and uncertainty 'ineffective'. The solutions they suggest pointed away from their own initiative to help from government and introduction of 'new' inputs. Changes are thus seen purely from the technological angle rather than the integrated strategies which they had practised for generations. Detailed examination suggests that farmers' devaluation of their own competence arises out of the dominant position and privileged status of government officials, planners, researchers and agricultural scientists - in effect those who have formal education. It is the result of the weakness of rural people in the face of exogenous organized knowledge and way of life (cf Chambers, 1979; Chapters 2 and 3). As has been pointed out, only by proclaiming the indigenous system 'primitive', 'wasteful' and inherently unproductive can officials of ministries of agriculture and planning, and research bodies maintain their privilege to determine what farmers need, and to focus research along their own way. Most of government films, pamphlets and radio messages intended to encourage agricultural production (see Chamber 7) were designed to demonstrate the superiority of new methods, inputs, machinery, crop varieties etc. over the indigenous. Over time farmers have imbibed the 'outsiders' view aboutthemselves. Most of the responses given below can therefore be seen in the context of this paradox outlined in the two points just discussed.

Changes in the Farming System

Certainly, a large proportion of farmers in the sample (107 or 89.2%) told me that they think the way they farm is no different from the way their parents did. We should note, however, that this is to defend a set of practices which they see as effective. For instance the 13 farmers (11%) in the sample said they farm differently by using fertilizer, pesticides, and some new crop varieties. These are peripheral adjustments which the majority did not judge to be significant changes in the farming system. The few who hired tractors in 1978 to make ridges, used it on some plots while using the traditional heaping methods for other plots (Chapter 7). The basic farming system, with the advantages outlined in Chapter 5, thus continues to be the framework for crop production by all farmers. Two points are worth making, however. One is that farmers are thinking about the macroscopic features of the farming system. At a detailed level, there have been many changes as will be described later. Secondly, 80% (96) of farmers foresee the probability of a radical change in the basic farming system by 1988, suggesting that these changes will emphasize increased mechanization, reduced heaping and that this will in consequence increase the need to use fertilizer, pesticides and herbicides. Many of the farmers believe that they will be too old to farm in ten years' time and that most of these changes will be introduced by a new generation. In short even if most farmers in the sample do not see themselves as part of the process of change, they have no problem in conceptualizing the changes needed or that might take place. Most farmers see these changes as essential if the 'shortcomings' of the present system are to be overcome.

In response to the question "is farming activity increasing, decreasing or remaining the same in this area?" farmers responded as follows:

	Takete-Ide	Ejuku	Olle	Iya Gbedde
Increasing	4	10	14	9
Decreasing	26	20	16	12
Same	0	0	0	9

When the same question was put to farmers about their own farming activities, the individual responses are as follows:

	Takete-Ide	Ejuku	Olle	Iya Gbedde
Increasing	7	8	16	13
Decreasing	20	22	14	17
Same	3	0	0	0

The same pattern is observed in both cases, suggesting perceived decline in the state of agricultural production in the sample villages. Interviews in the other eleven villages chosen also indicate that farmers perceive a downward trend in farming activities.

Reasons given by farmers for this trend in general and individual farming situations are also similar. The few optimists feel that certain positive economic indicators will over-ride the problems which, they also acknowledge, face farming in this area. They pointed to the formation of farmers' unions to develop co-operative farming and thus tap the advantages of scale; increasing urbanization and shortage of food in towns and cities which will keep prices up and the increasing availability of tractors, pesticides and fertilizer which people are now taking advantage of. 36% (16 out of 44) of those whose farm sizes are increasing reported receiving cash aid from children and relatives in towns to enable them employ extra labour. The large number of optimists at Olle is explained by the distribution of cleared land to farmers by the Forestry Department, which is an advantage for older farmers who cannot clear the forest. Moreover, the recent change from concentration of all resources in tree crop to food crop production in Olle and Iya Gbedde also contributed to the positive thinking. In fact 12 out of 16 respondents in Olle said 'we now know the advantage of food crops over tree crops'.

The overwhelming majority who view the future of farming with gloom, however, perceive the problems as so great that the advantages mentioned by the optimists cannot be fully exploited. The most frequently mentioned reason for the gloom is labour shortage which is put in various ways such as: 'children who used to help on the farm are now in school', 'there is less interest in farming because there is no hope in it', 'people prefer education, office work and city life to farming', 'number of farmers has reduced and we are growing old', 'labour too costly; we have no money'. The labour situation is so critical that some of the older farmers who remember how much labour was available between the 1930s and the 1960s now believe that farming will be extinct in the future. Some of the leading farmers estimated that the farming population has reduced by as much as 40% in the past twenty years and total land area under cultivation is smaller than at any other period in the past forty years. Braun (1974), Boserup (1965) and many others have suggested that demographic pressure combined with reduced availability of suitable land is one of the major factors which are likely to cause the collapse of shifting cultivation systems and bring about change. This is evidently true in many areas of Africa (Uzozie, 1979) but in Kabba the collapse of the system will probably come due to a greater competitive power of the other sectors of the national economy, causing movement of labour from the farm to the urban centres and other jobs. If the present trend holds for much longer, farm population will not grow to cause land shortage; on the contrary, land will become more surplus as the number of farmers reduce through attrition. A reduction in the number of poll-tax payers by 37% between 1967 and 1978[1] in Kabba Division, is probably an indication of the reduction in the number of adult males in the rural population. This overwhelming emphasis on the labour situation being the cause of the decline in farming confirms farmers' perception of this factor as a major problem (see Chapter 9). Not a single farmer mentioned land shortage, soil deterioration or other physical handicaps. It was attributed mainly to social and economic factors inside and outside Kabba.

From the foregoing explanation, the farming systems seem to be on the verge of change if they are to survive (de Vos, 1975).

Changes in crop types planted

In the face of labour shortage, increase in return to labour becomes the primary concern of farmers and the changes in the types of crops planted reflect this. Uneconomical crops which are neither prominent in household diet, nor in the market have been dropped while those important in both aspects, or requiring less labour, have better yields, or are more resistant to weather exisgencies have increased. The trend in tree crop production has been discussed and is cited as an example here.

Farmers were asked to list the four most important crops on their farms in 1978, ranked in order of importance. These were presented in Table 5.4 but 73% (88) of the farmers said this was not the order of importance ten years before. The reasons given for this change in the importance of crops

1. Kwara State Ministry of Finance, Inland Revenue Division: Revenue Collection Review, April 1978.

include shortage of labour which increased the chances of cassava which is less labour intensive than yam; market forces and more financial needs today also tilted the balance to crops which sell more, while older crops whose utility, both in household diet and crop sales are small have been discarded. In the latter category are crops such as yellow yam, millet, beans, climbing melon, groundnuts, castor oil, and cotton which many farmers said were planted in their parents' days but not now. The downward trend in cotton production was also attributed to decline in the traditional weaving industry which once provided all the cloth used. Cassava, rice, potato, coffee, citrus, cashew, cocoyam, and vegetables featured prominently among crops which are grown today, but not in the previous generation of farmers, confirming that farmers drop or adopt certain crop types or varieties depending on perceived utility (see Chapter 5). In terms of quantity of production, less yam, beans, guinea corn, water yam, cotton, aerial yam are being produced today than in the previous generation because of shortage of labour. Many farmers, however, said that they foresee a change in this trend with the use of fertilizer.

To elicit specific information about crop trends, farmers were asked to list crops which have been increasing, decreasing or remaining the same in the area since the mid-1960s. The responses, presented in Table 10.1 show that cassava, guinea corn, maize and groundnuts have increased (cocoyam increased at Iya Gbedde) while most others especially yam, decreased. The perception of the underlying causes for the increases shows a careful estimate of the usefulness of crops by farmers. Such utility is expressed in words such as a) 'they are good for food', b) 'the crop sells well',

Table 10.1

TREND IN PRODUCTION OF MAJOR FOOD CROPS
(NO. OF GROWERS IN RESPONSES)

	Takete-Ide			Ejuku			Olle			Iya Gbedde		
Crop	A	B	C	A	B	C	A	B	C	A	B	C
Yam	7	23	-	9	21	0	24	6	-	10	20	-
Cassava	29	-	1	30	-	-	30	-	-	30	-	-
Guinea Corn	21	5	4	29	-	1	20	4	1	14	7	9
Maize	17	9	4	29	-	1	30	-	-	24	3	3
Rice	2	-	-	4	-	2	30	-	-	5	-	1
Cocoyam	3	-	-	5	-	4	28	2	-	26	3	1
Beans	2	28	-	5	18	7	18	-	12	4	13	13
Potato	2	-	-	7	1	2	14	15	1	-	1	4
Groundnuts	17	4	1	14	-	6	12	11	5	-	7	15
Melon	8	4	18	10	6	14	19	4	7	8	2	18
Soyabeans	11	6	13	8	4	2	15	3	4	10	16	4
Pepper	15	9	6	18	3	9	30	-	-	25	-	5

N = 30

A = Increasing B = Decreasing C = Remained Same

Source: Field Work, 1978

c) 'cassava requires less labour than yam', d) 'it is easy to cultivate' e) 'the produce can be consumed in different ways', f) 'can do well, when rain or soil is poor', and g) 'produce can store for a long time'. These strategic considerations lay behind choices which farmers make as to whether to adopt, increase or decrease production of various crops.

The trend in yam production (as the most important food and cash crop) deserves special attention in the belief that it will highlight farming problems and likely future trends. 90% (27), 70% (21), 47% (14) and 67% (20) of the farmers in the sample in Takete-Ide, Ejuku, Olle and Iya Gbedde believe that yam production has been reducing in the past 10 years (1968). When compared with personal cases only 67%, 57%, 40% and 53% in the respective villages said that yam production has been declining on their own farms in the same period, showing a greater alarm at the general downward trend in yam cultivation than what actually happens on the farm. A slightly different set of responses was received when farmers were asked about the future of yam. 77% (23), 70% (21), 53% (16) and 60% (18) of farmers in Takete-Ide, Ejuku, Olle and Iya Gbedde said that the future of yam is poor and it will continue to decline. In fact 28% (34 in the four villages) said that in three decades yam will no longer be grown in the area. The reasons for this gloomy prediction were easily identified all over Kabba. These include the fact that yam demands more labour than any other crop while labour has been declining due to factors already cited. Emphasis was laid on the fact that as a result of education and civilization in towns, the youth will no longer involve themselves in the rigours of yam cultivation. Lower yields of yam due to poorer soils, deteriorating rainfall conditions and increasing crop diseases, all added to labour shortage sound the death knell of the crop. The few optimists believe that yam production will increase because it is still the best source of food - in fact the 'king' of all food - and if its supply is threatened, farmers will rise up to do something about it. Moreover, at present, yam sale is the single most important source of cash income and that will induce farmers to produce more. The larger number of people in Olle and Gbedde areas who saw the bright side of yam attribute this to the decline of tree crops (cocoa and coffee). When all farmers were asked what their choice would be, if assistance were to be given them on any one crop, 87% (26), 87% (26), 33% (10) and 73% (22) of farmers in the four respective sample villages chose yam but the majority in Olle chose coffee. Farmers suggested that only mechanization of the heaping operation, enticement of young people back to the land, easier access to cheaper fertilizer and pesticides and government loans to farmers can turn the tide not only for yam but also for farming in general.

'Improved' or new varieties of crops such as maize, rice, cassava, citrus, yam and vegetables were adopted by 52% (62) of farmers in the sample between 1973 and 1978. These new varieties, some originating from surrounding villages and others from extension officers and the School of Agriculture at Kabba, were planted alongside old varieties using the process of experimentation and adoption described in Chapter 7. Depending on how well these new varieties perform, farmers gradually phase out older varieties which they perceive not to be doing well (Chapter 5). During interviews, farmers were prepared to give reasons why they adopted new varieties. These include a) 'it yields faster than the old one', b)'produce stores better', c) 'helps in times of food shortages', d) 'sells well', e) 'because old crops are not doing as well as in the past' and f) 'want to experiment and increase the stock of varieties on my farm'. These indicate that adoption of new crop varieties is not based on blind following of anything new, but on perceived advantages of new crops over old ones. This same principle applies to all other farm inputs. One must note though, that this perception is aided by government advertisement of the supposed qualities of seedlings bred in research stations or imported from abroad.

Changes in inputs

Over the past three decades, new inputs have been introduced into farming in this area. One of such is fertilizer. The number of people who usedfertilizer and the amount of money spent on it have been discussed (Chapter 5). The number of farmers who used fertilizer increased dramatically between 1970 and 1978 rising from 7% to 97% in Takete-Ide, 3% to 90% in Ejuku, 20% to 60% in Olle and 1% to 40% in Iya Gbedde. The trend in the use of fertilizer is clearly upwards because 89% (68) of users said that their application of fertilizer had increased since adoption and only in Olle did use decrease among 39% (7) of users. Other responses point to a positive impression created in farmers' minds by its use. Majority of users said it makes crop yields better while the middle aged and elderly said that they had increased yields with fertilizer to compensate for smaller areas cultivated. A sizeable number started to use it to avoid crop failure. 21% (16) of users adopted it being impressed by the crop yields of other users while some said that shortage of virgin land makes the use of fertilizer necessary. For those who have increased use of fertilizer, the following reasons were given as the cause, a) 'because it vastly improved crop yields', b) 'I tested it on a few crops and saw its benefit', c) 'more readily available now than before', d) 'helps late planting', e) 'I have no rest of mind about crop well-being unless I use fertilizer' and f) 'all farmers report its good use'.

Major problems encountered by fertilizer users are its prohibitive price and the irregularity of its supply, causes of which have been discussed. Of the 43 (35.8%) in the sample who did not use fertilizer in 1978, 38 or 88% mentioned that they did not have money to buy, while 7% (3) felt their land was fertile enough to do well without fertilizer. Only 2 (1.7%) farmers in the sample refused to use fertilizer at all because they said it changes the taste of crops - a non-economic factor unaccounted for by orthodox agricultural economic theory. Inavailability of fertilizer at the right time was also mentioned as a disruptive element to scheduled application of the input. For those in Olle who used less fertilizer in 1978 than when they first adopted it, serious weed problems caused by fertilizer was cited as the most important reason for reduced use while some said that their land was still so fertile that fertilizer did not add much extra to crop yield. Reduction in farm size was also mentioned as one reason for reduction in the quantity of fertilizer used. The foregoing is another clear indication that farmers know what they are doing.

The trend in the use of chemical pesticides is very similar to that of fertilizer. A brief review of indigenous pest control strategies is necessary to illustrate the negative impact of the imposition of new methods on farmers. Pest control measures built into the farming system by such management practices as plot shifting, mixed cropping (Ajibola Taylor, 1977; Benneh, 1976; Norman, 1972, 1973) and crop care methods have been described (Chapter 5). Others include the use of herbal concoctions (àgbó or 'medicine') which is sprinkled on seedlings before planting and crop produce before storage to combat pests such as termites, rats and birds. Other kinds of herbs are dried, mixed together with àtàré (aligator pepper) and burnt in big bowls at strategic points on the farm producing smells which drive insect pests away. It is also said to have supernatural power to keep most pests out. Another pest is human (thieves). A special charm (àlìlé or the 'watch') is placed on the farm to arrest any thief. Anyone who steals on any part of the farm will be unable to leave until the owner arrives, arrest him and produce the antidote to the charm. This control measure may be treated with scepticism in some quarters but any sceptic is invited to try. Only one or two people in each village know how to make them and the high cost paid for them prevents many farmers from obtaining one. The low incidence of theft on the farm also makes it less of a priority.

Other indigenous pest control methods include the setting of traps for animals, planting of ōrọ́ (cactus) around the farm to keep pests off by its smell and poison, building scare crows (against birds and monkeys) and setting tree trunks on fire overnight to produce smoke to keep birds and animals away. A pest control measure which springs from superstitious beliefs concerns the bird called alasàrā́ (named after its cry) which do the most serious damage to maize cobs. It is believed that this bird does not walk on sand or the ground. No farmer interviewed, from the youngest to the oldest had ever seen the alasàrá on the ground under normal circumstances. It is believed that if they alight on the ground or on sand they will not be able to fly. So farmers and their children expend enormous amounts of labour putting sand on every green maize cob on the farm, believing that the birds will drop on to the ground if they touch it, where they can be caught and killed. As a boy, I took part in this operation and though catches did not run into hundreds, some of the birds were indeed killed by this method while others see the bait and leave. The major drawback of this method is frequent rainfall during the wet season which washes the sand off. To be effective, the operation has to be repeated almost on a daily basis. With the labour situation, this is impossible.

Many more indigenous methods of pest control abound and demand further research into its extent and effectiveness. The sad point to note is that 'modern' chemical pesticides have eclipsed indigenous pest control methods. Except among old farmers, people have abandoned the control measures developed over many generations except those imbedded in the farming system itself, preferring to use imported pesticides instead. Farmers' response to the problem of the grasshopper (zonocerus variegatus L.) demonstrates the loss involved in this process. Damage to crops by this grasshopper was so serious and widespread, that the National Agricultural Technical Committee of Nigeria (now the National Agricultural Development Council) declared it a pest and sought the assistance of the Overseas Pest Research of London in co-operation with the University of Ibadan, Nigeria, to investigate the biology,

bionomics and control of zonocerus. While scientific field experiments were set up at and around Ibadan, other investigations (in which I took part in 1974) took place in various places in southern Nigeria. Even though I grew up in a farming community, I was surprised by the detailed knowledge which farmers have about this pest. Farmers in my own area of Kabba and Ibarapa area of Oyo state among others are adept at recording observations of the historical occurrence of the pest, its life cycle, the relationship between climatic conditions and certain weed types (eupatorium odoratum (akíǹtọ̀lá), and the peak periods of this pest, and the fact that they congregate to lay eggs in pods in the soil in a few places on the farm. Farmers were also able to assess the amount of damage done to various crops. For example, the yield reduction caused by zonocerus to cassava was estimated at an average of 62%, sufficiently close to the 60% obtained by scientific experiments. In fact many Kabba farmers had observed zonocerus' egg-laying characteristics sufficiently closely to have carried out experiments of their own into digging up egg-laying sites - the most effective method of control that the researchers were later to recommend. Detailed reports of this investigation have been discussed elsewhere (Barker, Oguntoyinbo and Richards, 1977; Richards, 1978). The point to be made in passing is that thousands of naira was spent in researching into a problem which farmers were sufficiently aware of.
In fact this report showed that there are aspects of the problem outlined by farmers, which scientific research could not possibly have unearthed, such as the historical occurrences of the pest. The foregoing illustration has been given to point out the kind of losses being experienced by forcing farmers to abandon effective farming strategies for quick-fix

solutions which can only benefit the manufacturers of fertilizer, pesticides, farm machineries who are eager to sell to farmers, and governments who want farmers to produce food cheaply enough for urban centres to keep the latter politically quiet. The loss in information which farmers can provide is also illustrated by the much heralded discovery by the International Institute of Tropical Agriculture, Ibadan, Nigeria, that yam can be grown from seeds. This discovery resulted from enormous effort in research and experimentation. This discovery, is however, a fact known to Kabba farmers for a long time. Though planting by the seed is no longer attempted because the making of setts provides a shorter route to tuber generation, the possibility is known practically to every farmer. In fact very old farmers remembered past instances of producing tubers from yam seeds. Indeed, some yams are labelled 'male' or 'female', with the females having seeds. Most prominent among the female varieties (whose seed is said to be able to germinate) are kẹ̀rẹ̀gẹ̀ and ìkì (see Chapter 5 and Atteh, 1974). Such local knowledge is an invaluable aid to current research and supports the argument that farmers can and indeed should be equal partners in efforts to promote change in agricultural production.

Today, most farmers rely entirely on 'modern' pesticides. 80% (24), 53% (16), 60% (18) and 47% (14) of sample farmers in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively, used chemical pesticides in 1978. They were asked to list the type of pesticides used, against which pests and on which crops. Responses are presented in Table 10.2, showing that farmers are not slow to adopt measures other than their own when convinced that the former are more effective.

Table 10.2

REPORTED USE OF PESTICIDES, 1978

Crop	Pest	Pesticides Used	No. of Respondents
Yam	Termites	Adrex T.40	16
		Aldrin Dust	8
		Gamalin 20/40	5
	Okuye	Adrex T.40	7
		Aldrin Dust	2
		Gamalin 20/40	2
	Grasshoppers	Gamalin 20	1
Maize	Birds	Adrex T.40	29
		Aldrin dust	2
Guinea Corn	Birds	Adrex T.40	29
Melon	Birds	Adrex T.40	11
		Battery water	2
	Toads, lizards, rats	Adrex T.40	6
Cocoa	Korikori	Gamalin 20/40	9
	Black pod	" "	5
		Korikori pesticide	8
		Perenox	4
Coffee	Grasshoppers	Gamalin 20/40	5
Citrus	Grasshoppers	Gamalin 20	18

Adrex T.40, Aldrin dust and Gamalin are the most widely used pesticides.

Source: Field Work, 1978

Non-indigenous implements have also been introduced to the farming landscape though on a small scale so far. All farmers said they had seen tractors before and are aware of their use. Yet only 10% (3), 13% (4), 17% (5) and 3% (1) of farmers in the sample in Takete-Ide, Ejuku, Olle and Iya Gbedde respectively have actually paid the subsidized hire rate to have government tractors plough or ridge their fields. Those who adopted it referred to the advantage in using less physical energy, working faster and having larger farms. The vast majority of those who have not adopted it cited lack of money to hire the tractors as one reason but other fundamental issues were raised as well. Firstly, ridges made by tractors are too small to allow successful planting of yam which is the most important crop both for food and for cash. Farmers said they will be forced to plant only grains and so might starve. Secondly, the ridges do not allow the planting of many crops as the heap does, yet farmers cannot risk mono-cropping under present circumstances. Thirdly, the hoe allows making heaps in stages and in different sizes to fit different crop types, which the tractor does not allow. Fourthly, most farms are inaccessible in the wet season when the tractors are needed because of numerous rivers and streams. Traditionally, farms are not located close to the road or footpath to make sure they are hidden from prying enemy eyes who might be jealous and try some mischief (cf Atteh, 1974). This has created the problem of inaccessibility to farms where tractors are needed. Fifthly, under present circumstances, using the tractor is seen to be uneconomic by many farmers. Each will still have to clear his own plot as he does under the indigenous system, but in addition, he will have to remove stumps of grasses after burning. He will then have to uproot the trees and clear them from the plot. Above all these, he will pay to hire the tractor. In contrast, the hoe enables heaps to be made without uprooting trees. By the time they finished preparing the plot for the tractors, farmers estimate that they could have finished heaping with the hoe, with all the advantages of heaping realised. Finally, the completely unreliable and inadequate tractor service makes it risky to clear the land, uproot the trees and wait for tractors which may not arrive in time for the heaping season. For these reasons, farmers still hold to the indigenous system though they see the labour-saving advantages which the tractor brings. The shortage of labour, however, seems to force farmers to conclude that the change to a mechanized means of heaping is inevitable if farming is to survive. The co-operative farming programmes embarked upon in Takete-Ide, Ejuku and other villages are designed to take the risks which the individual cannot take. By pooling their resources together, they clear a large area, contribute money to hire a tractor, monocrop the plot and employ an intensive application of fertilizer and pesticides. For the individual, however, the indigenous system is very much in evidence. Farmers' concern for ensuring the planting of a mix of crops necessary for household consumption and for sales, their reliability of supply and stability through diversification all override the very prominent advantage of using tractors. When examined closely, it is clear that farmers do not hold to old practices for the love of it, but for the advantages inherent there in which new introduced methods or inputs do not have.

The foregoing represents an overwhelming concern with a set of commonly perceived improvements which can be achieved within the existing farming system. It also indicates perceived problem areas in the system. Discussions in all parts of Kabba show an immense eagerness on the part of farmers for improvement in crop production, but they maintain that these adjustments should be made within the existing farming system. They do not envisage a change from plot shifting, heap-making nor mixed-cropping, the advantages of which are overwhelming (Chapter 5).

In concluding this chapter, note must be taken of the fact that farmers expect necessary changes to come from 'outside' - (from the government in particular) rather than an inward look at what they can do. Having imbibed 'outsiders' notions about their farming system, they see themselves as unable to contribute anything because things are being done differently in the life of today. Throughout the survey, farmers wanted to use me as a medium through which their problems and their appeal for aid can get to the government of Kwara State. I was told to inform authorities to provide new seedlings, pesticides, fertilizer, storage facilities and other services listed in Table 10.3. Priority of crops for which aid is sought is given in Table 10.4 while types of aid per crop are listed in Table 10.5. In making these appeals, none of the confidence radiated when they were describing their farming system (Chapter 5) is apparent, reflecting the paradox discussed at the beginning of this chapter.

Important is the fact that farmers are able to diagnose the problems which face their production systems (Chapter 9) and are able to prescribe solutions to them. Pessimistic as their assessment of the present and future trends is, their basic faith in the effectiveness of plot rotation, heaping and mixed cropping is unchanged. All the foregoing shows that peasant farmers in Kabba as elsewhere, are progressive

Table 10.3

TYPES OF ASSISTANCE SOUGHT BY FARMERS FROM GOVERNMENT

Types of Assistance	Takete-Ide	Ejuku	Olle	Iya Gbedde
Improved seedlings	7	3	3	11
Pesticides	28	20	30	26
Storage facilities	11	1	2	14
Fertilizer	30	30	28	29
Higher prices for crops	1	-	7	23
Tractor for heaping	30	27	30	24
Loans	16	11	7	9
Crop Inspectors	-	3	-	1
Herbicides	17	19	26	21
Road Construction	8	7	-	-

N = 30 in each Village

Source: Field Work, 1978

Table 10.4

CROPS FOR WHICH ASSISTANCE IS SOUGHT IN ORDER OF PREFERENCE

Crops	Takete-Ide				Ejuku				Olle				Iya Gbedde			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Yam	26	4	-	-	26	1	3	-	10	9	5	2	22	3	2	1
Cassava	3	11	14	2	4	18	5	3	3	5	5	8	4	8	2	4
Guinea Corn	1	8	12	-	-	3	16	-	-	1	-	1	-	-	-	1
Maize	-	7	4	16	-	8	4	8	-	3	9	7	-	1	5	2
Beans	-	-	-	4	-	-	2	3	-	-	-	-	1	7	1	2
Cocoa	-	-	-	2	-	-	2	4	-	2	1	3	1	2	7	4
Coffee	-	-	-	6	-	-	-	10	17	5	5	-	2	7	8	7
Kolanuts	-	-	-	-	-	-	-	-	-	2	1	2	-	-	-	2
Rice	-	-	-	-	-	-	-	-	-	2	3	3	-	-	-	-
Pepper	-	-	-	-	-	-	-	-	-	1	-	1	-	-	1	3
Citrus	-	-	-	-	-	-	-	-	-	-	1	3	-	-	2	3
Tobacco	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-

N = 30

Source: Field Work, 1978

Table 10.5

TYPES OF ASSISTANCE WHICH FARMERS SEEK FOR DIFFERENT CROPS

Crops	New seeds	Pesticides	Storage Facilities	Fertilizer	Higher Prices	Tractor service	Loans	Herbicides
Yam	6	61	7	78	-	90	46	
Cassava	-	65	1	44	-	70	35	
Guinea Corn	-	47	5	47	-	36	6	(a)
Coffee	-	54	-	3	23	-	17	
Cocoa	-	27	-	-	13	-	-	
Maize	-	28	3	45	7	38	24	
Beans	-	13	2	10	-	5	-	
Melon	-	1	2	-	1	-	-	
Soyabeans	-	2	-	2	-	2	-	
Pepper	-	-	5	2	6	-	28	
Kolanuts	-	5	-	-	-	-	-	
Cocoyam	-	-	-	-	-	3	-	
Rice	-	1	3	2	-	12	-	
Citrus	-	1	6	-	-	-	-	
Tobacco			4	-	4	-	17	

(a) = all crops. N = 120

Source: Field Work, 1978

rather than conservative (if progressive is taken to mean the abandonment of indigenous practices for 'new' or introduced methods designed from outside). These farmers are advantageous partners in the planning process, because where opportunities, which they consider rational, do arise within their means, "peasant farmers are rapid to respond" (Collinson, 1972:33).

CHAPTER 11

CONCLUSION

Throughout this thesis, I have used the method of highlighting findings, inferences, deductions and issues which require further investigation wherever these occur. Summaries of chapters and the way they are related to the whole argument were also attempted in the text. A long conclusion consisting of the summary of the text, issues for further studies and relevance of the study to rural development planning will not be necessary except points already made are repeated. Only brief comments are therefore made here.

A. Major Findings: A few of the major findings of this investigation are as follows:

(i) 'Traditional' farmers are inheritors and possessors of a rich store of environmental knowledge about soils, vegetation, climate, crops, weeds, pests etc. both of historical and temporal nature. Technical knowledge as to how to exploit the environment is also highly developed. Both aspects have developed into a knowledge system ('folk' or'ethno' science) through generations of experimentation and observation. For all practical purposes, this is as valid as formal science, though unwritten. It is stored in form of cognitive patterns, farm practices and encoded in the form of proverbs, puzzles, local games, stories, rules and norms (cf Chapter 7).

(ii) In the light of the social, economic, cultural and physical context existing in Kabba (cf Chapters 3 and 7) and the goals of farmers, the farming system is ecologically, economically, and culturally rational. This is made possible because farmers' environmental knowledge are not just based on things and objects but also the underlying ecological processes and social and economic issues (proximal and distal) which affect their production.

(iii) The farming system discussed in Chapter 5 represents a careful and time-tested balance between farmers' perception of their needs, and the resources available to them.

(iv) Farmers' goals and aspirations are determined not only by the need for security, but also by cultural rules, and farmers' 'representational model' of urban-rural relationships in Nigeria (Chapter 4).

(v) It has often been asserted that introduction of the market economy in 'traditional' systems produces esteem goals of desire for achievement, excellence and status (Collinson, 1972). In Kabba, all these goals were present all the time as explained in Chapter 4. New values created by the colonial experience only changed the means of achieving them - substituting new values for indigenous ones.

(vi) As can be seen throughout the study, the greatest impact on the indigenous farming system was caused by the colonial experience. This led to changes in values, goals, aspirations (cf Chapters 3, 4 and 7) and have eroded the basic infrastructures which successfully maintained 'traditional' farming. It must be pointed out that it also stopped indigenous efforts at innovation and change, directing the attention of farmers to 'outside' means of improving the system (cf Chapters 9 and 10). Farmers' responses to these changes show that they are not as conservative as they have been presented to be.

(vii) The boom in the other sectors of the national economy as a result of the dominance of petroleum in recent years, has created a serious stress in 'traditional' agriculture, drawing away labour from it and increasing the urban-rural gap.

Yet planners turn round to blame farmers for not producing enough cheap food to feed urban dwellers. Farmers, paid low prices for their crops, see themselves in a no-win situation for no fault of theirs. Evidence in Kabba clearly points to the fact that as soon as enough capital is generated, farmers invest in non-farm enterprises as a means of sharing in the 'national cake'. There is therefore no move towards investing in agricultural improvement.

(viii) The notion of farmers' 'primitivity', 'irrationality' and 'conservatism' results from either a palpable ignorance on the part of 'outside' observers or is a device by the latter to enhance and maintain their privileged position where they can 'plan' for, and 'dictate' to farmers.

B. Areas of Needing Further Investigation

a) Writing this thesis has shown how vast the topic of enquiry is. The result is that most of the issues have been dealt with briefly. For example, topics such as the farming system (Chapter 5), culture, environmental knowledge and farming (Chapter 7), farming problems, changes in farming techniques and inputs, and the state of 'traditional' farming in relation to the national economic picture (Chapters 8, 9 and 10) and others could easily have been major topics of enquiry on their own. In fact time and space cut out a lot more data which could be included in these different topics.

b) The constraints of time and resources also prevented the 'scientific' identification of all the soil types, trees, grasses, weeds and pests which bear relevance to different aspects of this study. A lot of specimens were collected which are still being analysed at the IITA, Ibadan. Farmers' cognitive patterns concerning these environmental objects could prove a fascinating research topic.

c) Non-conventional methods of eliciting information were used on the field in addition to well-established methods. Psychological tests such as the repertory grid and anthropological tools such as participant observation, group discussions, taped interviews, local games, collection of proverbs, puzzles etc. were also employed. For data yielded by these methods, proper analysis in the form of stream-lined and reproduceable procedures was not carried out. This is not to say that they did not produce fascinating insights into the cognitive processes underlying farmers' decision-making. A major research effort is required to exploit the potentials inherent in these techniques, codifying them into technical manuals which can be used and analysed in comparable situations.

d) The ethnoscientific model (discussed in Chapter 7) opens up potential areas of enquiry, to establish the interrelationships between culture, environmental knowledge and farming. Moreover, only a few examples from the mass of data collected on farming proverbs, crop epithets (òríkì), alo etc. could be analysed and included in the thesis. Efforts will be made to transcribe the rest and present them together in a finished format at a later date.

e) One area which will need immediate follow-up study and work is the incorporation of lessons learnt from this study into the extension training curricula in Nigeria. This could have a positive effect in changing the perspective of extension officers towards local farmers and enhance their effectiveness.

C. Relevance of the Study to Rural Development Planning

It was intended to make data collected on this section a chapter on its own. Due to time and space constraints these data will be published as soon as possible.

65-70% of the Nigerian labour force is still involved in agriculture. Until petroleum became dominant in the economy, agriculture accounted for 56% of the GDP and about 80% by value of the country's exports. Food-crop production claimed over 75% by value of total agricultural production (Oyenuga, 1967; Taiwo, 1973). Until recently, Nigeria fed herself. Now importation of food has replaced that self-sufficiency with serious food problems looming large over the nation (Akinrele and Chibundu, 1970; NAC, 1971; Olatunbosun and Olayemi, 1973; Olayemi, 1971). In response to this situation the Federal Government launched the 'Operation Feed the Nation' scheme in 1976 to encourage food crop production. This has been replaced with the Council for Green Revolution, placing emphasis on a massive importation of machinery and inputs, and establishing large-scale capital intensive agricultural projects in the agri-business mould. This is a revolutionary strategy with clear implications. It is a quick-fix strategy which may produce crops now, but trouble later (Clark, 1975). This is because the likely beneficiaries from such a scheme will be multinational corporations and industrial enterprises who manufacture machinery, fertilizer, pesticides, etc. and urban dwellers who will be able to buy food more cheaply. This creates a situation where the rural peasant farmer is paid less and less for his crops. This strategy will also enhance the privileged position of government in determining policy, and focus of research, thus denying farmers the initiative they have had in the past. Another problem is that opportunity costs in terms of cultural values lost will be unacceptable. The whole history and science of traditional farmers, will be undermined and substituted with 'outsiders' ideas. Government cannot afford to divest people of this heritage which have been developed over a long period.

What is being proposed in this thesis is a supplementary rather than an alternative approach. It is an evolutionary approach which encourages farmers to produce more through co-operation between government and farmers. Suggestions for doing this are outlined below:

a) The rational production strategies employed by farmers must be recognized to be valid and productive. As such farmers can be valuable partners with government. The 'ethnoscientist' who has lived in rural areas all his life can adequately articulate environment processes. His advice, contribution and knowledge are vital especially in the preliminary survey of what obtains, historical aspects, and priorities of people where projects are to be cited.

b) Farmers must be taken on board as partners in policy formulation and implementation and in defining research directions. An illustration of how this can be done is provided by the example of Community Development in Kwara State. With the inability of government to provide all the social and infrastructural amenities which people yearn for, villagers have taken the initiative of planning and executing development projects in their areas. This became so widespread that government created a department of Community Development which became part of the Ministry of Local Government and Community Development, to co-ordinate these activities. Highlights of data obtained from this Ministry show that in 1978 there were 100 approved post primary schools and colleges in Kwara State, only 43 of which were built and are being run by government. The other 57 were built by communities and are run with help from the State Schools Board. In the 1976/77 financial year, 197 projects, worth N2,789,100, were executed in all the twelve local government areas by people themselves, while 454 on-going projects valued at N10,638,306 were registered with the Ministry. To aid these efforts government gave a paltry sum of N400,000 as grants to all the communities combined. The Ministry estimates that since the creation of States in 1967, various communities have executed projects valued at N20,340,742. Projects executed, and on-going, include building of roads and bridges, court houses, classrooms, dispensary/maternity centres, postal agencies, market stalls, libraries, hospitals, construction of dams for rural water supply and the electrification of larger settlements. All these projects were initiated by local people and their children living in urban centres. Villagers determine priorities, plan, finance, and execute development projects on their own. The people have therefore provided themselves with more amenities than the government did. Most of these projects are financed from the sale of crops produced by 'traditional' agriculture which is deemed primitive. Yet government appreciates and co-ordinates these efforts, lending hands through grants, technical supervision of projects, etc. If government can take them as partners in these efforts, because they are recognized to be capable, and 'progressive' it is an irony that they are not seen to be worthy partners when planning policy is being formulated. The community development model just described provides an ideal avenue for governments and farmers to be partners in the planning of agricultural production.

c) The readiness of farmers to accept new ideas has been demonstrated (Chapter 10). However, it can be seen very clearly that farmers have their own priorities about the type of inputs they want. Consultation with them to identify these priorities is vital. Without going into elaborating the advantages of project impact assessment (Ortolano, 1973), the importance of taking the values, norms and concerns of the farmers into consideration cannot be over-emphasized. The public, once taken into confidence becomes more interested in the project. This study shows that farmers are articulate enough about the social and economic issues affecting their occupation, to want to be consulted on development planning.

d) While allowing farmers to continue with the basic features of the 'traditional' system, as long as they are convinced of its 'utility', inputs such as fertilizer and pesticides which farmers have enthusiastically taken aboard should be made more readily available through regularization of distribution. Adequate compensation for farmers through a guaranteed pricing policy which seeks social justice rather than in simply maintaining urban peace, must become operational. Only by rewarding farmers adequately can they be expected to generate enough capital to improve their material living standards and also invest in farming.

e) Reduction in the urban-rural gap by redistributing national wealth more equitably between them is a vital step which needs to be taken if anybody is going to remain a farmer in the future. It is clear that Kabba farmers are seriously concerned about the social and economic issues concerning the inequalities which exist between urban and rural dwellers. Chief Obafemi Awolowo, in his address to the Graduation ceremony of the University of Ife, Nigeria (1973) warned of the dangers of failing to do something about this problem, declaring "... it is pertinent to remind ourselves that a situation which we now have, under which the good things of life are assured to a small minority of Nigerians, and almost totally denied to the vast majority of our countrymen is pregnant with unpredictable dangers for all of us if allowed to continue for much longer". Massive efforts, centred on integrated rural development with farmers participating as equal partners seems the best way of avoiding this danger. Issues involved in improving 'traditional' agriculture are therefore not just economic, but also require social and political action. Actually, recognition of 'traditional' farmers' abilities requires positive political action from third world governments.

f) Incorporating lessons learned from this study into the curricula for training extension agents is probably one of the most vital proposals in this section. This will enable them to understand what farmers do and why. In addition good farmers can be brought to schools of agriculture and extension training centres, to exchange ideas with students and to develop new strategies together with them. Through this, extension officers can be trained to understand the ways in which farmers identify and perceive their resources of soil, vegetation, crops and crop varieties, and problems such as pests and weeds while farmers learn of alternative ways of approaching these issues. In this way the disparate objectives and strategies of farmers, extension agents and planners can be harmonized. These farmers, once back in their villages, are probably the best extension agents possible.

g) Finally, there are many farmers who are experts in various aspects of environmental knowledge. Some are excellent soil scientists, entomologists, botanists, historians, climatologists etc. and there are equivalents of professors among them. Could it be preposterous to suggest that we recognize them as such?

Concluding Remarks

Two points are appropriate here in conclusion.

a) Wherever human decision-making involves activities aimed at satisfying goals, "men wish to make their activities 'efficient' rather than wasteful" (Herskovits, 1964:512). For this reason men consciously strive to make the most efficient use of resources available to them for the achievement of goals which motivate them into action. The strategies employed for crop production in Kabba in the light of resources available to them show an efficient management of resources.

b) Goal-directed activity seeks to attain something which the decision-maker considers useful to him (utility). The concept of 'utility' is used by economists to describe the most general common denominator for comparative value (Found, 1971). Definition of 'utility' differs from person to person and from group to group. There is therefore no 'objective' utility. Once objectives are set therefore, decision-making relevant to achievement of such objectives comes under the concept of subjective rationality. This is because, from a phenomenological point of view, we can only speak of rationality relative to a frame of reference, which in turn is determined by the limitation on the rational man's knowledge. In making choices that meet 'satisfactory' standards, the 'standards' themselves are part of the definition of the situation.

Setting such standards whether by individual farmers or groups of people involves what Edwards and Tversky (1967) call subjective probability (or imputed risk) which is derived from the basic behavioural hypothesis that human decisions result from a tendency to maximize expected 'utility'. The latter is seen as the product of an expected pay-off from an activity. No where does man hang on to a behavioural pattern for its own sake unless that pattern has some value to him which new alternatives don't have. The response of 'traditional' farmers to innovations and programmes of agricultural development must be seen in this light.

Each group thus seeks to exploit what it considers a 'utility' on the basis of its desire for ordering its life and organizing its society. It must be accepted that because peasant farmers' attitudes, goals, and behaviour differ from those of industrial societies and third world citizens who are trained to think in the way of the latter, the farmer is not necessarily 'primitive' or irrational because "one man's milk is another man's white wash" (Harris, 1972:12,14; Simoon, 1967). One cannot understand the goals, resource management strategies and problems of 'traditional' farmers until one accepts that they are normal people whose operation within their environment is governed by the same principles of goal satisfaction and efficient resource use as other people. They only differ from the industrial world in the material, social and contextual environment in which they live. Aptly put, "... it can be taken as cross-culturally acceptable, that on the whole, the individual tends to maximize his satisfactions in terms of the choices which he makes. Where the gap between utility and disutility is appreciable, and the producer is free to make his choice, then, other things being equal, he will make his choice in terms of utility rather than disutility" (Herskovits, 1965:18). This is as true for farmers in Africa as with any society. It is basic in man because he is driven by 'a rage for order' (Kuntz, 1968) which is the basis on which he uses the environment. Man, whether in the industrial west or in Africa or Asia, seeks to make sense of his surroundings and to define and locate himself there. He is continually directed towards organizing his environment, endowing it with meaning (utility) and evaluating his own place in an environment thus structured. He is not governed by a detached contemplative apprehension of the world, he is rather concerned with what exists, and what happens around him in terms of his perception or image, his momentary desires and his long-range ideals about the type of life he would want to live. He does not confront an environment sharply divided into physical things and social beings. For him all of them are interwoven and his subjective 'utility' views are rooted within this framework. As Goffman (1959) rightly points out, the structurization of the environment is not in terms of inert things or entities, but in terms of relevance and meaning of features of the environment for his <u>plans</u>, <u>goals</u> and <u>actions</u>. He (man) is always interpreting happenings and objects with respect to a schema which he has of the nature of the environment and its resources. This schema is not simply a structure pertaining to the spatial arrangement of things but consist of deeply ingrained "rules" and "expectations" as to how things are to be used.

The foregoing represents the view of 'traditional' farming presented in this thesis. These are the norms which govern the action of people in the industrial and post-industrial world, but the same principles prescribe, delimit and define how they should interpret the actions of other people. If by this point the reader has begun to think that way, then the purpose of this thesis has been served.

APPENDIX 1: Patial Lists of Species in the Major Vegetation Zones of Kabba Division.

(a) Forest Zone	(b) Daniellia-Elaeis Complex (Savanna)	(c) Daniellia-Uapaca Complex (Savanna)	(d) Daniellia-Prosopis Complex (Savanna)
Acacia ataxacantha	Afzlia africana	Afrormosia laxiflora	Afrormosia laxiflora
Albizia adianthifolia	Annona senegalensis	Afzelia africana	Bridelia ferruginea
Allophyllus africanus	Butyrospermum parkii	Annona senegalensis	Butyrospermum parkii
Aspilia latifolia	Entada abyssinica	Butyrospermum parkii	Daniellia oliveri
Blighia sapida	Lophira lanceolata	Cussonia barteri	Delarium microcarpum
Bombax buonopozense	Parkia clappertoniana	Daniellia oliveri	Hannona undulata
Ceiba pentandra	Terminalia laxiflora	Detarium microcarpum	Lophira lanceolata
Chlorophora excelsa		Gardena/ternifolia	Parinavi polyandra
Cola gigantea	along streams are	Hymenocardia acida	Parkia clappertoniana
Dialium guineense	Alchornea cordifolia	Parinari cuvatellifolia	Prosopis africana
Dioscorea spp.	Cleistophelis patens	P. Polyandra	Terminalia spp.
Elaeis guineensis	Bambusa vulgaris	Parkia clappertoniana	
Khaya grandifoliola		Terminalia laxiflora	grasses
Monodora tenuifolia	grasses		Andropogan pseudaprious
Paullinia pinnata	Imperata cylindrica	grasses	Ctenium newtonni
	Andropogon tectorum	Ctenium newtonni	Hy'arrhenia chrysargyrea
	Ctenium newtonii	Monocymbium ceressiforme	
	Hypasrhenia chrysargyrea	Schizachyrium sanguineum	
	Monocymbium ceresiiforme		

Source: After Clayton, 1962.

APPENDIX 2 Requisites for a human food supply system.

1. Maintain continuity: there must be genetically - and culturally - encoded information which guides the system.
2. Provide space: a land tenure system which provides space for crop production.
3. Manage water: provision of water for green plants by resource location.
4. Provide nutrients: nutrient supply is necessary for plant growth - provided by land management or nutrient supplements.
5. Channel solar energy: both micro- and macro-spatial structures as well as temporal sequencing, guide food production to meet this requirement.
6. Control succession: normal ecological processes must be controlled to enhance yields from desirable cultigens - weed control.
7. Provide protection: plants and animals must be protected against predators, diseases and pests.
8. Harvest production: food production must be brought closer to consumption by harvesting - concentration of the usable portion of harvests.
9. Transportation: food must be carried to the site of consumption unless eaten on the farm or directly from animals.
10. Storage: temporary concentration of food products for later distribution over time.

Source: Knight and Wilcox, 1976.

APPENDIX 3 Local names of plants* which farmers associate with good farm land.

Upland plots
Ofe

iyà
òrùpá
ákóró
épépé
sìnàhì
ayín
àpàsà
àyéyé
ìrà
ọ̀pàsì
árírá
arán
Gbédégéré
ìgbà
ọ̀mí
àfẹ́
olobùtù
áwó
òrìrì

Grasses
igún
kínkín
òrùwà
odisùálé
óbìró
apóréjì
éléró

Valley bottom plots
Akuro

ọ̀dẹ́
ibó
ọjìn
arọ̀jẹ́
ayín
ápópó
ọ̀gbàràhìn

Grasses
ikin
igán
àmìkò
mìró
agun író
Imúm

Forest soils
Igbo

ígé
ìrókó
ọ̀fún
àyọrè
orìró
áfá
ogùngùn
áwó
Alabẹ́ ọ̀pẹ̀
Akọmù
ọjín
orée
ógégé
ọ́rọ́
fẹ̀rẹ̀gúngún

Grasses
ìjokún
kásán
agun àgbó
ogbé

Upland heavy soils
Ibo

àtù
àyín
ajọ̀lé
ápópó
ọbọ̀nránín
ọfún

Grasses
ēré
ọ̀wọ̀lè
ẹ̀rìkì ìmọ́
òrókùn ákán
ọ́gà mo sántán
kínpàsán
ẹrán

Source: Field work 1978 - a partial list. Transcribed from Tape B.
*Identification of plants to be part of follow-up study.

APPENDIX 4: A list of major crops planted in Kabba.

Common Name	Botanical Name	Local Name
White yam	Dioscorea rotundata	ísú
Yellow yam	D. cayenensis	éhùrù
Water yam	D. alata	éwúrá
Aerial yam	D. bulbifera	émíná
Cassava	Manihot esculenta	pàkí or ẹ̀gẹ̀
Guinea corn	Sorghum vulgare	ọ̀kà or ẹ́kà
Maize	Zea mays	àgbàdò etc.
Rice	Oryza sativa (etc)	ìrẹ̀sì
Melon	seed from cucumoeropsis edulis	ẹgúsí or ẹ̀pá
Okro	Hibiscus esculentis	ìlá
Tobacco	Nicotiana officinarum	tábá
Groundnuts	Arachis hypogaea	ẹ̀pàyọ̀
Potato	Ipomoea batatas	idūnkù
Cocoyam	Colocasia esculentum	kōkō or lambó
"	Xanthosoma sagittifolia	"
Plantain	Musa paradisiaca	ọgẹ̀dẹ̀ agbágbá
Banana	Musa sapientum	ọgẹ̀dẹ wẹ̀rẹ̀
Lima bean	Phaseolus lunatis	érējó
Cowpeas	Vigna unguilata	éré or ẹ̀wà
Soyabeans	Glycine (max)	ihéhē or sèsé
Water leaf	Talinum triangulare	egùré
Bitter leaf	Vernonia amygdalina	ewùró
Pepper	Capsicum annum & C. frutescens	ata, àgère, apọ̀pọ̀
Cotton	Gossypium barbadense	owū
Spinach	Corchorus olitorius	ewèdú or tánkèlèkàn
Spinach	Celosia argentea	ẹfọ́, sọkọ̀yọ̀kọ̀tọ̀

APPENDIX 5: Crop varieties, local names and epithets (oriki).

Crop varieties	Name meanings or oriki	Meaning and significance to farmers
Yam - ìkì	Ọbọ̀n ún, àràgà bò ọ́ léní, ò wọ́ ànà f'árún mèjí	The shield over the poor, makes negative prospective in law to change her mind and accept the man (tubers are very large, saves the poor, impresses in-laws).
Kẹ̀rẹ̀gẹ̀	Ọ mọ̀ gbé ọwọ mi t'ẹ̀gí mọ̀ gbé ọwọ rẹ̀ tẹ kẹ́kẹ́, ọ́yá	If you put my twine on the stakes, I will put your hand on a wife, bicycle etc. (Sells well to enable achievement of goals).
ògùnmọ̀	a kèsí l'àjá à mọ́ jó	Spends a year in storage without spoiling (the most durable variety of yam).
ọ̀lọ̀fẹ̀rẹ́	Ja àlé gbà lọ̀wọ̀ ògéré	You can change the mind of a lazy man's wife and make her your concubine with a gift of this luxurious yam.
ẹsín	Ọlọ̀bẹ́ ma sọ́fún	The soup maker wastes her soup (the only sweet white yam variety. Can be eaten without soup).
Pàósà	sàgbẹ́ d'ọbà	It has become king! (when introduced to the area it spread so widely that it became the most widespread variety).
ọ̀gọ̀dọ́yọ́	a hùn bábá le ígí	Rest on trees like a mat (produces a lot of leaves).
Bọ́bọ́	Íyán kùngbá ọ̀lọ̀jọ́ kàọ́ àrín hí	The bowl is full of pounded yam and the visitor smiles (makes so good pounded yam that delights a visitor).
Sémsù	ẹ̀rẹ̀kẹ̀ tùẹ́tùẹ́, alé ẹ̀kẹ̀tẹ̀	Soft texture, the concubine of palm oil (very soft when cooked, best eaten with palm oil).
Ale wọ̀lẹ́	Ale wòlẹ́ mọ wo orí ìgì	Look into the heap, not at the tree top (leaves usually small, yet tubers in heap are big, concentrates energy on tuber, not twine.
éfé	O wọ̀lẹ́ tu pùkẹ́	Breaks the heap (breaks soil easily, first to be harvested - quick maturing.
Ajíˆmòkúnnì	Ọ ni mọ̀jì iyá àpà	Strong, germinates reliably (secretary to all other yams).
Ọwọ̀	Bẹmbẹ etì àjà, ọ̀wọ̀ òlé ké jànù	Big tubers! Frustrates the thief (tubers so large that it is not easy to hurriedly dig it and run).

APPENDIX 5 (continued)

Yam -	aga	o dun mo inu ghere ghere, a mu'ja d'oru, oni oso e gbedo je.	The one that causes slight stomach ache, reserves fight till night, one that wizards and witches must not eat (thought to cause stomach ache for witches and wizards or anybody impure).

Crop varieties	Meaning to farmers
Cassava - olisuté, oliyán, gbolokógbàlà, dónígbèsè nìjò, bábá óyín, éléwúró, ọ̀bà ègbírà, Ghana, Àlàbá, àsánréré	See text
ídíóbà yẹ̀pẹ̀	Bottom does not touch ground - cooks quickly. Once on fire, one can hardly sit down before it is ready.
Igède	Brought from Igede in Ondo State.
Kerikerí	Valuable at time of seasonal hunger - endures when others are exhausted.
Ibọ̀n and Ígbòkó	Brought from Nupe and Gboko areas respectively.
Õgún lọ̀wọ̀	Sweat is money (good for sale, brings money for the hard worker).
Pàkí dùdu	Black cassava (turns greyish after cooking).
Ọ̀rúnmíré	'To heaven I am going' (manna from heaven, sweet and reliable).
Láfúnké	Particularly good for lafun (cf. Table 6.2).
Ọ̀gàmílèná	Cooks very quickly to meet a ravaging appetite.
Gashi	A hausa word meaning 'accept' (brought in by a hausa migrant who advertised it).

Names of other crop varieties

Guinea corn	Maize	Beans	Cocoyam	Pepper	Water yam	Melon	Okro
Red	elẹrunpẹ	Ere	Red	agere	Akawodi	Egbira	Ladudu
White	agric	Erejo	White	ẹiyẹ	Okanwura	Palaba	Ólówó (finger)
Imoye	gogọrọ	Akanmiyeregbe		pọki or kobọ	Kain kain	Sepẹ	Òlósùmeji
awaole	igbin	Ganranho		atarodo		Bàra	Owọ agbinrin
	Gadobata	Ere Apo		Atasọmbọ		eletidudu	Teribọle
	Akadun	hehe					Ila Ojo
	Pẹpẹsẹ	ito					Ila agric.

Source: Field work 1978, transcribed from Tape F.

APPENDIX 6: The 'Traditional' Farming Calendar

Traditional months	Corresponding period on Western calendar	Farm Operations
Órìkà	January-March	Cultivation of àkùrọ̀, forest clearing, mulching and staking. Replanting of failed yam.
Alébọ̀gún or Ẹríndùn	April-Mid-June	1st hoeing of yam plot, ẹ̀sá (bed preparation for guinea corn), planting of guinea corn, maize, melon, okro, etc.
Ẹrúndùn or '5th period of year'	Mid-June-mid-July	Clearing of fresh upland plots (àyọ́).
Ẹfádùn or '6th period of year'	Mid-July-August	Second yam hoeing (àròlé), 1st stage of heaping (ẹ́kà and àlàtì) clearing (àyọ́) continues.
Ejédùn or '7th period of year	September	2nd stage of heaping (ẹ̀wá)
Ẹjọ́dùn or '8th period of year'	October	Heaping completed, last hoeing (àròkẹ́hìn) and beginning of seed yam preparation and planting.
Ehóndùn or '9th period of year'	November	Harvesting of beans, seed yam preparation and yam planting, harvesting of soyabeans.
Ewádùn or '10th or last of year'	December	Yam planting, harvesting of soyabeans and guinea corn - crop storage.

Source: Field work 1978 (Tape G).

APPENDIX 7

MEN	WOMEN	CHILDREN Age (10 – 18) Male
3. Crop Care – Hoeing (weeding) – Staking yam – mulching yam etc. 4. Harvesting – yam (all types) – Guinea corn – bending the stalks only – Maize – Cocoa, kolanuts 5. Preparation of storage facilities on the farm – the barns, aka, etc. 6. Over-all Farm Manager – Makes decisions about farm size, use of inputs, crop varieties to plant harvesting schedule and looks after the welfare of the farm.	4. Crop Harvesting – guinea corn (cut ears from stalks bent by men – coffee – and all crops mentioned above except maize which is harvested by men. 7. Transportation – send yam from place to place – evacuation of crop produce to central points on the farm – evacuation of produce from farm to village – transport of produce from village to market. 8. Crop Processing – Threshing of guinea corn, beans, soyabeans. – All food processing and cooking listed in Table 6.2 making them ingestable. 9. Marketing of Crops (See Ch. 6) Proceeds even for those crops planted and harvested by women go to the family pool.	

APPENDIX 7

FARM OPERATIONS PERFORMED BY MEN, WOMEN AND CHILDREN

MEN	WOMEN	Age CHILDREN (10 - 18) MALE
1. Land Preparation for Planting - clearing - burning - heaping	2. Crop Planting (on plot prepared by husband) - guinea corn - maize - pepper - beans, soya beans - okro - melon all vegetables. - help in yam planting by carrying seedlings from one plot to another or place to place on the farm and putting them on heaps for husband to plant.	Depending on age - help in all farm operations in which adults are involved male or female except 1st stage of heaping, and Nos. 8 and 9. He is exposed to the broad range of all farm operations as an educational process.
2. Crop Planting - seed yam preparation - yam (all types) - transplanting of pepper and guinea corn - maize occasionally - cocoa - coffee and other tree crops		10. Drawing of drinking water for use on the farm from nearby streams. 11. Gathering of sticks for making fire for cooking on the farm.

APPENDIX 8: Examples of 'Don't' rules for farm operations.

	Rules	Perceived significance and comments
1.	New yam must not be eaten before the New Year Festival.	Ingratitude to God. Following year's crop will be bad.
2.	Yam should not be planted when àkòkòsó tree is flowering.	Yam will not do well. (By this time, it is already too late to plant yam as it starts to germinate.
3.	Don't leave hoes in the rain or in the open after day's work.	Disrespect to God of iron (seems designed to prevent rust).
4.	Nobody must whistle on the farm during yam planting.	Whistling is said to spoil charms placed on the farm (spirits don't like whistling so they will not come to help plant growth.
5.	Knife used for cutting cooked yam must not be used for cutting setts.	Yam setts will not germinate (it is believed that heat remains on the knife and will make setts rot).
6.	Those who carry seed yam must not play with oduru (flower of parki clappertoniana).	Yam will 'die' (a type of disease resembles this flower, so occurrence of the disease is connected with it).
7.	Cursing songs for òró festival must not be sung when planting yam.	Seed yam will not germinate because God doesn't like cursing.
8.	Women must not go to the farm during the mentral flow.	Leads to poor performance of crops (seen to be unclean).
9.	If you mulch in February and March, don't touch heap top.	Yams will spoil (seems designed to prevent accidental damaging of emerging yam shoots).
10.	A man must not engage in sexual intercourse the previous night before yam planting.	Yam will not do well (sex is seen to weaken a man spiritually and morally and this might affect his farm operations).
11.	A man must not quarrel with or have a grudge against anybody during yam planting period.	Crops will not do well (God will be angry and may not bless crop - coincides with Christmas celebrations so helps to keep the peace).
12.	A newly married man must not jump across freshly prepared yam setts.	Crops will rot (a newly married man is said to be unsure of himself, in the new experience, so might damage yam setts).

Source: Field work 1978, transcribed from Tape E, 'Farm Rules'.

APPENDIX 9: Examples of Puzzles (Àlọ́) used to teach Environmental Knowledge.

Àlọ́ (in local dialect	Translation
1. Puzzle: Gbọ̀gbò òkò r'àrín Answer: Òwù	P. The whole farm is all smiles. A. Cotton: when ball breaks to expose white cotton, it is like the plot is full of teeth.
2. P. Ọ́lọ̀ sisẹ sé pélù idùnnù, ọ́lò ta ta pẹlú idùnnù, sùgbọ́n ọ́lọ̀ rà rà pẹ́lù ibanujẹ, ọ́lò lò lò pẹ́lù ibanujẹ A. Apòti òkú	P. The maker was happy, the seller was happy but the buyer and user were sad. A. Coffin.
3. P. Bàbá mi kàn kù s' ọ́dún ígbá, àn m'ẹ̀hìn tẹ orí'nlẹ́ ó' A. Ìràè	P. There is a man who died for two hundred years, he was touched and he said 'careful'. A. Dead leaves - makes noise when stepped on.
4. P. Gbógbó ókó t'ẹ́ní A. àyọ́	P. All the farm spread mats to sleep. A. Cleared 'agi' (cf. Ch. 5).
5. P. Gbógbó ókó d'ètù A. àpàlé	P. All the farm put on caps. A. Mulched heaps (picture of plot with hats).
6. P. K'èlọ́wọ́ k'èlẹ́hín àràn g'bọ̀mọ̀ ghà A. órípo	P. An object without hands nor legs said 'let me hold the baby'. A. Traditional bed.
7. P. O jòkó h'àrín ómí tàb-álá épẹ́pé k'ángbẹ́ A. Ìghọ́n	P. A man sat in a pool of water still crying for thirst. A. The tongue.
8. P. Mo gb'ẹ̀sù hòwó àpàtà òtá, mo gbẹ̀ h'ìlẹ́ e tá A. Ìtàn	P. I planted yam on the rock, it germinated but failed when I planted it on soil. A. Fiction.
9. P. Akìkọ́ òjòmbàlà, ẹ̀jẹ̀ ówó rẹ, ẹ̀jẹ̀ ìdì rẹ̀ A. Ẹ̀ká	P. There is a large cock. The head is eaten but the bottom is not. A. Sorghum (only the ears on top are eaten).
10. P. Mirè'kẹ́ a pọ́jù dá'kẹ́, ébọ̀ kẹ̀'apọ́jù dá'kẹ́. A. Ọ̀pẹ̀ gígùn	P. When going to Ike village I faced Ike, and when coming back I still faced Ike. A. Climbing a tree (face same direction).
11. P. Èmí ọ́rẹ́ mi kan ìrín rẹ́ Èffó, títí à fi déwẹ́ e bà mi A. Òjìjì	P. I was travelling to Effo village with a friend but he never levelled up until we arrived. A. Shadow.
12. P. Asọ òkìkì mọ̀kí ọ̀ló tá e mọ̀ ró, ọlọ̀ró è mọ̀tá A. Oyún	P. An important cloth! The weaver cannot wear it and the wearer cannot weave it. A. Pregnancy (role of male and female cannot be interchanged).

Source: Sample from I50 Alọs in Tape D. Collected in 1978.

APPENDIX 10. Examples of Proverbs connected with Farming.

	Proverb	Meaning and Significance
1.	O lò kọ̀ ọgọ̀rún àrí 'gba ón ko 'ni 'lẹ̀ rẹ̀	The man who says he has a 100-heap farm and said it is 200 is deceiving himself.
2.	E mú béré béré yọ̀ lọ̀wọ̀ ébi¯	You can't escape hunger by being sweet-tongued (response to someone who always gives excuses for not going to the farm).
3.	Étíbá kì ìyàn ìpá	The hungry season is severe for those who say that it is too late to plant (to encourage as late planting as possible in case).
4.	O ló mọ̀ rò kọ̀lẹ́ lìká mò ró l'ọ́mọ́ ọ́gẹ́	It is the hard working who wins the bride (cf. ch. 4 and 7).
5.	Osè ọ́wọ́ isẹ̀ kingé kingẹ́ osè ọ̀wọ̀ ikẹ́lé dọ̀tìn-dọ̀tìn	The working hand seems thin, but when it starts to eat the fruit, it seems big (hard work but good reward).
6.	Arọ̀kọ́ lìjọ́ ọ́wẹ́	Works hard during owe (cf ch. 5) as a display for people to see but can't work on his own farm (a lazy man active in other people's work).
7.	Yẹ̀yẹ̀ likẹ́sé, ótò kì yàn tàn a dọ̀rán kókó	Foolish act when being done, but becomes almighty during famine (refers to cassava which is taken lightly during planting but seriously during the hungry season).
8.	Ọ̀gbọ́n lìnù ìlẹ́	Feet in the ground (refers to cassava with long tubers in the soil, but useful for food).
9.	Lòlò línú érú, ọ̀wọ́ àgbàlàgbà sè wùrùkù l'ètì iná.	Makes patterns in ashes, makes the old man stoop near the fire (refers to fresh maize cob which comes at the end of the hungry season. Even old people stoop near fires to roast some).
10.	Amù 'gbá d'ábọ́	A man who can work so hard that he leaves 200 heaps for part-day work (some do that a whole day's job).
11.	Olò kọ́ 'kẹ́tẹ́ a mọ́ gbè áyín rẹ́ nkọ̀, ayín rẹ́	A man who makes an <u>akuro</u> plot but does not plant it because he ate the yam is headed for dire consequences (it's better to suffer now and reap later than eat the seed yam now and go hungry later).
12.	Ọkiùn, ọ lẹ́ t'ọ́wō bà	The white one, who is approached from the top (a praise epithet for pounded yam).

Source: Transcribed from Tape C, Field Work 1978.

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