FOOD, CULTURE AND ENVIRONMENT: THE CASE OF THE ATHARAKA OF EASTERN KENYA

BY
ESTHER I. NJIRO
24TH NOVEMBER 1994

A THESIS SUBMITTED TO THE INSTITUTE OF AFRICAN STUDIES IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ANTHROPOLOGY OF THE UNIVERSITY OF NAIROBI

DECLARATION

This thesis is my original work and has not been presented for an academic award in any other University.

SIGNATURE _____

ESTHER I. NJIRO

DATE 14/8/95

This thesis has been submitted with my approval as the University Supervisor

SIGNATURE _____

PROFESSOR SIMIYU WANDIBBA Director

DATE 11.8.95

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

LIST OF ACRONYMS

ACRONYM	
AEZ	Agro-Ecological Zone
ASAL	Arid and Semi Arid Land
CCIC	Canadian Council for International Co-peration
CGIAR	Consultative Group on Agriculture Research
ELCI	Environmental Liaisons Center International
FSA	Farming Systems Approach
FSR	Farming Systems Research
GAD	Gender and Development
GOK	Government of Kenya
HIID	Harvard International Institute of Development
ICIHI	International Commission on International Humanities
ICRAF	International Centre of Forest Research
ICRW	International Centre for Research on Women
IDRC	International Centre for Research and Development
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
KEMRI	Kenya Medical Research Institute
LEISA	Low External Input for Sustainable Agriculture
NES	National Environmental Secretariat
NIRDP	Netherlands International Research and Development Programme
SES	Social-economic status
TAC	Technical Advisory Committee
TWASP	Tharaka Water and Sanitation Project
UNDRO	United Nations Disaster Relief Organization
UNEP	United Nations Environmental Programme
UNICEF	United Nations Children's Educational Fund
WID	Women in Development

ACKNOWLEDGEMENTS

Several people and institutions have contributed in various ways to the completion of this work. Professor Simiyu Wandibba has guided and supported me throughout this study. Apart from his professional guidance, he can never be criticized for any delay in reading and correcting this work. I thank him for his unfailing assistance, encouragement and concern. Dr. J.A.R. Wembah-Rashid will not be forgotten for his enthusiasm and very useful suggestions throughout this study.

Others who contributed, in one way or another to the completion of this research but I am not able to mention by name, include the Atharaka who, despite the inconveniences and constraints, welcomed me warmly into their homes. Their affection and generosity in offering time and effort to respond to the many enquiries of this study, is greatly valued and I wish to sincerely thank all of them.

I am especially indebted to Dr. Kithaka wa Mberia and Evaristus Irandu of the Linguistics and Geography departments, respectively, of the University of Nairobi for agreeing to respond to the questionnaires of this study. Their responses enriched my understanding of Kitharaka concepts before and after the fieldwork. I am grateful to the management of the Tharaka-Swedish Water and Sanitation Project (TWASP) for accommodating me in their camp. The place was invaluable as a base from where I sought an alternative home in Tharaka.

Dr. Halima Mwenesi of Kenya Medical Research Institute was helpful for she read through the first draft of this study and made comments. The teaching staff at the Institute of African Studies who examined and passed this study's proposal, made an important contribution. I am also indebted to Dr. Mauri Yambo and Professor York Bradshaw of the Departments of Sociology Nairobi and Indiana Universities, respectively, who made the arrangements for staff exchange programme. This exchange gave me an opportunity to read more and engage in computer classes which were useful in enabling both the analysis as well as the documentation of this study.

I acknowledge with thanks the Nairobi Office of International Development Research Center (IDRC) for the funds that enabled me to go to the field. This was through the concern shown by Dr. Ogbu Osita who readily responded to my request for funds at a critical time for this study. I also acknowledge with thanks the grant from the Council for Development of Economic and Social Research in Africa (CODESRIA), who have awarded me their small grants for thesis-writing. I felt privileged that the proposal for this study won in the stiff all-Africa competition for these funds. Many thanks to the Deans Committee of the University of Nairobi for approving and granting me funds to complete this research.

Finally, I thank my family for giving me unwavering support throughout this study.

ABSTRACT

This study explored the cultural institutions of the Atharaka so as to identify the strategies they use to cope with food shortages in their drought-prone environment. The economic and cultural institutions of the Atharaka were explored so as to identify the coping strategies used in their food procurement. Attention was focussed on the way the Atharaka conceptualize food, environment, and the forces of change that impinge upon their culture.

The rationale was to highlight the potentials of indigenous knowledge and coping strategies in both food production as well as environmental management. The study was to fill the gaps in the knowledge of how communities cope with food scarcity during ordinary food shortfalls. Such knowledge is useful for laying the basic foundation and strategies for reducing vulnerability to both short and long term food shortages for a given community. It is also crucial for Kenya's food and environmental policies.

Both qualitative and quantitative methods of data collection and analysis were used. Ethnographic methods such as in-depth interviews, formal and informal interviews, direct and non-participant observation, focus group discussions and key informant interviews were employed. Secondary data was mainly library studies whereby available written literature and archival materials were perused so as to determine the gaps of knowledge which needed filling.

This study found that the economic and cultural institutions of the Atharaka are well able to cope with food shortages in their drought-prone environment. Coping strategies were found to be within the experiences of nearly everyone of the respondents in Tharaka. Unfortunately this knowledge has not received support from development agents in the area. Forces of change are also making it difficult for their traditional coping strategies to continue yielding the required food. Disintegration of cultural and economic institutions is a threat to food security and environmental management.

The study recommends a deliberate official commitment to supporting the Atharaka's coping strategies which clearly have a capacity to maximize on the scarce environmental resources. Promoting these strategies is likely to enhance techniques of responsible and sustainable manipulation of their semi-arid ecosystem. Although these coping strategies have proved successful over the years, they now require strengthening so as to deal with the forces of change. Current transfer of technology ought to be discouraged for it is not likely to reduce vulnerability from food shortages.

lowering of body vitality, lethargy and even death (Richards 1939).

Access by all people at all times to enough food is a major policy concern all over the world and has led to various studies concerning the causes of inadequate supply of food. Some of the findings of these studies are that food shortages are brought about by interaction of many variables, including erratic weather, poverty and low incomes, poor infrastructure (lack of roads and food markets) and lack of appropriate technologies for food production particularly among those who live in semi arid lands (GOK/ UNICEF 1992). Efforts to address food insecurity in many of these areas have for long focussed mainly on improving agriculture, technology and providing emergency relief when food shortage is prolonged and several deaths are reported due to starvation.

What is lacking are data to confirm that rural communities have the profound and detailed knowledge necessary to cope with their ecosystems and derive nutritious products from them. These communities normally have ways of ensuring that plant and animal species within their environment are maintained (International Union for Conservation of Nature 1990).

A major objective of this study was to explore the Atharaka's knowledge and techniques of ensuring food security in their drought-prone environment. What mechanisms do they employ in procuring, sustaining and coping with food scarcity? This investigation entailed understanding food production and coping

strategies in Tharaka. Issues such as land tenure, land use, patterns of labour organization, food distribution and consumption were investigated. Other concerns were trade, exchange, social networks and consumption of food, including issues of food preparation, processing, preservation, dietary habits, attitudes and preferences.

A romantic approach to the effectiveness of the Atharaka's knowledge of coping with food scarcity was avoided. A return to "merrier Africa" is definitely not possible as the onset of the market economy has disrupted the social, political and economic fabric within which indigenous coping mechanisms operate. There are forces of change which are constantly affecting the traditional ways of coping with food scarcity. Examples of these changes include: the onset of the market economy commercialization of natural resources through sale of land and environmental products; individuated land tenure and delocalization of labour processes.

Nevertheless, this study contends that whatever is left of the Atharaka's knowledge has been effective over the years in enabling them to cope with frequent food shortages and in ensuring the management of resources in their environment. Studying their coping strategies highlighted the wisdom of experiences and accumulated wealth of knowledge of various resources within their harsh environment.

This study's intention identified and documented the strategies used by the Atharaka to mitigate and deal with food shortages.

This entails a study of their cultural and economic institutions as well as their conceptualization of food and environment.

1.2 Background to the Problem

Tharaka-Nithi District falls within the savannahs and grasslands areas of Kenya, usually known as Arid and Semi Arid Lands (ASALs). These form much of Kenya's terrain. Within these ASALs, there is increasing deterioration of soils, water and plant resources through desertification. The situation is exacerbated by a growing population within the ASALs and also by migrations from the overcrowded arable regions (Rocheleau *et al.*1988). The inhabitants of ASAL are further affected by changing economic conditions such as individuated land tenure, land-use patterns, prohibition of hunting for wild animals as a source of food, introduction of new technologies (e.g., deep digging and use of fertilizers) and the spread of the market economy. The pace of change is such that it seems to threaten the capacity of ASAL people's cultural institutions to cope.

Studies have established that there are no short-term solutions to food problems in Africa (Plucknett and Smith 1986:292). Serious food shortages in the 1980s are said by some scholars to be a result of increased population and adverse global economic and environmental changes (Delgado and Blackie 1987; Higgins *et al.* 1991; Bunders *et al.*1992b). These scholars have recommended that research be directed towards food production rather than towards export crops.

They have also noted that food shortage in Africa is not due to

lack of endeavour since three-quarters of the African population is engaged in small-scale food production. Shortage of food is rather, a result of poor ecological factors which lead to a decline of the bio-diversity and nutritive organic matters in the soils. In developed countries such organic nutrients are injected into the soil through the use of high technology. Such technology is, however, not available for use in most parts of Africa. This is despite the concern expressed by the international community to urgently look for ways of improving the food situation for the Africans.

An example of such international effort is by a Consultative Group on International Agriculture (CGIAR) formed under the auspices of the World Bank, United Nations Development Programme (UNDP) and Food and Agricultural Organization (FAO) in mid 1970s. CGIAR has recommended research which seeks to improve technologies that could increase the quantity and the quality of food production in developing countries. This group is said to have established that there is little potential for improving food production in Africa through large-scale irrigation and also found that generating improved technologies to deal with rain-fed agriculture by smallholders would be a more useful strategy (Bunders *et al*. 1992a). Such research emphasizes the need for sustainable food production and environmental management.

This research should be a central part of economic planning in African countries since the food sector has the potential for ensuring food security as well as proving viable employment to

a large population. Although CGIAR and the Technical Advisory Committee (TAC) have viewed dry farming as the most prevalent form of African food production, they have not dealt with ecological systems where there is little or no rainfall.

1.3 Statement of the Problem

This study explored the cultural institutions of the Atharaka so as to identify the strategies they use to cope with food shortages in their drought-prone environment. Most of Tharaka Division of Tharaka-Nithi District where this study was conducted falls within Agro-Ecological Zones (AEZ) 5 and 6. The area is semi-arid, with a hot and dry climate and an evapo-transpiration ratio of less than 0.5. Rainfall is low and highly variable in space and time. Occasional storms do occur but due to absence of adequate vegetative cover, considerable run-offs intensify droughts (see also chapter four).

These climatic and environmental circumstances are not new to the Atharaka whose economic activities are said to have evolved from hunting and foraging to nomadic pastoralism and, later, to sedentary crop cultivators (Abella *et al.* 1984). Although the bulk of economic activities in Tharaka Division are focused on food production, the inhabitants are not food secure. Food shortages through droughts, and moisture deficiency are prevalent. The Atharaka, like other inhabitants of ASALs, have for long been vulnerable to food shortages but have always managed to cope with them. Apart from environmental deficiency, Tharaka lacks the necessary infrastructure such as all weather roads, hospitals, schools and banks. Despite these handicaps,

the study assumed that the Atharaka have effective coping strategies within their cultural and economic institutions. It is these strategies that this study explored, identified and documented.

This study sought answers to the following questions:

- How do the Atharaka conceptualize their environment?
- What do they consider to be food in their drought-prone environment?
- What is the nature of their food-procuring strategies?
- What are the coping strategies within these food-procuring strategies?
- To what extent have these coping strategies been affected by forces of change?
- What roles and responsibilities do individuals within the Atharaka households play in procuring food for themselves and other members of the household?

Answers to these questions provided the findings for this study.

1.4 Justification of the Study

This study was carried out to satisfy a curiosity about what keeps the Atharaka who live in such a dry and parched land from starving to death. The latest population census indicated that the population in Tharaka is actually rising and it was important to know what the people there live on.

The study was undertaken too to contribute to the debates related to agrarian reforms and environmental degradation. There are those who argue that growth in incomes through improved

agriculture does not necessarily lead to improved nutrition within households (Fleuret and Fleuret 1991). Others suggest that agrarian reforms have reduced the productive capacity of land because, in most cases, reforms have disregarded the indigenous knowledge and technologies (Nyaga-Mwaniki 1986b; Warren 1991; Brokensha 1989). Then there are those scholars who hold the view that introduction of cash crops has a positive effects on the nutrition of household members (Pinstrup-Anderson 1983; Chambers *et al.* 1981; Njiro 1990). Other debates have to do with the question of agricultural and other human activities being the causes of desertification and environmental degradation (Omosa 1992; Environmental Liaison Centre International 1993a; United National Environment Programme 1990). Lack of generally accepted answers to these debates suggests that empirical data are weak and further research is necessary.

Understanding the strategies which are devised and used by those who live in drought-prone environments like the Atharaka confirms that people are not just passive recipients of the vagaries of weather. Despite the limits of certain environments, people are constantly devising their own coping strategies and improving the ones they already have (Edgerton 1971). Thus, while scientists ponder the worsening ecological conditions, ordinary communities have flourished as a result of adapting coping techniques and strategies for survival which have been perfected through years of cultural experimentation (Kiriro and Juma 1991). The Harvard Institute of International Development (1983) has collected data that emphasizes that even though

poverty is at the heart of food shortages, effective coping strategies can be found among the poor. Such strategies need to be understood and strengthened if the case of food scarcity is to be fully addressed.

Exploration of the ethno-agronomy of the Atharaka revealed that they, like their neighbours, the Ambeere, are endowed with notable ethnoscience (Glazier 1975; Hunt 1975; Mbithi and Wisner 1978; Riley and Brokensha 1988). Such knowledge is ingrained in the indigenous knowledge of a community. The Independent Commission on International Humanities Issues (1985) and International Labour Organization (1986) have noted that there is evidence to link the acute food insecurity to a breakdown of indigenous coping strategies in some communities. This study's contribution was in identifying areas that need strengthening within the Atharaka's cultural institutions into which indigenous coping strategies are found. Such a documentation would be useful to those involved in development for it would provide them with a chance to build on what already exists (Foster 1969).

Clearly, the experiences of the Atharaka in adapting to the exigencies of environmental changes are a valuable input into the Kenyan Government's food policy which is currently realizing the value of the indigenous farming systems. This author affirmed this when she participated in a study of ASAL in Laikipia which recommended, among other things, the use of the Farming Systems Approach /Research (FSA/FSR) and Low External Input Strategic Approach (LEISA), as methodologies of

intervention by the Netherlands Integrated Rural Programme (NIRDP). These methodologies aim at building on locally available farmers' knowledge and technology (Bakema *et al.* 1992). The same methodology can be applied in Tharaka if information that closes existing gaps between scientifically tested farming methods and the ethno-scientific indigenous knowledge of the rural populations is availed.

Exploring the gender issues within the social structure of the sampled population is justified because food shortage and environmental degradation in most African societies have been attributed to the restrictions of women's access to and control over resources, particularly the decision-making powers over the way land is used as well as the disposal of what is produced. Gender roles and relations were rightly assumed to affect food production and management of the environment in Tharaka. Information concerning the household division of labour for food production among the Atharaka contributes to what Porter (1965), Knight (1974a), Moser (1989), and Brouwer *et al.* (1992) have referred to as social construction of gender.

1.5 Study Objectives

This study was exploratory in nature and encompassed a wide range of topics with an ultimate goal of finding out the linkages between food, culture and environment by looking into how the Atharaka cope with food scarcity in their drought-prone environment. The following were the specific objectives :

- To explore the Atharaka's concepts of environment and food in

order to highlight their basic components. To investigate and describe the way these concepts may have changed as a result of the dynamic nature of cultural and economic institutions of the Atharaka.

- To investigate the food-procuring methods of the Atharaka in order to identify the coping mechanisms within them.

- To enquire about the extent to which ways of coping with food shortages are affected by the onset of the market economy such as modernization in agriculture and other forces of change.

- To investigate the Atharaka's social structure, gender relations and intra-household allocation of food-procuring roles and responsibilities.

In conclusion, the chapter has dealt with the nature of this study's problem, i.e., the need to provide information about the way Atharaka, a community living in an ASAL environment, copes with food shortages. The study assumed that since the Atharaka have not starved to death over the years, they must have developed certain coping strategies. These have hitherto not been systematically documented.

The study investigated the economic and cultural institutions, particularly those related to food production, as well as environmental management in order to highlight the strategies for coping with food shortages. The study assumed that despite what seems to be helpless dependency on relief food by the

Atharaka, their cultural institutions have within them mechanisms of coping with food shortages which if strengthened by improved technology could provide food security for many generations.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Literature for this study is reviewed under the following subheadings: (i) A history of coping strategies; (ii) coping strategies as adaptations and adjustments; (iii) coping strategies in crop cultivation and pastoralism; (iv) coping strategies and environmental conservation; (v) coping by individuals and communities; (vi) coping strategies at the household level; (vii) gender and coping strategies; (viii) studies about the Atharaka: an overview.

2.1.2 A History of Coping Strategies

Coping with food shortages may be traced back to the pre-historic period, when humans devoted all the time to searching for food. Frequent food shortages due to inefficient and inadequate preservation and storage techniques, as well as carelessness of the early humans, are said to have triggered off the earliest coping strategies (Desrosier 1970).

Wright (1992) has reiterated that agriculture was not a chance discovery, but an adaptive food-getting strategy brought about by increased population pressure on the existing food resources of the time. Such pressure upset the equilibrium between demand for food and its supply, forcing people to device new as well as refined techniques of food production. An interaction between people's cultural institutions and environmental factors brought about agriculture, a more reliable food-procuring strategy as compared to foraging.

Later, agriculture and other human activities created an imbalance between the cultural institutions and the environment, leading to environmental degradation. Currently, there is acute food shortage almost everywhere in the world, particularly in African countries. Even in wet areas where food shortage was never a cause of concern, there are incidents of inadequate food supply. This is creating more and more of what Korten (1990) refers to as environmental refugees. Shortage of food has forced rural farmers to incorporate ways of minimizing the impact of hunger into their dietary habits and agricultural practices. Food shortages have also necessitated adjustments in cultural institutions which deal with food supply. Understanding these adjustments might lead to long-term solutions for the current drought-induced food shortages in many parts of Kenya (Fleuret 1986). Such solutions are a welcome hope to the starving people who are now dependent on foreign-financed food aid (Korten 1992).

2.1.3 Coping Mechanisms as Adaptations and Adjustments

Although drought and the consequent food shortages are a concern for most people, literature on coping strategies is sparse. Darwin's (1859) theory of the survival of the fittest was among the earliest enquiries into the nature of coping strategies. Darwin generated the instinct theory, which stresses the existence of inherent mechanisms in the psyche of each individual which determine human survival. Inherent behaviour, which is relatively fixed in individuals and which changes from generation to generation through a mechanism of natural selection, is known as adaptation.

Culture is the adaptive device by which humans accommodate themselves to a given environment (Kaplan and Manners 1971; Kilbride and Kilbride 1990; Geertz 1963, 1965, 1973). This study is concerned with the way the cultural institutions of the Atharaka have adapted to their drought-prone environment. The relatively stable relationships between people and their environment include the many ways in which human activities are structured to reduce damage from extremes of environmental conditions (Burton *et al.* 1978).

Whenever environmental conditions stretch beyond a society's adaptive capacity, that society has to adjust to the new situation. Adjustments characterize most human activities for most people tend to remain in action until the source of their problem is removed or its bad effects reduced (Kluckhohn 1965). Adjustment is therefore one useful way of explaining coping strategies. In addition, Kluckhohn (1965) has also stressed that no cultural forms survive unless they constitute both adaptive and adjustment mechanisms.

Wisner (1977) describes some aspects of farming systems which have the effect of optimizing available soil moisture and which have become routine practices from season to season among farmers. Such practices, which are uniformly practised, are known as adaptations. Other drought-mediating practices, which are engaged in as drought continues, are perceived as departures from the normal farming practices and are known as adjustments. The term coping strategies combines both adaptation/and adjustments.

In Kenya, there is a wide variety of farming techniques and what is adaptation by some farmers is adjustment by others. Coping strategies constitute adaptations and adjustments that enable societies to mediate or escape the effects of hazards such as food shortages. This study demonstrates how these concepts are applied in Tharaka.

2.1.4 Coping Strategies in Crop Cultivation and Pastoralism

Coping strategies are part of a community's indigenous knowledge which is unique to a given culture. Local people's decision-making about food production and management of environmental resources are ways of coping (Warren 1991). Such strategies constitute a large body of technical knowledge based on careful observations by a given society as shown by examples of crop cultivators and pastoralists.

2.1.4.1 Crop Cultivation

Brokensha (1989) has called for greater recognition of the salience of what local farmers do to cope with food shortages. Leakey (1936) was one of the earliest scholars to note that the Agikuyu's agriculture was not only rational but very well organized. His appeal that attempts to organize it should start with learning from the local people fell on deaf ears. Kenyatta (1938) also hailed the proper use of agricultural practices among the Agikuyu. Planting of slow-growing crops during the short rains was not allowed for these crops were bound to be stunted for lack of adequate moisture. Millet and pulses were not planted during the long rains as they usually grew tall and did not produce grains. Such practices show that

coping strategies were part of the indigenous knowledge of the Agikuyu.

Ruthberg (1977) has categorized coping strategies in crop cultivation to include migration systems, where individuals from households move from abandoned fields to new pieces of land. This is either cyclical, whereby the community reclaims land previously left fallow, or a linear style of a steady and progressive clearing of new lands (Ruthberg 1977). Onyango (1991) has pointed out that the periodicity and the direction of the shifts were features of rationality in a shifting cultivation. Clearing of the land and the way it was done followed the people's knowledge of soil types, rainfall distribution, available tools and diets.

Richards (1939) describes the *citemene* method of burning of brushwood, in an area that was much larger than what was intended for cultivation, among the Bemba of Zambia. The large amount of ash obtained supplied the most essential nutrients to the farms. Composting through the burying of debris and ash was an integral coping strategy within the local knowledge of cultivation (Rochleau *et al.* 1988). Mixed crop cultivation was another system of cropping which was well adapted to a given environment. Farmers also used their knowledge of soil types to know which crops were suitable for a particular environment (Riley and Brokensha 1988). Inter cropping helped in restoring soil fertility, reducing weeds and avoiding plant diseases.

The economic viability of shifting cultivation lies in the way

it is carried out almost without capital inputs. The system is, however, based on availability of labour from extended relatives, whose payments are almost exclusively in kind. As such, this type of cultivation is unable to cope with a growing population as it is dependent on the availability of extensive land for cultivating. Furthermore, it does not accommodate effectively the continual accumulation of monetary benefits from high yields derived from labour-saving innovations.

Cultivators are usually always willing to include new crop varieties in their agricultural programmes. They have a deep understanding of their environments and their own needs. They assess the fertility of a piece of land and its suitability by examining the type of vegetation which covers it and also by observing the characteristics of the soil, such as its "staying power", i.e., the number of seasons for which it can be cropped with satisfactory results, as well as the extent of fallow period it requires. This knowledge is an aspect of coping which is remarkably complete.

Conclin (1969) studied how the Hanuno of Mindoro in the Philippines distinguished about 1600 different types of plants with a finer classification of criteria than that employed by botanists. He noted how inter-cropping and planting of different crops at different times of the year were ways of responding to seasonal variations, i.e., coping with seasonal variations. Coping also includes structuring of the diet so as to have a type of food upon which to depend in times of

scarcity (Nanda 1987). This was noted among the !Kung of the Kalahari who are known to have a wide range of knowledge of the flora and fauna in their hostile environment, but have a habit of eating the protein rich *magongo* tree during the time of food scarcity. These nuts are abundant, easy to store and are not greatly affected by environmental variation (Lee 1968).

Close associations with the neighbours in better-off areas, is another way of coping with food shortages. The Mbuti of Ituri forest in northern Zaire have a close association with their neighbours (Turnbul 1961). They have a specialized adaptation to their local environment. Such adaptation is also found among the Kohistanis and Gujars of Pakistan. Such adaptation by a particular group is known as a *niche* (Barth 1956). Barth also described a pattern of social interactions, which entails exploitation of the different types of environment and engaging in a system of mutual exchange of a variety of products by different people.

2.1.4.2 Pastoralism

Studies of pastoralists have discovered their great skills and knowledge of coping with the changing circumstances of their environments. Baker was right when he observed the misconceptions of some trained scientists by pointing out that:

> What was sadly misunderstood, was the highly developed adjustment to the environment which the pastoralist had made, to arrive at a system which offered them the minimum of risk, in a very marginal physical environment and the very intimate knowledge of the physical resources which they had acquired in the process (Baker 1967:187).

The pastoral art of converting browse into human food in the form of livestock products such as meat, milk and blood is both an adaptive and adjustive response. Shortage of browse leads to strategies which include selective grazing, diversification of livestock, herd-splitting, exchanging animals and seeking refuge for a few in the herds of neighbours and relatives (Porter 1970; Ndagala 1974).

Campbell (1979, 1984) has described the Masaai strategy of building large herds so as to provide human subsistence during drought. Even when large numbers of livestock die, are sold or loaned to others, those with large herds are able to live longer than those with a few.

Apart from these strategies, there are other ways of coping applied by pastoralists in pursuit of their many ends. According to Aronson, they:

> ... engage in a multiplicity of economic activities making use of a wide diversity of resources within their reach, and often modifying their animal production to the demands of other pursuits. Above all, they farm, but they also trade, they smuggle, they transport, they raid and make war on their own or for others, and they manage the labor of others working for them (Aronson, 1980:173).

These adjustments are confirmed by Robinson's (1980, 1989) studies of the Gabbra's resource management system along the Kenya-Ethiopia border. The Gabbra have managed to cope with scarcity of water through utilization practices which are most effective. Coping strategies which the Gabbra have developed to utilize their environment follow a pattern of distribution which allows for the widest possible spread of human population and livestock. They are able to anticipate

ecological and climatic events as well as changes in the environment. So efficient are their skills that they are ahead of the climatologists and meteorologists in placing themselves and their livestock in positions where adversity will have the least negative impact on them (Robinson 1989).

2.1.5 Coping Strategies and Environmental Conservation

Several scholars have argued for the strengthening of local farmers' coping strategies asserting that these are the most coherent, rational and self-evident way of conserving environmental resources in Africa (Hill 1972; Netting 1977; Knight 1974a; Richards 1985; Brokensha 1989). More recently Warren (1991 and personal communication), has hailed the belated discovery that many ethnic groups value trees for reasons not always obvious to Westerners. Trees are used as indicators for soil fertility and seasonal changes. They are used to conserve moisture in the soil and for the sustenance of local animal life. They provide sources of savings and security and, therefore, knowledge of their conservation is jealously guarded. Such information has been gained painstakingly over the years.

So far, too much attention has been focused on the need to intensify environmental conservation. Reports by the United Nations Environmental Programme (1990, 1992), have emphasized the need for understanding traditional coping strategies for the purposes of conserving the environment. World conservation strategies recognize that local people's knowledge can help in achieving the objectives of combining conservation and rural

development. That is why IUCN (1990), has stressed the provision of the means for local people to maintain ecologically sound practices.

There is, however, too much stress on the conservation of the environment as though it was a `Museum' and not a source of food for most people (Diouf 1993). There is need for conservation approaches which regard environment as a food store for many rural communities. Forje (1993) has highlighted the forces of destruction which threaten the bio-diversity on which global food supply depends. These include destruction of forests, construction of dams, rapid population growth and the inappropriate economic and political power play.

The focus on increased yields and demands of foreign exchange have paid little attention to biological safety. Top-down agricultural policies have aggravated the misunderstandings between the scientifically-oriented change agents and the local communities who utilize traditional sciences. As Kiriro and Juma (1991) have aptly pointed out, there is need for linkage between current knowledge and technologies which are dependent on reading from books with ethnoscientific indigenous knowledge. This may be the only way to ensure humankind's capacity to cope with food scarcity and environmental conservation. There is therefore the need for an inventory of culturally-based coping mechanisms, especially in drought-prone environments.

This view was strengthened by claims that food insecurity is attributable to a breakdown of indigenous coping mechanisms, which have disregarded environmental resource management (ICIHI 1985; ILO 1986). These two studies stress the need to strengthen local people's coping strategies so as to redress uneven effects of famine on different regions and communities. Unfortunately, although the reports have demonstrated the need for strengthening the broken-down coping strategies, they have not specified the nature and extent of the broken-down strategies and the way they will be strengthened. A site-specific study, such as this study, is crucial for highlighting the series of crises which go unheeded at the household level and which lead to famines and environmental degradation.

2.1.5 Coping by Individuals and Communities

Burton *et al.* (1978) noted that individuals and communities follow a certain pattern in their response to hazards. They first appraise a hazard, perceive their options and their decisions on how to cope with it are prioritized. If hazards occur frequently, there is a tendency by communities to accommodate their situation through a variety of responses. Webb *et al.* (1992) observed such responses among the Ethiopians in response to the famine in their land. They noted that a continuum of coping runs from crisis damage containment to the collapse of households. A series of coping activities include household risk minimization, risk absorption and risk-taking. There is a time when everyone struggles for their own survival.

Goyder and Goyder (1988) have urged for studies to fill the gaps about the way in which the Ethiopian households coped as the famine unfolded progressively. Cultler and Stephenson (1984) had earlier underscored the need for research into human responses to reveal why some populations are more vulnerable than others in attempting to reduce the shock of drought and mitigate the effects of famine. One way of doing this is by a study of coping strategies during ordinary food shortages.

These interesting observations, however, are too general in their explanation of individual and community responses to famine. Site specific explanations of individual and community responses have the advantage of noting the effects of such factors as the demands of the market economy which have penetrated almost all societies and are threatening the traditional ways of coping with hazards. Kilbride and Kilbride (1990) and Sen (1985) have used the theory of delocalization to explain the chain of complex events which result when food and energy sources and services are transferred into the market exchange. In most cases people recognize the potential of technology which could be adapted into their culture so as to enrich their coping capacity.

2.1.6 Coping Strategies at the Household Level

Studies of households and their coping strategies include those by Reynolds (1982), Wignaraja (1984), Guyer (1980, 1985), Akong'a and Downing (1985), Downing *et al.*(1986, 1989, 1990), and Kayongo-Male (1988), among others. These studies

have given various definitions of the term household. In rural communities it is equated to smallholders whose lands are less than 10 hectares. Agro-pastoralists, such as the Atharaka, have a larger hectareage.

A smallholder's nature and extent of coping is determined mainly by climatic variability as well as non-climatic factors. Members of a household are also characterized as actors in their environments where they adapt and adjust to its changes (Berry 1971). These adaptations and adjustments were clearly depicted by Wisner (1977) when he documented the adjustments of the Atharaka and the Akamba to the climate of Eastern Kenya.

Government of Kenya's (1979) Central Bureau of Statistics definition of the household was found most appropriate for this study. Defining a household as a dynamic grouping of individuals who are usually related and who live in the same compound, eat from the same sources and are answerable to the same head, took care of the dynamics of the Atharaka households which were discovered during the fieldwork. Such dynamics include growth, births and deaths, migrations and numerous decision-making aspects of the individuals within the households or far away in search of household needs.

A survey by Abella *et al.* (1984) pointed out four major objectives underlying the Atharaka's food-procuring strategies. The first is to provide their families with sufficient food for consumption. The second is to safeguard

the future through investing in a variety of storage systems. The third is to meet social obligations and kinship networks while the fourth is to maintain status and wealth symbols. Essential purchases like paying for school fees, medical care and other consumer items are also met at the household level (Franzel 1983). Noted too, are the aspects of differentiation that are marked by socio-economic factors constituting household units of production and consumption of food.

Households are, therefore, indicators of a variety of coping strategies. It is in them that long-term processes of in-built socio-economic systems are best demonstrated. During drought, it is at the household that one notes the sensitivity to the environment. This is by routine practices which do not vary from season to season and which enable individuals within the households to balance their objectives by a series of short-term strategies. There are no hard rules as to what constitutes adaptations and adjustments for they differ from one season and region to another. Reliable adjustments can be classified as adaptations and the general term for both is coping strategies.

2.1.8 Gender and Coping Strategies

Another aspect which was explored in this study is that of gender and coping strategies among the Atharaka. Gender studies deal with the persistent inequalities between roles and status allocated to men and women, which permeate almost all societies. Throughout the world, women have borne the brunt of economic crises (Joekes 1987; Sen and Grown 1985).

This study explored the application of coping mechanisms from a gender perspective. This approach has a rich literature (Staudt 1988; Wipper and Lyons 1988; Stitcher and Parpart 1988; Stamp 1989; Palmer 1991; Sostheimer 1991; Annabel 1992).

Gender is used in relation to the socially constructed roles for men and women in a given community. Gender is said to be socially produced and culturally constructed. Roles allocated to men and women are socially and culturally determined (Canadian Council for International Cooperation 1991). Different communities assign different roles to females and males yet, in a majority of communities, women's roles are in food production. Such food production activities of planting, weeding, post-harvest processing and cooking are designated to women. Women produce food and other crops for sale as well as for family consumption. Women engage in wage work, petty commodity production, trade and other informal sector occupations. They are important social actors in kin groups, religious organizations and voluntary associations. Their ability to give gifts in form of social support as well as in creation and maintenance of social networks are other ways by which women enhance the quality of community life. They constitute some of the main ways of coping with decrease in resources as well as the management of an environment (Guyer 1980; Walsh 1986; Cloud and Austin 1985).

Other ways in which women achieve the food needs of their households include caring for the environment through collecting animal and crop residues, maintaining compost heaps

and applying fertilizers in the fields (International Center for Research on Women 1992:67). Women have a considerable knowledge of environmental resources. They are aware of the extent and the nature of the diminishing of edible leaves, roots, stems, fruits, sources of fodder, fuel and medicinal plants. Unfortunately, the way women participate in a given community in search of ways to cope with food shortages is indelibly stamped by their status within the households (Haugerud 1987; Stitcher and Parpart 1988). Men are looked upon as the guardians of household and community resources as well as other collective interests (Browner 1982).

The women's low status is embedded in the processes and methods of provision of the basic household needs. If women producers lack resources, then food supplies cannot keep pace with the expanding population (Schoepf 1992). Lack of rights to land by women is a source of concern for it removes the individual interest for personal gain. Dankelman and Davidson (1988) have cited the increased workloads and the longer distances women have to cover in search of declining food resources as other factors adversely affecting food security. Women are also increasingly taking

> ...more time hunting for bargains, setting up informal exchange networks with neighbours and kin, making and mending at home rather than buying new items (Daily Nation 6th September 1991:12)

These views are strengthening the documented information (Annabel 1992; Haugerud 1987; Hunt 1983; Elson 1987; Boserup 1965; Moser 1989) that women are the key custodians of coping strategies in most rural economies. As Elson succinctly concludes:

> ...the bottom line is that, it is women who must derive survival strategies whenever household incomes fall and prices rise (Elson, 1989:70).

Despite these sacrifices, there are numerous cultural practices which ensure that women eat the least amounts of food and only after everyone else has had their share. Endurance is therefore one of the crucial coping mechanisms women have adapted. These views were explored in the light of the more recent Gender and Development Approach (GAD). The merits of GAD are that it focuses on the complex relations of the production and reproduction activities of women and men. Women in Development (WID) programme, on the other hand, is discredited for isolating poor women into separate analytical categories. Coping strategies used by the Atharaka women were explored with a view to demonstrating women's role as active participants in the entire economic life of the Atharaka.

2.1.9 Studies About the Atharaka: An Overview

Almost all the scholars who have written about the Atharaka start by decrying the extremely sparse literature about Tharaka. This study came to the same conclusion but efforts were made to search for any written materials available. This section reviews the few written sources concerning the Atharaka's food, culture and the environment.

Dundas, an early traveller, who led an expedition up the Tana river to Mount Kenya in 1891, described Tharaka as a fertile highland territory, a land of numerous villages, fine pastures, cattle and well-tended plantations. A scenery of fine mountains on all sides with woods on either side of the

river valley was noted. He noticed that the main crops were millet and "a small black grain" (perhaps bulrush millet). Other crops included maize, castor oil and tobacco. He noted that goats were very important in the area and were owned by every household. Even in those days his records show that there were food shortages for he notes that he was unable to buy as much food as he hoped for as it was very expensive (Gedfe 1892).

Hobley (1910) and Champion (1912) are the other travellers and administrators who wrote reports about the Atharaka. Most of their records are impressions of travellers who had racist attitudes towards the Atharaka. Champion's account, for example, describes a woman in Tharaka as follows "... when she stands with nothing in her hand she is very suggestive of an ape" (Champion 1912:68). His bigotry, notwithstanding, he recorded remarkable descriptions of Tharaka environment. He saw the whole place covered with bush, except where the Atharaka had made a clearing for cultivation. The banks of the Tana had an especially dense bush inhabited by water bucks. He described the staple foods as *mweli, mbaazi, mutama, kunde, ngina* and *mubia*. By then maize was not grown in that area and people cultivated far from their homes. Every man of any standing possessed from ten to a dozen head of cattle, and almost everybody possessed goats, beehives and tobacco.

These descriptions provide a background to the Atharaka's economic activities, in an environment which allowed extensive resource utilization. This was the situation before the onset

of the market economy. The information is useful in a diachronic analysis of Atharaka's food culture and environment.

Other studies of the Atharaka were conducted during the colonial era and the post-independence period. They include that of Lambert (n.d., 1956). His account of the Atharaka social structure describes them as having a similar age-set as the other Ameru. This description, however, was found to have relied on non-Atharaka for the information and Bernardi (1959) accused him of being an armchair scholar whose work relied a lot on the oral reports of other Europeans. It is difficult to ascertain this as there are no other records for comparison. Bernardi (1959) has an accurate and detailed account of the social organization of the Atharaka. Unfortunately his studies dealt almost exclusively with the account of Mugwe, the ritual leader of the Atharaka.

Brokensha (1971) wrote notes at the request of the provincial planning team of Eastern Province, in which he described the Atharaka socio-economic institutions. Although these notes were hastily compiled (after seven days only!), they provide a holistic overview of the Atharaka economic and cultural institutions. They were thus useful as the basic reference points for this study.

Lowenthal's (1973) doctoral study of the Atharaka is the most serious work on the Atharaka social organization and age-set systems. His conclusions that development agents have ignored

Tharaka despite the evidence of social change among the Atharaka was a prediction of this study's findings. His work has also generated a theory about cultural domains of the age set system which explains a situation of social change in the area of this study. This study did not test his theory for it was not its objective, but it would be an interesting subject for future studies.

Mwabu's (1976) Master of Arts Thesis about the financing of smallholder agriculture in Tharaka has useful information about their household budgets and the dynamics introduced by the economics of cash crops to food production. Nkondi, where his study was done, is one of the most fertile areas of Tharaka and was mentioned as a place where many Atharaka seek help in times of food shortage. Mwabu's study, however, neither gives the cultural aspects of the Atharaka institutions, nor does it provide the relationships between the Atharaka food-procuring strategies and their environment.

His 1984 doctoral study on A Model of Household Choice Among Medical Treatment Alternatives in Rural Kenya, has more information on the socio-economic aspects of the Atharaka. His brief description of the socio-economic characteristics which determine the extent of disparities of levels of well-being was a useful demonstration of how the Atharaka cope with scarcity of basic needs. His study was, however, concerned mainly with causes and cures for various illnesses rather than ways of coping with food scarcity.

Generally the reviewed literature has not exhausted issues of food, culture and environment in general and among the Atharaka in particular. This study is therefore filling gaps of knowledge that have not been exhaustively dealt. These include:

- The way the Atharaka conceptualize their environment and the foods within them.
-A record of the hitherto undocumented inventory of various strategies of coping with food shortages in a drought-prone environment.
-Why some communities are more vulnerable to food shortages than others within the same environment.
-The effects of the demands of market economy on indigenous coping strategies.
-The effects of household dynamics such as gender roles and other relationships that impinge on food procurement and environmental management.

In addition, there has been little anthropological study of cultural and economic institutions in Tharaka. The last anthropological study was carried out there more than twenty years ago.

2.2 THEORETICAL FRAMEWORK

2.2.1 Introduction

The theoretical framework used to guide this study was that of cultural ecology. As a theoretical orientation cultural ecology is concerned with analysis of the way human beings interact with their ecosystems through their culture. It

focuses on the adaptation processes which allow the emergence, maintenance and transformation of cultural configurations (Kaplan and Manners 1972). It seeks to explain the origins of a particular cultural feature as well as ascertaining whether or not adjustments of societies to their environment require particular modes of behaviour (Steward 1955).

Cultural ecology as a theoretical orientation was propounded by Steward (1955) and furthered by Barth (1956), Rapparport (1967), Cohen (1971), Edgerton (1971), Kaplan and Manners (1971), and Geertz (1973), among others. Most of these scholars are neo-evolutionary anthropologists. This is an important observation for it shows that one does not need to be an evolutionist to test cultural ecology as a theoretical orientation.

As a theoretical orientation, cultural ecology distinguishes as unique, the way humans come to terms with their environments through learning rather than instinctively. Humans are therefore not passive recipients of the vagaries of their ecosystems but are active in modifying and adapting themselves to these ecosystems (Edgerton 1971). Culture is the enabling device through which humans begin by adapting and end up by controlling their environments. No wonder many of the natural environments have increasingly become cultural environments due to human adaptations.

The relationship between culture and environment that is explained by this theoretical framework involves dialectic

interplay of the elements of culture and environment which show a reciprocal causality, depicted by the following formula:

C----------> E and E ---------->C. Where C equals culture and E equals environment. The essence of the equation is that culture affects the environment and the environment affects culture. The way people obtain food and live is one of the best ways of demonstrating cultural effects on the environment as well as environmental effects on culture (Nanda 1987). Cultural ecology proves that a wide variety of food procuring strategies have to make sense of the environment. The argument is that cultural ecology is concerned with adaptation at certain levels. Systematic adaptation implies that new culture systems are created over time. In the systems, there are several components or sub-systems. It is these subsystems that act or adjust to one another. Cultural ecology seeks to explain cultural features and patterns which characterize cultural areas (Kaplan and Manners 1971).

Geertz(1973) illustrates this point by pointing out that what constitutes an environmental opportunity or limitation can never be stated in absolute terms. It is always relative to the cultural means available for exploiting the possibilities of the environment. For example, among the Javanese farmers studied by Geertz (1973), rice terraces are closely integrated with the modes of work organization and forms of the village structure with its processes of social stratification.

The point is that the precise nature of a people's adaptation to the geographical site is equivalent to their adaptation within their culture. The ecosystem of the Javanese, for example, is one where certain selected cultural and physical variables are definitely interrelated. Thus, adjustments by communities to their environment require particular modes of behaviour so as to allow a latitude for a certain range of possible behaviour patterns related to coping with a variety of weather changes.

The underlying principle is that in the course of their interactions with their environment, people act towards things on the basis of the meanings those things have for them. Their definition of their situations undergoes revision and reconstruction over time, as the process of interaction changes. Symbolic interaction describes the purposeful and selective adjustments that people make when faced by threats such as droughts and famines(Odegi-Awuondo 1990). Stryker (1973) explains symbolic interaction model by noting that humans deal with classified worlds whose features are named and placed in categories that indicate their meaning and behaviour. He asserts:

> When one enters a situation in which his behavior is problematic, that is, in which pure habit will suffice, he must find some way to represent that situation to himself in symbolic terms if he is not to behave randomly, if he is not to select arbitrarily from the range of actions in his repertoire of possible actions. He must in short, define the situation. The products of his behavior are definitions of the situation (Stryker 1973:515-516).

Cultural ecology stipulates that interactions between natural and cultural environments stimulate human adjustments. Humans

have learnt to reconcile themselves to their environments through certain survival strategies embedded in their cultural institutions. Human perceptions of environmental hazards such as shortage of food, depend on their culture. Frequent food shortages are likely to have made the Atharaka change their definition of what is edible. Selection of what is appropriate for consumption is continuously redefined depending on the magnitude of food shortages. Odegi- Awuondo (1987) highlighted the adjustment behaviour of the Turkana, noting that it moves from the level of individual to group context. Analysis should, therefore, emphasize collective awareness and interpretation of survival strategies. Collective awareness of the economic hardships permits and even legitimizes what is otherwise anti-cultural conduct such as begging or pawning of women and children by a given society. These activities are resorted to for survival.

2.2.2 The Relevance of Cultural Ecology

Some anthropologists are critical of cultural ecology since its advocates are prominent cultural evolutionists. This study contends that the association between advocates of cultural ecology and cultural evolution is not inevitable. Indeed as Kaplan and Manners (1972) have argued, one can think and write ecologically without being an evolutionist. Whatever its deficiencies, cultural ecology is suitable for this study for the following reasons:

Firstly, the human patterns involved in food production and environmental management can easily be analyzed by testing

cultural ecology as a theoretical orientation. As Vadya and Rappaport (1968) have reported, humans interact with other factors in the ecosystems to form food webs. Similarly such habits as the subsistence strategies of food production and management of the environment could be explored.

Secondly, cultural ecology allows a proper grasp of interrelations between key cultural-economic features such as land tenure, land use patterns and labour allocations within the environment. It also explores the extent to which food procuring strategies are functionally tied to other aspects of culture. The concern is more with the manipulation of ecosystems for procuring of basic needs rather than with simple interactions. This makes an enquiry such as was undertaken by this study an empirical concern.

Thirdly, cultural ecology is useful as a methodological tool for ascertaining how cultural adaptations affect the environment and the consequences of this. In assessing the interactions between variables of environment and those of culture, a distinction is made between the environment as given and the environment as modified by humans. The way culture utilizes its environment is a function of the way it perceives and conceptualizes that environment. Thus, the Atharaka's knowledge and techniques, i.e., their coping strategies, are what enables them to modify their semi arid environment.

Finally, cultural ecology also recognizes that any environment

is organized according to the verbal categories of those who use it. Cultural ecology has a holistic approach which emphasizes the interrelationship between technology and environment. Among the Atharaka like other communities, technology includes their material culture, e.g., their tools for cultivating and animal husbandry, weapons for hunting, transportation devices and containers for gathering and storing food. Gender issues and household dynamics through such derived roles as special tasks in food-supply affect basic adaptations.

In conclusion cultural ecology as a theoretical orientation highlights the way humans confront the imperatives of adapting to and exploiting their environment. Specific ways in which different people have at different times and places responded to this imperative as was reviewed in the theoretical framework, provided guidance for analyzing data on the Atharaka way of responding to their environment. This was at least a partial answer to fieldwork investigation about the way the Atharaka organize their economic and social life. Exploring the coping strategies of the Atharaka confirmed the view that humans adapt primarily through their culture and that the consequences of their mode of adaptation are unique to locality-specific situations.

Cultural ecology is thus suitable for exploring coping strategies that people engage in when faced by such hazards as scarcity of food in their natural environment. Food shortages in a drought-prone environment are likely to have forced the

Atharaka to select certain coping strategies which this study explored.

2.3 Study Hypotheses

From the objectives of this study the following three hypotheses were formulated to guide this study:

The Atharaka's concepts of food production and environmental management are endowed with a variety of coping strategies.

The demands of the market economy and other forces of change brought about by modernization have affected the effectiveness of the Atharaka's coping strategies.

The Atharaka's household dynamics such as gender relations are likely to affect their coping with food shortages and environmental management.

2.4 Operational Definitions of Key Terms

The key terms of this study include:
Food production, environmental management, coping strategies, forces of change, effectiveness of coping strategies, gender, households and food shortage.

2.4.1 Food Production

Food production is a complex term encompassing all the processes of ensuring food availability to all who need it (Onyango 1989).

2.4.2 Environmental Management

Environmental management is the art and science of mobilizing and using natural resources and the total environs in which they exist in ways that enhance sustainability and avoid wastage. This is also known as conservation (Okidi 1992:18).

2.4.3 Coping Strategies

These are generally dynamic cultural features which relate to a whole range of atypical behaviour whose aim is to enable a person or persons to endure the effects of adverse situations, such as drought, which bring about food shortage. Coping strategies are basically cultural adaptations and adjustments which mitigate between human demands for food and its shortage in a given environment (Kluckhohn 1965; Mowrer and Kluckhohn 1944; Burton *et al.* 1978; Wainaina 1990). In this study, coping strategies were used in place of both cultural adaptations and adjustments.

2.4.4 Forces of Change/Market Economy

The major forces of change include:

(i) Population growth from within Tharaka as well as from migrants from the high potential areas around Mount Kenya.

(ii) Increased demands brought about by the market economy (Todaro 1982). People are also affected by the current implementation of the global aspects of structural adjustment programmes.

(iii) Introduction of new technologies (Douglas 1967; Bohannan 1959).

(iv) Displacement of the Atharaka's traditional political

authority. During the pre-colonial era, the Atharaka elders were renown for their arbitration capabilities all over Meru District.

2.4.5 Effectiveness of Coping Strategies

This refers to the strength of the atypical behaviour within a dynamic culture that allows people to cope with hazards such as food shortages.

2.4.6 Gender

The term gender refers to the socially constructed roles for women and men. Gender differs from sex in that the latter is used to denote the biological features which characterize women and men. Sex roles and gender roles are different in that the former are natural and are fixed while the latter are culturally constructed and can be changed.

2.4.7 Households

Since no definition of households is fully comprehensive for all situations, this study had to make several adjustments to the definitions that were first adopted. To begin with, the United Nations definition which states that the household is an institution based on arrangements made by persons, individuals or groups for living was adopted. Households were then viewed as either made up of single persons who make provision for living without assistance or multi-persons who are related or unrelated or a combination of both. A household differs from a family in that family members are related to a specific degree through blood, adoption or marriage (United

Nations 1973:336, Mburugu 1986:71, Ekejiuba 1984:11).

2.4.8 Food Shortages

Food shortages in this study, was defined as lack of food to eat. It was also viewed as a decline in nutritive products within the Atharaka's environment. Such a phenomenon is usually a result of various situations including drought, lack of infrastructure (roads and markets), low incomes and inadequate storage facilities to keep enough food as people await the harvests. Food shortages are also caused by political instability and economic factors such as the inflation of the Kenyan currency, which is used to purchase food.

2.5. Operational Variables

2.5.1 Independent Variables

The independent variables in this study include food-procuring and environmental management activities, demands of the market economy, food shortages, and women and men's roles in household food production. There are indicators of each of these which include:

Food-Procuring Strategies

Resource allocation, mainly land tenure; land use patterns; labour organizations; productive assets including cash incomes and remittances.

Demands of the Market Economy

Types of available employment opportunity; estimates of levels

of income; control of incomes by individuals; frequency and reliability of incomes; market exchange and commercialization of social relations.

Community Appraisal of Food Shortages:

Communal predictions and measures taken by the community's cultural institutions; the range of strategies adopted by the Atharaka community to minimize risks of food shortages, e.g., risk minimization, risk absorption and risk taking to cope with food shortages.

Women's and Men's Roles and Relations as Coping Strategies:

Household task allocations; inventory of tasks that relate to food supply; organization of tasks; social norms regarding food-procuring activities; innovations to cope with time burdens, conflicts between reproductive activities and income earning opportunities.

Households:

These are operationalized in terms of:

- The household composition including parents, children and others; role allocation based on gender, age and the status of individuals in the household; resource allocation/decision-making/ time use; variety of functions within households: co-residential; joint production; kinship links; shared consumption; exchange of relationships; common uses of income; common cooking pot and mutual support.
- Household Composition:

Household head; number of wives; number of children;

kinship relationships and number of dependents.

2.5.2 Dependent Variables:

These include: coping strategies and their effectiveness. Knowledge of coping strategies by individuals and community. These are distinguished by the following indicators:

- Ways of coping within the methods of food production and environmental management;
- Farming and non-farming strategies;
- Risks and uncertainty in food production;
- Exchange relations/systems of exchange;
- Risk insurance, e.g., reciprocal food sharing;
- Dietary diversity;
- Dietary change, e.g., modification of basic diets;
- Improve food preservation and storage;
- Change of crops to more drought resistant ones;
- Social organization, e.g., kinship networks;
- Supernatural ways, e.g., rain-makers and praying;
- Market economy strategies, e.g., search for money and hunting for bargains;
- Endurance;
- Possible government relief;
- Sale of stock, crafts and others;
- Travel far in foraging the environment for food

Change land use system, e.g., plant early or late.

In conclusion this chapter has reviewed both literature and also cultural ecology as the theory which was tested during this study. The highlights of the reviewed literature focused

on the analysis of the ways human beings interact with their ecosystems through their culture. This led to the formulation of the main hypothesis of this study, which is seeking a relationship between the dynamics of the Atharaka culture and their environment. This relationship is sought through understanding the ways of coping with food shortages in the Atharaka drought-prone environment.

CHAPTER THREE

METHODOLOGY

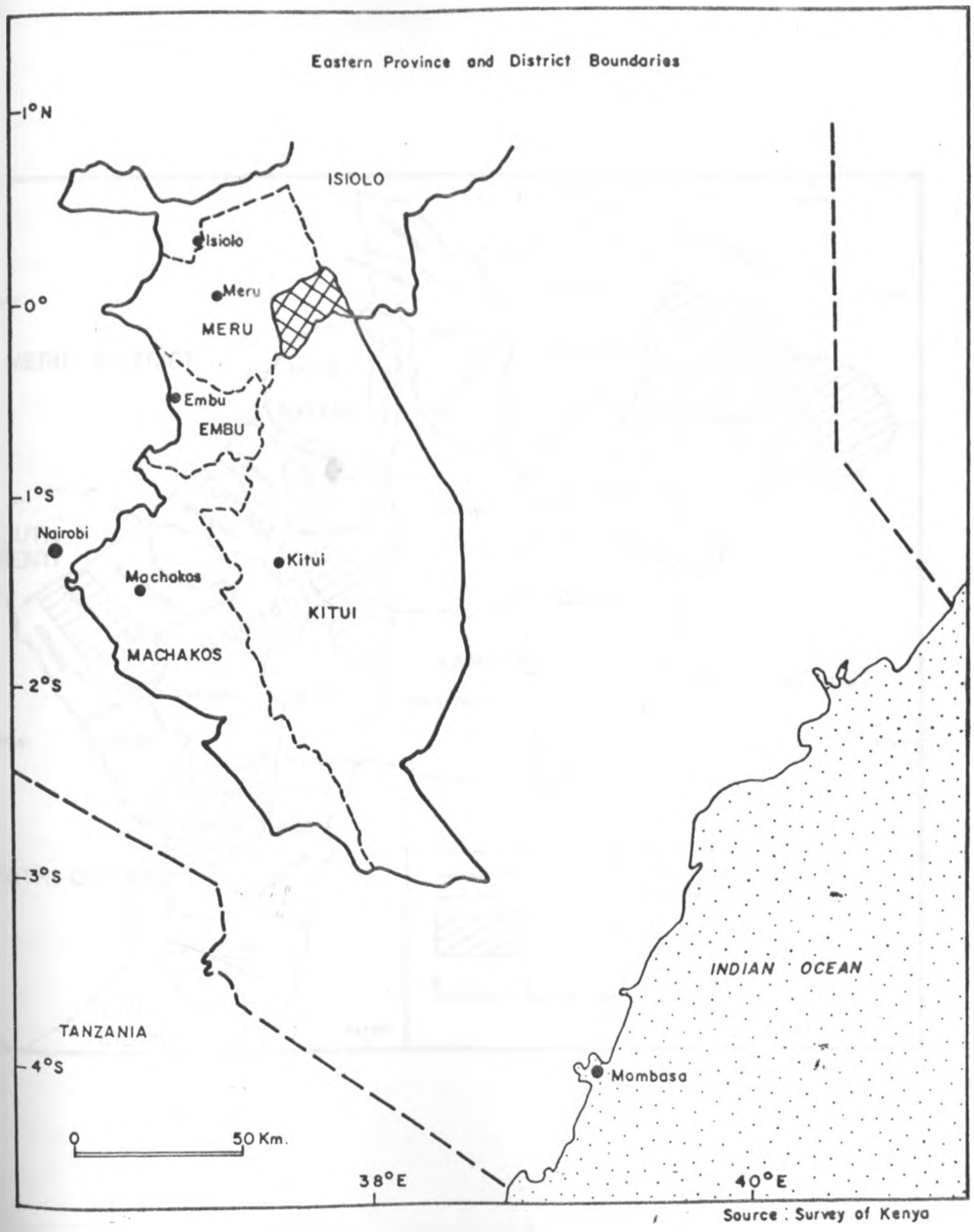
3.1 Selection of the Research Site

Tharaka Division of Tharaka-Nithi District was the selected site for the research of this study. Tharaka-Nithi district was carved out of Meru District on 2nd April 1992 while this study was going on. The District is to the east and south-east of Meru District. Tharaka is the drier part of Tharaka-Nithi District in Eastern Province (Map 3.1) and it occupies an area of approximately 150,000 ha. or 1497 km^2. This area excludes the Meru National Park which takes a large part of Tharaka. Tharaka lies across the equator, approximately between O'.30" S and 0'.5" N, and between 37'.45" and 38'.15"E.

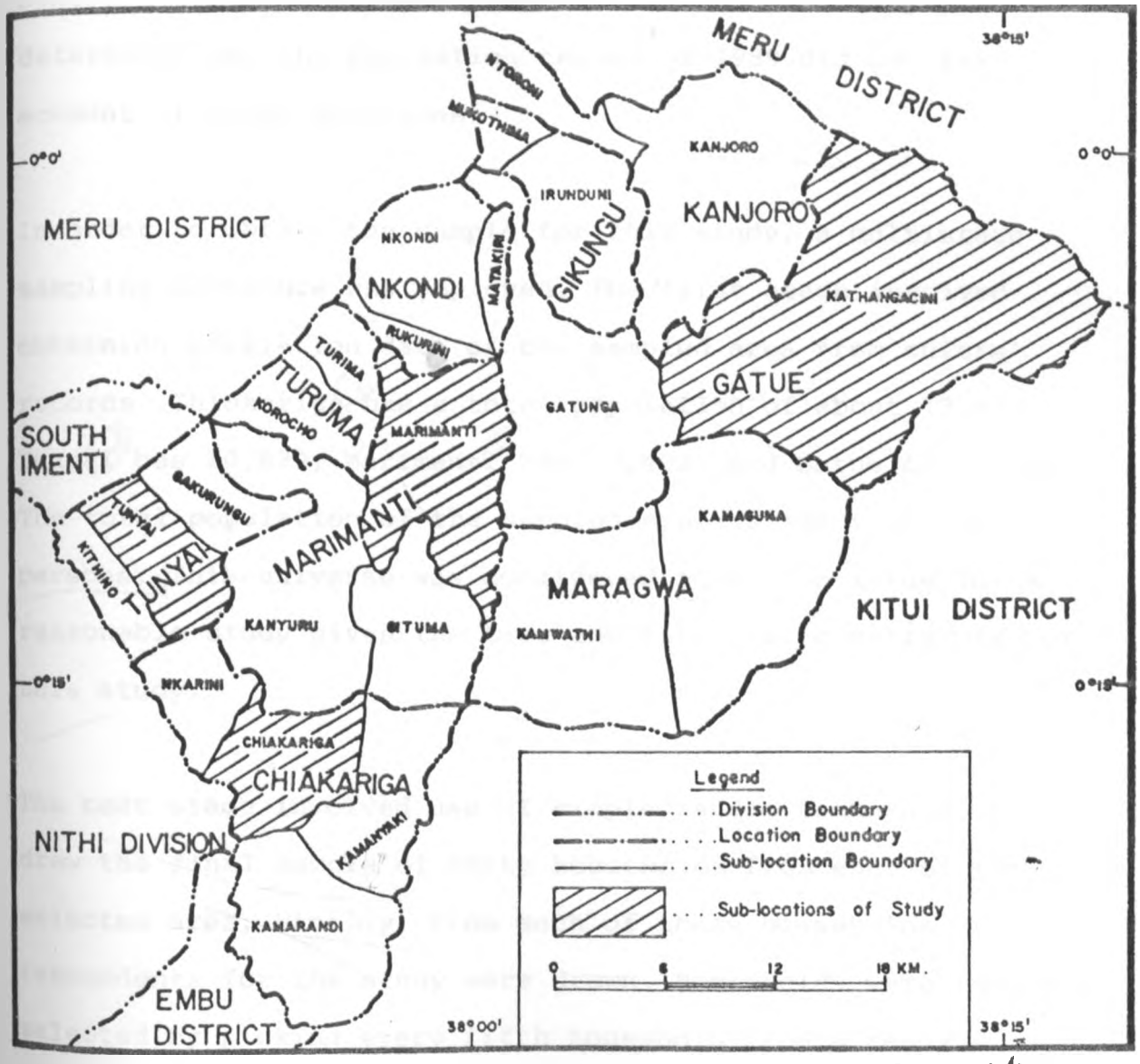
Chiakariga, Tunyai, Marimanti and Gatue are the locations in which the study was carried out (Map 3.2). These four locations were found suitable for this study because they have variations in climate, environment and land-use patterns. Chiakariga and Marimanti locations are within AEZ 5, which has a medium to low potential for agriculture.

Chiakariga, the headquarters of Tharaka Division, was the resident place for this author. Marimanti is centrally located and there were many non-governmental projects. On the other hand, Gatue is in Tharaka North within AEZ 6, a scrubland. Finally, Tunyai is in AEZ 4, the area with the highest potential for agriculture. The varied environments were expected to portray different ways of coping (See also chapter four for a detailed account of the ecology).

MAP 3.1: THE POSITION OF THARAKA IN EASTERN PROVINCE OF KENYA



MAP 3.2: THE RESEARCH SITE



Source: Survey of Kenya.

3.2. Sampling Procedure

Tharaka-Nithi District has a total population of 293,327 people and has an annual growth rate of 3.3% p.a.(Republic of Kenya 1994). The administrative units of Tharaka include the following divisions: Tharaka South, Tharaka North, and Tharaka Central. The boundaries of Central Tharaka are not yet determined and the population census of 1989 did not take account of these divisions.

In order to obtain the sample for this study, a multistage sampling procedure was employed. The first stage involved obtaining population data of the sampled area from chiefs' records. Chiakariga has a total population of about 13,627, Tunyai has 10,839, Marimanti has 12,402, and Gatue has 6,890. The total population of the sampled area is about 43,758 persons. This universe was considered to be too large for a reasonable study given the time and financial constraints for this study.

The next stage involved use of simple random techniques to draw the final sample of forty households from each of the selected area. Finally, from each of these households, the respondents for the study were drawn. Households were randomly selected by picking every fifth household from a ready household sampling frame found at the TWASP office at Chiakariga. A total of ~~about~~ 160 households were selected.

Although random sampling was used to select respondents for this study, care was taken to ensure that the sample would

reasonably reflect the real situation of the population structure in the area of the study. A census of each location was done at the beginning of the fieldwork by use of a demographic questionnaire. The data sought included age, marital status, occupation and residential arrangements. The purpose was to ensure that those selected randomly were mature people (at least aged 18 and above) who could understand the variables of this study and contribute information from their life experiences. Both men and women were interviewed.

3.2.1 Sample size

A total of 200 adults were interviewed. The proportions were approximately 110 women to 90 men. These numbers reflected the sex ratio of the residents of the research site. The proportion of females was more than that of the males. This could be an indication that more males than females move out in search of various opportunities. There were, however, no data to confirm the actual numbers of migrants.

3.2.2 Description of the Sampled Households

Certain characteristics were considered to be indicators of the relative affluence of households. These were useful indicators of the resource base for the sampled respondents which determined knowledge of coping with food shortages. The indicators of wealth were mainly buildings/ structures, livestock and possession of farm implements. Table 3.1 below shows what were considered indicators of the socio-economic status (SES) of the sampled population.

Table 3.1: Asset ownership around Chiakariga Location

TYPE OF ASSET	% OF HOUSEHOLDS OWNING IT
Building structures	
Single houses	100
Multiple-roomed houses	80
Storage facilities	8
Farm implements	
Dibble stick	90
Machetes	50
Hoes	30
Plough	10
Cart	04
Livestock	
Cattle	89
Goats	99
Sheep	70
Poultry	80

N= 40 households

Almost all the houses in the sampled area were constructed using mud and sticks with grass thatched roofs. The multi-roomed houses and those roofed with corrugated iron sheets belong to the younger Atharaka. Around the market centres, there is a steady increase of stone houses which are roofed with corrugated iron sheets.

3.2.3 Characteristics of Selected Sample

The Atharaka households from whom the respondents were selected for this study were at various stages marked by age. The dependent population of ages 1-14 and >60 constitutes more than 40%. This was confirmed in a survey by the Government of Kenya (1989). These tables were also useful in determining the ages of those to be interviewed.

Those who were over 60 years old provided a historical perspective on the coping strategies of the Atharaka. Some were key informants who gave their life histories concerning the changes which have taken place within Tharaka as a whole. They were found to be conversant with the social, economic and political issues as well as information about forces of change taking place in Tharaka. To this author these elders were like walking libraries.

Those aged 20-59 years old are most actively involved in food production and environmental management in the study area. They are also actively involved in coping with food shortage, for they are the parents of the most food consuming age group. About 80% of them are involved in local networks such as churches, women groups, councils of elders, herbalists and entrepreneurs. About 30% are employed as teachers, church leaders and workers in a number of development projects in the area. On the other hand, as many as 85% of them are striving to balance indigenous and modern ways of coping with food shortages.

3.3 Units of Study

The households of the Atharaka constituted the units of study. As stated earlier, a precise definition of the Atharaka households was not possible before the beginning of the study. It was not easy to establish the boundaries of the Atharaka households. This empirical study, however, had to establish some boundaries even if this was with imperfect precision. As units of study and analysis, the Atharaka's households

omprised individuals who are related in one way or another. ome relationships within these households do not entail blood elatives. Residency was not fixed as some members of ouseholds had gone "elsewhere".

hose members of the household who were living elsewhere are insmen "out there" who were of significance in this study as he ones responsible for providing food during times of carcity. Residence alone therefore, cannot describe the tharaka's households. There are social and economic benefits hat accrue to households from non-resident relatives. The igh mobility to urban areas as well as to the ecological ones with higher potential, fitted well in the seasonal trategies for coping with food shortages. Several respondents eferred to relatives living somewhere else who had gone in search of food, to pursue education, employment, medical treatment, trade and adventure, among other interests. Tables 3.2 and 3.3 represent some of this information. Both of these tables were from data obtained from a pilot study that facilitated the preparation of the main study.

Table 3.2: Sex composition of the individuals in the sample

Sex	% of Population
Male	48.1
Female	51.9
Percentage total	100.0

No. of individuals in all households 1120.

Table 3.2 also indicates that there is a noted trend for more

female headed households than those headed by males in rural areas of Kenya (Republic of Kenya 1994). The average age of adult males who were heads of households was 40 while that of women heads was 31. Table 3.3 below demonstrates a detailed structure of the ages of those in the sampled area.

Table 3.3: Age Structure of Individuals in the Sample Households

Age in years	% of Individuals
1-5	17.2
6-10	21.7
11-15	13.1
16-20	8.7
21-25	5.5
26-30	6.6
31-35	5.0
36-40	6.9
41-45	3.6
46-50	4.9
51-55	1.7
56-60	2.5
>60	2.6
	100.0

N= total number of individuals 1120.

Table 3.3 shows that as much as about 40% of the population in this study area is below 15 years of age. This is an indicator that the total dependency ratio is very high for many of these are children, ~~and the elderly~~.

3.4 Data Collecting Techniques

This study carried out ethnographic investigations using the well known anthropological techniques of in-depth interviews,

formal and informal interviews, direct and non-participant observation, group discussions/ conversations and key informants.

3.4.1 In-depth Interviews

After pretesting the research a number of in-depth interviews were carried out. These are repeated face-to face encounters between researchers and informants. The interviews were directed towards understanding informants' perspectives on their lives, experiences, or situations as expressed in their own words. The interviews were mainly conversations with the respondents. They were not just a learning of answers to questions but learning which questions to ask.

3.4.2 Formal and Informal Interviews.

Formal interviews were necessary so as to ascertain the demographic data of the respondents. Written questionnaires formed the formal interviews while verbal questions and interview schedules administered the informal interviews. Formal interviews were structured while informal interviews were unstructured. Both had open-ended and closed questions (see Appendix).

During the first week of the fieldwork, a draft questionnaire was pre-tested. During the pretesting stage, important information which helped in the formulation of appropriate questions was gathered. A list of various names and metaphors that denoted what the Atharaka do to cope with food shortages in their drought prone environment was compiled. This list

helped greatly in probing for information which the respondents tended to ignore or to take for granted. The first step was to obtain a clear understanding of what the Atharaka consider to be coping strategies in their food-production and environmental management. Care was taken to ensure that the questions asked were culturally relevant to the Atharaka as Weller and Romeney (1988) have noted.

The questions also elicited data on the following:
(a) Demographic and socio-economic status of the respondents. Household composition: relationships, age, sex and status of individuals was sought. An inventory of household assets, i.e., the material culture of different households was noted in order to determine the available techniques of coping with food shortages which were used by the Atharaka in their food-procuring methods.

(b) Dietary surveys: Information about what constitutes food among the Atharaka as well as where it is found. The various types of foods eaten, grown and purchased. Food items which were obtained through hunting and foraging were inquired into. Conceptualization of the what constitutes their basic diets, eating habits and what they craved for. The way these change with variations in seasons and over time was also a subject of inquiry.

(c) Division of labour, particularly in allocation of food procurement tasks and responsibilities to individual household members, was another concern. Questions and interview

schedules focussed on gender concerns and other household dynamics. Independent individual responses to food scarcity and their coping mechanisms were also discussed.

3.4.3 Direct and Non-Participant Observation

Direct and non-Participant observation entailed careful observations of what the Atharaka do to obtain food in their drought-prone environment. By observing their activities and behaviour it was possible to notice non-verbal clues which were not easily explained by questioning.

The most useful information was gathered when the author participated in what was being done particularly by groups of women. By attending several meeting of different women groups it was possible to gain useful information for this study. At times this required walking for long distances with the women to their many gardens and to the water wells and open-air markets. Much of non-participatory observations took place while the people were performing their different tasks in various places. This necessitated sitting with the women in the market as they sold their wares and bought items to make food. Much was also learnt from observing people during various gatherings. By participating in their ceremonies and at public *barazas* it was possible to gain a lot of information which was not as forthcoming during the formal and informal interviews. In addition, this author participated in several meetings between the Atharaka and the officers managing TWASP, the agricultural office, health personnel and a non-governmental body, known as Christian Children's Fund, where

the attitudes of the development agents towards the Atharaka were observed.

3.4.4 Group Discussions and Conversations

Conducting thematic discussions with a selected number of respondents was another data collecting technique. Group discussions consisted of about ten to twelve people. Dialogues and conversations focussed on the study themes of:

(i) The Atharaka's conceptualization of food and environment.

(ii) Coping strategies within production, distribution and consumption of resources. Management of the environment was also an interesting area.

(iii) The way the market economy/ modernization has affected the indigenous coping strategies.

(iv) The environmental variables influencing coping strategies. This was in relation to the various ecological sites within the study site.

(v) Decision-making, power relations and role allocation by gender and age within households.

3.4.5 Key Informant Interviews

These are formal interviews and informal conversations whose purpose is to learn about people's views, interests, terminologies and judgements on a topic of interest. These elicited data on the Atharaka's perceptions and experiences in food production and environmental management. A key informant was any person who was especially knowledgeable in the topics of interest for this research. These were men and women, local leaders, professionals and the local administration. These

were considered able representatives of the views of the larger Tharaka community.

Key-informants were selected because of showing interest in the subject matter of this study during the pre-testing. The selection of key-informants was purposive and it focussed on those respondents who were found to be information-rich and with a desire to illuminate the topic of study and increase the scope or range of the data. Selection of a key-informants made use of snowball or chain sampling. Individual respondents who displayed a keen interest, knowledge and experience in particular issues of this study's key variables, were selected as the key informants and then asked to name others.

Both women and men were selected as key informants. Their information was proved consistent by repeated probing and comparisons. Cross checking of this information from different informants helped to distinguish consistencies and inconsistencies in the collected data. Informal discussions with other respondents added to the information. Key informants provided the historical data on how they or their parents coped with food shortages. They were also asked how they ensured continual supply of resources in an environment that was evidently losing its former vegetation.

Other information obtained was on accounts concerning resource ownership and rules of access to and control over land, livestock and other resources. In addition, the changes brought about by government officials, NGO development

workers, religious leaders, technicians and government administrators were noted. Prominent officers were asked to give their own views concerning the implications of the current agrarian reforms and food policies on the Atharaka's knowledge base of coping with food shortages.

A tape recorder was found to be most appropriate in facilitating a continuous conversation, with minimum interruptions.

3.5 Secondary Data

In addition to field work research, available written literature concerning cultural adaptations and adjustments in various environments was perused and interpreted to relate to the major variables of this study. Tharaka lacks much of written records but a diligent search revealed some useful written documents and archival materials. Interviews with the Divisional Officers, Chiefs and Assistant Chiefs, led to a discovery of relevant written information which had not been requested by previous scholars of the area. The National Development Plan for Meru District(Government of Kenya 1989) and Tharaka-Nithi District (Republic of Kenya 1994) were useful documents in supplying comparable information on issues of land tenure, relief, demography and social structure. Frequent discussions with both government and non-governmental officers in the area served to build confidence between this author and the local authorities. This way, very useful information was collected.

3.6 Comments About Data Collecting Techniques

Although this study made use of both quantitative and qualitative data collecting techniques, qualitative methods were found to be most useful. This is because of a number of reasons; one of which is the way they tended to elicit data from the Atharaka's own viewpoints. Holistic information about the Atharaka's cultural setting and their way of coping with food shortages were easily elicited through qualitative techniques. Another reason why qualitative techniques were preferred in this study was their suitability to exploring areas in which information is scanty. As noted earlier, there are few records of the Atharaka ethnography. Qualitative data collecting techniques facilitated an understanding of the real life of the Atharaka which in ordinary circumstances is inaccessible to outsiders (Kipusi: personal communication). These techniques helped in giving a meaningful interpretation of the Atharaka's concepts of coping with food shortages as well as their ideas for ensuring resource conservation. Formal interviews helped in cross-checking the accuracy of the informal discussions and interviews.

3.7 Data Processing and Analysis

Data processing and analysis were carried out on a daily basis in the course of the fieldwork. By content analysis it was possible to determine just what knowledge was available and the type of additional questions that needed to be formulated. In addition, content analysis shaped the procedure that was followed during this study.

simple descriptive statistics, mainly frequencies and percentages of itemized responses such as the number of respondents and the mode of strategies they use to cope with food shortages, were computed. Inferences were drawn for tables as well as analytical descriptions of the study questions, for example, the relationships between levels of income and modes of coping strategies employed. Other descriptive matrices were gender roles and work allocation and coping strategies.

The bulk of the data for this study was analyzed qualitatively by use of a combination of the following qualitative data analysis methods: the ethnograph, epi-info, text-based alpha and ranking card game. These methods have special manuals and texts to facilitate qualitative analysis through the use of the computer. Information elicited by the above means was coded, decoded and then classified according to the major themes that emerged in the course of the study following the formats proposed by Lofland and Lofland (1984) and Poggie *et al.* (1992).

During the fieldwork, interesting anecdotes and personal experiences which showed insights into the major questions of this research were grouped together. Consistencies and inconsistencies of key informants were recorded and wherever there was doubt in the information, an alternative explanation was sought.

On the whole, qualitative data analysis included presentation

of quotes from different respondents. Recording verbatim what the Atharaka respondents said concerning their natural and social environments in relation to coping with food shortages and caring for the environment was one way of qualitative data presentation. Detailed descriptions of what is found in particular settings was portrayed by a calendar of activities, tables and folk taxonomies. Qualitative data were also analyzed by inferences and discovery procedures as described by Spradley and McCurdy (1975). This entailed identification of both tacit and explicit folk concepts and interpretations of the Atharaka.

It was noted, for example, that discussions with most of the elderly respondents were tinged with nostalgia, bitterness and hope. They spoke of times of abundance in the past and were pessimistic about the current trend in environmental degradation. Some were of the view that modern governments are the source of hope in that they provide the relief, whiles in the past many people died after only a short period of food shortage. Those with diversified sources of income, apart from just livestock and grains, were dissatisfied for not meeting their expensive diet patterns and were of the view that what is needed is more income-generating opportunities.

Generalizations were drawn according to the purpose of this study, i.e., the need to identify the salient features of the way the Atharaka cope with food shortages in their drought-prone environment. By analysis of the relationships between

the independent and dependent variables of this study it was possible to build a logical chain of evidence. Generalizations were supported by the elicited evidence and conceptual and theoretical coherence as was noted by Scrimshaw (1987).

Both qualitative and quantitative analysis allowed descriptive and comparative accounts of the various strategies used by the Atharaka to cope with food shortages. The data also portrayed indicators of differentiation among individuals within households and for different households.

3.8 Problems, Limitations and Solutions during the Study

One of the hurdles encountered early during this study, was when this author's role as a researcher was confused with that of the management of the Tharaka-Swedish Water and Sanitation Project (TWASP). This is because I was accommodated in the project's camp near Chiakariga shopping centre. The Atharaka were particularly unhappy with the personnel of the TWASP project who had carried out a series of baseline data.

I noted that my questions were not being answered truthfully and that my research interests were not being supported by the majority of those interviewed. After frantic enquiry, I found that the Atharaka had become suspicious, assertive and protective against the many researchers who were carrying out research during the same time as this study. There were as many as ten NGOs working in the study area and almost all of them were seeking socio-cultural information about the Atharaka. The respondents had become tired of being asked the

same questions by different groups of researchers without being informed of the use of the information. In this respect, they did not want to answer more questions. I was often taken to task on the objectives of my research. Was I going to make money from the proceedings of this research? What would they gain for taking me into their confidence and my taking up their time? Would I represent them honestly or would my documentation of their knowledge base lead to more discrimination by those in authority?

These issues were not easy to resolve, but since some were threatening accurate data collection, I had to do something about them. I moved residence to stay in a hired room at the Chiakariga shopping centre where I had the advantage of conversing with the shopkeepers and those who came to roam about in the area. I wished I could tell the people of what benefit this study would be to them but I did not have a direct answer. I, however, convinced them that once their knowledge of how to cope with food shortages was well known, some humanitarians may want to support them and strengthen their efforts. Also they will be on record as people who know what to do when faced with difficulties. This gave them confidence and raised their morale.

I felt uneasy being an objective researcher when surrounded by people in great suffering and need. As Oliver-Smith (1974) and Impey (1992) have pointed out, the distinction between non-intervention in a research community's needs and being an observer tends to be somewhat blurred. One way in which I

resolved the constraints of my conscience was to write a proposal on gender and tropical diseases based on some of the information gathered during this study. The proposed study has been accepted by World Health Organization agencies and a study of a healthy women's guide has commenced in the study area. This study might hopefully highlight the health needs of the Atharaka to international forums and important interventions probably follow.

Other issues which challenged the data collection of this study were the attitudes of some respondents towards the objectives of this study. Many of them were of the view that promotion of indigenous knowledge is a difficult path for the Atharaka. Since everyone had modernized why did anyone expect the Atharaka to be different? How were they to develop if they continued utilizing their indigenous ways? As far as some respondents were concerned, the fastest way for development was that the Atharaka try and catch up with other people in Kenya. To them development was viewed as a track race.

In addition to these hurdles, other constraints were insufficient research funds to hire strong four-wheel drive vehicles which could have made journeys less taxing. This was overcome by a spirit of being content with whatever means of transport were available. Whenever a four-wheel drive vehicle was available, particularly from TWASP offices, it assisted me greatly.

In sum, this chapter has discussed methods which were used in

obtaining the information for this study. Detailed procedures of sampling, data collecting, processing and analysis are shown. The merits of both qualitative and quantitative techniques of collecting data as well as processing it were also discussed.

CHAPTER FOUR

INFRASTRUCTURE, ECOLOGICAL AND HISTORICAL BACKGROUND OF THARAKA

4.1 Infrastructure

Travelling to Tharaka for the first time, one has an interesting experience. On leaving the beautiful tar-marked Embu-Meru-Isiolo road one enters a rough shaky road where some sections of the road are invisible because of endless blocks of stones. The road network is in a deteriorating state for many of the roads traversing the area are very old and are impassable during the wet season. The poor road network has several implications for the Atharaka. One is that there is scarcity of transport services. Lack of transport makes travelling an arduous task for the common form of transport is on foot. This has serious implications for movement of people and goods. High transport costs are a hindrance to food procurement for most goods are sold via middlemen and this involves high transportation costs. Lack of proper roads leads to poor market linkages and other aspects of social development like health facilities.

4.2. Physical Features

4.2.1 Topography and Relief

Tharaka lies within the gentle slopes of Mount Kenya and Nyambeni ranges. These slopes range from a height of 900 to 300 metres above sea level near River Tana. The landscape is markedly different from that of the volcanic north-western ranges. The basement complex that forms this landscape is in a state of maturity and has erosional surfaces characterized by

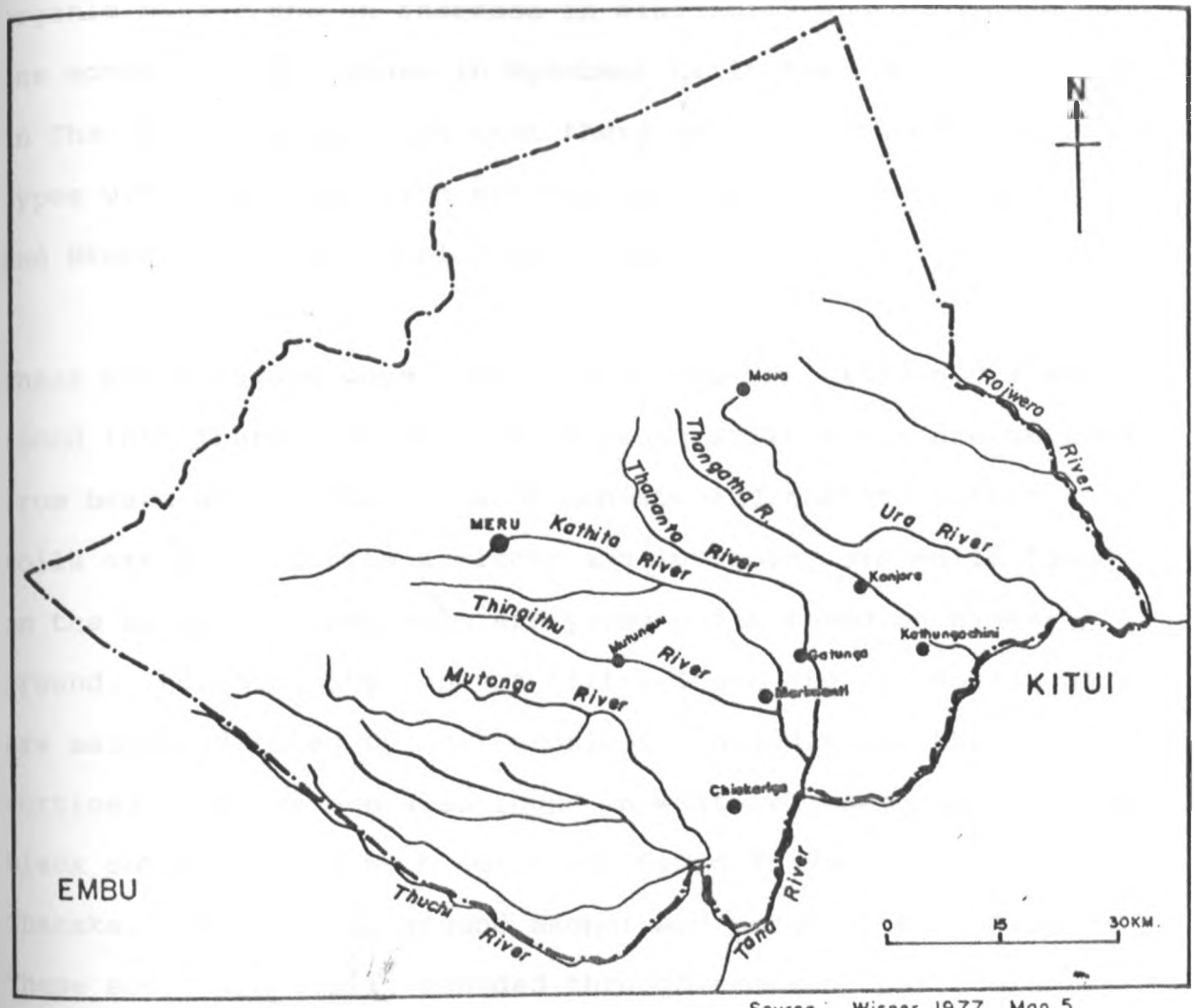
broad interfluves and wide spaced streams (National Environmental Secretariat 1985). The terrain of the interfluves is gently sloping except where it is broken by inselbergs (low-lying hills) with a few rocky tors, such as Kijege at a height of 1664 metres.

The vast rocky plains of Tharaka which stress as far as the eye can see are covered mainly with a thicket of acacia bushes and short trees. There are hills which rise on the horizons and the highest of them is Kijege near Chiakariga. The downhill journey is marked by striking and sudden ecological changes. There is a marked change in size and features of vegetation as one leaves Ishiara in Mbeere of Embu District to enter Tharaka.

4.2.2 Drainage

There are very many large rivers in Tharaka that can mislead one to the conclusion that the Division is well watered. There are about six perennial rivers which traverse Tharaka as shown on Map 4.1, and several seasonal streams which rise during rainy seasons. In the dry seasons they appear only as sandy traces. Why then does the area suffer from lack of water for human activities? This was a question that was asked and the answers are discussed in chapter five.

MAP 4.1 DRAINAGE IN THARAKA



Source: Wisner 1977, Map 5.

4.3 Soils

Wisner (1977) made a detailed study of the patterns of the texture and chemical constitution of Tharaka soils. The most notable points of his observations include the decrease in organic matter and an increase in alkalinity and sandiness as one moves from Mikumbune in Nyambeni hills towards Kathagacini in Tharaka. He also noted that there is variation of soil types within Tharaka with surprisingly good soils in Tunyai and Nkondi, the two settlement schemes.

These observations were confirmed by the NES (1985 n.d.) who found that Tharaka is made up of young soils which are derived from basement complex rocks of schists and gneiss. Other soils are derived from acrisols and luvisols, old soils found on the basement. Cambisols are young soils found on higher ground, including the tops of hills. These are the soils which are mainly affected by soil erosion. In addition, there are vorticellas which are also found in what are commonly known as black cotton soils. Such soils are found in various parts of Tharaka, for example, around Nkondi and parts of Mukothima. These soils are easily denuded through erosion, particularly where the slopes are more than 25%. Soils along the river valleys are deep, fertile and able to support a dense vegetation.

Cursory observations during this study revealed red soils, dark brown and clay loams, with pockets of black cotton soil and a few places with the olivine basalt derived from volcanic debris. Table 4.1 gives a summary of the type of soils in the

area of this study.

Table 4.1: Percentage of Fertility of Different Soil Categories

Sub-location	Fertile	Moderately Fertile	Poor
Chiakariga	20	20	57
Marimanti	47	47	48
Tunyai	42	42	27
Gatue	13	26	31

Source: Adapted from Abella et al. 1984:12. (More information was copied verbatim from the Agricultural Divisional Office at Marimanti).

4.4 Climate

Tharaka is characterized by warm and hot temperatures with no marked seasonal variations. Temperatures are normally high, with a mean of about 35° C at the height of the dry season. Towards the Meru National Park, temperatures are known to rise as high as 40° C. Throughout the year, there is little cloud cover during day and night. Evapo-transpiration is, therefore, very high.

Rainfall is low and very variable in amount, date of onset and seasonal distribution. The average annual rainfall is approximately 500 mm per year. The western side of Tharaka is wetter than the eastern side. There are two rainy seasons in Tharaka, from March to May, *muratho* and October to November, *nthano*. During this study, many respondents referred to the second seasonal rain of October to November as the long rains

while the first rains were referred to as the short rains. Further enquiries revealed that the Atharaka find the rains in the second season more reliable than those of the first season.

Even though rainfall records are not well kept, it was clear that Tharaka has a history of erratic rainfall, as shown by table 4.2 which depicts 27 years of rainfall distribution: This table, however, does not tell the whole story concerning the low rainfall in Tharaka. Figure 4.1 depicts a clearer picture.

Table 4.2: Rainfall Figures for Tharaka From 1967 to 1991

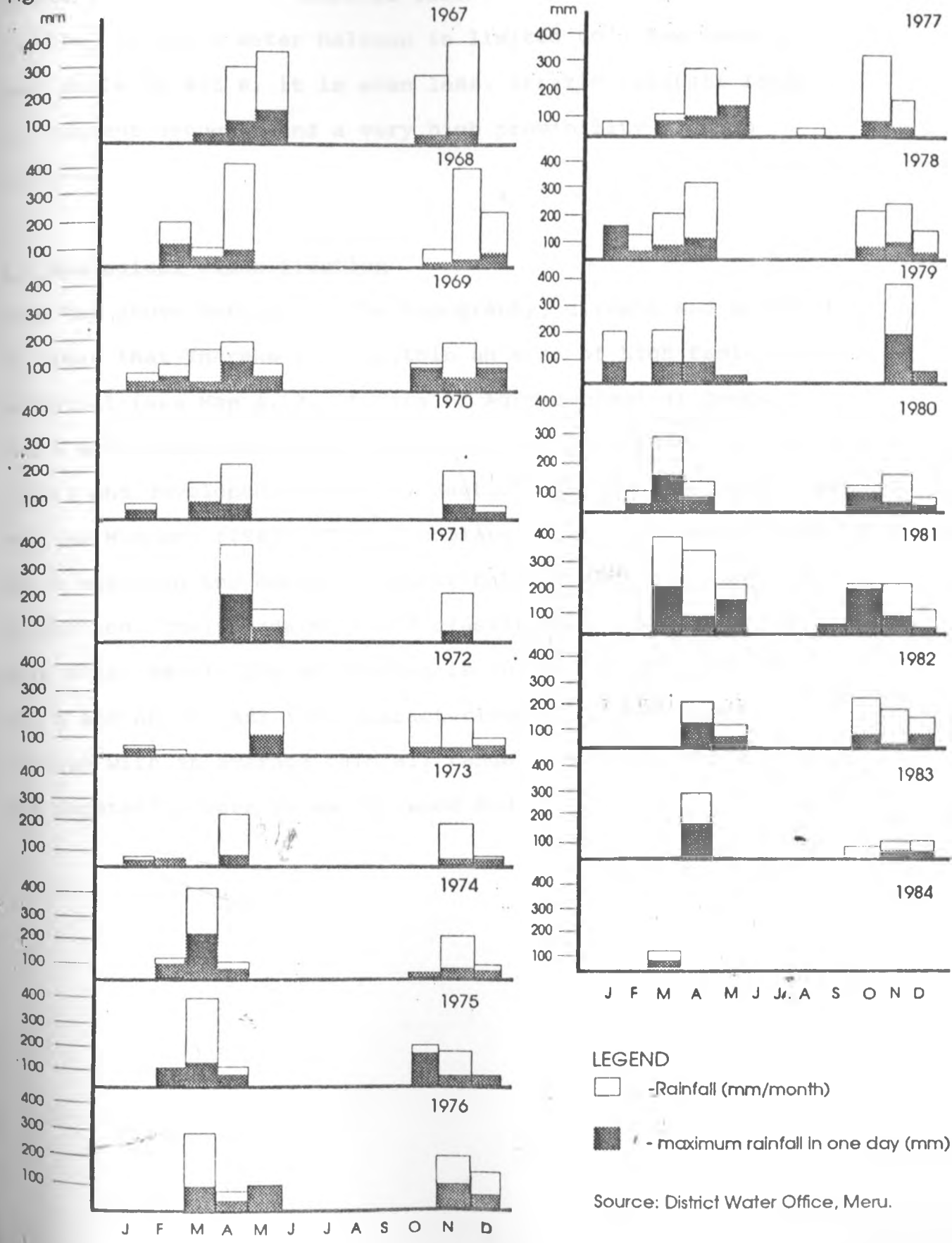
Year	Rainfall (mm)
1967	1400
1968	1500
1969	900
1970	650
1971	700
1972	800
1973	550
1974	900
1975	850
1976	750
1977	1050
1978	1250
1979	750
1980	1250
1981	750
1982	600
1983	640
1984	870
1985	870
1986	770
1987	564
1988	880
1989	-
1990	1200
1991	880

Source: Adapted from NES (n.d.), with additional information from Marimanti weather station.

From Table 4.2, one can see that Tharaka generally falls within the ASALs. Rainfall is low and constantly inadequate. years of drought seem to follow those of intensive rainfall in a pattern which is clearly shown by Figure 4.1 below:

Monthly rainfall (1967-83) Marimanti (including maximum in a single day)

Fig.4.1.



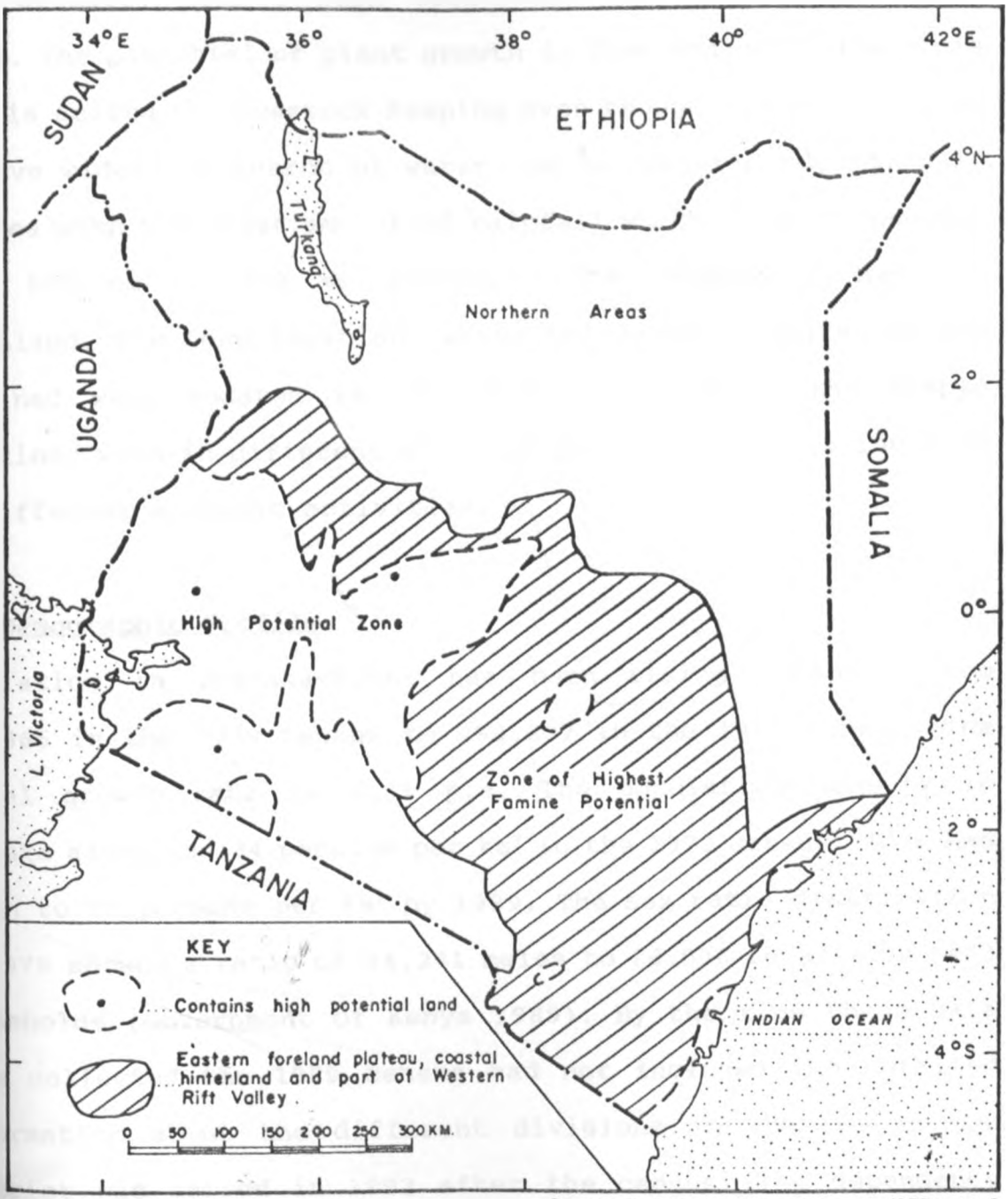
Source: District Water Office, Meru.

from Figure 4.1., it is notable that the average annual amount of available moisture derived from rainfall/evaporation is too low. In AEZ 5 water balance is limited to a few weeks a year while in AEZ 6, it is even less. Erratic rainfall leads to frequent droughts and a very high probability of crop failure.

4.5 Ecological Classification

From the above details of the topography, climate and soils it is clear that Tharaka falls within an area of high famine potential (see Map 4.2). Studies of Agro-ecological Zones (AEZ) were first introduced by Braun (1977) followed by Ogallo (1981) and developed further by Jaetzold and Schmidt (1983) as well as Musembi (1984). These scholars carried out experiments which measured the amount of water balance and crop production. Their models of AEZ classify Tharaka into three main AEZs. Nearly 20% of Tharaka is in AEZ 4, while 80% is in AEZ 5 and AEZ 6. AEZ 4 is characterized by a semi-humid climate with an average rainfall range of between 600-1100 mm. The vegetation here is mainly woodland.

MAP 4.2 EASTERN FORELAND PLATEAU



Source : Adapted from Wisner B., 1977a, Map 2.

Although the described agro-ecological conditions of Tharaka are suited to livestock keeping, the density of population makes crop cultivation unavoidable. AEZ 5 has more features of a semi-arid climate, with a bush vegetation with scattered thorny trees. The potential of plant growth is from medium to low. This area is suited to livestock keeping even though the animals have to move widely in search of water. On the other hand, AEZ 6 is an area with the least amount of rainfall which ranges from less than 500 mm to 300 mm annually. The vegetation here is scrubland. The four locations where the sampled population was obtained were located in the three AEZs. Thus, the sample locations were in different AEZs and the population is involved in different economic activities.

4.6 Demographic Profile

Population in Tharaka-Nithi has been rising steadily from 191,366 in the 1979 census to 293,237 in the 1989 census. The annual growth rate is 3.3% p.a. The population density in Tharaka alone was 34 persons per km² in the 1979 census. This has risen to 58 persons per km² by 1989. The sex ratio distribution by 1979 showed a ratio of 24,241 males to 26,036 females in 9463 households (Government of Kenya 1989). By the time these data were collected the 1989 census had not included the detailed information about the different divisions in Tharaka as the District was carved in 1992 after the census. The dependency rate was projected to 122.3% between 1994 and 1996 (Republic of Kenya 1994). Using data from offices of chiefs the following population distribution was compiled:

Table 4.3: Locational and Sub-locational Demographic Profile

South Tharaka Division (24, 466)

Chiakariga	13,627
Tunyai	10,839

Central Tharaka (40, 690)

Marimanti	12,402
Turima	12,181
Nkondi	16, 107

North Tharaka (35,037)

Gatue	6,890
Maragwa	6,177
Gikingo	12,283
Kanjoro	9,687

Chiakariga and Tunyai were examined closely in order to obtain more demographic details. Chiakariga has an estimated 1600 households, each with an average of 7 residents. The population density is estimated at 15 households per km^2 while the average family size is 6.6 children per woman. Forty percent of the population is under 14 years of age while 17.6% is between 15 - 59 years old. Only 3.4% of the population is over 60 years old.

Tunyai, which is within the settlement schemes, is one of the most densely populated areas in Tharaka and has an estimated 2018 households, each of which has an average of 7.5 resident members. The population density is estimated at 24.6 households per square kilometre. The average family size is 7.8 children per woman. Nearly forty percent of Tunyai's population is under 14 years while another 39% is between ages 15 -59 years. Only 4% were over 60 years old. The ratio of males to females is 1:1, with more males resident in the area than in Chiakariga.

These demographic figures indicate that the population of the

area is growing at a rapid rate for a semi-arid environment. According to a survey conducted in 1983 (Abella *et al*. 1984), the population in zone 4 region had increased in real numbers at a higher rate than in all the other areas. This was as a result of the influx of farming communities from low potential zones. The population of zone 6 has, however, decreased as a result of pastoralists moving further west to zone 4 due to insecurity brought about by cattle rustlers from North-Eastern Kenya (Njiru 1982).

These findings confirm what other researchers have observed about migrations of pastoralists from areas of excessive risks and dangers (Dyson-Hudson 1966, 1980; Dyson-Hudson and McCabe 1985; Bryceson 1990; Jiggins 1989). Elsewhere in Kenya, the population increase is what Campbell refers to as ..."land-use competition at the margins of the rangelands" (Campbell 1984:3).

The data also pointed out that the Tharaka population is fairly mobile and it is men who do most of the moving. This increases the phenomenon of female-headed households in some parts of the studied area. Gatue was particularly interesting for the estimated rate of males to females is 100: 130 (Government of Kenya 1989). Where do the men go? Answers to this question were of great interest to this study's objectives for it was clear that many people had gone in search of food or other means of livelihood.

Another observation was that the population is too scattered. One does not see homesteads clustered in what are commonly known

as villages and it was only by a determined effort and the help of the chiefs that the households where this study was carried out were identified. However, on the roadside there are people walking or cycling to various places. While men would be riding bicycles, women were seen carrying water or market produce on their backs. As they walk they are often braiding a basket or a hat or a rope. Livestock grazes by the sides of the roads. These animals usually look very healthy.

4.7 HISTORICAL BACKGROUND

4.7.1 The People of Tharaka

The Atharaka belong to the same culture complex as the Ameru, Aembu, Agikuyu, Achuka, Ambeere and Akamba (see Map 4.3). Lambert (1950) suggested that the Atharaka were an aggregation of offshoots from the above mentioned ethnic groups. This was seriously objected to by Bernadi(1959) who argued that the Atharaka are too conscious of their ethnic hegemony to be offshoots or outcasts from different groups. During this study, it was noted that despite similarities of culture and language with the neibouring ethnic communities, the Atharaka have different ways of conceptualizing food and the environment. The differences are rather subtle and one needs to be careful and listen to each word they pronounce. There are distinctions too in the ways of coping with food shortages as well as environmental management.

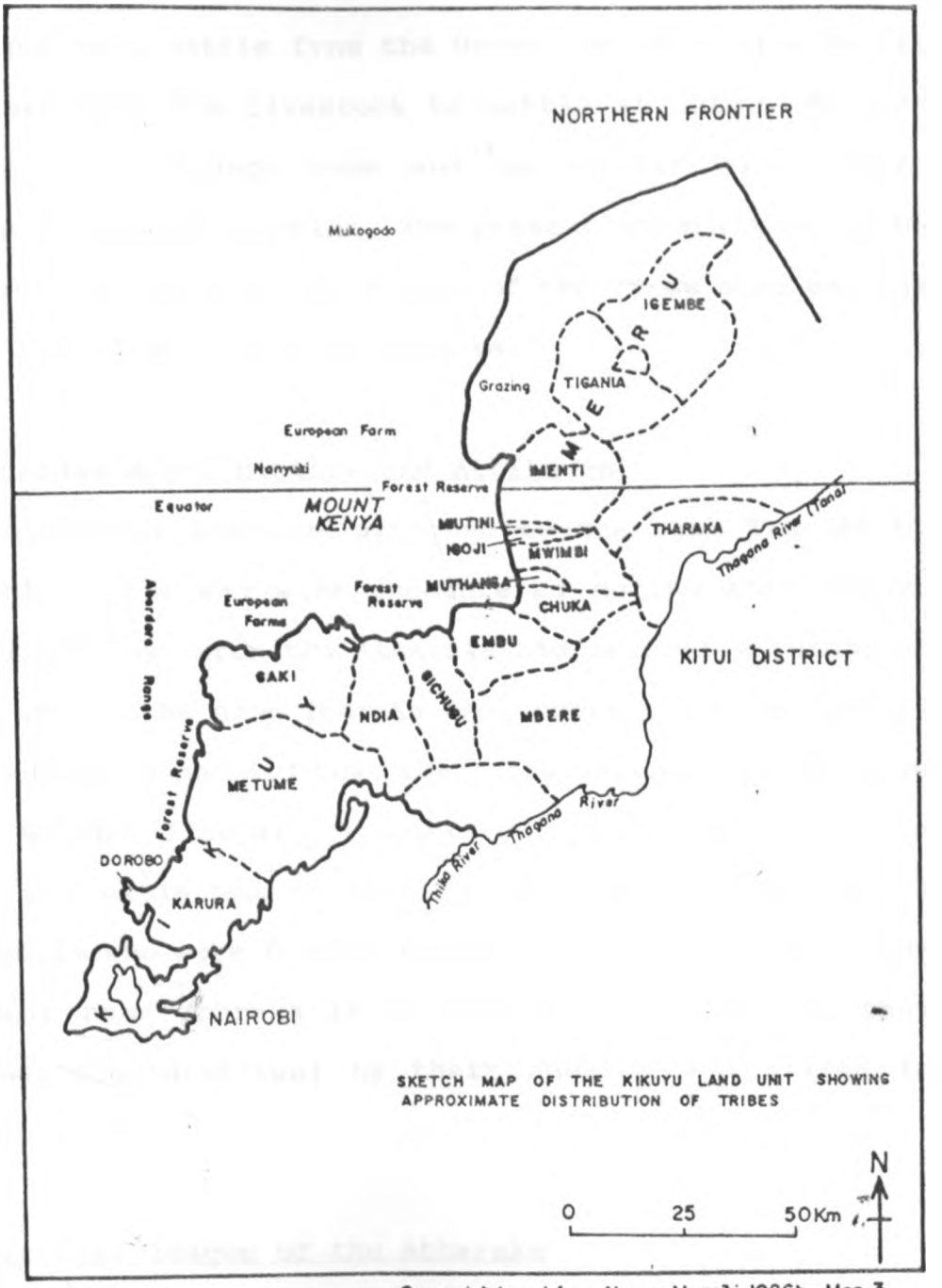
4.7.2 Origins of the Atharaka

Padiman (1970) and Lowenthal (1973) have traced the origins and migration patterns of the Atharaka back to Mbwa, the dispersal

area of the Ameru. The Atharaka are said to have separated from other Ameru subgroups at a place known as Igaironi which, according to a popular legend, is also said to be the parting point between the Atharaka and the Achuka. Two sons of the original Mutharaka, namely, Mbugi and Murutu, are said to have quarrelled and parted ways. Mbugi preferred the full sunlight and salty waters of present day Tharaka while Murutu sought the cooler area where he could not be burnt by the sun in what is known as Chuka. A quarrel erupted when Murutu decided to get his father from the scorching sun and take him to Chuka, his new home. The two sons pulled their father in different directions and he died at Igaironi. The brothers then parted and each went to their present homelands.

Another version of the migrations and settlements of the Atharaka was obtained during this study. According to this version, one Mutharaka and his wife were the first couple to live on top of Kijege hill (the highest point in Tharaka). Here, they had the advantage of seeing their enemies as they approached from different directions. This man had a lot of cows and goats which attracted a lot of enemies from as far as Ethiopia. The couple bore one daughter named Mukanjogu and three sons, namely, Mugakina, Muramugenia and Munjiru. When the sons were old enough, the father challenged them to go into all directions and prove their manhood by bringing home more cows and goats than their father had possessed. Two of the sons left immediately.

MAP 4.3: THE ATHARAKA AND THE NEIGHBOURING BANTU SOCIETIES



Source: Adaped from Nyaga-Mwaniki, 1986b, Map 3

One went to Chuka, where he married, obtained his flock of livestock and did not go back to Kijege. He changed his name to Mu'Muthambi and that is why the Atharaka refer to Achuka o Amuthambi as kin. Another son went beyond Kathagacini and managed to get many cattle from the Oromo. He married a Somali girl and drove back his livestock to settle at Gatue. Munjiru did not leave the Kijege home and he married his sister, starting the Kanjogu-Njiru clan. The present Atharaka could be the descendants of the two sons and/or of the three sons and one daughter of the first couple in Tharaka.

4.7.3 The Tharaka Name, History and Attitudes

There were different meanings attached to the name Tharaka by the different people who were encountered during this study. Those who looked down upon the Atharaka had several versions of the meaning behind the name Tharaka to support their derogatory attitudes to them. Some said that the actual meaning of the name is *Tharika* which, literally translated, means attack. This translation was explained as meaning that the Atharaka are a disunited people who were fond of betraying their fellows to the enemies. Their name Tharaka is an indication of the way they were attacked (*kutharikirwa*) by their enemies and killed in great numbers.

4.7.3.1 Stereotype Images of the Atharaka

Most development agents who work in Tharaka have a suspicious attitude towards the Atharaka which seems to be passed over from one group to another over time. Strangers in Tharaka are at times warned that the Atharaka are not to be trusted as they are

against visitors to their land for they are have an anti-development attitude. Their hostile attitude was noted by Bernard (1972) who contrasted the little resistance by the Ameru against colonization to fierce resistance by the Atharaka as early as 1909:

> Tharaka warriors killed several soldiers on two separate occasions. This engendered a brief but brutal punitive expedition by the King's African rifles. After they inflicted a few Tharaka casualties, according to the British officer in charge, the expedition assured the government of future cooperation in the region (Bernard 1972:45).

Brokensha (1971) gives a detailed account of the paternalistic, almost racist, attitudes of the early administrators in Tharaka. During this study it was noted that these attitudes are echoed by the non-Tharaka African development officers currently working in the study area. Such derogatory attitudes towards the Atharaka were found to be similar, if not identical, to those of the early European racist administrators. The only difference was in substituting the word race for culture.

Culture of the Atharaka has been viewed by development agents as the main cause of backwardness. The following passage by Norconsult, a consultancy firm which has done a baseline study for the TWASP, confirms this. Agricultural development and diversification in Tharaka Division has been slow in the project area because:

> ... of physical difficulties posed by the environment, by the culture of the people and by lack of government and other resources devoted to the division for social and development services (Norconsult 1990a: 30).

This observation could be compared with another one made by Champion a Colonial administrator in 1912 who wrote:

> As a race the Atharaka are exceedingly proud, and though some of them show a willingness to work, they are very

> independent, and unless everything is arranged for their convenience and they are treated better than their fellow workers who are frequently the Akikuyu, they will go away in a huff...Their brainpower, however would seem to be of a very low order... they are avaricious to a degree and will accept freely and ask for more, but will give nothing in return; exorbitant bribes will not induce them to bring milk and eggs. Their ideas of trade are very one sided, and the prices they demand for goats, wax hides etc. are very ludicrous; the trouble at present is that they are not in want of rupees, so that they can afford to stand by their price or return with their produce (Champion 1912:69).

Champion expected the Atharaka to be gullible and lacking in economic rationality. He was dissatisfied by their independence and a sense of maximizing on the available opportunities. Later in 1926, the Atharaka were said to have remained in their primitive state where drunkenness was a recurrent condition. Such a condition was looked upon by one administrator as a coping strategy:

> ..it is possible only by being constantly drunk they became reconciled to live in such a country...A stony barren piece of drought stricken country... The Tharakans are difficult, difficult, difficult! ...disease and drink are rampant. Palm wine is the staple food for all Tharaka (Brokensha, 1971:3-4).

It is ironic, notes Brokensha that those who made these observations could notice that:

> ...the African has deep knowledge of his own condition. It should be our business to discover the principles underlying native agriculture and improve on them rather than inculcate new ones of which the long-range effects are unknown to us (Brokensha, 1971:4)

1.8 General Observation

The unfortunate reality is that development agents who came later in the late 1980s, like the colonial officers in the past, have tended to force the Atharaka to submit to authority and adhere to modernization. There has been little effort to support the Atharaka's ethnoscience, particularly in the area of food production and environmental management.

During this study, it was clear that the attitudes of the current group of development agents towards the Atharaka were not conducive to encouraging their participation in planning and implementation of their projects. This is likely to hinder development and economic progress in the area. Both the non-governmental and governmental officers were obviously very biased against the Atharaka as was witnessed on many occasions during the study. The agricultural officers at Chiakariga, for example, were constantly expressing amazement at the bucolic naivety of the Atharaka who had refused to exchange their traditional cockerels and he-goats for the graded ones.

Further enquiries revealed that the Atharaka were neither naive nor as ignorant as they were thought to be. It is the way these projects were introduced that triggered hatred, not only for the projects but also for those who administered them. For example, in the design and implementation of the Embu Meru Isiolo (EMI) goat project in Tharaka Division, the knowledge, views and skills of the Atharaka, who have reared goats for many generations, were not sought.

Their involvement in this project was not considered a priority by project implementers and the government administration. Several people were forced to vacate their land so as to give space for the fencing of this project. This triggered the Atharaka hatred of the project and they later turned down the requests by the EMI goat project officers to exchange their traditional livestock (mainly goats) with the graded ones. The Atharaka also became permanent enemies to the project, rendering

its implementation impossible. Moreover, their disinterest towards anyone purporting to be a development agent in the area was strengthened.

By the time this study was carried out, the EMI project had declined so badly that only the fence and dilapidated timber houses remained as a reminder of the existence of that project. It failed to gain support from the Atharaka whose arguments were that the graded goats required too much work and a lot of tender treatment, such as spraying for tick control and buying special food supplements and vitamins. Yet the graded goats did not physically look very different from their traditional goats. The arguments about the use of goat milk did not appeal to the Atharaka who normally consider consuming goat milk an irresponsible act of depriving the helpless kids of their only source of food. The Atharaka also disliked the graded cockerels for breeding white chicks which were too visibly attractive to the hawks. The EMI project implementers and others currently operating in Tharaka have not taken into account the labour constraints of those to whom the projects are directed.

On the whole one can argue that the collapse of this and other projects in Tharaka is due to the failure of the project planners and implementers to integrate it within the Atharaka's cultural institutions. As already noted the culture of the Atharaka was often reported as the main obstacle to development without finding out the reasons why they cling to their traditional values. Ignoring the indigenous knowledge systems of the Atharaka is a major cause of the slow progress in the area.

complaints by agricultural officers that the Atharaka had not adopted the advanced farming techniques as taught by them, were also found to be a result of poor communication between the Atharaka and these officers. Most of the officers in this area were posted there through government institutions. They were foreigners in Tharaka for many of them hailed from the highlands where the farming techniques include deep digging, intensive cropping and cultivation using such farm implements as machetes, hoes and folk-jembes. These officers were amazed that the Atharaka were not keen to use similar farm implements in their farms.

The Atharaka ways of crop cultivation were, however, well adapted to their mostly rocky soils (see also chapter six). Their cultivation techniques also demonstrated that they were aware of the limitations of their environment and the need to adopt ways that took advantage of readily available soil nutrients. Slash and burn is the main form of land clearing. Many agricultural extension officers complained about this practice and they attributed the aridity of the area to constant burning.

The Atharaka prefer extensive rather than intensive cultivation and cropping. They plant using a dibble stick, *muro*, instead of the machete. Mix-planting ensures that they do not engage in frequent weeding. Deep farming in most parts of Tharaka is complicated by the stony earth. Through indigenous knowledge, they know that deep-digging could lead to exhaustion of the fertile upper layer of soil by reaching the sub-soil which is

infertile.

Further complaints against the Atharaka were raised by those working for the Tharaka-Swedish Water and Sanitation Project (TWASP). According to these officers, the Atharaka were not taking advantage of the pumped water provided by the project. "They should be using this water to make kitchen gardens where they could plant vegetables instead of buying them", one officer said. This suggestion was deduced as an indication of lack any economic sense and rationale among the Atharaka.

This was, however, not so according to the observations of this study. These pumps were open to all and it would be difficult to take care of a kitchen garden unless one stayed by the pump the whole day to guard the crops from the livestock and all the people who went for water. Unlike Mbeere and Machakos where people put up shrubs which grow and protect their plants from predators, Tharaka is too dry to allow such permanent shrubs to grow.

A more serious reason why many people hate the water from these pumps, a number of respondents confided, was that the water from these pumps was too salty to quench thirst. Some respondents said they preferred river water to that of the bore-holes because the latter was hard water and requires a lot of soap for washing clothes. Some said that it was not good for making the traditional beer.

A few respondents found the TWASP project as a way of draining

their traditional wells and yet not satisfying the need for water by the Atharaka. Such information was not known to the management of the water project whose contacts with the ordinary Atharaka were limited to reprimanding the Atharaka during forced *barazas* called by the area chiefs. During these meetings, the people were not free to participate in the needs assessment or in airing their views. Asking of questions during these meetings was restricted and people tended to agree with what was being said so as to save time.

These observations agree with what Brokensha has noted about complaints by development agents. They are made by those who have "too much respect for the Western science and a contempt for custom" as the following passage indicates:

> ...many agronomists, foresters livestock officers and others concerned with production systems in Africa have failed to grasp the complexity and subtleties of local societies. The technical experts often assume homogeneity which never exists and they may give little credit to the local farmers for their detailed knowledge of their environment... the experts have also preferred exotic species (of plants and trees) ignoring indigenous species of whose merits they are usually ignorant and for which they lack a sure set of supply, concentrating research and extension efforts for the few cash crops and neglecting staples like millet, sorghum, peas, beans, yams and cassava. In making such generalizations, I am referring to a sizeable portion of the experts who include not only "expats" (generally Europeans or North Americans), but also African technical officials who have been trained in Western (or Western-style) universities and whose training has inculcated respect for western science and a contempt for custom (Brokensha, 1989:189).

In conclusion, this chapter has shown some aspects of systems constraints in Tharaka which are a source of concern for food procurement and environmental management. Poor infrastructure is an indicator that the linkages and channels of communication

between the Atharaka and other people are limited. Poor development of markets as exchange points is another problem which limits sources of food resources. Insufficient infrastructure also entails a low level of institutional support to agriculture, extension and research services. The situation is made worse by the fact that the physical and climatic features are not suited to crop agriculture and environmental management. The contemptuous attitudes towards the Atharaka by those coming from outside their boundaries could be a contributing factor to food scarcity.

CHAPTER FIVE

ENVIRONMENTAL MANAGEMENT AND COPING STRATEGIES

1 Introduction

this chapter, the findings concerning the question of how e Atharaka conceptualize their environment is discussed. An count of what the Atharaka consider nutritious from their vironment as well as their natural resource utilization as picted by their material culture is presented. A pplementary question that was asked and discussed is how the haraka conserve their bio-diversity. This elicited formation concerning the links between culture and the vironment.

2 Conceptualization of the Environment by the Atharaka

though climate and topography are the primary variables in termining the potential productivity of a given environment owning 1988), Downing *et al.*(1987), there is truth in what sner (1977) wrote. Humans, whom he called men:

> ... do not act directly on their surroundings but rather indirectly through a perceptual and cognitive filter composed of elements of culture (Wisner 1977:119).

rry (1974) had earlier reiterated the same views when he tated that culture is an adaptive mechanism used by people to djust to a remarkable range of natural and social nvironments. Culture, according to Ayisi (1979), presents ariations of behaviour between different societies. Since umans have had one long struggle for survival between hemselves and their environments, they have left traces of heir achievements at various levels of their development. ulture as viewed by these authors, refers to accumulated

knowledge which embraces everything which contributes to the survival of humans. This includes people's experiences from childhood to maturity as well as their standards of adaptation. Pelto (1973) was right when he proposed that every environmental *niche* poses special problems of adaptation for its human inhabitants. Similarly, the Atharaka have not only protected their *niche* but have developed a wealth of knowledge on how the flora and fauna in this environment could be used to cope with the contingencies of their environment.

Although it was not easy to find one word in Kitharaka which is equivalent to the term environment, as many as 89% of all the respondents demonstrated a vivid perception of their environment. Continued probing yielded phrases like *maundu maria matuthigukirite* (our surroundings) and *nthi yetu* (our world / our earth). Environmental degradation was referred to as *muthiro wa nthi* (the wearing out of the earth). On the other hand, soil erosion and the subsequent efforts to bring about environmental conservation was collectively referred to as *gukondorwa kwa muthetu* (control of the soil).

Knowledge of different soils and their capacity such as *muthetu mujiro* (black soil), *kithanga* (loamy soil), *ndondo* (red soil) and *thangathi* (silty soil) was also demonstrated. Silty soil is neither stony nor clayish and it can be depended upon for higher yields due to its better ground water retention. As many as 80% of all the respondents were well aware of the serious signs of environmental degradation, including dry river beds and extinct marshy land. Nearly 50%

of the those over 40 years old could remember a time when they did not need to go far in search of environmental resources such as wild fruits and roots.

About 85% of all the respondents demonstrated a very deep knowledge of vegetation. This was also confirmed by other researchers in Tharaka, who noted that:

> ...the local people supplied a lot of data on the trees and shrubs of Tharaka. There are trees for different purposes be it medicinal, building, fodder, tools, fencing, charcoal burning. Some were cited as very important: e.g., *Muguucwa, Fagara chalybeum (Zanthoxylum chalybeum)* Good for fuelwood; bark and leaves boiled to give reliable anti-malaria drug. *Muthwana (Berchemia discolor)* : fruits, very nutritious, gum, poles, fodder. *Mware (Rhaphia farinifera), Mukindu (Phoenix reclinata) and Murara (Hyphaene compressa)* used for basket making, building and hives. *Mugaa(Acacia tortillas* fuel fodder, *Muthithi (Tamarinds indica)*, shade, Agro-forestry. *Mworobwe (Sesamothamnus rivae)* line fencing (NES n.d.).

These same respondents demonstrated that they were aware of similar signals as were recorded by McCorkle (1987) among the Burkina Faso and Moran (1979) among the Brazilians which they referred to, as, early warning famine signals. The Atharaka elders narrated the following as signals to approaching drought:

> The movement of bees, i.e., when the bees are moving from the forest areas to the plain grasslands it is a sign that humidity has increased and the bees are collecting certain special nectar on the grasses.
>
> The movement of birds and their sounds. There is a particular way birds flab their wings and also make certain sounds which indicate they are uncomfortable with the decrease of humidity in the air.
>
> The croaking of frogs in dry ponds is another sign which heralds the coming rains.
>
> There are certain trees known to the elders which flower when it is about to rain. These elders not only know the features of these trees but they can

also identify the manner of their flowering.

The same elders demonstrated great skills in watching the sun's direction by marking certain trees where the sun's rays rested to indicate a dry spell.

such trees include the evergreen trees listed in Table 5.1 below:

Table 5.1: Names of Evergreen Trees in Tharaka

Kitharaka name	Scientific name
Mukau	Melia volkensii
Mugaa	Acacia tortillas
Mutithi	Tamarinds indica
Mururuku	Terminalia brownii
Mubobua	Baranites aegyptiaca
Mung'ora	Acacia nilotica

Source: National Environmental Secretariat n.d.

The terms discussed above show that the Atharaka's perception of their environment is close to that of the trained scientific environmentalists, i.e., the universally accepted view. Nearly 70% of the respondents understood the following dimensions of drought:

- Agricultural drought, whereby the moisture availability falls short of what crops and fodder require (Hewitt 1971).
- Meteorological drought, in which there is a shortfall in the expected moisture (rainfall), resulting from rain producing mechanisms which could be linked to shifts in the atmospheric circulation (Downing *et al.* 1986, 1989 and 1990).
- Hydrological drought, where there is lack of water causing low stream flows. This is the scientific explanation as to why the numerous rivers in Tharaka are not used for irrigation by the inhabitants of the area. Lack of water has led to the low

flow of these rivers and this makes it difficult for the Atharaka to plant crops by their banks to cope with droughts.

Deforestation is increasingly threatening these elders' meteorological signals for predicting the weather. Many of them decried the acute environmental degradation caused by intensive agrarian and money making activities such as charcoal burning and sale of timber (see also ELCI 1993b).

5.3 Conservation of Bio-diversity

The Atharaka depend a lot on their environment and this makes them pay attention to it. Until the late 1980s when individuated land tenure processes gained ground, the Atharaka considered their environment as a common-land or the social property of those who are charged with its care i.e. members of a given clan. Everyone was expected to ensure proper utilization and preservation of whatever was in the environment. Several elders described the various techniques of exploitation of the environmental resources before people's behaviour towards them was changed by commercialization of their products.

For example, people waited until the fruits were ripe and were blown down by the wind or when they fell by themselves. If the ripe fruits had not fallen for some time, young boys were allowed to climb and shake the branches of these trees to make the fruit fall. Nowadays people are not patient to allow such fruits as *matithi, the products of Tamarinds Indica*,to ripen. Since its market value is high, the fruits are picked

prematurely and forced to ripen. This makes their taste bitter and they are unpleasant to eat.

Similarly, medicinal plants are exploited using very destructive methods. According to the elders, the roots, leaves and barks of the medicinal plants are no longer harvested but are destroyed completely. Traditionally, each tree was considered the property of the ancestral spirits and mistreating them was forbidden lest one was cursed. A series of taboos ensured that these species were protected and allowed to continue for use by posterity. Before uprooting or picking any of the products, it was considered necessary to consult the ancestral spirits who not only directed the herbalist to the right tree but also instructed on the correct amount to be administered. A series of taboos ensured that herbalists did not destroy these precious plants.

In Tharaka the environment had a right to exist. Conceptualization of the bio-diversity was embedded in the Atharaka belief system and their culture as a whole. Breaking the soil even for agricultural purposes was considered an act of violence and everyone was trained in the mastery of exploitation. This entailed tender fostering and involvement of ancestral spirits throughout the cultivation processes. Many traditional beliefs of the Atharaka have not been totally eroded by modernization. Such views were also observed by Lee (1959) among the Dakota Indians.

5.4 What the Atharaka Derive From Their Environment

As already indicated in the last section, the Atharaka possess an outstanding store of knowledge concerning their environment. They are also aware of the various ways of utilizing its resources. Nearly everything which is used by members of the Atharaka households is obtained from the environment. Table 5.2, below, gives the main usage of the environment as was observed during this study:

Table 5.2. Procurement and Utilization of Environmental Resources

USAGE	ENVIRONMENTAL RESOURCES	PERSONS KNOWLEDGEABLE
Building of homesteads and garden protection.	Thorn trees and sisal. Trees used for poles, eg., the centre pole and the rafters. Grass, soil and vegetable fibres.	Men and women make use of these for fencing and putting hedges in their farms. More men construct houses using trees while the women get the grass for thatching and they also mix water and mud for the walls and the floor.

Fuelwood and charcoal	Dry wood, shrubs and different trees	Although women have a greater responsibility for looking for firewood, men usually carry heavy logs which are useful for overnight fire banking. Such logs are also used for brewing of traditional beer. Ordinary fuel is by women and they prefer dry wood which does not have unpleasant smell or too much smoking.
Wild plants as food	There are many plants whose leaves, roots,fruits, and barks are used as foods.	The Atharaka women know, for example, *mitunga* leaves to pick and cook as relishes to different foods. They were particularly clear as to which foods are used regularly and those that are used during food shortages. Both men and women have knowledge of the plants useful as fodder for livestock.

Medical use	The Atharaka have a wealth of knowledge in therapeutic potential of their environment as shown by this list of herbal cures and names of diseases: *Muarubaine* cures Malaria, *Mukururu* cures stomachache, *Muthigira* cures colds and coughs and *Mutagata* cures Worms.	Both the Atharaka men and women are well aware of the plants in their environment and the different diseases which are cured by these. They go for these medicines on an ad hoc basis whenever a person in their household becomes sick.
Tools and weapons	Tree stumps are used for making several household tools such as the dibble stick, the axe, traps, bows and arrows, utensils, containers and furniture.	There are specialists in the art of fashioning tools and weapons. Most of those observed in this study were men. Boys make most of the traps

Ornaments and musical instruments	Seeds of *Mukunyi* and *binika* are gathered by the river-beds and mixed with *canga* to make necklaces using the vegetable fibres. Ear plugs are also made from the environmental resources. *Coro* and drums are the musical instruments that are most used in Tharaka. The former is made from hollowing a tree stump while drums are made with hides and cylindrical stumps.	Girls and women have skills in making their own ornaments. The two musical instruments were, however, made by the men.
Personal use	Various environmental resources are used to obtain dyes, oils, soaps, perfumes, chewing sticks and as toilets.	Men, women and children make use of the environment according to their personal needs.

Ritual use	Religious beliefs among the Atharaka call for symbolic use of trees. During the circumcision of girls and boys there are certain rituals which are observed. Some woodlands areas are not to be interfered with as they are sacred groves.	Elderly persons are the ones who understood the meaning and the processes of these rituals.

5.5 Links Between Culture and Environment

The information from Table 5.2, makes it clear that the Atharaka have the knowledge and technology which adapts them to their environment. Their culture is, therefore, a major way of coping with shortages of food and other resources within environment. They are in many cases able to choose one possible solution out of a number of available alternatives (Nanda 1987). By observing the procurement and utilization of environmental resources among the Atharaka one can conclude that culture is indeed a "codification of reality", i.e., that which transforms physical reality of what there is, into experienced reality (Alland 1972).

One of the distinctive reasons why the Atharaka are able to cope with shortages of resources in their environment has to do with the way they culturally perceive that environment. Their culture has the advantage of relative stability as it

has withstood the disruptions of the market economy compared to other areas in Kenya. There are, however, signs of change in the Atharaka's way of life whose indicators are marked by cultural adjustments in relation to the environment.

In conclusion, the Atharaka have a wealth of knowledge of environmental resources. Their conceptualization of the environment relates well to its conservation and coping with food shortages. Conservation of the bio-diversity is a corporate responsibility based on the Atharaka's dependency on the environment. Appropriate procurement of the environmental resources by all the members of households ensured sustainability of the resources. Culture is an important variable in both food procurement and conservation of the bio-diversity.

It was also noted that there are a number of systems conflicts. Land clearing is essential for food security but it damages the bio-diversity and reduces fodder for livestock and bees. Trees and shrubs are homes of birds and other pests which harm crops and livestock yet their foliage improves soil fertility.

CHAPTER SIX

FOOD MANAGEMENT AND COPING WITH SHORTAGES

6.1 Introduction

This chapter discusses the findings based on other questions that were asked at the start of the research problem. What do the Atharaka consider to be food in their drought-prone environment? What is the nature of their food procuring strategies? What are the coping strategies within these food-procuring strategies? Finally, to what extent are these strategies affected by forces of change? Other supplementary questions discussed in this chapter include a discussion of the views of the Atharaka concerning food shortage and how they cope with food shortages Non-farm coping strategies are also discussed.

6.2 What do the Atharaka call food?

Studying the Atharaka food and feeding patterns required intensive observation of twelve randomly selected households for two months. By recording their morning, afternoon and evening meals, Table 6.1 was compiled to show the frequencies of different meals.

Table 6.1: Popular Foods in Tharaka

Food Name	Frequencies per Household											
	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
NKIMA cooked with:												
green vegetables	60	65	78	80	82	54	63	68	71	88	76	89
cow peas	56	60	70	73	70	69	66	56	55	60	70	60
green grams	20	18	12	15	18	13	14	16	19	14	15	12
UCURU made from												
Bulrush millet	80	82	83	84	78	89	67	76	76	72	79	79
Sorghum	50	49	39	30	29	40	43	28	29	30	32	33
Maize	20	21	19	18	16	24	28	17	19	20	22	17
KITHERE maize and:												
Cowpeas	17	19	18	16	20	23	25	17	18	14	19	
Green grams	8	7	4	6	4	9	8	8	7	8	6	
KITHONGANIO	11	13	10	14	13	11	9	13	12	14	10	
MUTHURA	1	0	0	2	0	2	1	0	0	0	1	
RICE/*CHAPATEES*												
stew: meat	3	2	1	0	1	2	1	0	1	2	0	
green veget.	5	4	3	1	1	0	1	2	4	3	0	
beans	1	0	0	2	1	0	2	0	1	2	1	
TEA/BEVERAGES	10	11	9	8	10	9	10	8	9	10	9	

Key: *Nkima* is a type of mixed dish made from millet meal mixed with various vegetables or pulses.
Ucuru is a thin gruel made from cereals. It is usually fermented in gourds.
Kithere is a mixture of maize and pulses eaten fried or just plain with salt.
Kithonganio is a kind of mixed grill with all types of cereals and pulses. The mixture may be mashed with potatoes as well as with green bananas.
Muthura is made of boiled sorghum grains.

Fish is usually eaten, but mainly by young men. Honey is eaten directly as a sweet but the most common use is when it is put in the *kathoroko*, a locally brewed beer which is taken by both women and men. During the months of August and December beer drinking was observed to be a widespread activity as people celebrate during circumcision ceremonies.

Although Table 6.1 shows that there is a wide variety of foods eaten by the Atharaka, *ucuru* and *nkima* are the most popular dishes. The processing of these foods requires systematic procedures, some of which are arduous. After millet is harvested, it is threshed, winnowed and then put into bags. It is removed from there, a little at a time and ground into flour. Many respondents preferred flour that is ground on a grind-stone to that which is ground by a diesel propelled mill. The latter is said to have the smell of diesel.

Millet gruel is usually prepared in stages. Ground flour is soaked and then ground into a soft paste known as *kimere*. Some of the paste is cooked while the other is left uncooked. The uncooked paste is used to hasten fermentation. Fermented gruel is what is commonly offered as a cool and nourishing drink, especially when the weather is very hot.

Fermentation of gruel is an aspect of coping with food scarcity which has of late been supported by scientific research. Burgess (1994) lists the following advantages of fermentation of starchy foods:

- fermentation prevents some germs including diarrhoea germs multiplying. In a hot place like Tharaka fermentation is useful as it acts as refrigerator for the foods.
- Fermentation reduces the amounts of poisons such as cyanide in cassava and aflatoxin in stored foods such as maize.
- Fermentation probably reduces the phytates in cereals and so may increase absorption of iron and zinc.
- Some people prefer the taste of fermented foods

Nkima preparation requires boiling water as a first step. Flour is then poured and mixed with cooked vegetables and /or pulses. This is a one dish meal which includes different nutrients without an extra dish of relish. The cereal flour provides carbohydrates, pulses provide proteins while the vegetables provide vitamins.

The nutrition of the Atharaka depends almost entirely on the amount of millet and sorghum they are able to harvest and the seasonal variations from hunger to plenty. Millet flour is the main ingredient in the Atharaka diet. So important are the cereals in Tharaka that there are many myths about their origin. One of these myths was interesting for it relates to the theme of coping with hunger. About 60% of the respondents knew where that the original cereals came from a swampy area known as *irimbani*. A story is told of how at one time all families in Tharaka lived on meat only. At that time hunting was the only economic activity and it was the prerogative of men. A certain woman was neglected by her husband and was not given meat to feed herself and her children. In a desperate effort to cope with lack of food, the woman went through the bush searching for something to eat.

It was during this search that she came across birds surrounding a millet plant. She chased away the birds and ate some of the grains. She found them to be very satisfying and took some to her children. After eating these grains her children became healthier than when they ate meat only. Afterwards, when more people came to know about this

discovery, they adopted millet as a crop for cultivation. Today there are many varieties of millet and other cereals grown by the Atharaka.

6.3 Land Tenure and Coping With Shortage of Resources

Land is an important resource for the agro-pastoral activities of the Atharaka. Access to and control over land are important issues in a discussion of coping with food scarcity. Land ownership in Tharaka is governed by traditional rights under the informal control of the clans. In most parts of Tharaka, land demarcation and consolidation is almost complete but freehold titles have not been issued, except to plot owners in Tunyai Nkondi and other settlement schemes.

Land ownership among the Atharaka is strictly through clan membership. Investigation of land tenure revealed that about 50% of the respondents held the view that *kithaka nikia mwiiriga* (pl.*miiriga)*, i.e., land belongs to the clan. Among the Atharaka, the clan is the largest group of agnates who trace their decent from a common ancestor. Clans are sub-divided into sub-clans known as *mariiko* (sing. *riiko*,) which literally means fireplace. These are further subdivided into households, *micii* (sing. *mucii*), the smallest unit of kinship. It is within these units that allocation of rights to land and land use patterns takes place. The ongoing demarcation, land consolidation and privatization is taking place within the same units. Access to and control over land resources are mainly by the male members of the same *riiko* or those adopted by one or the other form of *giciaro* (see chapter seven).

This system of land tenure enhances cooperation as well as intensification of kinship ties. Those sharing close kinship relationships used to live close to one another but now clans are not localized as territorial units. However, wherever they are, members of a clan are bound to ensure that the environmental resources are maintained. Social solidarity fosters communal responsibility for each other's needs. Exchange of labour and sharing of food items are some ways of coping with food shortages.

Communal land tenure functions as the social security for the Atharaka. It guarantees rights of the individual Mutharaka to use or control some land in order to earn a living in both livestock keeping and/or crop cultivation as well as through extraction of food from the natural environment such as in hunting and foraging. People's settlement is also guaranteed in that a person has a place to settle and build a house.

Customary land tenure is, therefore, not a constraint but an opportunity for individuals to pursue their own economic opportunities with the protection of known and well valued guarantees. Customary land tenure also functions as a way of curbing selfish accumulation of too much land by individuals who are unable to utilize it completely. Customary land tenure has also maintained egalitarianism among the Atharaka. Traditionally, no one had too much control of the means of production. Consequently, no one could control the production activities of other people. Individuated land tenure, once it is complete, is likely to bring about patron/client

relationships which are a great discouragement to the way people cope with food shortages in the area of this study. This is shown by the way freedom of grazing livestock wherever one wants is being curtailed by the individuated land tenure and issue of freehold titles.

Privatization of land is a big debate in Tharaka as it is forcing those not issued with title deeds to move to the hill-tops and other unsuitable terrains. There were respondents who argued that land should not be individually owned. They advocate for group tenure to avoid the acute land fragmentation and soil degradation. Others argue that it is only by privatizing land that individuals will be motivated to maximize on its resources through encouraging conservation of environmental resources.

Changes in land tenure, especially where freehold titles have been issued, have a number of implications for the Atharaka resource utilization. For example, adjudication of Marimanti has changed land-use patterns gradually from communal grazing to crop farming, with the land being fragmented into very many uneconomic parcels. Land privatization has led to land scarcity, forcing a number of farmers to cultivate on the sloppy areas and hill-tops after being allocated such plots. Demarcation work in some areas has been done up to a few metres from the river banks and along the valleys thereby encouraging the owners to farm such areas(see also Brokensha 1978; Cohen and Lewis 1987).

6.4. Agriculture in Tharaka

There are two most common land use practices in Tharaka, namely, crop cultivation and livestock keeping. These are the main sources of livelihood for most people in the area. Tharaka covers 1497 km² and has agricultural land of 126,700 hectares of which 3000 ha are cultivated, 4700 ha are unsuitable land, 8900 ha are forest land while 9200 ha constitute others (NES n.d.). There are 10,714 agricultural small holdings. By 1984, nearly 85% of the cultivated land was devoted to food crops such as millet, sorghum, green grams and cowpeas while 17% was devoted to cash crops such as cotton, sunflower and tobacco (Abella et al. 1984).

Although climatic and ecological factors make Tharaka unsuitable for arable farming, especially in zones 5 and 6, food security in Tharaka requires an agro-pastoralist approach. As pointed out earlier, Tharaka land is unsuited to arable crop cultivation but factors such as increase in population density, desertification and poor accessibility to and from the outside sources of food, make crop cultivation inevitable. Land-use patterns of the Atharaka are changing rapidly from the extensive and communal-based farming to the intensive individuated farming especially as a result of the ongoing land demarcation and consolidation. Table 6.2 below depicts the distribution of crops by hectares.

Table 6.2: The Area Distribution of Food Crops in Tharaka

Crops grown	Area in Hectares(ha)
Millet	3500
Maize	3800
Beans	1230
Green grams	2700
Sorghum	2400
Cotton	2000
Njabi	300
Cowpeas	3260
Pigeon peas	1800
Castor	4000
Sunflower	3150
Groundnuts	850
Citrus	91
Mangoes	70
Papaws	70
Sisal	60

Source: Compiled from data from agricultural extension offices Tharaka Division

Table 6.2 also confirms that food crops account for 85% of the cultivated area. Millet, sorghum and cowpeas take up most of the cultivated land while the exotic plants are planted by those in the settlement schemes.

6.4.1 Crop Cultivation

Ecology in Tharaka is not homogeneous. Some parts are more suitable for crop production than others since they are potentially endowed with fertile soils and climatic features, allowing for better yields than others, and the people are not confined to a singular form of food production. In the past, shifting cultivation was common, with cultivation for three years and a fallow of 10-20 years (Wisner 1977). According to a survey of 1983, the fallow periods have been considerably reduced, with 77% of the farmers having fallow periods of five years or less (Abella *et al.* 1984). In addition, only 10% of the farmers were reported to have moved their homesteads, a

phenomenon associated with shifting cultivation. Table 6.3 below shows the duration of fallow periods by 1984.

Table 6.3: Distribution and Length of Fallow

Fallow periods	% of farmers
Long rest (5-20 years)	23
Medium rest (2-5 years)	56
Short rest (1-2 years)	12
No fallow	9
Total	100%

Source: Abella et al.1984: 24.

In many parts of Tharaka where the land has not been demarcated, shifting cultivation is the main form of land use. There is, however, a gradual reduction of fallow as the demand for crops by the growing population is rising. Crop cultivation in the area of this study is limited in part, by differentials in soil fertility. The capacity of sandy soils to retain water is limited and the heavier clays and alluvials are not able to drain properly. Decline in soil fertility is also due to lack of measures to maintain or improve the soil through adding manure or compost. Soil erosion is further exacerbated by heavy and, occasionally, intense downpours over land which lacks vegetative cover. Overgrazing during fallow period is also a cause of degradation of the vegetation.

The most limiting factor to crop cultivation is, however, the irregularity and inadequacy of rainfall. Insufficient rain can hardly support plant growth throughout the growing season. Despite these constraints, the crops grown by the Atharaka can be classified as follows (see Table 6.4):

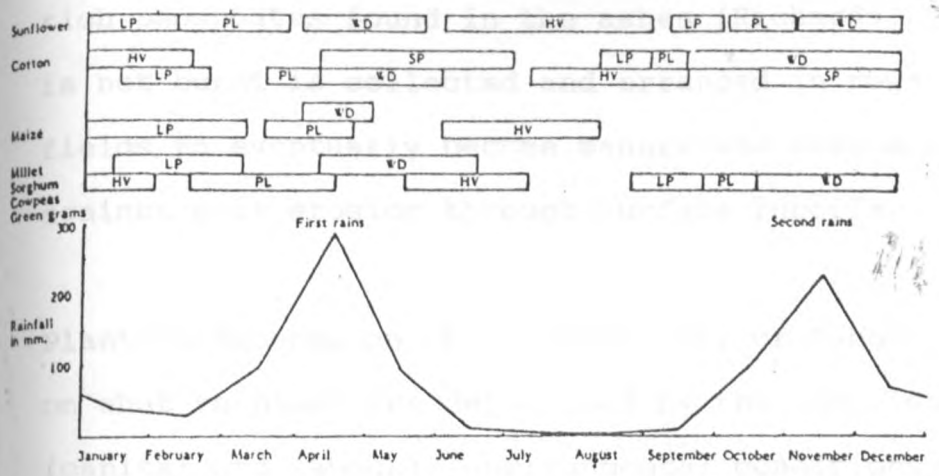
Table 6.4 Crops Grown in Tharaka

Plants	Kitharaka name	English name	Botanical name
Cereals	Mwere	Bulrush millet	Pennisetum typhoides
	Muyia	Sorghum	Sorghum Vulgare
	Mpempa	Maize	Katumani composite B
Pulses	Njugu	Pigeon peas	Cajanas cajan Vigna
	Ntoroko	Cowpeas	Unquiculata
	Nkina	Green grams	Phaselous aureus
	Mpoco	Beans	Phaselous vulgaris
	Njabi	Bonavist beans	Lablab niger
Tubers	Nkwaji	Sweet potatoes	Ipomea batatus
Fruits	Maembe	Mangoes	Mangifera indica
	Mababae	Papaws	Carica Papaya
Cash crops	Mpamba	Cotton	-
	Mpemba cia nguku	Sunflower	-
	Mbaki	Tobacco	-
	Makonke	Sisal	-

Millet, sorghum, cowpeas and green grams are drought-resistant and are, therefore, well suited to the erratic low rainfall conditions prevailing in Tharaka. They are cultivated by nearly 70% of the households covered by this study. Maize is increasingly becoming a popular crop but since it requires more rain than the other cereals, it was reported to be most frustrating to the farmers. Nevertheless about 43% of the

respondents kept trying to grow it despite the high percentage of failures. Fig 6.1 below depicts the Atharaka's calendar of activities:

FIG. 6.1. THE ATHARAKA CALENDAR OF ACTIVITIES



Key
LP = Land Preparation SP = Spraying
PL = Planting HV = Harvesting
WD = Weeding
Source: Adapted from Abella et al. 1984:27

As many as 80% of the respondents plan the calendar of their activities very much aware that drought could adversely affect their crops and fodder. In a group discussion on their understanding of drought, one group argued that droughts have random occurrences while another was of the view that droughts have clear cyclic patterns.

6.4.2 Methods of Cultivation as Coping Strategies

The most common method used by the Atharaka to open up new fields is what is known as "slash and burn". The bushes and smaller trees are slashed using *kathoka* (axe) or a sharp machete. The place is left to dry following which it is set on fire. The field is then ready for planting without further

preparation. A good burn is crucial for the success of most of the crops grown by the Atharaka as well as for the growth of fodder. The ash from the burnt vegetation was said to provide the necessary fertilizers. This knowledge indicates that the Atharaka, like the Mogbuama of Sierra Leone, are aware of the rich phosphates found in the ashes (Richards 1985). Whatever is not burnt is collected and arranged in rows across the fields to eventually become manure and also act as a check against soil erosion through surface runoffs.

Planting depends on the availability of labour. The decisions on what to plant are determined by the individual's resources (capital and labour), environmental conditions, inclinations towards change in agricultural practices and farming experiences, among others. The Atharaka's decisions concerning planting emphasize the type of adjustments one has to put up with. An individual has to decide what to plant or interplant and the size of the field. There are many variations in planting which show the attempts to cope with the vagaries of the environment, as shown by observations on Table 6.5 below:

Mix-planting: This refers to planting of two or more different types of seeds in the same hole. The Atharaka have different types of mix-planting.

Table 6.5: The Mix-planting

mi + so	-millet and sorghum mix-plant.
(mi + so)-(mi + cp)	-millet and sorghum mix-plant and inter-planted with a mix-plant of millet and cowpeas
cp + so	-cow peas and sorghum
(mi + so) - pp	-millet and sorghum mix-planted and inter-planted with pigeon peas
mi + so + cp	-millet inter-planted with sorghum and cowpeas
(mi + so + cp) -pp	- a mix-plant of millet, sorghum and cowpeas inter-planted with pigeon peas

Inter-planting of various crops in the same field but in separate holes is also popular among the Atharaka. The most practised inter-planting is that of cow-peas, millet and sorghum and maize (see Table 6.6).

Table 6.6: Inter-cropping and Inter-planting

cp + gg	An inter-plant of cowpeas in the same garden as the green grams.
(mi + cp) (mi + so + cp)	Millet inter-planted with cowpeas in one field and millet, sorghum inter-planted with cowpeas in another field.
so + cp + gg	An inter-plant of sorghum, cowpeas and green grams.
mi + so + cp	An interplant of millet, sorghum and pigeon peas
ma (mi + gg + cp)	Maize(Katumani maize) on its own and an interplant of millet, green-grams and cowpeas

The combination of planting methods and of crops to be planted demonstrates the wealth of knowledge possessed by the Atharaka in that they rarely mix-plant pulses as this can reduce yields greatly. Grain crops are mix-planted and inter-planted with each other and with pulses. The rationale behind this type of planting is to save labour without reducing the yields.

Do mix-planting and inter-planting complicate the harvesting of these crops? "Not at all", said one respondent who went on to state:

In a mix-plant of cowpeas, sorghum and millet,

> cowpeas ripen first, they are harvested by plucking off their pods, leaving the rest of the plant to rot. After the cowpeas are harvested, millet, which is taller than sorghum, is harvested leaving the stalks standing up to rot or for grazing. Since sorghum takes longer to grow, it is usually the last to be harvested. The growing shoots are cut to approximately six inches from the ground so as to allow more shoots to come out when the long rains came. This increases the number of sorghum stems bearing the panicles containing seeds. It also helps to reduce evapo-transpiration during the dry spell following the harvest of millet. Sorghum take two rainfall seasons to ripen (a respondent at Marimanti).

Early planting is practised by nearly all the respondents of this study. This is done so that the plants take maximum advantage of the scanty rainfall. Dry planting, particularly of grain seed before the rains, is well known to the Atharaka. Legumes have to have rainfall and are always planted at least one day after the rains. The Atharaka are well aware that while the grain seeds could stay in the ground for a relatively longer period without rotting, legume seeds cannot.

Planting of a wide range of crops which ripen at different times is considered important by the Atharaka. This ensures that some crops are harvested even if the rain is not adequate. Weeding and the harvesting are spread over so as to maximize on available labour. Extending of harvest time ensures a steady supply of new crops to provide food for the families over a longer range of time than when all crops are harvested at once. Similar coping strategies were observed among the Ambeere (Nyaga-Mwaniki 1986 a, b) and among the Adawida (Fleuret 1986).

6.4.3 Crop Protection and Harvesting

All planted crops in Tharaka require a lot of protection from various types of pests, which include small wild animals and birds. Some of these pests remove planted grains from the ground before they germinate and others eat the young plants. Millet and sorghum are particularly in need of protection from birds especially after they seed. The Atharaka employ a number of methods to protect their crops from predators. They erect thorny hedges around the whole garden. This is, however, not effective in stopping such animals as baboons from jumping over these fences and destroying whatever is in the farms. This necessitates killing the animals using bows and poisoned arrow heads (not many respondents wanted to disclose this information as killing of wild life is prohibited by law).

Spraying crops such as cowpeas with stinking cow dung is another protective method that is widely applied. The cow dung is first placed in a container and mixed with water. It is then allowed to stand and ferment for a few days before it is sprinkled on to the cowpeas at night to deter predators. The stronger the stench of the mixture, the more effective the protection it provides. Since protection of crops is an intense activity, mix-planting and inter-cropping of various crops makes protection easier and more effective than when planted in single strands. There are many other ways of crop protection which were observed.

There is reluctance to use of fertilizers and insecticides as these tend to increase weeds and attacks from pests (see also

similar observations by Soderstrom 1993). It is possible that the Atharaka's resistance to change may be due to what they see as economic necessity. Other important observations were how varieties of crops grown by the Atharaka bear inherent coping characteristics. Table 6.7 below gives details of what was found during this study.

Table 6.7: Crops and their Coping Characteristics

Crop	Its coping characteristics
Bulrush millet	A staple crop for the Atharaka with short maturation periods which evade drought. Millet thrives in areas of low rainfall between 500 mm and 625 mm. Millet has a rapid initial growth and it tillers so vigorously that weed growth is very much suppressed. Millet is used to make both food and beverages. It is therefore the most important grain to the Atharaka.
Sorghum	Has an efficient well balanced root system which makes it drought resistant. The root system of sorghum is such that it does not collapse even with the worst drought. It tillers freely suppressing all weed growth. It rolls its leaves during periods of water shortage which keeps it strong during the worst droughts. It responds rapidly to moisture, recovering quickly from water shortages. Sorghum can do well with well distributed rainfall of about 175 mm. It requires about 300-380 mm of rainfall during its growing period of two to three months. Both sorghum and millet give satisfactory yield on soils exhausted by other crops.
Cowpeas	These are the staple pulses for the Atharaka who utilize both the leaves and the seeds as food. Cowpeas are drought resistant in that they cover the ground so well that there is little competition for moisture with the weeds. Evaporation of the little moisture available is prevented.
Pigeon peas	These are perennial legumes with deep roots and stems that grow high. They are drought resistant and high yielding. Their root system has a favourable influence on

	soil fertility.
Maize	The most suitable maize crop for this area is Katumani composite A. This takes 60-65 days to tassel and is fully mature in four months. This crop is ideal for Tharaka as it requires little moisture to mature.
Green-grams	Green-grams, like cowpeas, are very drought resistant and they thrive well in Tharaka. They make a delicious stew but their use as food is impeded by their having to be sold to the ever demanding urban markets. Sales however, provide the Atharaka with the badly needed cash for meeting the market requirements for the people.

Source: Main study interview and some adaptations from Wisner (1977:120)

6.4.4 Use of Farm Tools.

Farm tools in the study area include *kathoka* (axe), machete and a digging stick known as *muro*. The axe is used for felling the larger trees when clearing the farms for the first time. Timber from the felled trees is used for building or for making beehives.

Use of steel and iron farm tools is slowly gaining popularity with the Atharaka. In most of the farms observed during this study, the Atharaka continue to slash and burn their land as well as to use digging sticks for planting despite calls by extension officers that they buy machetes. The Atharaka insist that they do not have money to purchase the needed farm implements. Further enquiry revealed that the Atharaka are well aware of the limitations of their environment and would rather not dig deeply into the soil as this may result in accelerating the process of soil erosion. Use of the digging

stick is also most effective in weeding crops, particularly in rocky soils where the delicate roots require protection from damage. Since most of these crops are mix-planted, use of a machete would not be appropriate for the plants.

6.5 Livestock-Keeping.

The Atharaka are an agro-pastoral people who combine agriculture with livestock-keeping. Livestock-keeping is a necessary condition for the maintenance and reproduction of the socio-economic system (Brandstrom 1979:8; Blomstrom 1984). In the area of this study livestock-keeping has a higher social importance than crop cultivation even though there are arguments that it was

> ...grafted onto, rather than being part of, the agricultural system (Bernard 1972:71).

Bernard (1972) also points out that for a long time crop cultivation was a rudimentary activity until the mid 1980s when the government attempted to persuade the Atharaka to put more emphasis on sedentary cultivation.

The Atharaka keep a combination of cattle, *ng'ombe*, goats, *mburi*, and sheep, *ng'ondu*, in various proportions. Livestock keeping is a sensible economic strategy in that both grass and browse are well utilized. Of those interviewed, 92% agreed that they have owned livestock at one time or another in their lives. The average herd of the surveyed households has about 9 cattle, 28 goats and 5 sheep. However, not every household had cattle. Many cattle had either died in the drought of 1984/85 or were sold to purchase some important items for the

households. Food and school fees were the main reasons why livestock is sold. Table 6.8 below shows an estimated number of livestock in Tharaka division by the end of 1991.

Table 6.8: Livestock Distribution in Tharaka by the End of 1991

Cattle	Beef	48,500
	Dairy	100
Goats	East Africa and Gallas	100,600
	Dairy (pure and crosses)	20
Sheep	---	35, 000
Poultry	Local Chicken	120,000
	Improved (dual purpose)	
	Layers	200
	Ducks	1,000
	Pigeon	50
	Turkeys	10

Source : Compiled from the Offices of the Divisional Livestock and Extension Officers in Chiakariga and Marimanti.

According to table 6.8 goats are the most numerous of the livestock that are kept. They are often sold to obtain money for the purchase of household needs. The value of livestock is in their re-distributive nature. The Atharaka have a high social value for livestock even though pastoralism as a system of production is under pressure to change.

Introduction of general purpose money has, to some extent,

undermined the value of livestock as a medium of exchange and reciprocity among the Atharaka. The introduction of cash crops, such as cotton and tobacco, has also provided new sources of income, for example, to those living in Tunyai. Cotton, tobacco and sunflower are cash crops and they demand more male labour. Men have therefore abandoned their herding duties for their households. Women have therefore to combine their responsibilities with the work of livestock rearing.

Herding among the Atharaka was traditionally done by young warriors who jointly managed herds through extensive grazing. Corporate grazing was possible because of the settlement patterns which allowed closeness of relatives with responsibilities towards one another. Grazing cooperatives with one's relatives meant that some people were free to engage in other economic activities such as carving wood or making beehives.

Livestock serve a number of functions which may be viewed as coping strategies among the Atharaka. Livestock act as commercial banks for several Atharaka households. As banks are depositories where people earn a profit through savings, so is the reproductive capacity of livestock. During this study, nearly 60% of the respondents confirmed that they invested in livestock in order to generate and create potential for more wealth. Similar views have been expressed on the way livestock reassures people against recurrent droughts and food shortages (Roberts, 1979; Muriuki 1974; Ochieng' 1985). This is why the Atharaka are reluctant to sell or kill their livestock for

mere consumption even in the middle of the worst famine. The rationale is similar to what Shopo wrote about the Ndebele of Zimbabwe:

> with the increasing restricted access to land, however, cattle prices always exceed those of the wages in the mines and factories and thus provide a way out of wage labour (Shopo 1985:25).

Thus, livestock is a great store of value for the Atharaka. This was demonstrated during this study by examples given by the elders of what the actual approximation of the currency value of livestock is. Table 6.9 shows the exchange rates between livestock and foodstuffs in Tharaka.

Table 6.9: Exchange Rates Between Livestock and Grains

1 cow or heifer	=(approximately) 20 bags of bulrush millet or sorghum.
1 ox	=(approximately) 10 bags of bulrush millet or sorghum.
1 She-goat	=(approximately) 2 bags of bulrush millet or sorghum.
1 he-goat	=(approximately) 1 bag of bulrush millet or sorghum.

During food shortages the amount of grains is reduced considerably. As a medium of exchange, livestock are also used to obtain other important items for the households. Livestock are used in payment of bride-wealth, which is considered an investment by the Atharaka. Through the reproductive capability of a woman, a husband hopes to get daughters who will bring him more livestock. As a standard currency, livestock are currently bartered for such needs as a place to cultivate exotic cash crops for sale.

Although livestock are not slaughtered for the sake of slaughtering, there are incidents where small animals such as goats and cockerels are slaughtered to strengthen friendship. Possessing livestock also ensures that a person has what could be converted into grain and other foods as readily as the need arises. Livestock products also have a complementary value in that they supplement daily diets. Milk from cows and goats is consumed by the Atharaka in various ways when it is either fresh or sour. About 40% of the respondents said they mixed milk with their millet flour to make some brew known as *ndite*. Small stock and fowls are used primarily for regular domestic meat. Goats are regularly sold on such occasions as when children are returning to school.

Livestock is also very important as a coping strategy for the Atharaka who believe very much in the power of prayer against disasters. Goats and sheep are sacrificed at various sacred sites. One of these sites is at the foot of Kijege hill where God is thanked and supplications made for the rains or to get rid of certain calamities among the Atharaka. Goats and sheep feature in such ceremonies as birth, marriages and circumcision. Friends also slaughter goats for one another to demonstrate their feelings towards each other. This strengthens the bonds of friendship in such a way that during times of scarcity, the Atharaka have someone to rely on for the supply of food.

Thus, livestock facilitates both the economic as well as the social exchange. The interactions are, however, closed to the

Atharaka living in close proximity or those in kinship relationships. On the other hand, they could be open and free for all particularly where they involve sale at markets (Lie 1992). Owning large herds of livestock is considered useful in that it brings social prestige to a person. Such prestige is not accorded only on the basis of mere possession of numbers, but on the generosity of the person who distributes the wealth for use by the less fortunate members of the clan.

It was also noted that Atharaka rarely use animal dung from their livestock to manure their gardens. However, since they practise shifting cultivation, which involves leaving the farms fallow for some time, and letting livestock lose to feed on the stalks after harvesting, their dung and urine supply the needed animal manure to the farms which are in fallow. Besides, new gardens are always fertile after a period of fallow.

Another way of viewing livestock-keeping as a coping strategy is the way the Atharaka use it as a loaning system, very similar to the *gefurdyed* described by Klima (1970) as:

> ...an exchange of one type of stock for another because of some specific purpose or goal. When someone needs a bull to use as sacrificial animal, or for another reason such as providing meat for a convalescent mother, the owner of the pregnant cow can exchange it for a bull that will be killed and eaten. The owner of the bull gains temporary custody over the cow and awaits the birth of a calf, which is a counter payment for the bull the other owner slaughtered. Ideally the counter-payment should be a heifer that could then be capable of increasing the herd of the new owner. After weaning of the calf, the mother cow, or dam is returned to its original owner and the calf remains as a counter-payment for the bull. While there are definite rules governing this stock transaction, known as *gefurdyed*, some

> individuals may deliberately try to exploit the situation to maximize on their gain (Klima 1970:30).

Among the Atharaka, this form of "stock associateship" is a useful coping strategy during times of acute shortage of pasture or when one has a problem finding enough labour for herding. It is also considered a precautionary measure against possible loss of one's entire stock through disease or some other disaster. At times, a poor person may request a wealthy neighbour or kinsman to hold a cow or a goat hoping that the owner will allow them to keep any forthcoming female offspring with which to build a herd. Nearly 60% of those interviewed were unhappy with this system of associateship for it breeds suspicion among the two associates.

6.6 What in the Atharaka's View is Food Shortage?

Most of those interviewed were clear about what is meant by food shortage. More than 75% of the respondents distinguished between famine as prolonged food shortage and the short-term food shortages. The extreme cases of hunger are constant and rhythmical, according to many informants. In a society where people anticipate food shortages and hunger seasons regularly, traditions and language are such that they prepare them for a time of deprivation. Famines are not a strange occurrence in Tharaka. Table 6.10 shows names and meanings of famine from 1908 to 1992. These names were listed by relatively young respondents, thereby confirming that food shortage is within the experiences of people of almost all ages.

Table 6.10: A Chronology of Famines in Tharaka 1908-1992

YEAR(Approx.)	NAME OF THE FAMINE	THE MEANING IN ENGLISH
1908	Yuura ria Banyani	Probably a famine which occurred after the infiltration or the Banyans from the coast
1910	Yuura ria kamigogo	Dead bodies like logs
1912	Yuura ria kagoyia	Crops and animal withered
1920	Yuura ria ukwaju	Only wild foods available
1921-22	Yuura ria kithioro	Perhaps strangulation of people
1927	Yuura ria kampempe	Maize was missing
1928	Yuura ria Ukambani	Search for maize in Ukambani
1930	Yuura ria Gikuyu	Search for food in Kikuyuland
1931	Yuura ria kampemba	Search for maize
1934	Gata ndugu	Relatives were not friendly
1945	Yuura ria kagiri	Fencing from would-be intruders
1947	Yuura ria mikwaji	Famine of cassava
1952-55	Yuura ria Mau Mau	Famine brought by Mau Mau emergency
1960	Yuura ria ciamunaika	Cereals sold in the smallest cups
1961-62	Yuura ria mafuriko	Famine of the big flood
1970-71	Yuura ria mikwaji	Famine of cassava
1980	Yuura ria kathirikari	Yellow maize
1984	Yuura ria ngakua ngwete	People died holding money in their hands but no food to purchase
1986	Yuura ria kibucio	When meat was weighed by a system of weighing which was mainly by lifting it to estimate the weight
1992	Yuura ria tukano	People were given wheat grains to cook.

Source: Adapted with modification from Wisner 1977:286

Table 6.10 confirms that the Atharaka have a history of narrowing choices and food shortages are within their ordinary run of experiences. Seasonal and localized food shortage are

variously described as *kiathu, nthano, muyuchuma, ka-yuura, urugura,and yuura ria kagita kanini*. Seasonal hunger occurs when food, mainly cereal reserves, have declined so much that people have to make adjustments to their eating habits. Sometimes a vicious circle in which a prolonged food shortage follows a seasonal or localized food shortage occurs. This happens when people are affected by short term food shortages to a degree that they lack energy to prepare for planting and grazing of their animals.

6.7. Non-Farm Means of Subsistence

6.7.1 Hunting and Foraging

Apart from livestock-keeping and crop cultivation, the Atharaka obtain food through hunting and foraging. Hunting and gathering are food-procuring methods which do not involve production in the sense of investing in the environment and waiting to harvest whatever has withstood the constraints of drought and pests. The Atharaka used to make widespread use of poisoned arrows as a technique for hunting such animals as antelopes.

As many as 80% of the elderly males interviewed agreed that hunting was one of the most enjoyable food-procuring activities of the past. Many remembered their hunting guilds and the cohesion of their groups with moving nostalgia. They are of the view that the Kenya Wild Life Act, which prohibited hunting in 1977, was not fair to them. The closely monitored traditional practices of group hunting ensured that the environmental resources were well maintained. Hunting guilds

required sanctions by ritual leaders who had effective magical powers to bestow on the hunters. Great care was taken not to kill unnecessarily. Very young or pregnant animals were not killed and this ensured that there was a constant renewal of edible wild animals.

In addition, there were compulsory rituals for cleansing hunters when they returned from a hunting trip and before they mingled with other people. Such rituals demanded a number of expensive items which were to be provided by the hunters or their relatives. Thus hunting was not performed carelessly or too frequently. These views on wildlife are similar those expressed by Barrow who wrote:

> The animal world must not be compared to man. Animals move in an older and more complete world than ours, gifted with instincts we have lost or never attained and communicating by means we shall never understand.
>
> They are not lesser creatures nor are they our brothers. They are other nations, other spirits, sharing with the splendour and darkness of life on our planet (Barrow 1985:35)

6.7.2 Honey and Beeswax

The Atharaka are skilled in honey collecting. Abella *et al*. (1984) estimated that there were 59,000 traditional hives in Tharaka, yielding over 300,000 kg of honey. This amount is likely to have increased greatly. Although current figures were not available, several honey collectors were reporting daily at the chief's camp at Marimanti requesting for additional collection centres since they had saturated the only existing places for the purpose. They also wanted to know

of far-off markets where to sell their honey. As already noted, most honey is used for brewing the local beer known as *kathoroko*.

Beekeeping is surrounded by magic and is mainly a men-only activity. Asked why they do not sell their honey to far-off markets where they could obtain better prices, they said it is because there are no established facilities for preparing honey for such markets. Apart from the Honey Refinery Project in Marimanti, started by the Methodist Church of Kenya in 1968, there is no other aviary in Tharaka. Thus, there is an urgent need for organized collection, processing and marketing of honey to boost its production and provide better returns for its collectors.

6.7.3 Charcoal Production and Other Non-farm Activities

Charcoal production activities are among the leading income generating activities that the Atharaka engage in for the purposes of purchasing food. Other ways of raising money include: casual and permanent employment in one of the local administrative centres, NGO offices and private enterprises. Those with skills in smithing are engaged in making artifacts for sale. Both men and women were observed weaving ropes to make baskets which are sold. However, a visit to two open markets in Chiakariga and Marimanti revealed that basketry is not an economically viable occupation. Large baskets are sold at very low prices (as low as five shillings for one large basket) and transported by middlemen for sale to bigger urban centres where their prices are ten times higher. The value of

these baskets remains low because there are several people who make them and take them to the same market. There is need for better and more organized marketing of baskets and other crafts.

Women collect grass for thatching houses and they sell it for cash. Some people are herbalists and they have medicines which are sold on demand. Others have small-scale enterprises such as way-side selling of foods.

Baskets are made using certain grasses and barks of trees which are threatened by drought. Both charcoal production and basketry are detrimental to the environment as observations revealed large areas of Gatue and Gatunga where the indigenous vegetation has been destroyed completely. Charcoal production is particularly devastating for it requires a lot of trees to make just one bag of charcoal. Despite the authority's vigilance in prohibiting charcoal production as an occupation, the activity goes on as a concealed business. This is another issue of systems conflicts whereby one wonders what is of value, the environment or people's lives?

6.8 General Aspects of Coping with Shortages

Interference with cropping and livestock activities is what leads to the main signs of food shortages. One respondent said that the way to cope with food shortages is by moving to better areas like Nkondi and Tunyai. According to the views of 40% of the respondents food shortage is localized and usually not the whole of Tharaka environment is affected by the

rainfall deficiency. There are some areas where crops are harvested and sold in the open markets and those people who suffer from food shortage may benefit through contacts with their relatives in well-off areas. On the other hand, even if many parts are affected by drought or any other cause, the Atharaka will derive a livelihood from their livestock or the non-farm activities.

Food shortage, therefore, occurs when factors of production run short(See also Swift 1989 for similar views). Table 6.11 explains the main activities for food procurement whose production capacity should not run short in Tharaka.

Table 6.11: Activities of Food Production

CROPS CULTIVATED	LIVESTOCK REARED	OFF-FARM INCOME
Millet, Sorghum, Cowpeas, Green grams, Pigeon peas, Maize, Cotton, Sunflower, Castor, Beans	Goats, Cattle, Sheep, Poultry.	Beekeeping, Handicrafts, Charcoal burning, Masonry, Selling building materials (such as sand) Marketing, Shop-keeping, Working as permanent and casual labourer.

Risk minimization among the Atharaka is demonstrated by their system of cultivation which makes use of fallow, mix-cropping and inter-cropping. The slash and burn as well as cultivating in different zones is a demonstration of their coping strategies. Keeping mixed species of livestock and preservation of last resort grazing grounds is another way they cope with drought. Thus, coping strategies are embedded

in all stages of food production in Tharaka and there is a continuum of responses which include risk minimization to crisis management.

Other ways of coping which were noted were the establishment of social networks as a basis for food sharing as well as loaning of animals. During times of food shortages, there are efforts to diversify earlier investments by calling loans and searching for wages in other areas. If the shortages persist, then some members of the household are sent to stay with various relatives who are better off. Such a continuum of coping was recorded among the Ethiopians and others who suffer from frequent food shortages (UNDRO 1988; Webb et al. 1992).

The capacity to cope with frequent food shortages is both a function of the asset base and also a function of human capital accumulation. Table 6.12 lists different types of coping strategies which were reported by 50 randomly selected respondents from Gatue and Marimanti:

Table 6.12: Types of Coping Strategies Reported

STRATEGY	PERCENTAGE PRACTISING N=50
Pray	100
Plant before rains	100
Ask help from relatives	97
Move cattle	91
Sell livestock	83
Seek wage labour	90
Collect wildlife/hunt/fish	59
Irrigate/Cultivate by rivers	8
Ask help from government relief	20
Do nothing	0
Dig ridges	11
Seek a loan	6

The coping strategies of the Atharaka depicted in Table 6.12 are close to what was identified by Sen (1981:45) as:

> Strategies which improve household consumption. These are generally those that seek improvement of subsistence agriculture making better use of available resources.

Prayer is top in the list of coping strategies. God, according to the Atharaka, controls all things, but particularly the environmental causes of food shortages. The Atharaka have continued with their traditional religious beliefs and practices of worshipping by performing sacrifices at sacred sites. There are, however, a number of Christian churches which are challenging these religious practices. What they do not acknowledge is the biblical basis of dependency on God for sustenance as stated by Psalm 33:

> Behold the eye of the Lord is on those who fear him. On those who hope in his mercy to deliver their soul from death and to keep them alive in famine (Psalm 33 verse 18 and 19).

Planting before the rains is one way of risk minimization as

people try to maximize on the inadequate and unreliable rainfall. Mix-planting and inter-planting of crops, as already explained, are other ways of maximizing on the environmental conditions of the area. This means that the strategies of coping and their efficacy are dependent upon what exists in an environment and the technology devised by the inhabitants. Similar views were expressed by Swift (1989) and Timberlake and Tinker(1985). Conceptualization of the means of subsistence by the Atharaka demonstrates coping with shortages is "bound by naturally occurring phenomena...climatic, topographic, geological and...biological processes" (Bunders, 1992a:61). The proposition is that environmental factors are explanatory variables of the way people cope with shortages (Bunders 1992b).

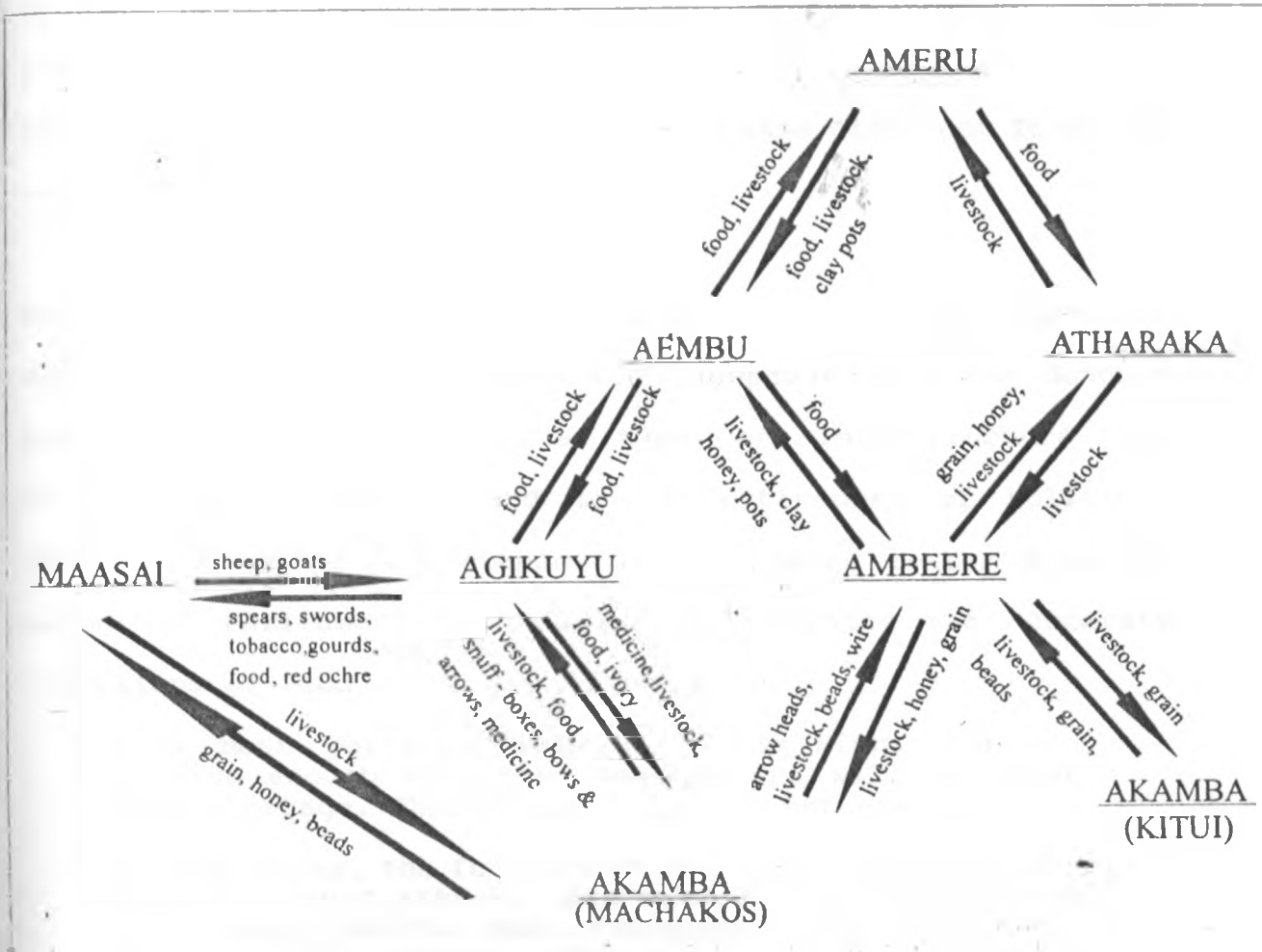
Remittances and donations from relatives, friends, the government and non-governmental organizations are other strategies of coping with food shortages. In several households the men were said to have gone to Meru, Embu, Kirinyaga and, in some instances, to Mombasa. In these areas of high agricultural potential, the migrant casual workers from Tharaka are preferred to the residents of the areas. This is because the migrant Atharaka are said to work harder for less than the residents of those areas. This phenomenon was also observed by Wisner (1977).

Remittances or, rather, transferred incomes received from an absent member of a household, form a significant source of non-farm income. Remittance money is useful for the purchase

of household consumption goods. It is also invested in payment of school fees as education of one's children is regarded as providing the necessary skills to those who will look after a person in old age. Remittances are also used to build better houses, purchase livestock and land. All these are aspects of coping which require austerity, reduction of consumption and reinvestment (UNDRO 1988:11).

Strategies that seek to diversify the economic base of the household involve market or monetary exchanges. The Atharaka's pre-colonial social structure, which provided opportunities for exchange of food and other basic necessities, has continued (see chapter seven). Exchange of goods is not new to the Atharaka who had a thriving pre-colonial system of exchange with their neighbours (see figure 6.2 and Map 4.3).

FIG. 6.2 PRE-MARKET INTER-SOCIETAL EXCHANGE BETWEEN THE ATHARAKA AND THEIR NEIGHBOURS



The onset of the market economy has commercialized the exchange relationships from barter trade to demand for cash. Buying and selling agricultural products in the open market is a major coping strategy that was observed during this study. Prices of food in the open markets of Tharaka, as well as the varieties available, are indicators of food availability in the area. Such products as fermented gruel, millet, sorghum, cowpeas, pigeon peas, green-grams, honey, bananas and crafts are offered for sale and the money obtained used to purchase different foods and other household necessities.

Depending on relief food is another coping strategy which was noted. The amount of donated foods depends upon the donor's perception of drought, the type of infrastructure for distribution of relief and the effectiveness of political leaders to attract assistance. The following letter from the member of Parliament for Tharaka demonstrates the desperate conditions of food shortages in the area.

> Like most parts of Kenya, Tharaka-Nithi did not receive enough rainfall. Hence there will be great food shortage. This requires urgent attention.
>
> In some areas, the food situation has been worsened by banditry. Such attacks have been so frequent in the last three months that residents of Kathagacini, Kanjoro and Kamaguna sub-locations have abandoned their shambas and homes. These people require food and security to stay home.
>
> I am sending an SOS to the Government and any NGO to save the community from the anguish of insecurity and hunger.
>
> As a matter of fact, the bandits or some pastoralists have built manyattas in the National Park. They now also occupy parts of Tharaka North Division.
>
> We need to know how and who allowed Somalis to settle in the park which is meant for wild animals and protected from human occupation...(Daily Nation, 4th March 1994).

This letter is evidence of shortages which lead to a need for coping strategies. It is also a sign of conflicts that are current in Tharaka as people struggle to make do with the little there is in their economy. The fencing off of the National Park as well as the law against local hunting are aspects of great concern among the Atharaka leaders. Ethnic conflicts are other obstacles in the way of the Atharaka's food security. There were some respondents who complained of having moved away from their farms at Kathagacini because of the marauders.

Elderly respondents in Tharaka could remember occasions in the past when they went for two days without food. They coped by sitting in their houses drinking water and taking snuff. During these hungry seasons, there is usually little movement and social activities are minimized. This is because there is a lowering of energy due to underfeeding.

CHAPTER SEVEN

SOCIAL STRUCTURE AND COPING STRATEGIES

7.1 Introduction

In this chapter, the social structure of the Atharaka and the way it enables them cope with food shortages and the decreasing environmental resources is discussed. The chapter focuses on the answers to the last two questions posed at the beginning of this study: What are the roles and responsibilities of individuals within the Atharaka households in procuring food for themselves as well as for other members of their households? Who in the household is the custodian of the knowledge to cope with food shortages? To answer these questions, it was found necessary to discuss the diverse types of the Atharaka's social structure. This entailed observing the households and intra-household dynamics through analysis of gender issues, power relations and division of labour. These are discussed in relation to the way they affect or are affected by food procurement and environmental management.

7.2 Social Structure

Understanding the social structure of the Atharaka is important as it forms the context of what transpires within the households in relation to coping with food shortages and managing the environment. The main organizational institutions of the Atharaka are the clan system, the age-set system and the brotherhood relationships. The clan, *mwiriga*, literary meaning "gate" of a household, is the name for the largest unit of kinship in Tharaka. Every Mutharaka belongs to a clan through descent from a common male ancestor. Clan heads are important today for land adjudication and for organizing circumcision

practices. Table 7.1 shows the names of the thirty-two clans in Tharaka as recorded by Lowenthal (1973) and which were verified during this study.

Table 7.1 The Names of the Thirty-two Clans of the Atharaka

Gankinya	Kamugwe	Kathoga	Mutwa
Gankunju	Kamurige	Kirundu	Mwagitiri
Gantue	Kandia	Kitherini	Ncuria
Igoro	Kanjiru	Kithuri	Ndegi
Kagunda	Kanjogu	Mbaru	Nyaaga
Kamarao	Kanthakame	Mbogoni	Rurii
Kamugenia	Kanyaga	Mbura	Ukunjio
Kamugao	Kanyaki	Muruguru	Utonga

Source:Adapted from Lowenthal (1973:30)

The sub-clan, *riiko,* literally means "fireplace" or the group around the hearth. The *riiko* ancestor is usually the son of the clan ancestor. Founders of various *mariiko* are spoken of as siblings. The smallest organizational unit of kinship for the Atharaka is the household, *mucii,* which is composed of a line of three lineal agnates who are defined as ego's grand father, father and ego's children. Extended family or lineage facilitates a person to gain access to a variety of land holdings and for livestock associateship. Kinship connections are also useful in protection of crops from predators and thieves.

The household was found to be the most useful analytical unit for this study because it is at this level that decisions about utilization of environmental resources to meet the food needs of individuals and family members are made. Such views were also noted by Bender (1967) and Goode (1970).

The Atharaka refer to almost all their relationships as *giciaro*, that is, brotherhood. Bernadi (1959) and Lowenthal(1973) have succinctly detailed three types of *giciaro* relationships as well as their attendant obligations in Tharaka. These are, *giciaro* by blood, oath and by goat. The strongest of these is that by blood usually through a common ancestor entirely in the male line or by a common ancestor whose commonality is possible only through a single female link. Legally the members do not intermarry, they are forbidden to fight and they are bound to assist each other in case of hazards. Among the obligations of the members of this *giciaro*, are unlimited hospitality and reciprocal exchanges. This was particularly useful to a journeying visitor who is guaranteed safety, shelter and food while travelling within the area of one's brethren.

It is not clear how *giciaro* by oath relationship was started. There is mention of an original oath between two men who are otherwise unrelated. The basis for the oath is a desire for mutual obligation pact or some event which was interpreted as an omen that such a relationship should start. Such a pact could, for example, start with the occurrence of a "miracle" which prevents two people from killing each other in a war. The two could then seal their relationship by sucking the blood of one another. The obligations of this relationship included military alliances and similar hospitality as that accorded to one's relatives. The relationship could, however, lapse if one partner offended the other.

Giciaro by a goat is the weakest of all these relationships in

that its obligations of hospitality and military alliances are not very binding. In case of conflicts, the other types of relationships outweigh this type. It is initiated by a ritual of sharing a goat between two men. The obligations are mainly alliances during times of hazards. These are not carried over the generations of those beyond the immediate descendants of those who make this pact.

Although these relationships were based on the age-set system which, according to Lowenthal (1973) has all but collapsed, they are indicators of the social environment of the Atharaka. Hospitality through reciprocal obligations is an important feature of the Atharaka which was observed during this study. The other type of relationship which has implications for coping with food scarcity in Tharaka is marriage.

7.2.1 Marriage

Marriage in Tharaka is patri-local whereby the woman joins her husband's family after the wedding. In general, the Atharaka are endogamous. Endogamy is encouraged by the very high bridewealth demanded for a bride in Tharaka. Current rates are 48 goats, 5 cows, honey and KSh. 5,000 for an illiterate girl and 68 goats, 7 cows, 1 bag of sugar, clothes and KSh. 50,000 for a literate one. These rates of bride-wealth discourage men from neighbouring communities from seeking brides in Tharaka. Young men are dependent on their fathers and other relatives for marriage. Paying the high bride-wealth is a confirmation that a man is serious about getting a wife and there is a high value in staying married.

After marriage, a woman's reproductive and productive capacities are transferred to her husband. Also, after marriage, a woman lives with her husband's clan of which she remains a member for as long as their marriage remains intact. She, however, depends on her agnatic kinsmen for protection against mistreatment by her husband. A woman is considered part of a clan wealth because of her reproductive capacity. Through the women the clans reproduce themselves. The woman's labour is also important and that is why the clansmen are eager to retain her when she is widowed. If she remarried outside the clan, the bride-wealth paid for her is returned to her deceased husband's relatives.

The Atharaka marriage system is like what was described by Levi-Strauss (1969) as complex in that a person cannot predict the clan from which he would get a wife. The Atharaka's complex and extensive marriage system facilitates establishment of the intricate affinal relationships. These are some of the ways of coping with food shortages. The Atharaka discourage marriage between close relatives. Marrying a daughter of one's age mate or relative by any of the *giciaro* is also not acceptable. All marriages in Tharaka are between persons who are not socially related. This is perhaps the strategy of "marrying out or be killed out" (Tylor, 1889:267).

Rules of exogamy are rules of reciprocity which aim at maintaining a network of interrelationships between all segments of a society. These are the rules behind the coping strategies of exchange within the established social networks.

Marriage enables a man to gain some limited access to lands controlled by his affines through activating his wife/ves usufructuary rights. For example, a Mutharaka living in Chiakariga could ask his wife/ves to cultivate in their natal homes. Such homes may be in the potentially fertile lands of Tunyai or Nkondi. The yields from such lands could be sold or used during times of food shortage.

Children are members of their father's clan. In case of the death of a father, inheritance of property within the household is governed by patriarchal consideration. The oldest son assumes the responsibilities of his father. A younger brother could inherit his deceased brother's wife together with all the property and children. The Atharaka women, like those in other patrilineal societies, are not eligible to inherit or have any exclusive rights of ownership of important forms of wealth such as land and livestock.

7.3 The Household

Interviews and observations within the sampled respondents revealed that the Atharaka households are neither homogeneous, nor are they unified decision-making entities. They constitute the smallest units of the Atharaka social structure. The notable feature was that they do not model the Western concept of households for example those in a family-farm where husband-wife unit maximizes on utility functions and shares goals (Sprig 1992). Household decision making concerning food procurement and environmental management are part of the inter-household dynamics, status of the household head, power relations between

different members of the household and a high mobility of the males from Tharaka.

7.3.1 Household Headship

One of observations relating to intra-household dynamics was the change in the status of the household head. The traditional patriarchal authority patterns which were strengthened during and after colonialism regard the man as the household head. Modernization has brought about a process of cultural delocalization whereby the rigid patriarchal authority is gradually changing.

The current trend indicates a slow shift from traditional gender-based role ascription, to one based on achievement. Among the Atharaka, the age factor no longer seems to carry the mystique and respect it used to in the pre-market times (see also Cattel 1990 on the Abaluyia). The implications of this for the household dynamics is that it is no longer age and sex which direct seniority in relationships, i.e., it is no longer the husband-wife, parent-child, brother-sister and other kinship relationships which matter.

Other factors such as education, employment, and political positions have altered the cultural role expectations. In some households for instance, there is a situation of power inversion whereby young persons are, in some cases, the ones who provide the needed food and other household requirements. Some are also responsible of paying school fees for their younger siblings. A situation of potential "conflict" in role performances is

created when children have to assist their parents in meeting basic needs such as food. Such a conflict was noted by Mburugu when he wrote the following:

> Thus, besides the formally recognized head of household, in reality there may be several people with positions of eminence due to their relatively high status and greater contribution to the welfare of the household. Consequently, sources of decision-making on matters affecting the welfare of the household (especially in matters relating to allocation of resources) have increased the level of disagreement and conflict among family members. For example, an older son in the household may question the fairness of continued economic support to parents and siblings at the expense of his delayed marriage or investment, in activities outside the household. Also much to the displeasure of an educated daughter, parents may delay her marriage if only to enjoy a few more years of her handsome contribution to the household (Mburugu 1986:75).

7.3.2 Household Power Relations

Power restructuring is becoming an important dynamic between husbands and their wives as other studies have noted (ATRW 1992). Educated women who have high status jobs have changed their attitudes towards what were accepted as gender-based roles. In some cases they act in a manner that challenges the traditional roles that have held them in inferior positions. For example, whereas women in Tharaka are expected to be submissive to men, there are those who are capable of buying their own land to which they have unlimited access and control. Many of these women are relatively well educated and they have the confidence and competence to free themselves from dependence on the Atharaka's patriarchal power structure. The market economy is thus raising women's marital powers, for many can now seek independence by opting out of the subordination by male heads. None-the-less, discrimination against women still remains a common feature in Tharaka.

7.3.3 Male Migrations

There is high mobility within and among the Atharaka households, largely in form of seasonal transfers of selected household members (mainly males and school children), who move away in pursuit of specific goals such as education, employment, medical treatment, adventure and visiting relations. For example, young people leave their rural households for several years to attend schools in urban areas where they may be under the care of working relatives. Although such children spend most of their life-time away from their homes, they are perceived of as belonging to those rural households.

In quite a number of cases, male heads of households are the main migrants. As many as 56% of the female respondents in Chiakariga said that their spouses had established other households in the high potential Tunyai and Nkondi settlement schemes. The Atharaka regard those who are away for educational purposes and as migrant labourers, as economically and socially present. As many as 80% of the sampled households had members living "elsewhere". Migrations are both rural to rural as well as rural to urban for most of the respondents. In almost 80% of the sampled households it was reported that some close relatives had gone to Embu, Meru, and even as far as Nyeri in search of work so as to send remittances to the remaining members of their households. In nearly 70% of the households, men were said to be in Mombasa and the coastal area while some educated younger Atharaka were said to be in Nairobi. Remittances from working relatives are a major aspect of coping strategies used by the Atharaka.

As to why men migrate more than the women there was no clear answer. The most repeated response was that men's opportunities for employment in urban sectors are better than those for the women. This trend began in colonial times when the imposition of taxes required men to seek employment in towns. Since these taxes are required even after independence, men have continued to move out. Women are constrained from leaving the rural homes because apart from prostitution and petty trade, there are few urban jobs available for them.

Another reason why men find it easy to move from their rural households than the women has to do with a decrease in what are typically male agricultural tasks since land has been on a continuous cultivation, and the increase in population does not allow for long fallow. For example, there are generally no lands to clear and prepare new gardens. Protecting crops from large animals is becoming obsolete as most large animals have been fenced off in the Meru National Park.

The study was also interested in knowing what men did with whatever they earned away from home. This question was not easily answered. It was, however, observed that most of what men earn is used to purchase consumer goods such as bicycles and radios while some is sent home as remittances to assist the purchase of food during periods of shortages. The implication of these trends is that both women and men are jointly involved in seeking ways for coping with the shortages whether within the households or away from their homes. It was not possible to establish conclusively who in the household or which gender is

more or less knowledgeable about coping with food shortages.

These findings are a contribution to the Marxist-feminist scholarship which has been instrumental in suggesting ways in which patriarchal control within the family or kin group is linked to the division of labour by sex. As men become more involved in production for exchange, rather than for immediate consumption, the work of women is increasingly restricted to the domestic sphere (Chalton, 1984:25). Similar views were earlier propounded by Hartmann when she wrote:

> Dependence is a psychological and political economic relationship...male control of women's labour power is the lever that allows men to benefit from women's provision of personal and household services including relief from child-rearing and many unpleasant tasks both within and beyond households... Patriarchy's material base is men's control of women's labour both in the household and in the labour market, the division of labour by gender tends to benefit men (Hartmann 1981:372).

7.4 Division of Labour by Sex and Age

Current division of labour by sex and the migrations of some members of the household have increased the Atharaka women's workload. This is because tasks of cultivation and animal husbandry which were performed by men are added to the arduous women's tasks of fetching water, gathering fuel and looking for edible wild vegetables to eat. Child-care, which involves feeding, cleaning and training the children, is another task exclusively for the women. Health care for the family, which involves travelling long distances in search of health centres, washing clothes by hand as well as cleaning the house and utensils is also their duty. These activities are often viewed as non-economic for they are not income generating and they

generally have no pecuniary remuneration (ILO 1986). Guyer (1985) was right when she observed that procurement of diet is greatly feminized and, in general, women cannot count on the regular support from men. Table 7.2 depicts the division of labour in cultivation activities performed by females and males as observed in Tunyai.

Table 7.2 Division of Labour by Sex in Tunyai

N=30 males and 30 females. (Percentage of those above 15 years of age who work regularly on task)

	Males				Females			
	Pl	Wd	Ht	Mkt	Pl	Wd	Ht	Mkt
CROP								
Maize	44	28	54	56	77	67	65	60
Mi & So	3	3	2	11	53	68	69	87
Green gra.	15	12	10	24	13	16	16	13
Sunflower	5	5	5	4	5	6	6	6
Castor	5	5	5	4	7	7	6	5
Cotton	6	6	6	5	8	8	8	5

Pl= Planting; Wd= weeding; Ht= Harvesting; Mkt= Market; Mi= Millet; So= Sorghum

Table 7.2 also indicates that men's interest in farm work is mainly for crops that have greater value in the market than for subsistence. They also tend to put their labour on those activities which have relatively fewer labour requirements. Table 7.2 also confirms that women spend much time on cultivation of what is normally consumed by the household members.

This pressure for women to perform many of the tasks of crop cultivation, domestic work and animal husbandry causes lateness in planting. In the studied households, women stated that they

were not able to finish planting all the household's plots before the rains. While the Atharaka know the need to maximize on available moisture, lack of adequate labour may lead to late planting and loss of crops to drought. Another observation was a change of crops grown from those that required labour intensity, such as millet. Maize does not require constant protection against birds, but it is less promising for food supply because it requires more rainfall than millet. So, by opting to plant maize in order to ease their labour requirements, they often end up losing the crop which puts them into problems of food shortage.

As noted earlier, gender is the term used in this study to highlight the inequalities and outright discrimination that exist between men and women in relation to access to and control over food and environmental resources. A gender approach disproves the wrong assumption that women and men in a household always share the same interests. Gender also plays down the erroneous presumption that men can adequately represent women's interests. There is a need to highlight the differential position of women *vis a vis* that of men in a given society. It is more important to do so when investigating production and consumption issues, such as how people cope with food shortages in drought-prone environments. Failure to focus on gender, leads to misunderstanding of issues that determine the course of action that people take.

This study found an asymmetrical division of labour in Tharaka. In almost all crop cultivation activities, men are nearly always

armchair managers while women do the actual duties of food production, e.g., land clearing, planting, weeding and protecting. All harvesting activities, including grains processing for storage, are the responsibility of the women. Men become active only when the harvest is abundant and there are possibilities of selling the surplus for cash money. It is then that they provide transport and are very enthusiastic about the farm produce. Their keenness starts early when they build drying up platforms to facilitate the complete drying out of grains and legumes in the farms.

These observations support what Sprig (1992), Rogers (1980) and Rogers and Schlossman (1990) noted, i.e., as farming becomes modernized and accentuated, men rarely do what is considered women's work on the farm or in the household. During the course of data collecting four men who were considered strange in that they engaged in threshing and winnowing millet, activities considered typical for women, were shown to this author. Such amazement was not expressed when women engaged in land clearing and other activities conceived of as masculine.

Children often help their parents in agricultural, livestock and domestic activities. Boys do most of the herding while girls do most of the domestic chores. Domestic duties are mainly tasks that deal with food production and provision of clean and safe environment. Food shortages make women and girls seek for ways to cope with the shortages. Alternative sources of food include gathering wild products. Even when there is flour to provide the main meals, women have to search for vegetables, legumes and

roots to be used as sauces and condiments. Women know where rare species of what makes up the relishes can be obtained. The author travelled to far off areas where women got leaves from a variety of wild plants useful for relishes. Fruits and stems were also collected to be sold in the market. Many of the plants from which the leaves were obtained are drought-resistant and are used during periods of food scarcity.

7.5 Who in the Household is the Custodian of the Knowledge of how to Cope With Food Shortages as Well as Management of the Environment?

Data from the field did not make it clear whether the Atharaka men know how to perform food production processes which are exclusively performed by women. All those interviewed were clearly opposed to any suggestion that they were capable of these tasks. The observations supported the GOK and UNICEF (1992) report that threshing and winnowing are almost always exclusively the work of women. Women and girls are also responsible for the processing, preservation and storage of the grains. In addition, they are the ones who perform processes of food preparation, which include fetching water and firewood, cooking, serving and washing of the dishes.

During this study as many as 50% of the respondents, both husbands and wives, stated that they owned separate gardens. Separate farms are for spouses and families. This was said to be one of the ways of coping with food shortages for what is harvested from the separate gardens is available for the needs of all household members. Men, however, have the advantage of

mobilizing the labour of their wives to work in their gardens while women depend on their children, friends and/or relatives for assistance. Women can obtain rights of cultivation from their natal homes. Thus, the conceptualization of a household as a place where resources are pooled and the benefits shared, may not be a common feature in all the households.

7.6 Female Organization/Women Groups

Two views were constantly expressed concerning the social functions of women groups during this study. The first is that women manage to break out of male dominated institutions which protect and oppress them (see also Nyaga-Mwaniki 1986 b about women groups in Mbeere). The second view places women groups more explicitly within the existing relations of production. Women groups are seen as the means of coping with the scarcity of resources in the context of changing socio-economic situations. Such a view was important to this study for women groups are the local institutions which strive to cope with scarcity of food and other environmental resources in Tharaka.

Written information describes the social structure of the Atharaka from a male point of view and it was difficult to obtain information on women's participation and involvement in decision-making at the household and community level. However, it is already clear that patriarchy dominates the Atharaka political and socio-economic system. Males have a higher status than the females and they do most of the public decision-making. Lack of information concerning the role of women in politics and decision-making has in another context been explained as being

due to the fact that most of those interviewed by ethnologists in Tharaka, were men and they may have been ignorant of the functions of women. Holding (1942) proposed that the men may have been afraid to disclose women's power lest they incur the wrath of women councils.

This study established that there were women councils known as *kiama gia kagita*. These councils had the role of disciplining those who misbehaved against traditional law. Women also had important roles in religious ceremonies. In times of problems such as prolonged food shortage due to drought the councils for women and for men met to make joint resolutions. This information implies that traditional sex segregation was not necessarily oppressive to women. Current political situations of centralized political systems have eroded women's work, views and position even though they have brought more women to the public (see also Chalton 1984; Ledge 1994).

Information collected during this study highlighted the high status of the role of women groups in Tharaka traditionally. Then, women groups catered for personal, social, recreational and ritual needs of individual women. Nowadays, women groups in Tharaka go through four broad phases which overlap and often coexist within given groups. These are welfare, fund raising, investment and re-organization (see also Oendo 1988 concerning the Digo). In articulating these phases, women groups are often equivalent to unions of the poorest of the poor as Rosaldo and Lamphere (1974) noted.

Women had mixed views concerning their groups. Some preferred to work alone as individuals and they engaged in making baskets, ropes and other crafts. They are also extensively engaged in both formal and barter trade. Profits from their exchange activities as groups are so meagre that many women expressed their dislike of the groups while others had dropped off completely. The marginalized position of the income generating efforts of the Atharaka women is similar to what Sprig propounded:

> Some of the income-generation activities are really income preservation activities valued (really overvalued) because the family does not have to buy what the woman can make (Sprig 1992:346).

In conclusion, this chapter has outlined the way the social structure of the Atharaka facilitates their coping with scarcity of food and other environmental resources. The relationships within this social structure maintain the cultural institutions for coping with shortage of environmental resources. Kinship relationships are also useful strategies of expanding the Atharaka's social networks for additional sources of the means to cope with the scarcity of resources. The dynamic household relationships depict a gradual shift from traditional patriarchal authority to an achievement-based one. In addition, male out-migrations indicate that the onset of the market economy affects a household's capacity to cope with food shortage.

There is an asymmetrical situation which relegates more work to females than to the males. Furthermore, men have more rights than women to dispose off produce. They also have greater power concerning access to and control over resources than women. Lack

of control by women has serious implications for food security and environmental management. For example, there were cases where women had to wait for long periods for permission from their husbands before selling a household asset, such as, a goat for an emergency.

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

The purpose of this chapter is to give a gist of this thesis by reviewing the entire study. This is done by giving an account of what the study set out to achieve, how this was achieved, i.e., the methodology and what was found. The proposed recommendations make up the last part of the chapter.

8.2 A Review of the Study

This thesis set out to explore the ways in which the Atharaka cope with food scarcity in their drought-prone environment. This led to an enquiry of their economic and cultural institutions which are the context within which food procurement and environmental management activities are performed. The study questions which led the investigations into these institutions are summed up in the study objectives which were to find out: (i) the way the Atharaka conceptualize food and environment, (ii) the coping mechanisms within their methods of procuring food and conserving the bio-diversity, (iii) the effects of the onset of the market economy on their indigenous knowledge of coping with food scarcity, and (iv) the way their social structure enables them to cope with food scarcity in their semi-arid environment.

Exploring how the Atharaka cope with food scarcity in their drought-prone environment had several purposes: First, it was to satisfy curiosity concerning what keeps the Atharaka and others who live in drought-prone environments from starving to death.

Second was to conduct a site-specific research that could contribute to current debates concerning the conflicts created by reforms in food production and environmental degradation. The third aim was to document an inventory of coping with food shortages which could be a starting point for promoting the indigenous knowledge of the Atharaka. In addition, the way the social structure and household dynamics facilitate or impede food security and environmental management were highlighted.

8.3 The Methods of Study

The study began by reviewing the available literature. This revealed that there was scarcity of information that links food to environment through cultural institutions. Literature also confirmed that even though the indigenous knowledge systems, such as coping with food scarcity, are considered creative, they have not received the attention they deserve. Ways of coping with food shortages that were described in the reviewed literature dealt mainly with emergency measures taken during extraordinary times to save communities from imminent death from starvation. This study was, therefore, set to document perceptions and the techniques used by the Atharaka to ensure food security and environmental management.

Cultural ecology, the theory that was tested in this study, demonstrated the way humans interact with the ecosystem to form food webs and, secondly, the way culture utilizes a given environment to maximize on the available resources. All these are a function of a culture's perceptions and organization. Both literature and the theoretical framework also revealed that

there is a decline of basic food supplies and a loss of resources from the natural environments almost everywhere in the world. Therefore, this study's contribution is in filling gaps of knowledge concerning the issues of food security and environmental management.

The conventional way of dealing with food scarcity and the degrading environment has been to bring remedy to the two issues separately. For example, the conventional solution to food scarcity is introduction of improved technologies and other inputs such as fertilizers. The problem of environmental degradation and the threat to wild-life is addressed separtely through such pragmatic programmes as introduction of protected zones such as national parks. This study propounds that there should be a linkage in addressing food scarcity and the environmental degradation.

Research for this study consisted of both fieldwork and library enquiry. In the field, data collecting techniques for this study included both qualitative and quantitative methods. The well known anthropological techniques of focus group discussions, in-depth interviews, key-informant interviews and observation were used. Quantitative data collection enlisted use of questionnaires and interview schedules which included both written and unwritten questions (probing questions formulated by the researcher in the course of the interviews). Discussions and conversations were held with a number of groups to elicit data on the way the Atharaka cope with food shortages during various seasons. Households were important as both production and

consumption units where individuals utilize coping strategies to meet their food requirements within their environment.

Data processing and analysis were quantitatively and qualitatively applied. Using these methods of enquiry, the study sought and obtained a clear understanding of what the Atharaka conceive to be the environment and the nutritious products within it. Coping strategies were sought within different methods of procuring food.

8.4 The Findings of this Study

The highlights of the findings closely follow the study themes as discussed in chapters four to seven. (i) The conclusions from the findings on ecological, social and economic background. (ii) Environmental resources and the coping characteristics. (iii) Conceptualization of food procurement and coping strategies. (iv) Social structure and coping.

8.4.1 Ecological, Social and Economic Background

The findings confirmed that the ecological, social and economic background of the study area adversely affect food production. A vivid description of infrastructure, ecological, and historical background gives the causes of frequent food shortages. Poor road networks have isolated Tharaka from other high potential areas. This has led to poor market developments and the infiltration of the middlemen who exploit the Atharaka. Lack of roads implies slow and tedious transportation with walking on foot as the commonest form of transport. Poor infrastructure also leads to a low-level institutional

development of extension and research services in agriculture. Educational and health facilities are also few.

The topography of the area is mainly a sloppy land which increases the potential for soil erosion. The soils are of low fertility and many of them cannot support crop cultivation. The climate is hot and dry with low and unreliable rainfall. Thus, there is not enough water balance in the ground to support plant life. Drought is a confirmed feature of the area as it is known to occur every three years. Famines are also a well known phenomenon, hence the need for capacity to cope with food shortages.

Development history of the area is also a pathetic story. Tharaka has been a neglected place from the colonial times to the post-independence period. There has been a continued and persistent poor attitude towards the Atharaka. This leads to a conclusion that the problems of food scarcity and environmental degradation in the area are exacerbated by both the physical, social and attitudinal factors. It is within such constraints that food procurement and environmental management are contextualized in Tharaka.

8.4.2 Environmental Resources and the Coping Characteristics

The findings indicated that the Atharaka have a rich understanding of the environment and what constitutes useful products in it. Such a wealth of knowledge about the bio-diversity and utilization of the environment shows that the Atharaka are well able to cope with food scarcity and manage

their environment.

There was a strong linkage between culture and environment as shown by gender disaggregation about individual roles and responsibilities in utilization of a variety of environmental resources. The indigenous methods of utilizing the environmental resources have the advantages of corporate ownership and responsibility for the management of the environment. This potential is currently present among the Atharaka. Such a potential can be improved and promoted so as to give it value.

Unfortunately, the reality of the situation is such that there is a gradual and steady abandonment of the indigenous knowledge systems of seeking food and taking care of the environment. The demands of the market economy are posing difficult dilemmas for the people. Indiscriminate felling of trees for making charcoal and firewood, and the picking of edible fruit and medicinal shrubs, are some examples. This is gradually leading to the disappearance of rare species as well as causing desertification. There are also a number of systems conflicts that were identified. Such conflicts include the clearing of trees for crop agriculture, which cannot be avoided even though trees and shrubs provide fodder for livestock and bees. Reforms and improvements in agricultural production which could lead to food security are a threat to the environment and the indigenous knowledge of preserving it.

8.4.3 Conceptualization of Food and Coping Strategies

What the Atharaka call food and the different ways of deriving

a living in their semi-arid environment is a cultural construction. A table showing the major foods eaten by the sampled population depicted what the Atharaka call food and the way it is processed. Important findings included the hitherto un popularized information of the nutritious nature of the foods that are known and eaten by the Atharaka. For example, the starchy cereals which are discouraged by the nutritionists were found to incorporate richer nutritive properties than mere carbohydrates. Fermented gruels, which are commonly regarded as primitive diets, are endowed with the capacity to facilitate the absorption of iron and zinc in the body, reduce toxins such as cyanide and improve the taste. Fermentation also acts as refrigeration in hot and dry Tharaka where people do not have modern ways of preserving food.

The study found interesting historical information. Anecdotes confirmed that the Atharaka have a long history and experience of food shortages and have devised ways of distinguishing nutritious plants and animals. Experiences of food shortage and prolonged famines were also ascertained. These experiences have over the years given the Atharaka knowledge and experiences of distinguishing subtle plants and animal species which are useful for food. Such understanding indicates the potential wealth of the Atharaka's indigenous knowledge for food procurement and environmental management.

Although land in Tharaka is unsuited to arable crop farming due to the physical and climatic factors, population density and poor accessibility to outside sources of food make cropping

unavoidable. Agro-pastoralism is, therefore, necessary for food security in Tharaka and it has brought about the debates about land tenure. Communal land ownership enhances intensification of kinship ties and these function as a social security and a guarantee of access to important environmental resources for food procurement. Corporate responsibilities over grazing livestock and other methods of food procurement have facilitated environmental management. Current changes in land tenure particularly the issue of individuated freehold titles have adverse effects on food procurement and conservation of environmental resources. This brings about uncertainty as everyone thinks of the maximum way they can gain rather than corporate responsible actions that could preserve the resources.

Apart from agricultural methods of food procurement other non-farm ways of ensuring that food is available were noted. The Atharaka engage in non-farm activities such as:

(i) Employment in non-farm places;

(ii) Working for neighbours;

(iii) Carpentry/black-smithing/masonry;

(iv) Charcoal-burning;

(v) Collection of grass by women for sale;

(vi) Sale of medicines and skills by herbalists;

(vii) Honey collecting;

(ix) Weaving;

(x) Hunting and gathering- collecting of tamarind and hunting of small animals found near the national park;

(xi) Shop and market exchange.

Thus, there are variations among the Atharaka related to the way they cope with food shortages. These variations regard their access to fertile soils, the amount of land available, labour allocations and income levels of individual households. The rate at which individuals adopt new crops and other agrarian technologies is also not uniform. This implies that food shortages do not affect everyone the same way.

Strategies that are applied by different individuals in the households for food procurement are also not homogeneous. Strengthening the diversity of coping mechanisms that have been tested and tried is a sure way to ensure sustainable food security and environmental resources. Control of household labour was found to also contribute to scarcity of food. Poor households are forced by poverty and hunger to work for better-off families, thus depriving their own farms of the needed work. Although there is a widespread negative interaction between food shortages and labour in the farms, those households which store surplus food are able to use it in exchange for labour from those without food. Vulnerability to food shortages, therefore, varies in that families without livestock or access to a variety of terrains, or a person to send remittances, are unable to spread their risks. They lose their opportunities working for those who are better-off and so the rich get richer.

8.4.4 Social Structure and Coping

The clan, age-set and brotherhood relationships are the main institutions that form the social structure of the Atharaka. Relationships obtaining from the composition of the Atharaka's

social structure, the composition of households and the intra-household dynamics such as gender, power and division of labour were found to have important implications for food procurement and environmental management. They also determine access to and control over resources by the Atharaka. Social structure among the Atharaka has, for example, enhanced reciprocal exchanges which thrive on various types of kinship relationships. Kinship expands social networks and facilitates additional mechanisms of coping with the scarce resources.

These aspects of social structure are, however, gradually disappearing and household dynamics are shifting from the traditionally ascribed roles to that which is based on one's achievement. Age and gender are no longer the basis for status and power. The patriarchal power-base is still dominant but there are indicators that this might have a threatened future. In addition, male out-migration from Tharaka is increasing women's burdens of coping with food shortages and the decreasing environmental resources.

The study did not establish who in the household is the custodian of coping strategies. Both women and men are equally involved in search of food among the Atharaka. However, it was observed that division of labour at the household is asymmetrical and gives more work is allocated to females than to males. Men too have more rights to dispose off produce and they have greater power of access to and control over resources than women. This has serious implications for food security and environmental management particularly as women are increasingly

becoming defacto heads of households.

A major conclusion of this study is that the harsh environment has taught the Atharaka how to cope with diminishing resources. Their culture allows them to negotiate between human survival and resource sustainability. In earlier times, death from starvation provided a solution by maintaining a balance between people and their drought-prone environment. Such equilibrium has, however, been distorted by the on-set of the market economy. Introduction of new technologies has not reduced vulnerability to food. What is needed is strengthening whatever knowledge the Atharaka have on coping with food shortages.

Currently, there seems to be a struggle to persuade the Atharaka to change from what they have been doing for years and be modern ways of food production. Modernization, however, has not reduced vulnerability to food shortages. It has, instead, led to dis-incentives to corporate food production and environmental management particularly by encouraging individaul land tenureship by the Atharaka. Food insecurity has left the people with few alternative strategies for risk minimization. Such strategies include moving out of their land to seek employment in far-off places and to wait for relief food from the well-wishers. A third option is to get drunk with traditional beer and bury their problems temporarily. These are humbling experiences which are not likely to ensure food security and good management of the environment.

The Atharaka are neither innately conservative nor are they

afraid of taking risks for their own good. Their settlement areas in Tunyai and Nkondi leave no doubt that the Atharaka can generate income by maximum use of irrigation schemes in cultivation of money-generating crops such as cotton, tobacco, sunflower and green-grams, among others, to maximize on the high market value and demand for these products. Sticking to their way of crop cultivation and livestock rearing is an exercise of prudence in which they consider all possible consequences before taking risky ventures. The Atharaka are thus not so much afraid of change for the sake of clinging to tradition, but for what they see as economic rationality.

8.5 Recommendations of this Study

On the basis of the study findings, the following recommendations were proposed:

1. It is clear from the findings of this study that the main cause of food shortages in Tharaka is a combination of the ravages of the environment and socio-economic factors. It was also noted that whilst their food-procuring methods are well endowed with coping strategies, the Atharaka production system often fails to provide the necessary food security. The Kenya Government and Non-governmental development agents ought to recognize, appreciate and promote agro-pastoralism as a way of food production and environmental management. Coping strategies within these ways of food procurement ought to be understood and encouraged.

If these strategies are understood, they might become more effective in minimizing the effects of food shortages in

Tharaka. Use of Farming Systems Approach or Extensions (FSA/E) could, for example, promote a holistic approach to food procurement which makes use of the locally available technology with only minor adaptations. Through on-farm research, development agents could get the farmers involved and interested in the results and outcomes of research. The extension staff have a lot of dialogue with the farmers.

2. Extension training should include ways of combining tried and culturally tested coping strategies with the modern agricultural developments. The former have the advantage of having been proved through years of adaptations and adjustments through many generations. A revised curriculum is long overdue for, as yet, the extension workers do not appreciate the fact that local crops have varieties which could be experimented upon for better production. Many experiments which the current agricultural extension staff were making, were irrelevant to the socio-economic and natural environment of the studied Atharaka. Extension workers have yet to realize the need to understand the value of what is available among the Atharaka.

3. Current pressure towards individual ownership and management of resources leads to unnecessary competition in exploitation of the environment. The individuated land tenure, for example, has the disadvantages of bringing about individualism and discouraging the pooling of resources for maximum use in production. Encouraging social ties in exchange relationships could enhance exploitation of economics of scale among the Atharaka. Corporate responsibility for the environment is

threatened by demand for cash as shown by the way felling of trees for charcoal-making has led to loss of nutritive, medicinal, and some specific trees and shrubs which had multiple usage in Tharaka.

4. There is need for a re-orientation that popularizes indigenous foods such as *kathoroko,* the locally produced beer, gruel and varieties of *nkima* which are food for the Atharaka. Cottage industries which could provide national and international markets for millet and sorghum-bread made with local honey could encourage massive production of these crops in Tharaka. The cash flows from such production could be an assurance to the Atharaka that their land is productive. This study and others which recommend support for the indigenous knowledge and techniques of food procurement and environmental management should be supported. Possible research and interventions include the need to investigate possible ways to minimize current agricultural risks and uncertainties.

5. Development agents ought to be concerned with the significance of what goes on within households in Tharaka and in any other area where rural development is taking place. Currently, the activities of the NGOs working in Tharaka lack co-ordination. Each of them emphasizes its own view concerning the "right " way for the developing Tharaka. The articulation of issues as observed during this study is reminiscent of "scramble for empires". There are several conflicting ideas which are forced upon the people in public meetings. The government ought to ensure that the conscientization of communities is carried

out sensibly.

6. Although patriarchy determines much of what happens in the household decision-making within the Atharaka culture, there is need to seek for ways of empowering women who carry out most of the food producing and environmental management activities. This study has shown that women in Tharaka were not traditionally excluded from political decision-making. There is need to build on these memories and enhance women's participation and involvement in projects meant for the community's welfare.

7. Improving the infrastructure in Tharaka is an urgent requirement. There is no way an area can improve without contacts with the rest of the world. Development of roads, health facilities and schools is essential for food security. Availability of transport could also make Tharaka accessible to more people and food prices could become lower. Transport could facilitate exchange of ideas and adaption of more ways of how to cope with food shortages from other people living in similar environments.

BIBLIOGRAPHY

Abella, J.C., P.B. Atengndem, N.J. Beun, J.F.M.Manval, D. Ray, B.P. Rosario and S.A.Winston.
1984 The Farming Systems in Tharaka: Strategies for Subsistence in a Marginal Area of Kenya. Wageningen, Netherlands: International Course for Development Oriented Research in Agriculture (ICRA) December.

African Training and Research Centre for Women (ATRCW)
1992 A Semi-Annual Newsletter of Economic Commission for Africa Programme on the Advancement of Women No. 18: 6-8 Addis-Ababa. 14th July.

Akon'ga, J. J.
1982 Famine, Relief and Public Policy in Kitui District. Working Paper No. 388, Institute for Development Studies, University of Nairobi.

Akong'a, J. and T.E. Downing
1985 Smallholder Vulnerability and Response to Drought in Central and Eastern Kenya. Nairobi: Ministry of Environmental and Natural Resources.

Alland, A.J.
1972 The Human Imperative. New York: Columbia University Press.

Annabel, R.
1992 Women and the Environment. London: Zed Books.

Anyango, G,J,T.E. Downing, C. Getao, M.Gitahi,C. Kabutha, S.W. Maghanga, S.K. Mbarire, S. Munene, W. Mutero, H. R. Muturi, B. Mwangi, M. Wainana and F. Were
1989 Drought vulnerability in Central and Eastern Kenya in T.E. Downing, K. Gitu and C.M. Kamau In Coping with Drought in Kenya, pp.169-210. London: Lynne Rienner.

Aronson, D. R.
1980 Must Nomads Settle? Some Notes Towards Policy on the Future of Pastoralism. In D.C. Salzman (Ed.) When Nomads Settle. pp. 173-184. New York: Praeger.

Ayisi, E.O.
1979 An Introduction to the Study of Human Culture. Suffolk, Great Britain: Richard Clay.

Bakema, R. J., D. Kimenye and E. I. Njiro
1992 Agricultural Interventions in the Arid and Semi-arid Lands of Laikipia District in Kenya: A Sectoral Proposal for NIRDP of Netherlands Government. Nairobi /Amsterdam: Ministry of Foreign Affairs, Netherlands.

Baker, P. R.
1967 Environmental Influences on Cattle Marketing in Karamoja Occasional Paper No. 5, Department of Geography, Makerere University, Kampala.

Barrow, B.
1985 Points to Ponder. Readers Digest, 127 (762):35.

Barth, F.
1956 Ecologic Relationships of Ethnic Groups in Swat, North Pakistan. American Anthropologist, 58: 1079-89:

Bender, B.D.
1967 A Refinement of the concept of the Household, Families, Co-residence and Domestic Functions. American Anthropologist, 69:493-504.

Bernard, F.E.
1972 East of Mount Kenya:Meru Agriculture in Transition. Munchen: Weltforum Verlag.

Bernadi, B.
1959 The Mugwe, A Failing Prophet: A Study of a Religious and Public Dignitary of the Meru of Kenya. London: Oxford University Press.

Berry, L.
1971 Human Adjustment to Agricultural Drought in Tanzania: Pilot investigations. BRALUP: University of Dar-es Salaam, Tanzania.

Bohannan, P.
1959 The Impact of Money on African Subsistence Economy. Journal of Economic History, 19 (4):491-501

Boserup, E.
1965 The Conditions of Agricultural Growth. London: Allen and Unwin.

Blomstrom, M. and B. Hettne
1984 Development Theory in Transition. London: Zed Books.

Brandstrom, P.
1979 Aspects of Anglo- Pastoralism in East Africa. Research Report no. 51, Scandinavian Institute of African Studies, Uppsala, Sweden.

Braun, H.M. H.
1977 The Reliability of Rainy Seasons in Machakos and Kitui Districts. Miscellaneous Paper no.12, Kenya Soil Survey, Nairobi, Kenya.

Brokensha, D.
1971 Tharaka Notes. Unpublished Document at the Institute for Development Studies, University of Nairobi.

1978 Introduction to Cash-crops in a Marginal Area of Kenya. Paper Presented at a Social Research Institute. University of California, Santa Barbara.

1989 Local Management Systems and Sustainability. In C. Gladwin and K. Truman (Eds.). Food and Farm, pp.179-197. New York: University Press of America.

Browner, C. H.
1982 Gender Roles and Social Change. Los Angeles: Los Angeles Press.

Brouwer, H., E.M Stokhof and J. F. G. Bunders (Eds)
1992 Biotechnology and Farmer's Rights. Amsterdam: Vu University Press.

Bryceson, D.F.
1990 Food Insecurity and Social Division of Labour in Tanzania, 1919-1985. New-York: St. Martin's Press.

Bunders, J.F.G., D.A. Haribou, O. Kane, M. Mensa, R. Musangi, C. Poort, T. Sande, A. Stanneveld and T.A. Tylor.
1992a Managing the Gap Between Needs and Options. Amsterdam: Vu University Press.

Bunders, J.F.G. and J.E.W. Broerse(Eds)
1992b Appropriate Technology in Biotechnology in Small-scale Agriculture: How to Re-orient Research Development. Wallingford, U.K.: C.A.B International.

Burgess, A.
1994 Community Nutrition for Eastern Africa. Nairobi: African Medical and Research Foundation.

Burton, I., R. W. Kates and G. F. White
1978 The Environment as Hazard. New York: Oxford University Press.

Campbell, D. J.
1979 Response to Draught in Maasailand: Pastoralist and Farmers of the Loitokitok Area Kajiado District. Discussion Paper no. 267, Institute for Development Studies, University of Nairobi.

1984 Responses to Drought among Farmers and Herders in Southern Kajiando District, Kenya. Human Ecology, 12 (1): 35-64.

Canadian Council for International Cooperation (CCIC)
1991 Two Halves Make a Whole: Balancing Gender Relations in Development. Ottawa: Association Quebecoise Des Organismes de Coperationnale.

Cattell, M. G.
1990 Old Age in Rural Kenya: Gender, the life course and Social change. Michigan: University Microfilms International, Ann Arbor.

Chambers, R., R. Longhurst and A. Pacey (Eds.)
1981 Seasonal Dimensions to Rural Poverty. London: Allanheld Osmun.

Champion, A.M.
1912 The Atharaka. Journal of the Royal Anthropological Institute, 42:68-91.

Charlton, S.E.M.
1984 Women in Third World Development. Boulder, CO and London:Westview Press.

Cloud, K. and J.E. Austin.
1985 Gender Roles in Development Projects. West Hartford, Connecticut: Kumarian Press

Cohen, J.M.
1971 Man in Adaptation: The Institutional Frame. Chicago: Aldine.

Cohen, J.M. and D.B. Lewis
1987 Role of Government in Combatting Food Shortages: Lessons From Kenya 1984/85. In M.H. Glantz(Ed.). Drought and Hunger in Africa, pp 269-296 Cambridge: Cambridge University Press.

Conclin, H.C.
1969 An Ethno-ecological Approach to Shifting Agriculture in A.P.Vadya (Ed.). Environmental and Cultural Behavior, pp 221-233. Garden-City, New York: Natural History Press.

Cultler, P. and R. Stephenson
1988 The State of Emergency Preparedness in Ethiopia. London: International Disaster Institute.

Dankelman, I. and J. Davidson
1988 Women and Environment in the Third World. London: Earthscan Publications.

Darwin, C.
1859 On the Origin of Species. New York: Atteneum (1967 edition).

Delgado, C.M. and J. Blackie
1987 Strategic Issues in Food Production in Sub-Saharan Africa. Atlanta: John Hopkins University Press.

Desrosier, N. W.
1970 The Technology of Food Preservation. Westport, Connecticut: The Avi Publishing Company.

Diouf, B. S.
1993 Natural Resources Production and Women's Knowledge and Techniques in the Field of Nutrition and Health. Paper

Presented at a Women, Environment and Development Network (Wednet) Research Review and Assessment Meeting, April 28-May 1, Naro Moru River Lodge, Kenya.

Douglas, M.
1967 Primitive Rationing: A Study in Controlled Exchange. In R. Fifth (Eds.). Themes in Economic Anthropology, pp. 119-145. London: Tavistock Publications.

Downing, T.E.
1988 Climatic Variability, Food Security and Smallholder Agriculturalists in Six Districts of Central and Eastern Africa. Ph.D. Dissertation. Worcester, Mass., Clark University Press.

Downing, J., L. Berry, L. Downing, T. E. Downing and R. Ford
1987 Drought and Famine in Africa: 1981-1986. Worcester, Mass.: Clark University Press.

Downing, T. E., K.W. Gitau and C.M. Kamau
1989 Coping With Drought in Kenya: National and Local Strategies. Boulder, CO: Lynne Rienner.

1990 Monitoring and Responding to famine: Lessons From 1984-85 Food Crisis in Kenya. Disasters, 14(3): 204-229.

Dyson-Hudson, N.
1966 Karimajong Politics. London: Oxford University Press.

Dyson-Hudson, R and N. Dyson-Hudson
1980 Nomadic Pastoralism. Annual Review of Anthropology, 9:15-61.

Dyson-Hudson, N and J. T. Mccabe
1985 South Turkana Nomadism: Coping With an Unpredictably Varying Environment Vol. I and II. New Haven, Connecticut: HRA Flex Books.

Edgerton, R. B.
1971 The Individual in Cultural Adaption. Los Angeles: University of California Press.

Ekejiuba, F.
1984 Contemporary Households and Major Socio-economic Transitions. In J.I. Guyer and P.E. Peters (Eds.) Conceptualizing the Household: Issues of Theory, Method and Application pp.9-13. Harvard University: Teleprint Publishing.

Elson, D.
1987 The Impact of Structural Adjustment on Women: Concepts and Issues. Paper presented to the Development Studies Association Annual Conference, Manchester.

1989 How is Structural Adjustments affecting Women? in Development (Lavoro Society for International Development) Paper no. 1.

Environmental Liaison Centre International (ELCI)
1993a A Series of Reports of Seminars held by Women Environment and Development Network (Wednet), April 28-May 1, Naro Moru River Lodge, Nanyuki-Kenya.

1993b Second Circular on the Convention to Combat Desertification. Nairobi: ELCI.

Fadiman, J.
1970 Oral Traditions of the Meru, Mwibe and Muthambe of Mt.Kenya. Seminar Paper Delivered at Institute of African Studies, University of Nairobi, July.

Fleuret, A.
1986 Indigenous Responses to Draught in Sub-Saharan Africa. Paper presented to a symposium on Issues and Strategies in Drought, Hunger and Famine of the American Association for the Advancement of Science, Washington D.C.

Fleuret, P. and A. Fleuret
1991 Social Organization, Resource Management and child Nutrition in Taiga Hills Kenya. American Anthropologist, 93 (1): 91-114.

Forje, J.
1993 Biotechnology, Biodiversity, Biosafety and Development in Africa. Paper presented at an International Conference on the convention on Biological Diversity: National Interests and Global Imperatives at Girigiri Nairobi: UNEP.

Foster, G.
1969 Applied Anthropology. Boston: Little Brown.

Franzel, S. C.
1983 Planning an Adaptive Production research for Small Farmers: A Case study of Farming Systems Research in Kirinyaga District, Kenya. Ph.D Dissertation, Michigan State University, Ann Arbor.

Gedfe, E.
1892 A Recent Exploration Under Captain F. G. Dundas, up the River Tana to Mt. Kenia. Proceedings of the Royal Geographical Society, 7: 513-533.

Geertz, C.
1963 Agricultural Involution: the Process Of Ecological Change in Indonesia. Berkerley: University of California Press.

1965 The Social History of an Indonesian Town. Cambridge, Mass: MIT Press.

1973 The Interpretation of Culture. New York: Basic Books.

Glazier, J.
1975 Conflict and Conciliation among the Mbeere. Berkeley: University of California Press.

Goode, W.
1970 World Revolution and Family Patterns. New York: The Free Press.

Government of Kenya
1979 Central Bureau of Statistics: Census. Nairobi: Government Printer.

1985 Meru District Environment Assessment Report. Nairobi: Government Printer

1989 Meru District Development Plan 1989-93. Nairobi: Government Printer.

Government of Kenya and United Nations Children's Education Fund (UNICEF)
1992 Children and Women in Kenya: A Situational Analysis. Nairobi: UNICEF Kenya Country Office.

Goyder, H. and C. Goyder
1988 Case Studies of Famine: Ethiopia. In D. Curtis, M. Hubbard and A.Adrews (Eds.). Preventing Famine Policies and Prospects for Africa, pp.73-110. New York: Routledge.

Guyer, J. F.
1980 Household Budgets and Women's Incomes. Paper Presented to the Symposium on Women in Work-force at the American Anthropological Association Meetings 10th March, Boston, Massachusetts.

1985 The Role of Women in African Economic development. A Background Paper for the Department of Anthropology, Harvard University, 13th February.

Hanger, J. and J. Moris
1973 Women and the Household Economy. In P. Chambers and J. Moris (Eds.). Mwea: An Irrigated Rice Settlement in Kenya, pp. 209-244. Munich: Wetforum Verlag.

Hartmann, H.I.
1981 The Family as the locus of Gender, Class and Politcal Struggle: An Example of Housework. Signs, 6:372-375.

Haugerud, A
1987 Food Production Wealth and Farmers' Strategies in Kenya. In R. Cohen (Ed.). Satisfying Food Production and Commercialization in African Agriculture, pp. 35-40. Boulder, CO : Lynne Rienner.

Harvard Institute of International Development (HIID)
1983 Aid Cooperative Agreements Research Papers on Social Science Issues at Cambridge, Harvard University, Massachusetts.

Hewitt, J.
1971 Probablistic Approaches to Discrete National Events. Natural Hazard Research Paper No. 8, University of Toronto.

Higgins, G., A. Kassam, and V.H. Velthuizen
1981 Africa's Agricultural Potential. Ceres, 14(5): 13-21.

Hill, P.
1972 Rural Hausa: A Village and a Setting. Cambridge: Cambridge University Press.

Hobley, C. W.
1910 Ethnology of Akamba and Other East African Tribes. London: Frank Cass .

Holding, E.M.
1942 Some Preliminary Notes on Meru Age Grades. Man 42(29-49):58-65.

Hunt, D.
1975 A Summary of Survey Methods Employed in the Mbeere Study of the Distribution of Economic Status and Farm Innovation Amongst Mbeere Household. Working Paper no. 238, Institute for Development Studies University of Nairobi.

1983 Gender and Class Consciousness. London: Macmillan.

Impey, A.
1992 They Want us with Salt and Onions: Women in Zimbambwean Music Industry. A Dissertation Submitted in Partial fulfillment of the requirements of the degree of Philosophy, Department of Anthropology, Indiana University, Bloomington Campus.

International Center for Research on Women (ICRW)
1992 The Environment and Natural Resources. In R.Mehra, D. Bruns, G.R. Gupta and M.Lycette (Eds.). Engendering

Development in Asia and the Near East: A Source Book, pp. 65-78. Washington D.C: ICRW/ USAID.

Independent Commission on International Humanities Issues (ICIHI)
1985 Is Famine: A Man-Made Disaster? London: Pan Books.

International Labour Organization (ILO)
1986 After the Famine: Towards an Approach. Geneva: U.N.

International Union for Conservation of Nature and Natural Resources (IUCN)
1990 Biodiversity in Sub-Sahara Africa and Its Islands. Gland, Switzerland: IUCN.

Jaetzold, R. and H. Schmidt
1983 Farm Management Handbook of Kenya. Vol. II: Natural Conditions and Farm Management Information Part C: (Eastern and Coast Provinces). Nairobi: Ministry of Agriculture.

Jiggins, J.
1989 An examination of the Impact of Colonialism in Establishing Negative Values and Attitudes towards Indigenous Agricultural Knowledge. In D.M. Warren, L. J. Slikeverver and S. O. Titilola(Eds.). Indigenous Knowledge Systems for Agriculture and International Development pp 68-78. Ames: Iowa State University Press.

Joekes, S.
1987 Women in the World Economy. New York: Oxford University Press.

Kabira, W. M.
1992 Story-tellers and the Environment. In S.Khasiani (Ed.). Groundwork, pp. 67-74. Nairobi: ACTS Press.

Kaplan, D. and R. Manners
1972 Culture and Theory. Engelwood Cliffs, NJ: Prentice Hall.

Kanogo, T.
1992 Women and Environment in History. In S. Khasiani (Ed.). Groundwork, pp. 7-18, Nairobi: ACTS Press.

Kayongo-Male, D.
1988 Dynamics of the Division of Labour. Paper Presented at a Workshop on Conceptualizing the Household: Issues of Theory, Method and Application. Boston, Massachusetts 21-19 August.

Kenyatta, J.
1938 Facing Mount Kenya: The Tribal Life of the Gikuyu. London: Secker & Warburg.

Kilbride, P. L. and J. C. Kilbride
1990 Changing Family Life in East Africa. London: The Pennsylvania State University Press.

Kiriro, A. K. and C. Juma (Eds.).
1991 Gaining Ground. Nairobi: ACTS Press.

Klima, G.J.
1970 The Barabig: East African Cattle Herders. New York: Holt, Rinehart and Winston.

Kluckhohn, C.
1965 Culture and Behavior. New York: The Free Press.

Knight, C. G.
1974a Ecology and Change: Rural Modernization in an African Community. New York: Academic Press.

Korten, David
1990 Getting to the 21st Century. Hartford, Connecticut: Kumarian Press.

Lambert, H.E.
1950 The System of Land Tenure in Kikuyu Land Unit. Communications of the School of African Studies, University of Cape Town, N S No. 22.

1956 Kikuyu Social and Political Institutions. London: Oxford University Press.

n.d. Use of Indigenous Authorities in Tribal Administration: Studies of the Meru of Kenya. Communication of the School of African Studies, University of Cape Town, South Africa. Un-serialized

Leakey, L.S.B.
1936 Kenya: Contrasts and Problems. London: Methuen.

Ledge, H.
1994 Water for Health and Wealth: A Study of Popular Participation In Tharaka Water and Sanitation Project, Eastern Kenya. Working Paper no. 28, Department of Social Anthropology, Stockholm University.

Lee, D.
1959 Freedom and Culture. Engelwood Cliffs, N J: Prentice Hall.

Lee, R.B.
1968 What Hunters do for a Living or how to make out in Scarce Resources. In R. B. Lee and I. Devore (Eds.) Man the Hunter, pp.30-48 Chicago: Aldine.

Levi-Strauss, C.
1969 The Elementary Structures of Kinship.(Translated from the French originally published in 1967). Boston: Beacon Press.

Lie, J.
1992 The Concept of Mode of Exchange American Sociological Review, 54 (4): 508-523.

Lofland, J. and L. Lofland
1984 Analysis of Social Settings. Bekerley, California: Wadsworth.

Lowenthal, R. A.
1973 Tharaka Age-Organization and the Theory of Age-set system Ph.D Dissertation, Graduate College, University of Illinois, Urbana-Champaign.

Maclachlan, M.D.
1983 Why They Did Not Starve. Philadelphia, Pennsylvania: Institute for the Study of Human Issues.

Malinowski, B.
1944 A Scientific Theory of Culture and Other Essays. Chapel Hill: University of North Carolina Press.

Mbithi, P. M. and B. Wisner
1978 Drought in Eastern Kenya: Comparative Observations of Nutritional Status and Farmers Activity at 17 Sites. Discussion Paper No.167, Institute for Development Studies, University of Nairobi.

Mburugu, E. K.
1986 The African Household in Socio-economic Change: A Conceptual Problem in Research. In O.M. Bashir, F. Fassil and G. Kiros(Eds.). Research Methods in the Social Sciences, pp.70-79, Addis Ababa: Khartoum University Press.

McCorkle, C. M.
1987 Food grains Disposal as Early Warning Famine Signals: A Case of Burkina Faso. Paper presented to the Department of Rural Sociology, University of Missouri, Columbia.

Moran, E. F.
1979 Human Adaptability: Introduction to Ecological Anthropology. Boulder, CO: Westview Press.

Moser, C.O. N.
1989 Gender Planning in Third World: Meeting Practical and Strategic Gender Needs. World Development, 17 (11): 1799-1825.

Mowrer, O. H. and C. Kluckhohn
1944 Theory of Personality. In J.M.V. Hunt(Ed.). Personality and Behaviour, pp. 50-72. New York: The Ronald Press.

Muriuki, G.
1974 A History of the Kikuyu 1500-1900. London: Oxford University Press.

Musembi, D.K.
1984 Identification of Crop Seasons of Semi-Arid Kenya by Analysis of the Soil Moisture Patterns. Unpublished Msc. Thesis, Texas A & M University.

Mustafa, A.
1993 Food Security in Drought-Prone Environment: The Case of Sudan, Paper Presented at a Women, Environment and Development Network (Wednet) Research Review and Assessment Meeting, April 28-May 1, Naro Moru River Lodge, Kenya.

Mwabu, G.M.
1976 Finance in Smallholder Agriculture in Tharaka Eastern Kenya: A Case Study of Small Farm Finance. Unpublished M.A. Thesis, Department of Economics, University of Nairobi.

1984 A Model of Household Choice Among Medical Treatment Alternatives in Rural Kenya. Ph.D. Dissertation, Department of Rural Health Boston University, Massachusetts.

Nanda, S.
1987 Cultural Anthropology. Belmont, California: Wadsworth Publishing Company.

Ndagala D. K.
1974 Social and Economic Change Among the Pastoral Wakwavi and its Impact on Rural Development. Unpublished M.sc. Thesis, University of Dar es Salaam.

National Environmental Secretariat(NES)

1985 Climatic Variability and Agricultural Production in Central and Eastern Kenya. Nairobi: National Environmental Secretariat.

n.d. Desertification Control and Monitoring: Tharaka Division An incomplete document by researchers from the Ministry of Environment. Crescent House, Nairobi.

Netting, R.
1977 Cultural Ecology. Menlo Park, California: Cummings.

Njiro, E. I.
1990 Effects of Tea Production on Women's Work and Labour Allocations in Embu District. Unpublished M.A. Thesis, Institute of African Studies, University of Nairobi.

Njiru, G. K.
1982 The Rendille Economy. Working Paper no.389, Institute for Development Studies, University of Nairobi.

Norconsult, A.S.
1990a Greater Tharaka Water and Sanitation Project: Draft Plan of Operation. Republic of Kenya: Ministry of Water Development/ Swedish International Authority.

Nyaga-Mwaniki, N.
1986a Against Many Odds: The Dilemmas of Women's Self-help Groups in Mbeere Kenya. Africa, 56(2): 211-257.

1986b Social and Economic Effects of Tenure Reforms in Mbeere. Ph.D Dissertation, Faculty of Graduate School, Indiana University, Bloomington.

Ochieng', W. R.
1985 A History of Kenya. Nairobi: Macmillan (Kenya).

Odegi-Awuondo, C.
1987 Human Response to Drought in Turkana, Kenya. Unpublished Ph.D Thesis, Department of Sociology, University of Nairobi.

1990 Life in the Balance: An Ecological Sociology of Turkana Nomads. Nairobi: ACTS Press.

Oendo, A.W.
1988 Identity and Adaptation: Social and Political Factors in Health and Development Among the Digo of Msambweni, Kenya. Ph.D. Thesis: Cambridge University .

Ogallo L. J.
1987 Relationships Between seasonal Rainfall in East Africa and the Southern Oscillation. Journal of Climatology, 8: 31-43.

Okidi, C.O.
1992 Africa, Environment and Development: Some Proposed Initiatives. Resources, 2 (3): 18-19.

Omosa, M.
1992 Women and the Management of Domestic Energy. In S. Khasiani (Ed.). Groundwork, pp.41-54, Nairobi: ACTS Press.

Oliver-Smith, A. R.
1973 Yungay Disaster and Social Change in the Peruvian Highland. Ph.D Dissertation submitted to the Department of Anthropology, Indiana University, Bloomington.

Onyango, T. A.
1991 Traditional Agriculture. Resources, 2(1): 33-36.

Palmer, I.
1991 Gender and Population in the Adjustment of African Economies: Planning for Change. Geneva: ILO.

Pelto, P.
1973 Technology and Social change in the Arctic. Santa Barbara, California: Cummings.

Pinstrup-Anderson, P.
1983 Export Crop Production and Malnutrition. Occasional Paper Series Vol.2. No. 10. Chapel Hill: University of North Carolina.

Plucknett, D. L. and N.J.H. Smith
1982 Agricultural Research and Third World Food Production Science, 217: 215-200.

Poggie J.J., B. R. Dewalt and W.W. Dressler (Eds.)
1992 Anthropological Research Process and Application. New York: State University of New York Press.

Porter, P. W.
1965 Environmental Potentials and Economic Opportunity: A Background for Cultural Adaption. American Anthropologist, 67 (1): 60-64.

1970 The Concept of Environmental Potential as Exemplified by Tropical African Research. In W. Zelinsky (Ed.). Geography and a Crowding World, pp.127-137. New York:Oxford University Press.

Rappaport, R. A.
1967 Ritual Regulation of Environmental Relations Among a New Guinea People. Ethnology, 6: 17-30.

Redford, K. H.
1993 The Ecological Noble Savage. In W.A. Haviland and R. J. Gordon (Eds.). Talking About People, pp.11-13, Mountainview, California: Mayfield Publishing Company.

Republic of Kenya
1992 Environmental Action Plan for Arid and Semi-Arid Lands (ASALs) in Kenya. A Draft World Bank Publication for the Development Policy for the Arid and Semi-Arid Lands.

1994 Tharaka-Nithi District Development Plan 1994-1996. Nairobi: Ministry of Planning and National Development.

Reynolds, D.
1982 The Household Divided: Competition for Cash Between Husbands and Wives in West Pokot, A Paper Presented At the Symposium on Household Level Analysis in Economic and Political Research, Department of Anthropology University of Washington, 28th to 30th June.

Richards, A. I.
1939 Land, Labour and Diet in Northern Rhodesia. London: Oxford University Press.

Richards, P.
1985 Coping With Hunger. London: Allen and Unwin.

Riley, B. W. and D. Brokensha
1988 The Mbeere in Kenya Vol.I. New York: University Press of America.

Roberts, R.S.
1979 African Cattle in Pre-colonial Zimbabwe. NADA, 12: 60-84.

Robinson, P. W.
1980 Disaster and Response Among the Gabbra of Northern Kenya: An Historical Perspective. A Discussion Paper for the Conference on Ecological Stress in East Africa, Nairobi, 15-17th June.

1989 Reconstructing Gabbra History and Chronology: Time Recording, the Gabbra Calendar and the Cyclical View of Life. In T.E. Downing, K.W. Gitu and C.M. Kamau(Eds) Coping With Drought, pp.157-168. London: Lynner Rienner.

Rocheleau, D., F. Weber and A. Field-Juma
1988 Agro-forestry in Dryland Africa. Nairobi: International Council for Research in Agroforestry (ICRAF).

Rogers, B.
1980 The Domestication of Women: Discrimination in Developing Societies. London: Tavistock.

Rogers B. L. and P. Schlossman (Eds.)
1990 Intra-Household Resource Allocation: Issues and Methods For Development Policy and Planning. Tokyo: United Nations University Press.

Rosaldo, M.Z. and L. Lamphere(Eds.)
1974 Women, Culture and Societies. Stanford, California; Stanford University Press.

Ruthberg, H.
1977 Farming Systems in the Tropics. Oxford: The Clarendon Press.

Schoepf, B. G.
1992 Gender Relations and Development: Political Economy and Culture. In A.Seidman and F. Anang (Eds.). Towards a New Vision of Self-Sustainable Development 21st Century Africa, pp.203-249. Trenton, NJ: Africa World Press.

Scrinshaw, N.
1987 Adjustment Policies that Increase Poverty. In K. Hak and U. Kidar (Eds.) Human Development, Adjustment and Growth, pp. 192-207.Islamabad; North South Roundtable

Sen, A.
1981 Poverty and Famine: An Essay on Entitlement and Deprivation. Oxford: The Clarendon Press.

Sen, G. and C. Grown
1985 Development Crises and Alternative Vision: Third World Women's Perspective. New York: Monthly Review Press.

Shopo, T.D.
1985 The Political Economy of Hunger. A Working Paper No. 2. Harare: Government of Zimbabwe.

Soderstrom, B.
1993 The destruction of Millet by Crop-Eating Birds-the Possible Impact on Trees. Working Paper no.233, University of Agricultural Science, Uppsala.

Sostheimer, S.(Ed)
1991 Women and the Environment: A Reader: Crisis and Development in the Third World. London: Earthscan Publications.

Sprandley, J. P. and D.W. McCurdy
1975 Anthropology: The Cultural Perspective. New York: John Wiley and Sons.

Sprig, A.
1986 Women Farmers and Food in Africa. Boulder, CO: Lynne Rienner.

1992 Women Farmers and Food in Africa: Some Considerations and Suggested Solutions. In A. Hansen and D. E. Mcmillan(Eds.). Food in Sub-Saharan Africa, pp. 332-348. Boulder, CO:

Lynne Rienner.

Stamp, P.
1989 Technology, Gender and Power in Africa. Ottawa: International Development Research Center.

Staudt, K.
1988 Women Farmers in Africa: Research and Institutional Action, 1972-1987. Canadian Journal of African Studies, 22 (3): 567-583.

Steward, J. H.
1955 The Concept and Method of Cultural Ecology: Theory of Culture and Change. Urbana-Champaign : University of Illinois Press.

Stitcher, S. and J. L. Parpart(Eds.).
1988 Patriarchy and Class: African Women in the Home and Work-force. Boulder, CO: Westview.

Stryker, S.
1973 Fundamental Principles of Sociology. New York: John Wiley & Sons.

Swift, J.
1989 Why are Rural People Vulnerable to Famine? In R. Chambers (Ed.). Vulnerability: How the Poor Cope, pp.8-15. Sussex: Institute of Development Studies.

Timberlake, L and J. Tinker
1985 Africa in Crisis. London: Earthscan.

Todaro, M. P.
1982 Economics for a Developing World. London: Longman.

Torry, W. L.
1974 Culture and Adaptations in the Desert Natural History. New York: The American Museum of Natural History.

Turnbul, C.
1961 The Forest People. New York: Simon & Schuster.

Tylor, E. B.
1889 Anthropology: An Introduction to the Study of Man. New York: D. Appleton and Co.

United Nations
1973 Determinants and Consequences of Population Trends. New York: United Nations.

United Nations Environmental Program (UNEP)
1990 Desertification Control Bulletin .Nairobi: UNEP.

1992 Status of Desertification and Implementation of the United Nations Plan of Action to combat Desertification. Nairobi : UNEP.

United Nations Disaster Coordination(UNDRO)
1988 Peasant Survival Strategies in Ethiopia. UNDRO News, No. 8, July/August.

Vadya, A.(ed)
1969 Environmental and Cultural Behavior: Ecological Studies in Cultural Anthropology. New york: Natural History Press.

Vadya, A.P. and R. A. Rappaport
1968 Ecology, Cultural and Non-Cultural. In A. Clifton(Ed.). Introduction to Cultural Anthropology, pp.460-494. Boston: Houghton Mifflin.

Wainaina, S.
1990 Major Agricultural Reforms Needed. African Farmers, 15 (3):26-34.

Walsh, J.
1986 Famine Early Warning Closer to Reality. Science, 233: 1145-1147.

Warren, M. W.
1991 Using Indigenous Knowledge in Agricultural Development. Washington, DC.: World Bank.

Webb, P., J.Braun and Y.Yohannes
1992 Famine in Ethiopia:Policy Implications of Coping Failure at National and Household Levels. Washington, D.C.: International Food Policy Research Institute.

Weller, S. C. and A. K. Romeney
1988 Systematic Data Collection. London: Sage.

Wignaraja, P.
1984 From Village to the Global Order. In M. R. Elghonemy (Ed.). Studies on Agrarian Reform and Rural Poverty, pp. 20-26. Rome: FAO

Wipper, A. and H. Lyons
1988 Special Issue: Current Research on African Women. Canadian Journal of African Studies, 22(3): 205-233.

Wisner, B.
1977 The Human Ecology of Drought in Eastern Kenya. Unpublished Ph.D. Dissertation, Department of Geography, Clark University, Massachusetts.

Wright, Gary A.
1992 Origins of Food Production in South-West Asia: A survey of Ideas. Current Anthropology, 33: 109-140.

APPENDIX

FOOD, CULTURE AND ENVIRONMENT: THE CASE OF THE ATHARAKA OF EASTERN KENYA

QUESTIONNAIRE

If Found to be sent to ESTHER I. NJIRO
INSTITUTE OF AFRICAN STUDIES UNIVERSITY OF NAIROBI
P.O. BOX 30197, NAIROBI

COMMENT: Some of the questions and statements in this questionnaire might not be readily understood by those who do not share the same cultural linguistic background with the Atharaka. An effort is made to elucidate these questions with supplementary questions and statements.

Enumerator's Name _____

Date of Interview _____

Agro-ecological Zone No _____

Location _____

Sub-location _____

PART I

DEMOGRAPHIC DATA

(tick the appropriate response).

1. sex: Male (M)
   Female(F)

2. Age: 60 and over____
   45-59___
   25-44___
   15-24___

3. Level of education:
   Primary
   Secondary
   Training
   Other(specify)
4. Family set up:
   Monogamous
   Polygynous
   Single:
   Never married
   Divorced
   widowed
5. Family members:
   No. of houses in the homestead
   No. of people in each house
   No. of girls
   No. of boys
   Total no. of people in the homestead
6. Relations of people living in the homestead:
   a) Co-wife---
   b) Cousin---
   c) Uncle---
   d) Brother--
   e) Parents of the husband--
   f) Sisters--
   g) Grand Parents-
   h) Workers--
   i) Others--
7. Type of Shelter:
   Permanent--

Temporary--

8. Source of water:
   a) Piped
   b) Spring /well
   c) River (name it)
   d) Roof

9. Distance from the water source:
   a) Less than one km
   b) 1-4km
   c) 5-8 km
   d) More than 8 km

10. Time taken to fetch water:
   a)Less than 1 hour--
   b) 1-2 Hours
   c) 3-4 Hours
   d) 4-6 Hours
   e) More than 6 hours

11. Sources of energy:
   a) Firewood
   b) Charcoal
   c) Electricity
   d) Cow dung
   e) Biogas/biomass
   f) Other specify

12. Would you agree that nowadays you travel longer distances in search of the following items than when you were a child:
   a)Firewood yes_____No
   Fill the space provided for b c d
   Approximate distance in km------- Time taken-------
   b) Wild game
   c) Wild plant food
   d) Other environmental and food products

13. What is your occupation?

14. Is your approximate income per year any of the following:
   a) Below Ksh. 1000
   b) Between 1001-5000
   c) Between 5001-10,000
   d) Over 10001 (If possible fill in your approximate income---).

15. Does your income come from the following:
   a) Sale of farm produce
   b) Sale of livestock
   c) wages
   d) Sale of other merchandise (indicate their name(s)
   e) Remittances from employed relatives

For questions a, b, c, d, e tick the responses as follows:
   Yes--

No--
Other specify

16. What are your sources of credit (list)
a)
b)
c)
e)
17. Evaluate your credit availability

a)Easily available
b) A bit difficult
c) Not available at all
For b and c state the reasons why

18. Type of health facilities

a) Traditional Herbs(list their names) and ailments cured

Name	Ailment cured	Mode of administration

b) Dispensary
a) Distance to dispensary----
b) Time taken
c) Mode of transport--
d) Are the hospital facilities satisfactory?

c) Is there a hospital near your homestead?
If so, name the hospital--
Indicate the distance covered in km--
Time taken-----
Mode of transport-----
20. Size of your family plot
a) none
b) Less than 1 hectare
c) 1-5 hectares
d) 5-6 hectares
e) More than 10 hectares
21. Do you own the land which you live on and cultivate?
a) Yes
b) No

c) Other (Specify)

22. What are the sources of family wealth?
a) Land
b)Livestock
c) Shop/kiosk/hotel
d) Other Sources of income (specify) _____

THE ATHARAKA DIET AND NUTRITIONAL PATTERNS

1. What food is available for consumption in your household most of the time?

Name of the food

a)
b)
c)
d)
e)

2.What makes up each of the foods mentioned in 1.

Food composition	Raw materials
a)	
b)	
c)	
d)	
e)	

3. Which one of these would you say is the staple food for this locality---------

4. For how long has your family eaten this stable food?
a) Yesterday
b) Last year
c) Last 5 years
d) As long as I can remember

5.List the types of food given to each of the following categories of people
a) Men
b) Husbands
c) Wives
d) Newly weds
e) Pregnant mothers
f) Nursing mothers
g) Children
h) Circumcised boys
i) Circumcised girls

6. What in your view is the nutritional significance (note their own words in this) of each of the above named food types?

Food type	Person	Nutritional value

_____
_____
_____
_____
_____
_____
_____
_____

7. State the foods that are consumed during the following occasions:

Occasion	Type of food
a) Birth	
b) Initiation	
c) Wedding	
d) Funerals	
e) Other occasions (specify)	

8. What in your opinion is the significance of these foods?___

_____
_____
_____

9. Indicate the eating patterns of your family

	Name of the food	Its composition
a) Breakfast	i)_____	_____
	ii)_____	
	iii)_____	
b) Lunch		
c) Supper		
d) Snacks		

10 In your view, are these consumption patterns affected by times of seasonal food scarcity?

Yes
No
Other(explain)

11. How far in history can you trace your family's consumption patterns?

a) 5 Years
b) 10 Years
c) As long as I can remember
d) Other (specify)

12. Would you say that food consumption patterns have changed since your childhood days?

a) Yes

b) No
c) Other (specify)

If yes, explain the reasons for change

13. What do you consider to be an adequate meal?
a) One plateful
b) Two plateful
c) Other (specify)

14 Name the main meal in your family_____
What relish goes with this food?_____
15. What is considered to be pudding in your meal times_____

PART III

CONCEPTUALIZATION OF FOOD SHORTAGE AND COPING MECHANISMS

1. What name do you give to the following?
a) Period between harvests_____
b) Food shortage_____
c) Famine_____
2. When was the last time your family experienced food shortage?
a) This year (month)_____
b) Last year_____
c) 5 years ago (specify the year)
d) Over 10 years
3. What names do you give to the following aspects of food shortage?
a) Hunger
b) Seasonal food shortage
c) Prolonged food shortage
4. List the names of famines known to you and indicate when they occurred

Name of the famine	When it occurred
a)	
b)	
c)	
d)	

5. During dry spells what is your main source of food supply?(tick the response)
a) Cultivated foods (C)
b) Pastoral products (P)
c) Hunted wild animals(H)
d) Gathered plants and fruits (G)
e) Fishing (F)
6. Please state other food resources known to you apart from the main diet.

7. How do you cope with food shortages (Briefly explain)_____
_____
_____

8. Which one of the following factors is the main cause of food scarcity?

a) Environmental degradation
b) Increase in population
c) Lack of farm workers
d) Off farm employment

9. Explain how these food supplements of question 7 are obtained taking into account economic and social variables

10. What significance is attached to your dietary patterns by your community?(Do you feel bad if you do not eat a particular food?)

11. Would you say that ways of coping with food scarcity are more difficult today than in the past?

a) Yes
b) No
c) Other (Specify)

If Yes, what are the reasons

12. When food is not enough, would you say that

a) Men have more food than women and children?

Yes
No
Explain your answer.

b)The food proportion of family members is reduced

Strongly agree
Moderately agreed
Not agreed
Other (specify)

c) List all the Situations that make the standards of life for your household go down.

d) Do you think that women of your household eat less than the menfolk?

If so why

e) The nutritional patterns of your family do not change as there are foods to supplement the main diet

PART IV
FOOD PRODUCTION STRATEGIES

1. Do you know the origin of the following Atharaka food types
a) Millet

b) Sorghum

c) Pigeon peas

d) Cow peas

2. Describe the various ways of obtaining food that are listed i.e. what is involved
a)Cultivation_____

b) Pastoralism_____

c) Fishing_____

d) Food gathering_____

e) Hunting_____

Other(Specify and describe)_____

3. Who owns the resources for these food getting strategies?
a) Yourself
b) Your spouse
c) Your clan
d) Other members
4. Do men and women have equal rights to land in this community?
a) Yes
b) No
c) Other Specify
6) What do you think is the reason why women do not own land_____

7) Explain how those without rights to land obtain their food?

8) Would you agree that ownership of land by all could increase food supplies in this locality?
a) Yes
b) No
Other Specify

9) Name the four types of soils that you know
a)
b)
c)
d)
10 Are your farms within these soil types?

If so explain how you ensured that they were within those soil types.
11) Is it possible to ensure that your farm is within all the soil types?
(Explain your answer)

12) Name four of the most frequently eaten foods of your household and describe the stages of processing

Name of the food	Processing methods
a)	
b)	
c)	
d)	

13) Describe the origin of the various food processes known to you

14) Have these food processes changed over time?
Explain the responses

15) In what way would you say that the changes have affected the nutritional value of traditional food?

16) List what you consider to be the modern ways of obtaining food
a)
b)
c)
d)
e)
17) Who would you say is most involved in obtaining new ways of getting food in your household?
a) Mother
b) Father
C) Children
d) Workers
e) Others
Explain your answer

18) In your view are there some indigenous ways of coping with food shortage which have been abandoned?
Explain your responses

19) Describe what you think are indigenous coping mechanisms which are used nowadays

20) Give reasons why these ways have continued_____

21) To what extent have the following factors affected indigenous coping mechanisms (indicate by means of the letter Large extent (L)) Moderately (M) Not at all (N) a)Education
b) Market economy(the idea of buying and selling)
c) Wage employment
d) Attitudes to food
e) Structural Adjustment Programmes (current economic situation)

PART V
CONCEPTUALIZATION OF THE ENVIRONMENT
1) What in your language is the name for environment?

environmental friendly(briefly explain)_____

_____

_____

_____

9) List four ways of conserving environment

a)

b)

c)

d)

PART VI
GENDER ROLES AND DECISION MAKING PROCESS IN FOOD SUPPLY AND ENVIRONMENTAL MAINTENANCE

1) The following in your household have the following responsibilities

	Food production	Food processing
a) Men	i)	
	ii)	
	iii)	
	iv)	
b) Women		
c) Boys		
d) Girls		
e) Others		

2) Briefly describe how each role contributes to adequate food in your family_

_____

_____

3) What is the significance of each role in relation to

a) Dietary patterns

b) Food production and processing techniques

c) Consumption patterns

4) Who in your family makes decisions concerning:

a) What crops to plant?

b) When crops are to be harvested?

c) Who is to process the crops into food or for storage?

2) Is the countryside different today from when you were a child? Explain your answer

3) Have you noticed the following symptoms of environmental degradation?(tick your response)
a) Dried up water resources Yes____ No____ Other_____
b) Few wood lands Yes____No___ Other____
c) Fewer sources of wild foods Yes_____No_____Other_____
d) Unproductive land Yes_____ No____ Other_____
e) Any other sign of environmental degradation
4) For all the yes responses explain the reasons.

5) In what way does environmental degradation affect food supply?

6) In your view is it the food production which has affected the environment or is it the environment which has affected food production?

7) Explain the way in which environmental degradation has affected the following:
a) Availability of different types of food
seeds_____
_____
_____
_____
b) Planting_____-
_____

d) Weeding_____
_____
e)Harvesting_____
_____
f) Storage_____--
_____
g) Cooking patterns _____
_____
h) Consumption ----------
8) Are the modern food production and consumption methods

d) Whether to store or to sell crops

Use the following abbreviations to answer question 4
Adult males (AM)
Adult females (AF)
Elderly sons (ES)
Elderly daughters (ED)
5) How many granaries are in your compound?

ii) Who owns each of these granaries?

6) Can you tell the number of your livestock?
i) No. Of cattle
ii) No. of sheep
iii) No of goats
iv) No of chicken
7) Is there any other domestic animal in your household?

Using the abbreviations of question four show who decides to
a) Move the animals away during the time of severe weather
b) Slaughter some to feed the people when they are hungry
3) How the following foodstuffs are distributed in your household?
i) hunted foods

ii) fish

iii) Gathered foods

4) Briefly describe the significance of each food -getting roles of the members of your family in ensuring that:
i) There is adequate food supply
ii) Available food is processed
iii) Food is stored for the next season.
iv) Stored food is well distributed to all family members
5) Who in your opinion is most responsible for the supply of food in your family?

PART VII
GENDER AND FOOD CONSUMPTION

1) What do you consider to be the appropriate meal for
a) Men
b) Women
c) Elderly
d) Children
State the reason for each of the answers you have given.

2) In your view are there foods which are a taboo for women/Men/children/elderly
Give reasons for each of your answers

3) What do you think are the factors that support these taboos?

4) Are all the members of your household well fed?
Explain each answer

5) What food do you crave?

If more than one indicate by numbers the preference

6) Is it easy for you to obtain these cravings/
explain the difficulties if any

7) Is it considered alright for the female members of your household to eat last?
probe for the reasons

8) How do you ensure that they have adequate food?

9) What cultural factors known to you explain the significance of different eating places for women, children' and men?
Explain each response

GENDER AND FOOD GETTING ATTITUDES

1) What in your opinion is the most tedious food getting strategy?

2) Are there certain cultural practices which are not allowed for certain genders(eg women should not slaughter animals)

3) Have the following modern ways affected food production?
a) Availability of money from sale of food stuffs?
b) Formal institutionalized education
c) Search for wage labor
4) State in which way each of these has affected

i) Food supply

ii) Environmental maintenance

5) In what way has the coming of the money economy increased work

for the women

6) Do you agree that women contribute more to environmental degradation than the men?
Explain your answer

7) Is there Communal participation in methods of food production? List them

8) What are your community's strategies for the conservation of the environment

9) Would you agree that everyone in your household cooperates with the other in search of food?

If not who is the most stubborn?
10) What religious beliefs are connected with frequent food shortage in this locality?(explain)

11) What would you advise the government concerning the needs of the Atharaka?

12) How to remove shortage of food

PART IX
INCOME, FOOD AND ENVIRONMENT

1) Apart from crop cultivation and livestock keeping what else do you do to earn a living?

2) Does anyone outside your immediate family depend on your income? state their name and the relationship

3) During the time of food scarcity from whom do you expect hel
Name and relationship

4) Is the amount received from these sources able to provide yo
with adequate food?

5) List the steps you would take to cope with food shortage