COMMUNITY RESPONSE TO MALARIA: MUHEZA DISTRICT TANZANIA 1983-1984

A STUDY IN CULTURAL ADAPTATION

BY

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ABSTRACT

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University of Illinois at Urbana-Champaign 1986
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This study of a rural community in the malaria endemic area of Muheza in Tanzania deals with several issues. (1) Malaria as a health problem is looked at from its ecological epidemiological context. It is seen as a problem which has made it necessary for the resident people to develop knowledge and ways of dealing with it. This is the people's adaptation to a known hazardous environment. (2) The resident people are considered in a historical and cultural context including their early contact with outside cultures. Their closeness to the Indian Ocean made it possible for them to develop early contact with Islamic Arab culture and others that followed later. Missionary contact came early as well and was followed by other Europeans who started the development of sisal, tea and coffee plantations. As a result of this cultural contact, the resident peoples of Muheza developed new adaptive ways of managing malaria. Hence, today, a combination of methods are used to handle malaria and other diseases of the environment. (3) Even though Chloroquine and other Western medicines are popularly used, traditional medicines are also used in various combinations. Disease etiologies include parasites, djins and ancestors. This shows that traditional beliefs and values still strongly influence malaria management behavior even though other

factors are also present. The institution of the African extended family, which is based on ancestor kinship linkage, has strong influence on malaria management behavior. (4) The Fishbein behavioral model and theory of reasoned action serve to point out and explain the underlying processes behind the pragmatic observed behavior regarding the use of chloroquine in the management of malaria. (5) Problems in the health services are pointed out and suggestions are made on the direction of change needed to achieve improved management of malaria and other diseases.

DEDICATION

to my extended family,
my ancestors, my living
relatives and the unborn.

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PART ONE

INTRODUCTION:PROBLEM AND METHODOLOGY

There is a great deal of literature on the different aspects of malaria from different parts of the world. However, this accumulated knowledge is deficient in some aspects of the disease. Studies of malaria in Africa for example have paid little attention, if any, to the role which socio cultural factors of a society can play in the management of the disease including its effective control. This dissertation deals with the socio cultural factors which influence malaria management among Sambaa people of Tanzania.

The study has two objectives: (1) to explore and determine those factors which influence compliance behavior towards malaria chemoprophylaxis in Muheza, a malaria endemic area of Tanzania, (2) to suggest ways or strategies which will facilitate the development of more effective ways at the individual and community levels to generate health programs which will further improve control of malaria, especially among pregnant women and children under five years of age. MacCormack and Lwihula (1983) studied factors which influence malaria chemosuppression in North Mara, Tanzania and pointed out those, including social structural ones which were found to influence the program. The current study goes beyond the state of identifying influential factors. It seeks to find ways of using the factors which are identified to change behavior toward effective control of malaria. There are many other ways in which the current study differs from other studies of problems related with malaria control. Most broadly, the current study seeks to offer an approach for behavioral

research and a model for improving community - health providers' interactions to facilitate epidemiological control.

The working hypothesis of this study has two parts: (1) it is advanced that a community which survives in a malaria endemic region, which has had dispensary services for almost a century, would have valid and useful knowledge of the disease from both the hospital as well as the handed-down tradition of local medicine. This knowledge makes it possible for an individual to make a choice which medicine she or he should take to manage a health condition. (2) The medical behavior which results from the person's decision has an impact on the effectiveness of any disease control project, e.g., malaria chemoprophylaxis. The knowledge which people have, aid in the formation or strengthening of beliefs, the beliefs give rise to attitudes which influence the decision and final behavior. This knowledge and beliefs are the basic elements of the Fishbein's interaction model which is applied in this study.

Compliance behavior toward malaria chemoprophylaxis as used in this thesis needs clarification. Compliance to taking of the drug in order to control malaria implies two things. One, it means accepting and complying with the instructions given by the nurse who is in charge of the program. Two, it means deciding to cooperate in the program regardless of any other problems which may arise in its course. This second condition is a follow-up of the first. It means that the message from the nurse has persuaded the individual so that every effort is made to support the program. Noncompliance is understood to indicate failure of the message to persuade the individual which leads to not making an effort to cooperate with the program. But it is critical to note that compliance

in the chemoprophylaxis of malaria does not necessarily mean optimal outcomes for individual health. Otherwise stated, compliance and health optimization (particularly from a community viewpoint) are distinct issues.

Malaria is the number one cause of of hospital attendance and the second highest cause of hospital admissions in Tanzania. It is also among the topmost causes of hospital deaths, especially in children. Malariologists have described Tanzania as a sea of intense malaria transmission in which are bathed a few islands of little transmission. The "islands" comprise the highlands at the altitude of higher than two thousand meters above sea level and some towns (Kilama 1980, 1984, and Clyde 1967). The present problem is that not only is it proving difficult to control malaria in the malaria endemic areas, but the disease is becoming a serious health problem even in the hitherto controlled areas, particularly in towns. The Tanzania government is seriously concerned about this problem and more research into the problem is encouraged.

In this first chapter, the problem of study is presented and the suggested behaviorial model for improved malaria control is laid out. The fieldwork methods are described, and the analytical procedure is presented.

1.1 New Strategies for Malaria Control: An Urgent Need in Africa

As already stated, the abundant literature and research on malaria aimed at contributing in one way or another toward finding better ways of managing the disease or its elimination altogether (Kortman 1972; Bruce-Chwatt 1954, 1969, 1980; Molineaux and Gramiccia 1980; Peters 1972; Zulueta de 1973; Sandosham 1965; Garnham 1966; Anderson and Kilama 1974) to mention some is still lacking. Literature on issues related to behavioral

aspects of the human host is very limited. Yet behavioral aspects are as important as issues of drugs in affecting malaria control. This point is discussed further in this dissertation. In Africa, malaria is one of the major causes of morbidity as well as mortality (Kilama 1984). However, the effects of malaria to a nation such as Tanzania are more serious. As Kilama put it:

> Apart from the usual morbidity and mortality directly attributable to malaria, the disease is also a major chronic impediment to the health of the affected communities. It may account to much absenteeism from school and from work. It often greatly lowers labor output and casts a general debilitating effect on our national economy. (Kilama 1984:2)

Tanzania's health policy with regard to malaria aims at protecting the most susceptible section of the population, that is the pregnant women and children under five years of age. The study of compliance behavior to malaria chemosuppression is therefore a study of a sample of mothers of young children who have used the drug to protect themselves during pregnancy, and who are responsible for their little children. Among the questions which this study asks are: How do these young mothers manage malaria when it occurs in their little children? In themselves? What influences their behavior?

The historical origin of malaria in Africa is not clearly understood. Researchers have suggested different possible courses. Livingstone (1958) suggests that malaria became hyperendemic in West Africa as a result of the introduction of iron-working technology and the adoption of the Malaysian agricultural complex, the slash and burn agriculture which allowed malaria vectors to establish whole year round parasite transmission

(Livingstone 1958). Laderman (1975) also traces malaria along an ecological perspective but goes further to consider the effects of a combination of different factors. She looks at the biological, demographic, ecological and cultural conditions which give rise to change (Laderman 1975). Genetically, it is evident that the malaria problem is very complex. Studies have shown that the Dufy gene, widespread in some African populations, provide major resistance to P. vivax. Resistance to P. falciparum, which is the most lethal form of malaria in Africa is given by the sickle cell gene and allied forms of thalassemia, (Mathews and Armstrong 1981; Allison 1954; White 1972; Bennett 1979; Alland 1969). The important relationships between the health of a person and the natural, cultural and social environment, have also been clearly demonstrated by Shimkin (1970). It is therefore necessary to consider health from biological, environmental and cultural viewpoints, with capacities to function and survive as ultimate system criteria.

A systems analysis links these factors in a field in which human decision-making provides basic control. The systematic analysis of factors which contribute to compliance behavior is described in Part Three. Systems analysis as a theoretical and methodological approach for research has been applied for various studies of human populations in the United States of America (Shimkin 1981). The systemic nature of culture is clearly demonstrated by the fact that real change occurs in the wake of extensive linkages, feedbacks and the development of new equilibria. Malaria control programs can also be analyzed in terms of input and output of a system of survival. Chloroquine prophylaxis constitute an input and compliance behavior an output of the system, related by perceived

contributions to population survival. While external pressures may be effective, in the final analysis acceptance of the prophylaxis program requires a general change in the cultural system of the people. Central to such a possible change is the relative valuation of traditional and Western medicine.

Acceptance of government programs means acceptance of cultural change. However, cultural change usually occurs by means of processes. Alland (1970) points out that change in cultural systems depends on innovation and borrowing (diffusion). Cultural traits are affected by existing elements that tend to resist change. This resistance depends upon the ability of human beings to think, to observe cause-and-effect relationships, and to construct theories which not only account for phenomena but which also may be used to predict future results (Alland 1970). In an area with a long-standing health problem such as malaria, innovation must displace existing perceptions. It inevitably touches upon the social mechanisms through which perceptions are formed as well as their content. It often involves deep-seated emotions reinforced by ritual. The introduction and general acceptance of chloroquine malaria prphylaxis are thus systemic processes.

The behavioral theory of reasoned action which is employed in this study is also an appropriate measure for determinants of compliance behavior to malaria chemoprophylaxis. A group, in terms of people living in a particular place, is made up of individuals organized in formal and informal groups with characteristic structures and processes. Community response to malaria is therefore the response of certain people to malaria.

A community simply characterizes a group of people in a particular way. The problem of study and its objectives determines the kind of community in question.

Unlike the study of MacCormack and Lwihula (1983), the current study aims at developing a model for improving malaria control, perhaps by increasing compliance behavior through a community structure based health service. Another significant difference between the current study and the study of North Mara is the fact that the current study is more interested in interactions at the community level and their implications for the malaria prophylaxis program. The study population is also small; two villages with a total population of less than 6,000 people. MacCormack and Lwihula covered a region with a population of not less than 185,000 in 120 villages. The current study takes a micro perspective unlike the previous study which has a macro perspective.

Research in relationships between community attitudes and social structure and the control of malaria suggest that the basic problem is one of attitudes. Belcher (1975) showed in his study of the utilization of malaria prophylaxis in Ghana that maternal attitudes were significantly related to program involvement. Since attitudes arise from beliefs, there is a direct relationship between belief and attitude. These are also intimately connected to the community setting and historical background of the individuals. The experience which an individual has with the problem and with chloroquine provides both a possibility for fast treatment (successful management of malaria) as well as an opportunity for health. But negative experiences are particularly powerful; so are fears

that may have little factual basis. A program of health education is expected to influence the attitudes and the behavior-related to malaria and its management. These attitudes and behaviors refer equally to health service providers and to the community. Effective health education is a two-way street, in which information needs to flow in both directions. This study of a community's response to malaria aims at identifying the loci for effecting better health provider-community interactions, perhaps through greater compliance toward malaria prophylaxis at the individual and community level, and improved strategies for malaria control.

The individual's compliance behavior may be characterized as compliance, partial compliance, or noncompliance. However, the axiom developed by van Etten (1976) is important. The structural relationship between the individual and the institution of medicine plays an important role in the individual's behavior. Van Etten demonstrated that access to a medical institution is influenced by the structure of the institution itself just as it is inlfluenced by the nature of the education given to the medical staff (van Etten 1976). The Fishbein behavioral model which is suggested in this thesis takes into consideration the different factors which influence behavior in their systemic links. Elements of the social structure have varying influences on beliefs, and beliefs have direct influence on attitudes, which in turn guide decisions and observed behavioral outcomes.

The series of independent variables can be influenced by appropriate persuasive methods to achieve the desired behavior. But such persuasion can have long-term effectiveness only it it has a solid basis of reality. A fundamental difficulty in health education in malaria is the limited

effectiveness of existing means of chemotherapy and environmental control. The repeatedly reported side effects of chloroquine serve to create negative attitudes to the drug. However, people still use the drug for therapeutic as well as prophylactic purposes, but they take precautions to minimize side effects. The behavioral model discussed in this thesis is applicable at the individual as well as at the community level.

The idea of community participation in health projects has been clearly discussed by the World Health Organization (WHO); (Newell 1975; WHO 1978; UNDP 1983). This approach was adopted after difficulties were observed in the course of applying conventional approaches to control malaria. These approaches include attack against the vectors by direct spraying and controlling breeding by attacking the larvae of the mosquitoes. Normally, these measures are undertaken by external workers with limited community participation. They are often reinforced by methods of personal protection, which are often too costly for very poor communities. Historically, such programs of environmental intervention have worked to some extent in the urban areas. In rural areas, with much water and dense vegetation, these measures provide only limited or temporal results (Lilijveld and Mzoo 1970; Kilama 1980, 1984).

When malaria eradication efforts were introduced in the 1950's and 1960's in different parts of the world, tropical Africa was not included in the program. World Health Organization pilot control projects and investigations showed that eradication was not achievable with the means and methods within the financial and other capabilities of the African countries. Consequently, the picture of malaria in Africa today has changed little from what it was before malaria control programs started.

Malaria-free areas exist only in the northern Sahara desert, the southern tip, and the higlands of Ethiopia. To complicate the situation, new problems of drug resistance are beginning to spread in different parts of Africa (Olsen and Spencer 1975; Peters 1970; Stahel, Degremont and Lagler 1982).

The WHO Regional Committee for Africa has given suggestions for managing the problem of malaria in the region. In 1981, the 31st session of the Regional Committee for Africa adopted a regional malaria strategy enlisting the active participation of the community through the primary health care delivery system. Among the priority areas for research are two important ones: (a) development of an operational strategy for the control of malaria through primary health care based mainly on the provision of adequate treatment; and (b) epidemiology of malaria and studies on human ecology and sociological aspects (WHO Newsletter No. 21:12 1984). The inadequacies of earlier approaches are recognized; context-specific approaches are now considered appropriate. In anthropological terms, the new approaches are ecological as well as emic rather than exclusively etic models. The micro approach looks at the problem from both the emic as well as the etic point of view.

The "emic" and "etic" concepts are derived from the linguistic terms "phonemic" contrasted with "phonetic". In the anthropological context "emic" perspectives deal with cultural systems from the actor's point of view. Emic viewpoints attempt to understand culture from inside the society as opposed to the "etic" which interprets events and phenomena using externally developed criteria. Both emic and etic perspectives are employed by cognitive anthropologists in their study of culture and cultural

phenomena. In Part Three of this thesis, a detailed description of the etic view as well as the emic view of the problem of malaria and their implications for compliance and noncompliance to malaria chemoprophylaxis are discussed.

The community-based approach to disease control has been successfully applied in various projects including the hypertension control project in Mississippi. The community control of hypertension project in Holmes County has been going on for more than ten years, and reports indicate that the project is showing good results (Frate et al. 1984).

Tanzania's political philosophy of Ujamaa (familyhood) and self-reliance provides not only a convenient rural structure for community-based approaches, but the ideological principle capable of assuring continuity of a system. The administrative structure from the village level to the national enables community members to participate in the decision-making and implementation of programs which affect their everyday life (Nyerere 1967, 1968, 1970). The community's understanding of malaria is important in getting its participation in disease control. It is hoped that the current study will contribute toward this hitherto neglected area.

1.2 Improved Intervention Through Increased Community Participation

Improved intervention which is aimed at better management of malaria requires consideration of several issues including the following: (1) the environment of the resident prople including the vegetation, landscape, agricultural patterns, and climate; (2) the size of the community and its structural organization; (3) the major occupational activities and extent

of external contact; (4) architectural and residential patterns; (5) the availability of institutionalized medical services and the historical experience with them; (6) the people's own experience with malaria; and (7) the degree of popularity of traditional medicine and other non-institutionalized medical services. To the extent that these different factors determine a person's beliefs and attitudes, they will also influence that person's behavior with regard to malaria. The relationship between individual factors and malaria behavior requires careful analysis so as to note the direction of influence. The ecology of the area determines not only the types of prevalent diseases, but can also explain people's attitudes toward the natural environment. The pattern of land use is also an indicator of the peoples' knowledge of the environment and their adaptive management of the land. The size of the community with its constituent neighborhoods, families and leadership structure also has influence on attitudes of the individuals. Small families and high levels of morbidity and mortality can be indicative of the degree of maladaptation of these units. This is of special concern where large families are symbols of good health within the lineage.

Occupational exposure can have direct influence on disease incidences; for example, guarding crops at night against vermin exposes people to mosquito bites increasing the chances for malaria. Entomological studies have shown that the Anopheles mosquitoes in Tanga Region are exclusively night feeders. Even when people sleep indoors, the type and pattern of architectural structures can expose residents to greater mosquito bites. For example, a more or less open house which allows air to move in and out of the houses freely may have a cooling effect, but it

also allows mosquitoes to move freely in and out of the houses. Screening windows and doors of houses has protective ability, so does the use of netting for beds. However, these are beyond most people's measures. In this case the architectural patterns may be suitable for cooling but unsuitable for control of mosquito bites.

Proximity to health care facilities can eliminate the problem of having to travel long distances, particularly for emergencies. Studies have shown that when health facilities are located closer to the people, the level of utilization is higher (van Etten 1976). However, other studies have also shown that the availability of the health care facilities by itself does not necessarily guarantee full utilization of the services (Benyoussef and Wessen 1974 and Reid 1969). Other factors including those which have to do with the informal structure of the institution itself, also play an important role in accessibility.

The historical experience which the people have with the disease, and the level of endemicity of the disease, has influences on the attitudes and behavior of the people with regard to the disease. Changing attitude towards an endemic disease will require more vigorous approaches than a short run kind of management of an epidemic. Community participation is therefore a necessary condition if community beliefs and attitudes regarding malaria, which is an endemic disease in Muheza, are to change. Effective management of malaria requires a two-sided change. A change of attitude on the part of the people is necessary, but equally important is an improvement in drugs and their administration.

Matola, Lyimo and Malle (1982) have suggested that the presence of malaria parasites in the blood of those who reported to have taken the

prophylactic drug indicated inadequate prophylactic dosages or ineffectiveness of chloroquine. More studies are needed to show the real problem within the drug or the dosage. Side effects such as drowsiness and dizziness are not uncommon with drug usage. The unpleasant side effects experienced by people will facilitate the development of negative attitudes towards the drug, therefore contributing toward noncompliance. Drug side effects can also be a result of improper use of the prescription. This is a problem of communication; miscommunication between the nurse and the client can lead to misuse of the drug, as pointed out by van Etten (1976). He argues that there is a social gap in Tanzania between the health institution staff and the population they serve. This social gap creates and maintains a social distance between the health worker and the people (van Etten 1976). Such problems can only be revealed by micro studies which consider more than the number of people participating in a program by studying the underlying patterns of communication and their impact.

Clearly, under the conditions of Tanzania with only one physician per 20,000 persons and other acute lacks of resources, progress in malaria control has to depend primarily upon improved self-help from local communities. To develop such self-help requires understanding of the ways innovation has flowed and is likely to flow into communities.

The people of Tanga region, the major ones being Bondei and Sambaa, have had much contact with outsiders. Age long Arab contact from the coast was followed by European Christian missionary contact in the mid-1800's, German settlers came to Tanga in the early 1890's and by the time of World War I, an influx of laborers had started populating the tea, coffee and sisal plantations opening in the highland as well as the

lowland areas of the region (Illife 1971). During this contact with other cultures, the Bondei and Sambaa have survived along with their culture by adapting to external forces while maintaining the basic structures fo their society. One of the basic structures is that of the extended family.

Both groups of people and both Christians and Moslems practice a strong "mother centered" family organization within a patrilineal descent system (Winans 1964). This family organization has facilitated and maintains continuing extended family linkages within a highly migratory community. Initiation rituals for girls at puberty and childbirth also serve to main0 tain the family organization. Winans (1984) gives a general description of the Sambaa family. According to his thesis, the Sambaa family has maintained the basic principles governing the family unit even though in the observable external organization one can notice some changes, e.g., the disappearing practice of polygyny, and the absence in the village of many members of the family. It will be shown later in this thesis that the traditional institution of the extended family and its governing beliefs are basic elements in the management of diseases by the community.

The Sambaa family, with the "mother" as the nucleus at its center, has functioned and still functions as the center of continuity and adaptation to change. In Part Two of this thesis more details are given about the ethnographic background of the people of Tanga. At this point, it is considered important to point out the significance of the family structure among the native people of Tanga. The family organization continues to survive side by side with the new institutions of Islamic and Christian religion, the plantation economy, and the Ujamaa village organization. The individual has a chance to respond in a pragmatic

manner in relation to external forces but mediates them through a family structure which provides security for the individual as well as its own continuity. This security is gained in an important way through a restatement of innovations in terms of family relationships, obligations and rituals. It is important to note the influences which the family structure has on the management of malaria and the effectiveness of malaria prophylaxis particularly via decisions and consultation procedures. In contrast as will be developed later, mere surface structures such as those associated with religious or educational differences, appear to have limited effects.

1.3 A Hypothesis Based on the Theory of Reasoned Action

The suggested model for improved malaria prophylaxis is based on Fishbein's behavioral theory of reasoned action. The theory rests on the assumption that humans are rational beings and that they process information available to them. However, the model also considers social components, i.e., information is weighted by source, with those emotionally closest and those who are authority figures being most influential. The model is further discussed in the following chapters. Compliance or noncompliance behavior to malaria prophylaxis is therefore the outcome of reasoning on the part of the individual who is expected to use the prophylactic drug. This means that the individual's reasoning can be influenced toward the desired behavior. This theory can be used not only for identifying factors which distinguish compliers from noncompliers, it can also be used to identify the loci of effects of a large number of individual different variables.

Sine a person's beliefs represent the information or knowledge which that person has about one's world, that person's behavior results from the information that she has. Beliefs constitute the input of a system which has a particular behavior as its output. In order to increase the degree of the output, what is needed is to bias the input toward the desired goal using those particular factors which exert the greatest influence. In this thesis, the theory of reasoned action is used to identify the key factors which need to be managed in order to improve the management of malaria in endemic areas.

1.4 The Empirical Investigation

A combination of methodological approaches was employed in the course of the field research for this study. (1) A party structured questionnaire was constructed and used to obtain quantitative data form the basic data of the study. (2) A number of key informants in the community were interviewed to provide qualitative data on the sociocultural aspects of the population. (3) Participation in social functions and gatherings including weddings and funerals added firsthand observations on the interactions and groupings of individuals in certain functions. (4) A follow-up study of a group of households showed how illnesses are handled by the family using both hospital or Western and traditional medicine.[1]

The basic questionnaire has five parts (the complete questionnaire is presented as Appendix A). Data are presented in Part Three. The first part has questions on the social charcteristics of the individual respondents. This includes information on age, education, number of children, marital status, religious affiliation and period of residence in

the village. The second part of the questionnaire consists of questions on diseases and the individual's knowledge of diseases and their management. These data show the level of awareness of malaria and other diseases by a significant group of community members. The third part of the questionnaire has attitudinal questions. The questions in this part attempt to measure the level of the strength of the beliefs using a five-point Likert scale. The respondent is asked to evaluate her own health and the health of the most important member of the family, that is, the youngest child. The attitude questions are framed in statement form wherein the respondent is asked to respond whether she strongly disagrees or strongly agrees. This level of questions has several objectives: One, to identify the disease which are believed to be amenable to traditional medicines; two, to discover the disease which are considered to be more lethal; and three, to assess the factors which contribute to compliance and noncompliance behavior to malaria prophylaxis. Part four elicits responses regarding individuals' experience with malaria prophylaxis and hospital medicine. The fifth part of the questionnaire consists of questions aimed at eliciting sociocultural beliefs which constitute a level of knowledge which can influence the individual's behavior with regard to malaria. The questions include assessing the degree to which individuals believe in the importance of cultural practices such as "Guna" which is a Sambaa traditional ceremony following the birth of a woman's first child. Individual understanding of the cause of 'Mchango", a name given to symptomatic diseases which involve convulsions, e.g., cerebral menigitis, may have an impact on disease management.

The key informant interviews were recorded in cassettes whenever the

informants consented to the use of the recorder. Notebooks were also used to take notes during the interviews. The questions to the key informants included identifying (diagnosing) malaria as well as its management outside the dispensary, observed changes in the occurrence of the malaria, as well as their assessment of the usefulness of the malaria prophylaxis program. Other questions included a general evaluation of the health of people in the community, and the role of ancestors and other agents in disease causation. Some elders discussed with ease the diet of their ancestors and compared it with the present diet. Another topic was childcare during their childhood compared with that of the present age. There was no hostility presented by anyone, except a few refusals to talk.

Several public gatherings took place during the period of the field-work. Attendance by community members was good. Notice of the meetings was passed around by word of mouth from the village office. Celebrations included the feast day of Saint Joseph, the patron saint of the village church. Neighbors made sure the researcher was informed about the forth-coming celebrations. It was also by invitation of a neighbor that a wedding was attended by the researcher. The neighbor had been invited to go and play the drum; she was not related to either the bride or groom. The customary wake following someone's death was attended by family members mainly, but also some neighbors and friends, including the investigator. These public and social gatherings gave opportunities to observe lineage and kinship interaction and the degree of political participation of mothers and others.

The follow-up studies were weekly diary records of 26 (initially 30) women to assess variations in illness, work and other behavioral

factors. They faced some problems because of the difficulties with the assistant's training and problems in finding the women at home during the weekly visits. More training and close supervision of the assistant was needed, but due to time limitations and pressure of other work this could not be done. However, some data was collected and used in the analysis which is presented in Part Three of this thesis.

The fieldwork started with the taking of village census of young mothers. From the census a random sample of the women to be interviewed was made. The 300 women sampled were mostly of childbearing age. This was considered important because it is they who consitute the group of susceptibles during pregnancy. It was assumed that these must have had experience with the malaria prophylaxis program at one time or another, for themselves or for their younger children. It is to this sample of 300 women that the basic questionnaire was administered. The interviewing was done over a period of three months, from May to July 1984. The interviews lasted between one-half hour and one hour depending on the openness of the respondent. Some of the interviews had to be filled in the fields where the women were working (see pictures at the back of this thesis). The two field assistants who helped with the filling in of the questionnaires were very conscientious; they kept working, rain or shine.

A total of ten key informants was interviewed. Among these were village elders, village leaders, community healers, a local school teacher and the local health personnel. Some of these individuals were suggested by the village leaders, while other names were suggested by villagers. Two elderly women did not respond to the interview questions

partly due to the fact that they were more at ease with the Sambaa language than with Swahili.

Finally, local institutions particularly the Amani Research Center, Ubwari field station, Muheza District Cultural Office, and Muheza District Hospital provided important statistical as well as general information and background materials. These are presented throughout the dissertation.

The analytical methods included programming and processing the basic data using the CDC Cyber 175 computer of the University of Illinois. The disciminant analysis was then used for statistical analysis to group malaria prophylaxis behavior into the three groups of noncompliant, partial compliant and compliant and to identify those variables which show the compliant and to identify those variables which show the strongest discriminating power (Klecka 1975, Nie et al. 1975). The behavioral model is also further discussed and its applicability to the study is shown (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980).

PART TWO

THE ENVIRONMENT OF INVESTIGATION

2.1 Biogeographical and Sociocultural Characteristics of Tanga

2.1.1 Climate, Geography, and Crops

Lying in the northeastern corner of Tanzania, Tanga Region is on the Indian Ocean (Figure 1). However, even though the sea has influence on the climate of the region, in some places, the Usambara Mountains which reach an altitude of 2,000 feet are less than fifty miles from the coast. There are four major identifiable climatic areas in the region: (1) the hot and humid coastal belt; (2) the warm and humid lowland area; (3) the cool and wet highland area; and (4) the dry and hot area to the north and southwest of the region. The region receives two rainy seasons every year, a short and long one, in October and November, and March, April and May consecutively. Temperatures vary with the changes in the altitude (Figure 2).

The climate of the region is important for this thesis. It is important not only because it plays an important role in the endemicity of malaria, making it possible for the vectors of the disease parasites to reproduce throughout the year and to the significantly active biting behavior at all seasons (Mosha 1980). It is also important in that it inlfluences the peoples' exposure to mosquito bites. Because of hot and humid climatic conditions, in the absence of air conditioners, people tend to spend most of their free time in the cooler evenings outside of their houses, thus exposing themselves directly to mosquito bites. The architectural design of the houses is also such as to allow air to move

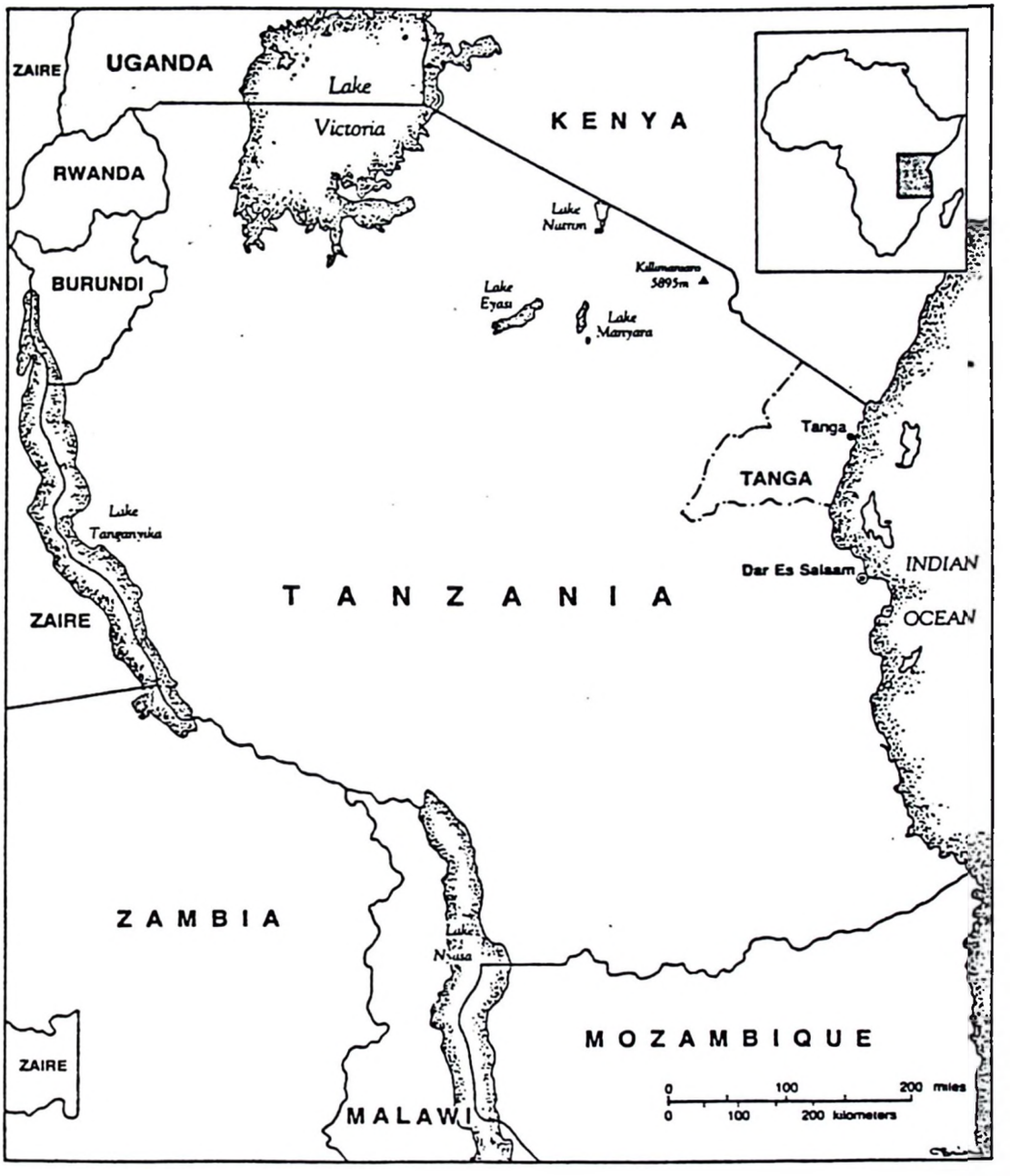

Figure 1. Map of Tanzania Showing the Location of Tanga Region.

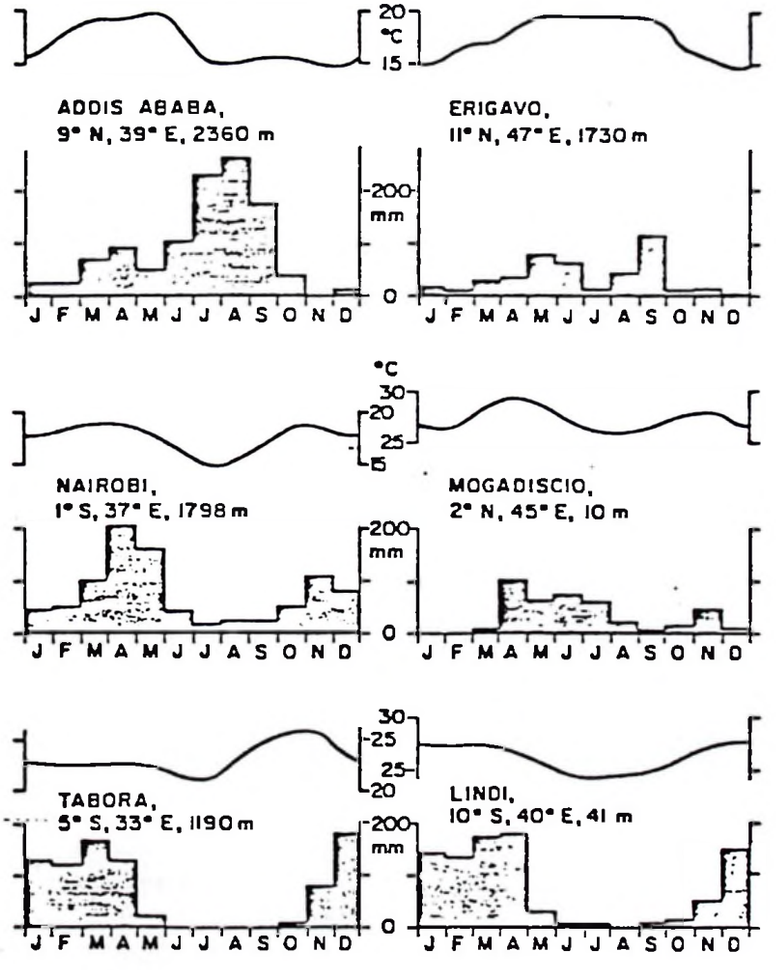

Figure 2. Climatic Diagrams for Six Stations in East Africa.

Source: Nieuwolt (1977).

freely in and out. This means that mosquitoes can also move freely in and out of the houses. What this means is that even when the people are indoors at night, their exposure to mosquito bites is not very much reduced. While smoking is often used to reduce insect exposures, this too closes in the late night when the fire extinguishes.

Tanga town, which is the administrative center of the regional government is also one of the country's major sea ports. Lying in the north part of the country, Tanga serves as a major sea port particularly for the inland commercial centers of Moshi and Arusha. There is a rail and road link between Tanga and these towns and also with Dar es Salaam, the capital city of Tanzania. Tanga is also connected to these towns by air transport. The relatively easy accessibility of Tanga has meant that people from other parts of the world were able to visit the area very early in history. Records have that the explorer Vasco da Gama made a stop on the coast overlooking the Usambara Mountains and took note of the line of mountains which he named "Sierra da Sao Rafael", after his ship Sao Rafael which he set fire on that coast after losing many men sailing across the Indian Ocean from the Far East.

As one moves from the coast further into the interior, one notices that the landscape quickly changes to an undulating terrain but remains warm and humid at an altitude of between 200 and 300 feet above sea level. Large tracts of this lowland area are cleared and planted with sisal. When plantations were established here at the beginning of this century by the Germans, the Bondei, Segeju, Zigua and other native inhabitants were forced out and resettled in the marginal lands at their edges, so that they would come and work as laborers in the plantations. In no time,

these native reserves brought about secondary land shortages and crowding. Nevertheless, people came to work on the plantations from these reserves and at the same time produced and processed food to sell to the migrant laborers who came from outside the region. These migrants came from inland and upland as well as coastal regions and were often highly susceptible to malaria.

The lowland plain zone goes up to fhe foot of the Eastern Usambara Mountains, some 40 miles inland. At the present time, many Sambaa people are settled around this area. For many generations, the Sambaa were living up on the mountains until their land was also taken over for tea and coffee plantations at the beginning of this century. Moving down to live in the lowland required a big adaptation for these people who were always living in the cool malaria-free highlands. Eastern Usambara is separated from Western Usambara by the Luengela River. The Western Usambaras run northwest ending with Mount Kilimanjaro only a short distance away. The Sambaa inhabitants of these mountainous area engage in vegetable growing and production of other food and cash crops. It is also from here that we get the earliest epidemiological scientific reports about malaria. The famous German scientist, Robert Koch, came to this area to investigate a killing disease which affected many German immigrants during the late 1890's. In his report, Robert Koch showed that the killing disease was nothing other than malaria. He showed how the immigrants contracted malaria parasites on the coast before reaching the mountains and a few days after they arrived the disease would erupt (Koch 1898).

The southwest side of the Western Usambara is sheltered from rain by the mountains. Even though dryer than the other areas, some sisal grows here as well. The northern portion of Tanga Region, going up to the border with Kenya, is also semi-arid and settled by the semi-pastoral Digo. As far as malaria epidemiology is concerned, there is almost no part of Tanga which is free from malaria today. One finds only differences in levels of endemicity. The spread of the disease has been brought about by increased contact between people in all ecological zones as well as the new openness of the mountain forests which has occurred from clearing for coffee and tea plantations. The cleared land has facilitated the survivial of malarious mosquito species. At the time of Robert Koch's visit, the high altitudes had no malaria. Epidemiological studies made by Clyde and Msangi in the early 1960's already showed increased cases of malaria at higher altitudes (Clyde and Msangi 1964).

The geographical differences found within the region allow sudden changes of temperatures as well as rainfall within short distances as one ascends and descends in altitude. Along the coast, temperatures reach as high as 90 degrees Fahrenheit at midday. On the plains, temperatures average 75 degrees Fahrenheit and 85 degrees Fahrenheit during the day, and fall to a cool 50's degrees Fahrenheit at night. The mountains are much cooler throughout the year but more so in June and July. During the cold season temperatures in the mountains may fall to the low of 30 degrees Fahrenheit at night.

2.1.2 Natural Vegetation and Agricultural Patterns

Much of the natural vegetation of Tanga Region has been replaced

as a result of extensive clearing on the lowlands. The Mwalambe trees (Terminalia prunoides) and Mkoche palms (Hyphaene coriacea), the shrubs (Pluchea sordida) and various grass species have given way to sisal. At the edges of the plantations where the native inhabitants live, coconut trees, mangos and jack fruit trees provide cool shade during the hot daytime. The history of malaria and its spread shows a direct relationship between ecological changes and the prevalence of the disease. Land clearance and the planting of sisal, which is a short crop, brought about greater opportunities for reproduction and survival of the malarial species of mosquitoes. The increase of the number of these species coincided with a large new population of migrant laborers from malaria-free areas. The parasites not only found appropriate hosts for developing and multiplying, but they were able to spread more quickly through the development of a rapid transport system. As a result, malaria was able to spread with little difficulty. Therefore, while malaria has been known from time immemorial and managed by most Tanga people, the increased level of endemicity which came as a result of ecological changes brought about concern not only to the health authorities, but to the native people as well.

At the high altitude up the mountains, some parts of the forest land are reserved for timber. Pill (1939) gives the names of some of the trees which until about one hundred years ago were found in larger areas of the mountains. A list of the Sambaa names of these trees and their botanical identifications is provided in Appendix D. The Cinchona tree, from the bark of which quinine can be extracted, was introduced to the Usambaras by the German immigrants. The bark provided quinine during

World War I. In recent years, cinchona production has almost vanished. There is pressure now, with the advent of parasite resistance to chloroquine and the use of quinine injections as a treatment of last resort, to revive cinchona growing. This, however, will take many years.

The Sambaa pattern of farming, as well as the tools used for farming, have changed little over the years. The land tenure system has changed considerably. According to Dobson (1940), the land tenure has changed to individual ownership rather than the traditional family or collective ownership which was the common system before. The change in the land tenure system can be accounted for by the land shortage which followed the opening of the cash crop plantations. Tanzania's Ujamaa policy of collective farming aims at facilitating continuity of the traditional family ownership system. Today most villages practice both collective (Ujamaa) as well as private family land tenure farming systems. The type of farming methods practiced by the Sambaa is slash and burn shifting cultivation. The reddish grits soil of Eastern Usambara and the sandy soils of the lowland areas are rich in humus and allow quick growth of tall grass and different types of weeds. The weed problem is an important factor which limits the size of the farmland which can be planted each season. Often the fields have to be weeded two or three times before harvest. Land is cleared and planted with maize and cassava during the first season. After the maize is harvested, the cassava is left to grow for another year. Thus, land which is farmed this first year, is left to lie fallow for two to three years before it is cultivated and planted again. Dobson (1940) argues that the fallow system does not help to return fertility to the land because the weed is left to overgrow during

this time. However, it does seem to make difference in the productivity of the land that has been left to lie fallow for some time. Personal observation showed that if left to fallow for a long time, land gives a much better harvest than from fields cultivated more frequently. Weeding also helps to return fertility back to the soil to feed the growing crops through burying to the ground the weed and dead leaves.

It is important to point out here one outcome of the ecological change in the vegetation. About twenty years ago, the Forestry Department decided to put a teak plantation in part of the forest land. When the natural vegetation forest got cleared, the monkey and hyrax populations (largely, Cercopithecus aethiops nesiotes) Schwarz (green monkeys) and Dendrohyrax validus terricola Mollison (Usambara tree hyrax), which were native to the forest, were forced to move and establish residence elsewhere. They moved closer to the villages where they were sure of finding food. Since that time, villagers have had to guard their crops against these animals. Maize, which is one of the major crops planted each season, has to be guarded from the day it is planted until it is harvested and stored inside houses. Likewise, bananas, mangos and other fruits have to be shared as long as they are in the fields. This is regarded as a serious problem by the villagers. Periodic killing does not eliminate the monkeys but only reduces their numbers for a short period of time. Poisoning is used to a limited extent. One elder reported that it was because of the monkey problem that people are turning to cassava as a major food instead of the preferred maize. Root crops are not only safe from vermin, but they can also withstand drought and other unexpected changes of weather. While changes have taken place in the general

agricultural pattern and vegetation, one can still observe other forms which reflect traditional patterns. For example, while individuals can buy and sell land, one notices that several retired civil servants have returned to their ancestral land which they claim by inheritance rather than purchase. Formerly, the Sambaa people lived primarily in the lower slopes of the Western Usambara Mountans (Feierman 1974). One notes that they preferred the mountains to the lowland, and that "all good things came from the mountains." The old centers of trade were down at the foot of the mountains which enabled the Sambaa to complete their market transactions and return to their mountain homes before darkness, thus avoiding bites from lowland mosquitoes which were known to cause malaria. The shoulders of the Usambara Mountains were free from the malarious mosquitoes found in the lowland, and yet not as cold as higher on the mountains. There were other advantages as well. Maize, for example, which was the common food, ripens faster at the shoulder of the mountains than it does higher up. By growing crops at different altitudes and different times of the year, the Sambaa were able to produce enough food, even a surplus, which they marketed or exchanged for other products. According to the key informants interviewed during the current study, the mountains produced more food than the lowlands. The elders are able to tell that the longer people stayed in the lowlands, the less malaria they got meaning that a level of immunity is acquired. The point which is being made here is the fact that Sambaa people have established knowledge of the environment in which they live.

The present-day adoption of cassava as a major food is an example of the adaptation of the people of Tanga. One key informant reported

that cassava was introduced to the area by migrant laborers from Unyamwezi in central Tanzania, that the traditional food of Sambaa people was millet, bananas, beans and maize. With the shift to the plains and more pressure on land with shorter fallowing, cassava has become an important although disliked food, particularly significant at times of food shortage. Unfortunately, cassava is a food of low nutritional value and inferior digestibility.

In sum, however, human adaptation in Tanga Region faces multiple, severe stresses which have been intensified (as will be discussed below) by extensive migration. That has greatly reduced agricultural labor on the family farm, increased women's work and produced a large proportion of female-headed households. Malaria here is only one problem of many. The problem around malaria control should be seen from the various ecological and social factors that directly and indirectly influence human behavior.

2.1.3 Demography

The last national census on the United Republic of Tanzania was taken in 1978. Volume II of the population census gives figures on the country's population by age and sex for each administrative unit starting with the village, the ward and the urban areas. The total population of Tanga Region was 1,037,767, that is, slightly more than one million people. Tanga has a relatively high population density when compared with other regions of the country. The plantation economy covers much of the land so that only a small percent of the land is available for subsistence farming by villagers. Eighty-five point nine percent of Tanga's population lives in rural areas which mean only 14 percent lives in the urban areas.

Table 1 shows composition of the population by age and sex. One important point noted in the population is the fact that it is predominantly young. The plantation economy attracts young men into the region where they find employment in the plantations. Tanga town is also one of Tanzania's major industrial centers. Therefore, the town also attracts many young people in its factories (timber, fertilizer, iron, rope, soap, cement, etc.).

The study population is a large part of two administrative villages of different types. (a) Tongwe village has a disbursed population comprised of 16 hamlets. (b) Bombani village is compact (see Figure 3). The village surroundings are well maintained to reduce insect nuisance. The yards and surroundings of houses are kept free from weed and each house has a pit latrine which is kept covered. Tap water runs through both villages.

One sees few animals around the villages due to the problem of trypanosomiasis. Some people keep few goats, chicken and ducks. The absence of too many animals including dogs and cats reduces somewhat the chances of zoonoses and other diseases. The temporal nature of houses makes rebuilding continuous. This has also a health advantage in that it eliminates the problem of insect pests and different kinds of infection accumulating insides houses. Table 2 shows the age distribution of the respondents in the study population. Nine percent of the sample is above childbearing age but have small children in their houses which makes them social mothers.

Table 1

Composition of the Populations, by Age and Sex, for Rural Tanga Region and Tongwe and Bombani Villages Compared to the Study Population

Ages	Tanga Region Rural[1]							Tongwe and Bombani Villages[2]							Study Population	
	Both Sexes		Males		Females		Sex Ratio	Both Sexes		Males		Females		Sex Ratio	Both Sexes	
	N[3]	P[4]	N	P	N	P		N	P	N	P	N	P		N	P
All cases	891.8	100.0	441.0	100.0	450.8	100.0	98	3,177	100.0	1,568	100.0	1,609	100.0	97	1,877	100.0
0 - 4	158.9	16.7	78.2	17.7	80.7	17.9	97	484	15.2	236	15.1	248	15.4	95	(327)[5]	(17.4)[5]
5 - 9	154.1	17.3	77.2	17.5	76.9	17.1	100	565	17.8	288	18.4	277	17.2	104	(358)[5]	(19.1)[5]
10 - 14	111.3	12.5	56.8	12.9	54.5	17.1	104	410	12.9	211	13.5	199	12.4	106	258	13.7
Sum 0-14	424.3	47.6	212.1	47.1	212.1	47.1	100	1,459	45.9	735	46.9	724	45.0	102	943	50.2
15 - 24	139.3	15.7	62.6	14.2	77.2	17.1	81	433	13.6	206	13.1	227	14.1	91	345	18.4
25 - 34	108.1	12.1	47.9	10.9	60.1	13.3	80	397	12.5	153	9.8	244	15.2	63	209	11.1
35 - 44	80.8	9.1	40.9	9.3	40.0	8.9	102	288	9.1	152	9.7	136	8.5	112	159	8.5
Sum 15-44	328.7	36.9	151.4	34.3	177.3	39.3	35	1,118	35.2	511	32.6	607	37.7	84	713	38.0
45 - 54	60.2	6.8	32.2	7.3	28.0	6.3	115	239	7.5	123	7.8	116	7.2	106	116	6.2
55 - 64	39.3	4.4	22.2	5.0	17.2	3.8	129	166	5.2	92	5.9	74	4.6	124	59	3.1
65+	39.3	4.4	22.9	5.2	16.3	3.6	140	195	6.1	107	6.8	88	5.5	122	46	2.5
Sum 45+	138.8	15.6	77.3	17.5	61.5	13.6	126	600	18.9	322	20.5	278	17.3	116	221	11.8
Median Age	16.0		--	--	16.0	--		16.5	--	16.2	--	16.8	--	--	14.6	--

Note: 1. Source: 1978 Census of Tanzania. Population in thousand persons.

2. Source: 1978 Census of Tanzania. Population in persons. The total population of Tongwe Village was 1,750; of Bombani, 1,427. The compositions are very similar.

3. Data by age and sex are incomplete.

4. Percent distribution.

5. Adjusted for heaping at age four.

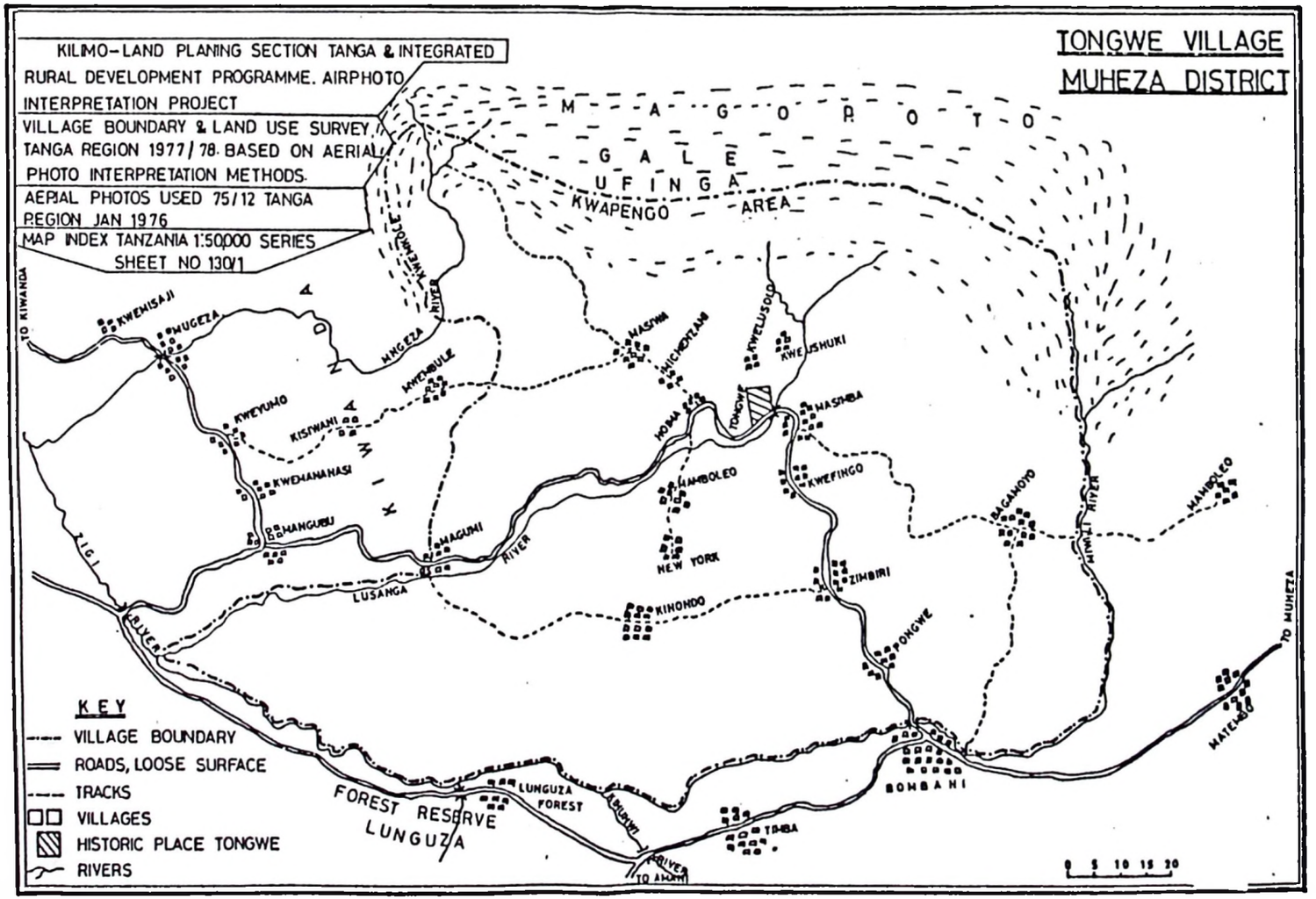

Figure 3. Survey Area and Its Hamlets.

2.1.4 Ethnic and Religious Groups

The Sambaa people among whom this research was done are one of the major ethnic groups of Tanga. Other groups, most of them Bantu, include Bondei, Segeju, Digo, Zigua, Nguu and Pare. Except for the Sambaa and Nguu, most of the groups live on the lowlands. One finds more historical records about the Sambaa than any other of these mentioned above. The lengendary ruler of Sambaa, Chief Mbega, has been the subject of much research (Kiro 1953; Feierman 1974). Legends and written historical records about the Sambaa and other ethnic groups mentioned above who live in Tanga Region suggest a common origin. They are said to have moved to their present locations from the northwest, after being driven away by the Nilotic Masai people some centuries ago. One of the field assistants who helped with the present project was Pare but had never visited Muheza before. She was able to understand all discussions and conversations when these were held in Sambaa or even in Bondei.

The Nguu are believed to have lived at their present location in Western Usambara longest of all. According to Kiro (1953) as well as some interviewed key informants, the names "Sambaa" and "Bondei" derive from the kind of geographical locations where the people live. "M-Sambaa" means someone who lives up the mountain, and "M-Bondei" means someone who lives on the lowlands.[2] The mountain/lowland dichotomy has developed over time as a major basis for classifying things as well as for identifying people and things. Sambaa and Bondei is used in this thesis to distinguish the two major ethnic groups in Muheza and their ecological adaptation and identity as separate groups. However, when it comes to rituals, informants

Table 2

Distribution of Respondents by Age

Age in Years	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
16 - 20	40	13.3
21 - 25	71	23.7
26 - 30	73	24.3
31 - 35	36	12.0
36 - 40	34	11.3
41 - 45	19	6.3
46 - 90	27	9.0

Mean: 28.0; Median: 26.2.

report that the Sambaa, Bondei and Zigua refer to the same ancestors, have the same sacred places and the same prayer. This latter point is an indicator of the common ancestry mentioned above. Historical records indicate further that trade between the Sambaa and Bondei has always existed as basically the exchange of mountain products for lowland products. Salt was a major lowland product at the market place, while milk and other animal products were processed on the mountains in exchange.

Until recently, land shortage was not a serious problem in the Usambaras so that migration to the lowland occurred only as a resolution of conflict between close relatives. However, as we have already indicated, at present a good number of Sambaa people live in the lowland, where they are experiencing land shortages.

As far as religious affiliation is concerned, the study area has three major denominations: Islam, Christian and Traditional. Table 3 shows the religious affiliations of the sample of women who were interviewed. Tanga Region as a whole is predominantly Moslem while some areas have a larger representation of various Christian groups, and pockets of followers of traditional religion, ancestor-based beliefs. Most people do not want to identify themeselves with traditional religion even though they may practice as well as adhere to its principles more than those of the Christian and Islamic beliefs. As we shall see in the following chapters, the basic beliefs of traditional religion are shared by most of the people in the studied community, even though as Table 3 shows, the majority of the respondents identify themselves with Christianity and Islam. Islam has spread gradually since the beginning of East African coastal trade with the Arab world about the tenth century. Some coastal communities in Pangani district of Tanga Region are almost one hundred percent Moslem. Today, Islam is the most common religious identity of all coastal Tanga. Islam has been the dominant religion of Zanzibar Island for many generations. Later, the religion spread into the interior of the country following the trade routes. It is said that later during the last century the agents of Islamization were not even Arabs but Zigua people who moved around between their coastal homes and the various trading posts in the interior. Feierman says that most Sambaa rulers of Vugha (one of the then major trading posts), called themselves Muslims, but they continued to eat pork, and were also central figures in the cult of the ancestors.

Table 3

Religion of Respondents

Religion	Distribution of Respondents	
	Persons	Percent
All cases	300	100.0
Christian	161	53.7
Islamic	136	45.3
Other (traditional)	3	1.0

Christianity came here during the second half of last century, after Dr. David Livingstone's visit to central Africa and his call for missionary work in Africa. The area of Muheza where the current field research was done is around one of the early mission centers. The Anglican Mission Center at Magila was started in 1883 from where the church spread to other parts of Tanga. In real life, it was observed that the followers of the Christian churches still practice some of the rituals which are associated with traditional religious beliefs, for example, the expressed need to sacrifice to the ancestors from time to time. Some of the key informants who were interviewed during this research strongly emphasized the importance of girls' initiation ceremonies as well as funeral rites which have roots not in Islam or Christianity but in ancestral beliefs.

Feierman also noted the Sambaa and other groups' ability to learn different religions but still maintain their own beliefs. According to Feierman:

> The people of the trading towns learned new religions in much the same way that they

> learned new languages, one could learn Islam without taking it as seriously as the Sambaa religion of the ancestor.(Feierman 1974:200)

There are few Sambaa or Bondei who admit today that they are followers of the ancestral religion even though as mentioned, participation in ancestral rites is popular practiced. One key informant insisted that "holding the ear of the goat" after a grown-up has died and been buried is very important. The informant, himself a Moslem, stressed that Islamic religion has nothing against such rites after the formal Islamic rites have been performed. Intermarriages between followers of different religious groups are practiced. Other forms of contact and relationships between followers of the different religions take place without conflicts. This is probably due to the fact, that one finds related kinsmen following different religions. It would appear that the kinship linkage serves to unite the people regardless of religious affiliation. The kinship idiom is strong because it has within it the lineage link which is not only binding the living members of the lineage, but their lineage ancestors as well. In other words, the kinship linkage has a religious idiom implicit in it. Among the Sambaa people, the family structure is a mechanism around which malaria is managed along with the other mechanisms, e.g., the dispensary, provided by the Tanzania national health system.

Table 4 shows marital status of respondents. Polygamous marriages are found among both Christians and Moslems in spite of the fact that Christian religion prohibits marrying more than one wife. This practice shows the degree of continuity of the traditional family structure within a different environment.

Table 4

Marital Status of Respondents

Marital Status	Distribution of Respondents	
	Persons	Percent
All cases	300	100.0
Married	197	65.7
-Monogamous marriage	161	53.7
-Polygamous marriage	36	19.0
Divorced	34	11.3
Single	60	20.0
Widow	9	3.0

It would be interesting to note the relationship between polygamy and monogamy and the management of malaria. Would the type of marriage have an influence on disease behavior? Does the presence of co-wives make it easier for a mother to seek medical help from neighbors (co-wives) or to travel to distant services? During the current study, it was not possible to cover this aspect because of time limitations. However, this is an important point for later study.

The fact, that the work load of rural women is heavy is a factor to be considered in medical behavior. Figure 4 shows a typical young woman's day schedule in Tongwe village. By the time she goes to bed, she has a had a long tiresome working day so that taking malaria prophylaxis can easily be forgotten. However, a health service program which is based on the community structure would help to solve this problem.

Table 5 shows fertility levels of women in Tanga compared with that of the study population. The study population is very fertile (19 percent higher number of children ever born) but also has a heavy loss through deaths. For Tanga Region, survivors are 88 percent of those born. In terms of household population in the study area, the households are relatively large as can be seen in Table 6. In view of the size of houses, housing is crowded. Table 7 shows the household composition. It is a clear illustration of the high frequency of extended households. The relatives include both ascending and descending generations. Such large households permit a sharing of responsibilities for subsistence, for example, child care. The extended family relationships are very important in illness matters including birthing and child care, especially relations between female relatives. Apart from co-residence, propinquity is functionally important, particularly the accessibility of the respondent's mother. Table 8 shows the proximity of the respondent's mother.

2.2 The Health Hazards of the Environment

2.2.1 Malaria Ecology

The major vectors for malaria in Tanga are Anopheles Gambiae and Anopheles funestus. The former breeds in fresh water temporary pools and swamps which are abundant in the village during rainy seasons. The latter group, on the other hand, breeds in large water bodies covered by vegetation which ensures their presence in good numbers throughout the year (Miles 1979; Service 1980). The efficiency of the two vectors in transmitting malaria is due to the fact that they have a high tendency of biting man (anthropophily) inside houses and rest indoors after a blood

Activity	Time of Day
Rising up	5:30 a.m
Starting fire and boiling cassava for breakfast (husband's and children's)	5:45 a.m.
Fetching water and walking to the field (0-2km away) while breast feeding her baby	7:00 a.m.
Hoeing and planting	7:30 a.m.
Breaking to eat cassava	11:30 a.m.
Resting	12:00 noon
Planting continued	12:30 p.m.
Collecting firewood to take home.	2:30 p.m.
Walking back home with firewood on her head and baby on her back	3:30 p.m.
Fixing vegetable for dinner	4:30 p.m.
Washing baby and older children	5:30 p.m.
Fixing dinner (that is, if there is flour or else pounding will precede the fixing of dinner)	6:30 p.m.
Serving dinner	7:30 p.m.
Putting children to bed	8:30 p.m.
Going to bed	9:00 p.m.

Figure 4. A Sambaa Rural Woman's Day Schedule During Planting Season.

The above schedule holds only where there is no monkey guarding. In the case of guarding, the woman generally spends the whole day out in the field keeping away monkeys or other types of vermin. The above schedule was prepared from an interview with an elderly woman who was one of the key respondents in Tongwe village in March 1984.

Table 5

Children Ever Born and Surviving to Rural Women in Tanga Region and the Study Sample

Category	Tanga Region, Rural[1]			Study Population		
	Number of women[2]	Number of children ever born	Number of children surviving	Number of women[3]	Number of children ever born	Number of children surviving
Total	3,052	11,727	9,648	300	1,368	838 - 973[4]
Mean/Women	--	3.84	3.16	--	4.56	2.79 - 3.24
Distribution						
0	193	0	0	1	0	n.a.[3]
1	217	217	324	55	55	n.a.
2	388	776	1,054	37	74	n.a.
3	597	1,791	2,166	42	126	n.a.
4	626	2,504	2,380	27	108	n.a.
5	431	2,155	1,770	34	170	n.a.
6	281	1,686	948	35	210	n.a.
7	131	917	434	19	133	n.a.
8	112	896	312	15	120	n.a.
9	36	324	54	10	90	n.a.
10	13	130	60	10	100	n.a.
11	7	77	44	7	77	n.a.
12	11	132	72	4	48	n.a.
13	6	78	0	2	26	n.a.
14	1	14	0	1	14	n.a.
15+	2	30	0	1	17	n.a.

1. Source: 1978 Census of Tanzania.
2. Co-hort aged 25 - 29.
3. Mean age 26.2, see Table 2.
4. Lower figure is the number of children residents in the respondent's household. The upper figure assumes that the number of children in other people's households equals the number of descending generation's relatives housed by the respondent.

Table 6

Persons in Household

Number in household	Number of households	Total Household Population Persons	Percent Distribution
All	300	1,877	100.0
1	2	2	0.1
2	7	14	0.7
3	24	72	3.8
4	44	176	9.4
5	55	275	14.7
6	35	210	11.2
7	41	287	15.3
8	42	336	17.9
9	20	180	9.6
10	12	120	6.4
11	11	121	6.4
12	7	84	4.5

Mean: 6.25; Median 5.51..

Table 7

Household Compositions

Relation to respondent	Distribution of household population		Person per household
	Persons	Percent	
All cases	1,877	100.0	6.26
Nuclear family	1,297	69.1	4.32
Respondent	300	16.0	1.00
Husband	159	8.5	0.53
Children	838	44.6	2.79
Relatives:	570	30.4	1.90
Respondent's generation	262	14.0	0.87
Brothers, Sisters	190	10.1	0.63
Cousins	28	1.5	0.09
Brothers, Sisters-in-Law	44	2.3	0.15
Ascending generation	173	9.2	0.58
Mother, Father	126	6.7	0.42
Mother, Father-in-Law	12	0.6	0.04
Stepmother, - Father	5	0.3	0.02
Aunt, Uncle	21	1.1	0.07
Grandfather, Grandmother	9	0.5	0.03
Descending generation	135	7.2	0.45
Stepson, Stepdaughter	9	0.5	0.03
Nephew, Niece	77	4.1	0.26
Grandson, Granddaughter	48	2.3	0.16
Unspecified	1	0.1	0.00
Unrelated Persons	9	0.5	0.03
Missing Data	1	0.0	0.00

Sex Ratio in Households:

Males	868
Females	1,009
Quotient	86/100

Table 8

Distance of Respondent's Residence from Mother's

Distance	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
Same house	79	26.3
Same village	60	20.3
Nearby village	31	10.3
Far away - bus trip distance	60	22.0
Not applicable	64	21.3

meal (endophyl). The malaria parasites which are transmitted by these vectors are predominantly Plasmodium falciparum and to a lesser extent Plasmodium ovale and Plasmodium malariae (Mnzava 1984, personal communication; White 1971; and Miles 1979).

As far as vector density is concerned, there is considerable variation depending upon the season of the year and the ecological characteristics of the area. Table 9 shows the calculated monthly totals of mosquitoes biting each person sleeping in a rural coastal type of house in Tanga (White 1971). As can be seen in the table, the maximum density of Anopheles funestus is January, March, July, November and December while for Anopheles gambiae is March through June, and September through December. The figures in the table are from White's (1971) study in 1969. The maximal period differs slightly each year depending on the timing of the rains which sometimes come earlier and sometimes later.

Table 9

Monthly Mean Totals of Female Mosquitoes of the Two Commonest Species Biting Each Person at Muheza During 1969

Month	Mosquito Species			
	A. funestus		A. gambiae	
	Number	Percentage	Number	Percentage
Total cases	1,591	100	2,971	100
January	225	14	78	3
February	62	4	59	2
March	134	8	394	13
April	50	3	136	5
May	62	4	316	11
June	66	4	230	8
July	137	9	88	3
August	81	5	114	4
September	57	4	457	15
October	104	7	462	16
November	284	18	331	11
December	329	21	306	10

Source: White, 1971.

Table 10 shows parasitaemia levels in a sample of population in Tongwe village at the time of this study and Table 11 compares the figures with those of Lusanga village in 1972. What is interesting to note is that despite the high levels of parasitaemias, particularly those above 400

counts (nine people), four with more than 800 parasite counts, all these were not patients, they were part of the study group. This does not mean that they may not have been sick. It simply mean they are busy sick people. However, the highest parasitaemias are from the infants and others less than nine years old. What this means is that the mothers underestimate the illness of the children or that the children do not show the signs of illness when the mothers are around to notice. This may cause the fevers to rise uninterrupted and result in cerebral malaria which gets interpreted as "Mchango" requiring not hospital but a healer's attention. While some may be lucky to survive, many children may succumb to the disease. This problem is partly due to the nature of an attack of malaria itself, but the busy schedule of the mother may also contribute considerably.

Tanga is a hyperendemic region for malaria. Studies on endemicity and immunity indicate that the intensity of transmission ensures that the majority of inhabitants suffer repeated infection during the year, thus acquiring and maintaining a considerable degree of immunity to overt manifestions of the disease. Practically, that immunity is expressed largely in reduced mortality in later childhood and adulthood. Clinical malaria is the most common ailment of the region. It is sometime associated, as native practitioners describe it, with severe chronic manifestations (see p. 53). It must also be noted that the demand for chloroquine in Tanga is enormous. This indicates the peoples' willingness to use all different resources to manage malaria.

A combination of favorable ecological conditions, that is the low altitude, considerable rainfall and humidity, and high temperatures

Table 10

Parasitaemia Levels in Tongwe Village, March 1984

Ages of Sample	Numbers and Percent Distributions at Parasitaemia Levels (Number of Parasites/200 White Blood Cells)						
	All Levels	0	1-100	101-200	201-400	401-800	801-1600
All cases	136	41	66	9	11	5	4
Percents	100	30	49	7	8	4	3
Infants:	28	2	11	2	8	3	2
0-11 months	17	2	6	0	6	2	1
12-23 months	11	0	5	2	2	1	1
Percents	100	7	39	7	29	11	7
Children:	54	9	34	5	3	1	2
2-4 years	35	6	21	3	3	1	1
5-9 years	19	3	13	2	0	0	1
Percents	100	17	63	9	6	2	4
Adolescents and adults:							
15 and over	54	30	21	2	0	1	0
Percents	100	56	39	4	0	2	0

Table 11

Frequencies of Positive Malaria Infections
by Age in Muheza District Lusanga (1972)
and Tongwe (1984) Villages

Age Groups	LUSANGA			TONGWE		
	Number		%	Number		%
	Total	Positive	Positive	Total	Positive	Positive
0 - 23 months	12	6	50.0	28	26	92.3
2 - 4 years	39	19	48.7	35	29	82.9
5 - 9 years	59	32	54.2	19	16	84.2
15+	97	7	7.2	54	24	44.4

Source: Table 10 and Table 13 in Otieno et al (1972).

account for this epidemiological situation. These ecological conditions affect not only the opportunity for development and survival of the vector and parasites, but also influence the work patterns and the total behavior of the human host. The current study of the susceptible population shows that the people in the communities are very mush aware that they live in a malarious condition. What is left for them to do is to maximize their own survival. This they do by using known herbal medicines for mosquito repellants and for malaria treatment, as well as chloroquine. But there are also limits to knowledge and resources. On the one hand, guarding against animals at night, for example, greatly increases exposures. On the other hand, little is known about controlling mosquito breeding places even in the close vicinity of housing, e.g., the water source.

The next section will discuss the Sambaa people's knowledge about

malaria. As already noted, Sambaa people have good knowledge of malaria and its epidemiology. Avoiding contact with malaria causing mosquitoes was one way which was used to protect themselves when they lived in a less malarious environment. Their increased contact with malaria has made it necessary for them to develop new ways of dealing with the disease.

2.2.2 Native Knowledge of Malaria

It may not be easy to differentiate malaria from other kinds of fevers on the basis of symptomatology. However, a frequently experienced disease is bound to show some generalizable characteristics which can be used by people as signs of that particular disease. Early records from Usambara tell about knowledge which the Sambaa people had regarding malaria. Robert Koch reported that the natives called the fever, which people got after being bitten by mosquitoes in the lowlands, the fever of "mbu", which means the fever of mosquitoes (Koch 1898). These Sambaa identified Kitivo and other trading centers at the foot of the mountains as the hotbed of malarious mosquitoes.

Several names are used to refer to malaria including the term used by Western medicine, "malaria", itself. One of the key informants gave the term "nyongo" as the Sambaa words for malaria. One says for example, "natotswa ni nyongo" in Sambaa, meaning "I have malaria". There is a level of knowledge of malaria which is common to all people who live under malarious conditions. However, there is a higher level which lies in the expertise of traditional medicine practitioners. Elders in the community are also regarded as more knowledgeable in health and disease matters. The following explanation is hsared among community members. Unlike other

kinds of fevers, malaria is not accompanied by a cold symptom or a cough. One can also tell that a fever is malaria by the yellowish color of the patient's urine. Other interviewed traditional healers added such symptoms as weakness of the body joints, red eyes, and loss of appetite. We can list their reported symptoms of malaria and contrast them with those of other fevers which occur in the area. The other fevers include: mchango (high fever accompanied with convulsions), safura (pneumonia), surua (measles), kamba kuu (native name for a kind of fever), zongo (a disease which usually attacks small children). The exact equivalent in Western medicine of the two latter diseases has not yet been identified. Malaria and the other fevers are given the following symptoms by Sambaa elders:

Malaria	Other Fevers
high temperature	high temperature
chills	no chills
weakness of joints	general body weakness
loss of appetite	loss of appetite
absence of cold symptoms	may have cold symptoms
yellowish urine	different color of urine
vomiting yellow	different color of vomit
normal eye color	red eyes
absence of convulsions	convulsions not uncommon

From this table, it is evident that, according to the Sambaa, the symptoms which malaria does not share with other fevers include: chills, weakness of joints, yellow urine and yellow vomit.

There are also known ways of treating malaria. Sambaa healers

also treat malaria with "Mshwee" (botanical identification unknown) extracts in combination with other medicines. Lists of other Sambaa plants used against mosquitoes and for malaria treatment are presented in Tables 23 and 24.

According to Bruce-Chwatt (1980), the clinical course of malaria consists of bouts of fever accompanied by other symptoms and alternating with periods of freedom from any feeling of illness. Differences are observed according to the species of the parasite, the intensity of the infection, the degree of resistance of the host and other circumstances. A primary malaria attack is identified with headaches, anorexia, occasional nausea and vomiting with three successive stages: the cold stage, with shivering and a feeling of intense cold; the hot stage, when the feeling of intense cold gives way to one of distressing heat; and the sweating stage, when the patient breaks out in profuse sweat. A typical attack takes eight to twelve hours, but clinical symptoms differ according to the species of the infecting parasite and the age and condition of the patient (Bruce-Chwatt 1980:35-15). Like the treatment by traditional medicine, clinical malaria is treated by a number of different drugs including quinine, mepacrine, chloroquine, amodiaquine, primaquine, proquanil and other drugs. Of these, chloroquine is the most commonly used drug in most of the tropical countries where the disease is prevalent. Chloroquine is still the most popularly used drug for treatment of malaria in spite of evidence of parasite resistance in several parts of the world, including East Africa (Olsen and Spencer 1974; Stahel, Degremont and Lagler 1982). Parasite drug resistance leads to continued research for newer drugs for treating the new resistant strains of parasites. On a

shorter range, it requires sharply increased dosages for prophylaxis and therapy. Since chloroquine has toxic properties, being for example, the leading cause of death from poisoning in Kenya (Maitai 1981), higher dosages involve increased risks. As will be discussed later, Sambaa mothers are very conscious of the side effects and risks of chloroquine.

2.2.3 Other Environmental Health Problems

Climatic conditions in Tanga are favorable not only for prevalence of malaria, but for other parasitic and infectious diseases as well. Different kinds of parasitic diseases are able to survive and spread during the greater part of the year because of favorable ecological conditions and the vulnerability of a population with poor housing, clothing and footwear. Tables 12 and 13 show the most common diseases in Muheza district and Tongwe village most of which are environment related. The predominance of malaria is clearly shown. Data from Tongwe dispensary are compatible with hospital data. Note also the high frequencies of ill-defined conditions.

The susceptibility of the people to infectious diseases in influenced by cultural practices as well as economic level of development. The habit or practice of not using shoes, for example, may be a practice which continues to exist because of the absence of inexpensive shoes in the village stores. The only pair of shoes which a child or an adult may have in the village is sparingly used not because the owner does not want to wear shoes but more because if worn frequently, the shoes would wear out fast, and the owner would be left with no shoes at all. Thus, the pair of shoes which one gets for Christmas, Islamic Idd or initiation

Table 12

Diagnoses of Outpatients and Inpatients at Teule District Hospital, Muheza District[1]

	Outpatients						Inpatients					
	Both Sexes		Males		Females		Both Sexes		Males		Females	
	N[2]	P[3]	N	P	N	P	N[4]	P	N[4]	P	N[4]	P
All cases	301.1	100.0	152.6	100.0	148.5	100.0	3184	100.0	1647	100.0	1537	100.0
Malaria	145.1	48.2	74.1	48.6	71.0	48.6	1471	46.2	729	44.3	742	48.3
Measles	-[5]	-	-	-	-	-	137	4.3	76	4.6	61	4.0
Bacillary Dysentery	2.5	0.8	1.2	0.8	1.3	0.9						
Other enteric and diarrheal diseases	11.8	3.9	6.3	4.1	5.5	3.7	330	10.4	188	11.4	142	9.2
Ankylostomiasis (Hookworm)	25.0	8.3	11.5	7.5	13.5	9.1	267	8.4	131	8.0	136	8.8
Ascariasis	20.6	6.8	10.5	6.9	10.1	6.8	-	-	-	-	-	-
Schistosomiasis	20.4	6.8	12.7	8.3	7.7	5.2	-	-	-	-	-	-
Skin diseases	-	-	-	-	-	-	356	11.2	219	13.3	137	8.9
Scabies	35.5	11.8	17.0	11.1	18.5	12.5						
Gonorrhea	34.7	11.5	16.1	10.6	18.6	12.5	-	-	-	-	-	-
Streptococcus infections	5.5	1.8	3.1	2.0	2.4	1.6	-	-	-	-	-	-
Bronchopneumonia	-	-	-	-	-	-	249	7.8	127	7.7	122	7.9
Spontaneous abortions	-	-	-	-	-	-	197	6.2	-	-	197	12.8
Hydrocele (Filariasis)	-	-	-	-	-	-	177	5.6	177	10.7	-	-

Note: 1. Sources: Appendices B and C.

2. Patients: in thousands.

3. Percent distribution.

4. Patients: in units.

5. Not reported.

Table 13

Diagnoses of Patients at Tongwe Dispensary, March - June 1984[1]

Diagnostic Category	Total Numbers	Percent	Patients M	A	M	J
All cases	3,523	100.0	871	898	1122	632
Malaria	962	27.3	215	293	304	150
Diarrhea	227	6.4	47	35	89	56
Intestinal parasites	154	4.4	28	45	33	48
Nutritional disorders	5	0.1	3	2	0	0
Anaemias	137	3.9	26	33	58	20
Schistosomiasis	2	0.1	2	0	0	0
Upper respiratory infections	220	6.2	47	52	71	50
Pneumonias	145	4.1	38	28	46	33
Whooping cough	6	0.2	3	0	0	3
Skin diseases	161	4.6	78	26	27	30
Gonorrhea	32	0.9	10	11	6	5
Eye diseases	74	2.1	21	17	23	13
Ear diseases	33	0.9	11	10	6	6
All other diagnosed diseases and conditions[2]	825	23.4	186	202	337	100
Symptoms and ill-defined conditions	395	11.2	111	89	107	88
Accidents (including burns and fractures)	145	4.1	45	55	15	30
Readmissions	869	-	240	138	271	220
Referrals	35	-	13	7	6	9

Note: 1. By comparison with Appendices B and C for malaria, enteritis, and skin infections (scabies), for each sex separately, March - June is a representative sample of the year.

2. Includes pregnancies.

ceremony is only used when going to the city or to church. The combination of economic limitations, the hazards of the environment and cultural beliefs and practices account not only for the prevalence of the diseases but also for many of the problems of disease management as well.

The above picture is not unique for Tanga, it can be generalized for other rural communities. It is important to point out the broader picture in which the malaria problem is only one. One of the basic problems of the conventional approach to malaria control is precisely the fact that the problem is seldom taken in its totality. The emic view of the problem which takes into consideration the structural relationships which holds the system together and causes the observed failure to contain malaria. In studies of disease control, good knowledge of the community's culture including knowledge and beliefs is as important as a good knowledge of the disease itself.

2.3 The Research Site

2.3.1 Location of Site and Reason for Choice

Muheza district lies in the northeast corner of Tanga Region (see Figure 5). The district, Muheza, one of the six administrative districts of Tanga Region, has all the four climatic zones described at the beginning of this chapter. The greatest part of the district lies in the hot and humid lowland and is therefore hyperendemic for malaria. The exact location of the fieldwork was at the foothills of the eastern Usambara Mountains, where the lowland plains meet the mountains. It is in this same location where earlier parasitological, entomological and immunological studies have been done. The early studies included basic investigations

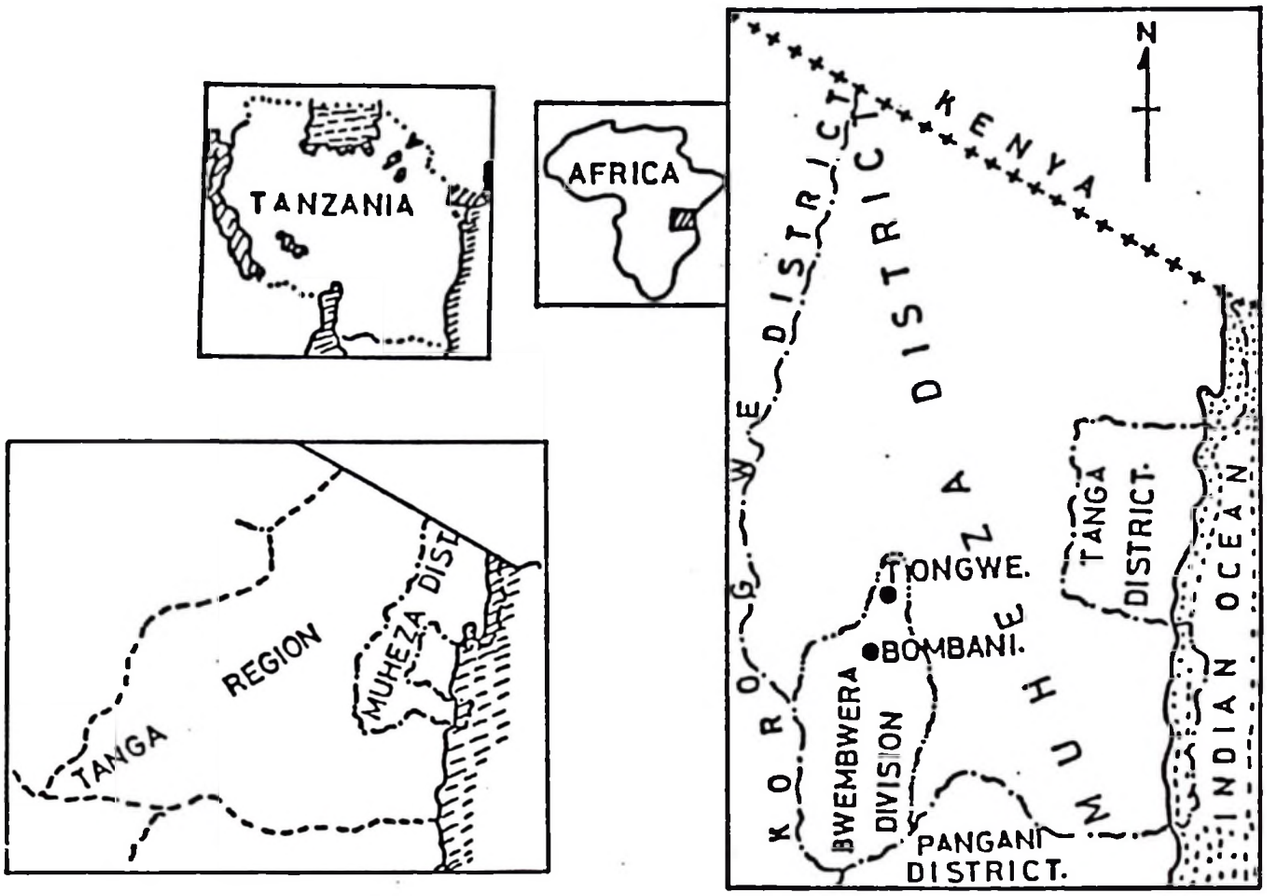

Figure 5. Map of the Main Surveyed Areas, Tongwe and Bombani Villages, Bwembwera Division, Muheza District.

of malaria transmission by Davidson and Draper in the early 1950's (Davidson and Draper 1953). The Center for the East African Malaria Unit was located at Amani, less than 12 miles from the research location and about 20 miles from Muheza town. Since the breakup of the East African community, the center is run as one of the research centers of the National Institute for Medical Research.

Muheza town is the administrative center of the district and is located on the road and railway station connecting Tanga with Dar es Salaam and Moshi towns. Muheza town is also close to the Tanga airfield, less than thirty miles. Other services of the town include a post office, a bank branch and a telephone connection. The district hospital at Muheza has 200 beds, it receives referrals from the rural health centers, and village dispensaries.

The epidemiological picture of Muheza district is similar to that which is found throughout the greater part of Tanga Region. Malaria, Plasmodium falciparum in particular, is the leading cause of hospital admission followed by other environment-related diseases (see Appendix C for the monthly admission figures for 1983 in Muheza). The size of Muheza District is 4,922 square kilometers out of which 51,312 hectares are under estate cultivation, that is, planted with sisal, tea, and cocoa. The acreage under family farm cultivation amounts to 300,062 hectares of arable land. The crops grown on the family farm include maize, bananas, cassava, cardamon, sugar cane, coconuts and citrus fruits. Thus, somewhat over 70 percent of the district is cultivated. Family farm land per capita averages 1.9 hectares, an adequate supply for a tropical area with

multiple annual crops were it not for the large amount of land, that is kept in fallow. However, some villages do experience land shortages as is the case with Tongwe and Bombani. Note also that chicken, ducks and goats are the only locally available meat animals. Slaughter cattle are brought in each week from outside the region. According to the 1978 census (Volume VI of the census), the population of Muheza district was 159,750.

The two village sites which were picked for fieldwork are Tongwe and Bombani. Both villages had to be covered to gain a statistically adequate sample of mothers of children under five years old (300). The two villages are linked by road with Muheza town and Amani Medical Research Center. The relatively easy accessibility of these places was one of the reasons for selecting them. This accessibility is only relative because after heavy rains it can take a week or more before road movement starts again. The two villages also represent a general pattern which can be found in other locations in Tanga and the country as a whole. The pattern is one where two villages are found next to each other, one comprising of a largely indigenous population which is indicative of the age of initial settlement. The second village is made up of largely an immigrant population, with an established marketplace and several provision stores. This second village has a more recent origin, and its development is from trade more than from farming. The two villages are dependent on each other for several services. Bombani depends on Tongwe for dispensary services, the church, school, the milling machine as well as some food products such as coconut beer, cassava and bananas. Tongwe is dependent on Bombani for supplies from the provision stores, bus services, market for farm products, and some employment.

The two villages lie in the warm lowland climatic zone, some forty miles from the Indian Ocean coastal line, right at the foot of eastern Usambara. Temperatures here vary between 70 degrees Fahrenheit in July and 87 degrees Fahrenheit in February. The annual rainfall for the district as a whole amounts to 1200-1600 milimeters with slight variations. At the higher altitude on the mountains, rainfall is heavier and more reliable than on the lowland. Still, the conditions necessary for year-round transmission of malaria are prevalent in both Tongwe and Bombani. The dispensary in Tongwe village is one of the 26 public dispensaries located in various villages in Muheza district.

Bombani village lies at the confluence of the Muheza-Amani road. Tongwe village center is some four miles from Bombani. The area around Bombani and Tongwe villages is crossed by numerous streams and swamps in which rice is planted between January and June. Sigi River is the only large river which forms a wide valley into which smaller streams empty their waters. The small streams and Sigi River provide places for mosquitoes to reproduce throughout the year. Davidson and Draper (1953) described the area as "holo-endemic" which means that malaria occurs throughout the year. P. falciparum is the predominant malaria parasite. The picture has changed little since the time when Davidson and Draper did their work in the area some thirty years ago. The significant change is perhaps that since then the population of the villages has increased and the malaria prophylaxis program has been introduced to protect pregnant women and children under the age of five from severe malaria attacks. The current study is therefore meant to contribute more knowledge

to that which already exists about malaria and the problem of its control in rural communities.

2.3.2 Politico-Administrative Villages and Residential Hamlets

In this part we shall briefly review the administrative structure of the district and place the research sites within the structure. Tongwe and Bombani are two of the seven villages in Nkumba rural administrative ward. The total population of the ward is nearly ten thousand people. The administrative and political leader of the ward is the ward secretary (Katibu Kata). The village leaders, chairpersons of each village, are answerable to him. Above the ward unit is the district subdivision (Tarafa) which is comprised of several wards. Several Tarafa form a district (Wilaya), and several of these make up the region (Mkoa). (See Figure 6 showing the politico-administrative structure). Tanga Region has six districts, and Muheza district has three sub-districts. Bwembwera sub-district, in which Nkumba ward is located, has three other wards.

Each village has an elected government with an elected chairperson (Mwenyekiti wa kijiji). The chairperson governs the village through a system of ten cell units comprised of ten households (Nyumba kumi). Each ten cell unit elects a representative (Balozi) to the village government. The village government has a secretary who runs the administrative matters of the village. The latter is the only one who is employed and paid by the district government on a permanent basis. This administrative structure at the village level facilitates research work in that it facilitates accessibility to the community. The census of

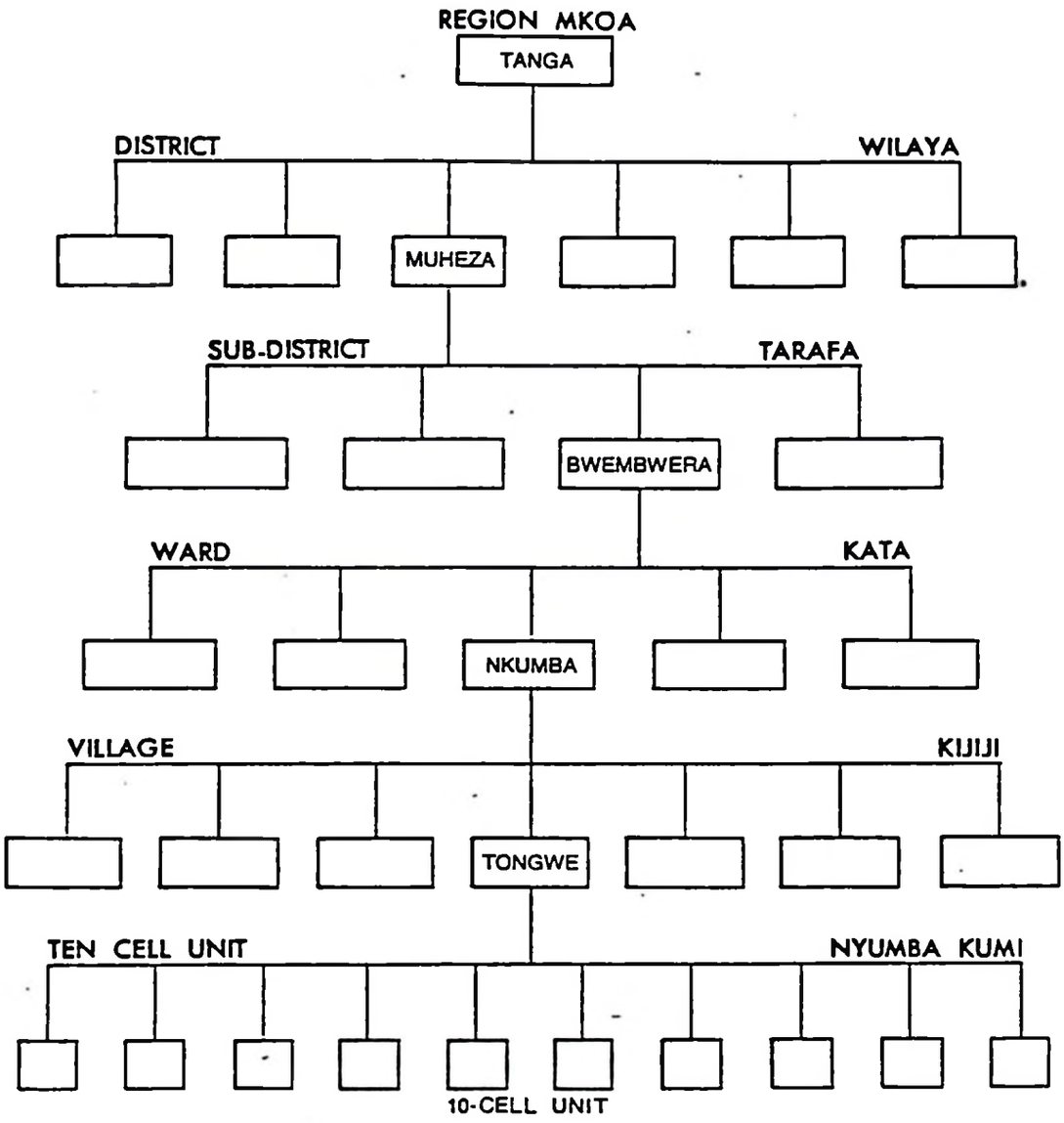

Figure 6. Chart of Political Administrative Structure at the Regional Level.

young mothers which had to be taken at the beginning of the research was very much facilitated by the ten cell system. This is particularly important because of the fact that the village is not located at one single place but is spread in several hamlets.

Tongwe village, for example, has some twenty hamlets spread in an area of 1,029 hectares (see Figure 3).

The distances between some of the hamlets caused some difficulties of accessibility particularly during rains. The red loam soil in the area makes roads as well as footpaths slippery and practically impassable after heavy rains. The area between Masimba and Bagamoyo and that between Tongwe and Masiwa (see map) gets swampy and tall overgrown grass covers up the paths cutting off all communication with other hamlets. The 1984 heavy rains did not fall until late April, and once they came, they fell continuously day and night so that people were confined to their own houses for some days.

The village administration office keeps records of members of the village and their ten cell leaders. Village public meetings are held monthly, and at these meetings, matters affecting the village are discussed as well as government legislation, which come from the district office. It was at the February 1984 public meeting that the researcher was introduced to the villagers. This is an opportunity given for visitors or guests to introduce themselves to the villagers and state their purpose for coming to the village. The size of the population in each hamlet varies. Tables 5 and 6 show the population of the Tanga rural area compared with that of Tongwe and Bombani villages.

2.3.3 The Structure of Tongwe

Since the detailed study of the community was done in Tongwe, a more detailed descriptive analysis of this village community will be given. Tongwe village is made up of 13 hamlets the size of which vary from one ten cell unit or ten households, to more than 10 ten cell units. These hamlets are scattered in an area of 1,029 hectares. At first sight, it is difficult to notice land shortage. However, because of the fact that the village is old it means that the earliest residents of the village divided large areas of land among themselves. Those who came to the village later got land in the periphery of the village and recent immigrants rent land for farming. Those who rent are given land use rights without payment but are restricted not to plant permanent crops such as coconut or orange trees. The number of those who rent land is large. However, many of those who rent land are often related by marriage or some distant relationship to the owner of the land. Therefore, family ties are very important among villagers.

Tongwe hamlet is the center of the village. The dispensary is located here, plus the clinic, a primary school and the church. Elders explain that the name Tongwe comes from the name of a small mountain near the sea from where the early settlers came. The village offices, a store and milling machine are located at Masimba which is only some hundred yards away from Tongwe hamlet across Lusanga River. The village has a tap water supply which runs by gravity from its mountain source through the village. There are several water points throughout the village and people come to do their laundry and fetch water for use in their houses.

The clean water supply came to the village in 1975. Most people use it for drinking without boiling it first and it is considered safe.

The rural medical aide and the village nurse aide live next to the dispensary. The pastor's house is also next to the church. All of the above houses are close to each other because of their historical origin. The church and the dispensary were built and run by Anglican missionaries during the first part of this century. The school buildings are located down the hill some few yards from these other buildings. The school teachers rent houses around the village, and most of them live in Kweusolo hamlet.

Among the villagers there are some people who have retired from employment in private and public service. Some of them have retired from teaching, from working as nurses, technicians and other types of employment. In most cases, they have lived away from the village during the whole period of their careers but maintained contact with their kinsmen in the village and built houses in the village. The chairman of Tongwe village, as well as a good number of his village government members, are among the retired workers. In terms of residence, these retired officers live in their own houses which they built on their ancestral land before they retired. The ancestral land is land which they received by their inheritance from their fathers. Therefore, they live next to their other relatives; brothers and uncles who also own shares of the land of their common lineage.

The age of the villagers is also interesting to note. Those under the age of 14 years form 45 percent of the village population. Those

aged between 45 and 65 and over form 25 percent of the village population. The middle-aged group is much smaller which shows the extent of out-migration of the youth after they complete primary education which generally occurs at the age of 14 or 15, (see Table 1). Twenty-five percent elders shows the rate of returning to the village after job retirement. In terms of networks of communication, one observes inter-actions between kinsmen and church membership.

The staff of the dispensary cooperate with the teachers of the school and vice versa. When the rural medical aide fell sick, for example, it was the teachers who were immediately informed and not the elders of the village. The head teacher and the nurse aide traveled with the patient in the bus bringing him to the district hospital which, unfortunately, he did not reach alive. On Saint Joseph's Day, the patron saint of the church, the teachers played an active role in organizing the program which included singing and dance performance by school children.

Weddings are primarily family functions, but other villagers are generally invited and neighbors are expected to attend. In this group of functions are Guna (the ceremony following the birth of a woman's first-born child), Nkimbizi (the initiation ceremony for girls), and Mwaiko (initiation ceremony for boys). Funerals are also family business, but neighbors and friends always attend and take part in the wake. On such occasions, Christians and Moslems alike interact while maintaining their religious differences.

As can be seen, the village population is not homogeneous, and the most noticeable difference is that between employees of the public

sector and the villagers. The staff of the dispensary and the teachers form a distinct group which cannot identify itself with the rest of the villagers. The villagers look up to this group for assistance on matters which they in the family have failed to manage. In Part Three of this thesis, a description is given on the role of the external professional (the dispensary staff) in community management of malaria and why a communication gap can exist between the patient and the dispensary staff. The social gap is one which is a result of conflicting cultural orientations. To improve the management of malaria by the community, there is a need for a conscientious effort to narrow the cultural gap which exists. This can be done by training the health personnel about traditional medicine and incorporating community specialists in village health services.

2.3.4 Ethnicity, Family Structure, Religion and Other Affiliations

As already mentioned, Muheza district is settled by Bondei, Sambaa, Digo and other Bantu ethnic groups. Tongwe village is settled by Sambaa and Bondei mostly while Bombani is settled by people from different parts of the country. The Sambaa and Bondei of Tongwe claim to have occupied the village for the same duration of time. As already pointed out, the Sambaa moved down from the mountains when the tea plantations took over their mountain homes, while the Bondei are said to have come to this area during their flight near present day Pangani town. The Bondei are said to have revolted against Kilindi, the rulers of Pangani and one group came finally to settle at the present day Tongwe village. According to one Bondei key informant, the area was unoccupied when his grandparents moved there. One Sambaa elder who had just started school at the outbreak of

World War I, says the whole area to the west of the Tanga-Korogwe railway line is Sambaa county, and that Ubondei (Bondei country) starts from the railway line eastward. Despite the differences in ethnic identity, there is close contact between the two groups and intermarriages are not uncommon.

Minority ethnic groups found in Tongwe and Bombani include some groups from the southern part of Tanzania; Yao, Bena and Hehe and some from Western Tanzania; Nyamwezi mostly. Some of these retired from work on the plantations and settled in the village. Some who came without wives married local girls but still identify themselves with their own ethnic identity. There are a couple of Arab families who are also settled at Bombani. In the past, the retail trade was run by these Arab traders. Of late, village stores have been gaining more popularity. The biggest cultural distinction is that between Sambaa and Bondei on one side and these minority groups together on another. For the Nkimbizi girls' initiation ceremonies, for example, only those who have gone through the initiation themselves are allowed to participate in the ceremony, and this evidently closes out non-Sambaa who may have a different type of initiation ritual.

Generally speaking, a Sambaa village is composed of lineage mates who are members of virilocally resident households. The smallest residential group is the nuclear family consisting of father, mother and their children. The Sambaa say that residence with the wife's lineage is against custom, but it happens quite frequently. With reference to the Sambaa family, Winans (1964) observed that:

> The local organization is based on corporate patrilineage. The corporate lineage is made

> up of a series of extended families whose heads are united by bonds of patrilineal descent. The most senior male within the lineage is recognized as the head Mgosh wa chengo. He is also the intermediary between the living and the departed ancestors above the level of a man's own father. (Winans 1964:37).

The present family structure has changed little from its traditional pattern. The most noticeable change is in the political function of the heads of households. The heads of households who represented lineages in the village government are now replaced by elected representatives who may not be senior members of any lineage. Sambaa households are big as can be seen in Tables 7 and 8. Members of a household are individuals who are related to one another in ascending and descending relationships. In discussion with the chairman of Tongwe village, he also reported that most families in the village are related either by matrilineal or partilineal descent. Some of the recent immigrants have also been assimilated into Sambaa family structure by marriage. One woman who said her mother was Sambaa but the father a Hehe, is assimilated into Sambaa culture to the extent that she is considered knowledgeable in Nkimbizi rituals and is called for whenever there is one. She explained that she went through the ritual herself when she was young and learned to play the leading role from her mother.

In terms of the realtionship between family structure and health problems, the family has an influence not only on the therapeutic measure which is adopted, but also in the management of the disease. Some details of family management of health problems are described later in this thesis. Janzen (1978) gives some analysis of the role of kinship in

therapy among the Kongo people. Among Sambaa, a close link is developed and maintained between a daughter and her maternal family. The influence which the family pattern has on disease management is an important subject of study. The decision to consult family or the nurse first can mean a decision of life or death depending on the stage of the disease and the type of disease, including complications of pregnancy.

Matrilineal linkages exist within a patrilineal system. However, such double descent is not uncommon among Bantu people of Africa (Ngubane 1977). While legal rights and descent come through the male line, there are other rights and obligations which are transmitted through women. These include the obligation to sacrifice to maternal ancestors. This is done when a wife visits her mother's brother to ask him to remember her child in ancestor rituals which are performed in her mother's lineage. Therefore, while a child is by descent a member of his father's lineage, its health and well-being are reinforced through the prayers and performed obligations in both the patrilineal and matrilineal lines. Insofar as lineage affiliation is regarded important for the health of the lineage members, it follows that it is also important in matters of disease control and health care itself. It would therefore be incorrect to assume that disease preventive ideas are new to the people of Tongwe and Bombani villages. What may be new is perhaps the method of disease prevention and not the concept nor the practice. The practice of malaria chemoprophylaxis is not accepted by the community as the only measure, but an additional measure, to what the community operates to prevent this serious disease.

Religious group affiliation often cuts across lineage boundaries and affiliations so that one finds family members in different religious

groups. Therefore, religious differences are not necessarily a basis for conflicts. Occasions such as funerals and some rituals bring together members of lineages without regard to their other affiliations. In other words, the kinship idiom has dominance over other kinds of affiliations. It is not uncommon to find a young mother taking her sick baby to its grandmother instead of seeking medical help herself. More about the importance of the family in disease management will be discussed in the next part of this thesis. What is important to realize is that there is a structural link between the social structure, the management of diseases and the environment, and that unless change affects all related aspects, it cannot be expected to persist and become general.

PART THREE

BASIC FINDINGS

3.1 Scope and Limitations

This part of the thesis contains the findings of the fieldwork and draws on other related studies which exist on the area of study. The levels of malaria infection and case of response to malaria are presented. An analysis is made of the triad network of communication which goes on within the community, particularly that between the mothers of young children, and the two types of medical specialists, the community specialists and the external professionals. Community specialists include not only individuals who are known in the community as knowledgeable in traditional medicine. It includes elders, among whom are the children's grandparents who are referred to for advice regarding questions of health. The external professional is an individual who is trained in the practice of Western medicine and works in national health institutions. The individual village is aware of these two medical resources and makes use of both in an effort to manage disease or illness. Points of conflicts may arise in the course of using these different resources. Such points will be pointed out in as far as they affect the control of malaria.

In this entire study, an inherent ambiguity of results occurs. An outcome of the interaction between the two medical systems can give the following effect. A woman's frequent visits to the clinic can be interpreted as compliance behavior to the malaria chemoprophylaxis program. But when follow-up studies show that the blood of the woman contains malaria parasites in no controlled form, it can mean one of two things.

It may mean that the parasites are not responding to the drug, suggesting the possibility of failure of the drug itself. It can also mean that the pattern of drug use is not in accordance with appropriate prophylaxis behavior. This means that the interpretation based on clinic attendance behavior was actually wrong. What is needed is a follow-up study of drug use patterns and their relationship to parasitaemia. An important aspect of this problem is the absence of a reliable biochemical measure of chloroquine ingestion. The ideal design for such a study requires the participation of specialists of different disciplines, including parasitologists, biochemists and behavioralists. A single discipline can only make a contribution to that one aspect of this complex problem: compliance, partial compliance and noncompliance in this study have been evaluated solely on the basis of verbal responses.

The parasitaemia data in Table 10 show some very high parasite levels in children under five. The highest reading of more than 800 is from infants, those less than two years old (seven percent). This group leads in the three highest parasite readings; 201-400 (29 percent) and 401-800 (11 percent). The problem which dispensaries face is that their disease diagnosis is clinical and this can cause misdiagnosis. It is possible that chloroquine is supplied for diseases other than malaria due to misdiagnosis.

3.2 Malaria as a Health Problem in Muheza District

It is unquestionable that malaria is the leading health problem in Muheza district. The respondents' appraisals in Table 14 are consistent with hospital and dispensary data in Tables 12 and 13 including the high

Table 14

Respondent Opinions - Prevalent Illnesses in the Village

Illness	Most Common Distribution of Respondents		Second Most Common Distribution of Respondents	
	Number	Percent	Number	Percent
All cases	300	100.0	300	100.0
Malaria	147	49.0	43	14.3
Fevers	49	16.3	17	5.7
Diarrhea	44	14.7	72	24.0
Abdominal problems	19	6.3	44	14.7
Measles	11	3.7	7	2.3
Headache	8	2.7	27	9.0
Anaemias	3	1.0	3	1.0
Vomiting	2	0.7	18	6.0
Coughs	1	0.3	15	5.0
Asthma	1	0.3	4	1.3
Mchango[1]	--	--	2	0.7
Other	9	3.0	31	10.3
Don't know	2	0.7	2	0.7
No reply	4	1.3	15	5.0

Note: 1. Mchango is convulsions, usually in children, associated with malaria and other high fevers, probably cerebrospinal meningitis among them.

predominance of malaria. This is an important indication of the reliability of the respondents' knowledge. Respondents consider malaria very lethal (Table 15).

The health policy of Tanzania supports a program of malaria prophylaxis for the sector of the population which is most susceptible to malaria, that is, pregnant women and children under five years of age. This program is carried out through the maternal and child care (MCH) clinics. (Tanzania has a socialized medical care policy which means that health care is provided free). In other words, the MCH clinic and its staff are the source of susceptibility definition as well as the source of the chloroquine drug used for prophylaxis. However, as we have seen in the preceding sections the disease is not new to the people which means that there is some established knowledge in the community with regard to it. Therefore, when young women receive information about malaria from the clinic staff, they are adding knowledge to what they already know. This places the woman in a position where she can decide to act according to what she thinks is best for her considering all other alternatives. In her thinking she exploits the resources of clinic knowledge as well as community knowledge.

Table 16 shows that respondents have a perception of seasonality for illness, something which Appendices B and C do not indicate. This can be a factor influencing compliance behavior in that during the season of perceived less illnesses, drug use can be relaxed. Table 17 shows that disease causation is viewed in pragmatic terms. There is no "hot"/"cold" concept, nor are supernatural causes viewed as primary. Even when it comes to Mchango, most respondents (31.3 percent) reported that it is caused by

Table 15

Respondent Opinions on the Lethality of Local Illnesses (Percent Distribution)

Illness	Not Very Easily	Not Easily	Not Sure	Easily	Very Easily
Measles	--	6.0	0.3	13.7	80.0
Diarrhea	--	2.0	0.3	19.7	78.0
Convulsions	0.7	3.0	1.7	20.7	74.0
Zongo[1]	0.7	10.3	4.3	49.3	35.3
Malaria	0.7	12.7	1.3	62.0	23.3
Tuberculosis	0.3	10.3	1.0	65.0	23.3
Djins	2.7	27.7	5.7	43.0	21.0
Fever	5.0	69.0	1.7	19.3	5.0
Headache	10.0	62.7	1.0	28.7	1.7
Bronchitis	5.7	79.7	1.3	11.0	2.3

Note: 1. For definition, see text p.

cold weather, and 26 percent said it was caused by high fevers (see Table 18). This is particularly interesting since popular belief among Sambaa has that Mchango is best treated by community specialists, and not at hospitals. However, this does not mean that a disease cannot be attributed to supernatural causes. Many diseases are treated with both traditional medicine and Western medicine. This practice is based on the fact that diseases are believed to have dual causation. Natural forces cause illnesses, but supernatural forces which include spirits can make a simple illness more complicated. Tables 19 and 20 confirm the impression given in Tables 17 and 18 and also show the openness of respondents to effective cosmopolitan medicine. Table 20 also shows a broad level of awareness of different measures which can contribute to good health.

Table 16

Respondent Opinions - What Season of the Year Brings Most Illness?

Season	Months	Distribution of Respondents	
		Number	Percent
All cases	January - December	300	100.0
Rainy	March - May		
Cold, dry	June - September		
Vuli (short rain)	October - November		
Hot	December- April		
Whole year	--		
Don't know	--		
No reply	--		

Table 17

Respondent Opinions - What Causes Illness?

Cause	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
Mosquitoes	139	46.3
Cold	76	25.3
Dirty water	38	12.7
Pollution	17	5.3
Heat	7	2.3
Change of weather	5	1.1
Dust	2	0.7
Exessive work	2	0.7
Other	8	2.7
Don't know	2	0.7
No reply	5	1.7

Table 18

Respondent Opinions - What is the Cause of Mchango?

	Distribution of Respondents	
Category Label	Number	Percent
Total cases	300	100.0
High fever	78	26.0
Cold weather	94	31.3
Severe malaria	14	4.7
Other*	30	10.0
Don't know	56	18.7
No reply	28	9.3

This means that the women either participate in health campaigns or that they get to know about the campaigns.

Health education campaigns are part of the dispensary health service. Tables 21 and 22 show an effective recognition of malaria symptomatology, particularly P. falciparum.

3.2.1 Housing, Behavior Patterns and Malaria Exposure

The kind of houses found around Muheza are the "Banda" type of structures (see Plates). The walls are made of poles and mud with palms or metal sheets as the main roofing materials. A few houses are built with mud bricks and others with baked and burnt brick walls. The palm roofing is more suited for the generally hot climate of the area, but iron lasts longer before termites destroy the rafters and therefore is more desired. The open eaves between the roof and the wall allow air

*Other included changes of the moon, breast of the mother and spirits.

Table 19

Respondent Opinions - What Reduces Illness?

Cause	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
The heat	119	39.7
Fewer mosquitoes	58	19.3
Drought	34	11.3
Good weather	22	7.3
Abundance of food	16	5.3
Clean water	7	2.3
No cold weather	6	2.0
Less arduous work	3	1.0
Other	18	6.0
Don't know	6	2.0
No reply	11	3.8

Table 20

Respondent Opinions - How Can One Protect Against Disease?

Method of Protection	Number	Percent
All cases	300	100.0
Weekly prophylaxis	118	39.3
Seeing a doctor	84	28.0
Boiling drinking water	39	13.0
Clean environment	35	11.7
Use mosquito net	7	2.3
Burn mosquito coils	2	0.7
Other	11	3.7
No reply	4	1.3

Table 21

Respondent Opinions - How Easy to Identify (Diagnose) Malaria?

Category of Difficulty	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
Very easy	255	85.0
Very difficult	35	11.7
Not sure	10	3.3

Table 22

Respondent Opinions - Symptoms of Malaria

Symptoms Category	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
Fever, chills, pain joints	70	23.0
Weakness in joints	60	20.0
Fever and chills	59	19.7
Fever	48	16.0
Vomiting	47	15.0
Other	5	1.7
No reply	11	3.7

to move freely in and out of the houses but also allow mosquitoes to move in and out of the houses. Therefore, the climatic advantages of the housing structure are at the same time disadvantages in terms of protecting people from malaria.

The house is rectangular in shape and contains up to six rooms. Most houses which have iron roofs have the kitchen outside the main

building. The fireplace is about a yard to a yard and a half from the shorter wall of the rectangle in the center. Above the hearth is a structure supported by four pillars on which dry foods are stored. Houses which have the kitchen inside the main building appear to offer greater protection against mosquito bites in that smoke from cooking fires helps keep mosquitoes out of the house. The structure of the house shows clear adaptation to the climatic conditions of the area. Given the hot and humid climate, and the absence of air conditioners and fans, maximizing the flow of air in the house is one way of keeping the house cool. Even when more modern houses are built, the absence of a ceiling and wire gauge screen on the windows does little to protect the inhabitants from mosquito bites. Mosquito nets are popularly used, but given the size of the households these are not as effective as they could be. Children often share beds which means that they are not restricted to the center of the bed to keep away from mosquitoes which rest on the net. The social and cultural practices of a people are related to the problems of malaria control. Hygienic practices include covering latrine holes and cleaning the ground around houses every evening. High humidity makes daily baths a necessity.

Besides the exposure to mosquitoes due to openness of the house, other behavioral practices increase the exposure. Evening social gatherings in the unscreened verandas and children's dances, particularly on a moonlit night, are some of the social events which allow mosquitoes to feed on human blood without trouble. Weddings and mournings which bring many people together at night also increase exposure to mosquito bites. There are therefore several factors at issue with regard to levels

of exposure to mosquito bites: (1) the openness of the house; (2) the social behavior of the people; (3) the cultural events and activities which go on at night; and (4) the degree to which smoking the house against mosquitoes is practiced. These are important factors in considering malaria control even though they are not exclusive. Considering the problem of malaria from its different aspects increases our understanding of the problems around its control and the need for multiple strategies which are effective in specific contexts.

3.2.2 Differences in Community Levels - The Evidence of Parasitaemia Surveys

As is clear from the entire dissertation, there is no more than relative immunity from malaria in the Tanga Region. At best, adults will suffer few overt symptoms although they may develop physiological damages through repeated attacks. But the consciousness of malaria is universal. Despite a great consumption of chloroquine, malaria is the most prevalent disease for adults as well as children. Community specialists, that is traditional medicine practitioners and herbalists, have a good knowledge of malaria as we have seen and will learn more in this chapter.

Bruce-Chwatt defines malaria immunity as "the state of resistance to the infection brought about by all those processes which are involved in destroying the plasmodia or in limiting their multiplication" (Bruce-Chwatt 1980:58). The host's resistance to some types of malaria infections includes natural genetic immunity. This is the inherent property of the host, a refractory state or an immediate inhibitory response to the introduction of the parasite. A second type of immunity is the acquired one, which may be active or passive. Active immunity is an enhancement of

the defense mechanism of the host as a result of a previous encounter with the pathogen. Passive immunity is conferred by the prenatal or postnatal transfer of protective substances from mother to child or by the injection of such substances contained in the serum of immune persons. This congenital immunity is common in malaria endemic areas of the world. Immune responses in malaria have been seriously studied among different peoples. In the present context it is considered important that a brief review of the extent of immunity of the people of Muheza be presented.

The physical basis of malaria immunity depends primarily on the activity of both humoral and cellular factors. The physiological condition of the host also plays a part, even though more specific research needs to be done in this area. The humoral factors are represented by antibodies in the blood, while the cellular factors are macrophages and cells which undergo intense proliferation following malaria infection. There is a known interdependence of cellular and humoral factors. These factors, plus other less known ones, function as the host's biological adaptive response to environmental conditions.

Research has also shown that in areas of high endemicity, the acquisition and extent of immunity are intricately related with the growth of an infant child and parasite infection. During pregnancy, the immune mechanisms of the mother are reduced to minimum levels. While infected mothers pass maternal antibodies to their newborns, the three-month-old infant may already acquire infections. In highly endemic areas, malaria infections are common in early childhood and many children succumb to these. Although surviving children slowly build up their own hard won acquired immunity, this happens gradually so that it is not until they

reach the age of five years that the immunity is strongly manifested.

With reference to endemicity levels and immunity, the following observations by the scientist, Robert Koch, are informative as far as Tanga is concerned. From a safari which Koch undertook to Usambara, he reported:

> Of the thirty porters who participated in the journey, not a single one fell sick, but they were all men from the coast. If the mountain dwellers have no immunity to malaria, which seems to be the case, it follows that they find no opportunity in the mountains to acquire immunity the natural way; in other words, malaria is not present in the mountains. (Koch 1898b)

This early report has been followed by other studies. In his study of the polymorphonuclear neutrophic pattern, Clyde (1964) showed that the amount of immunity acquired by Sambaa children was considerably less than that of their Bondei neighbors in the plains. From his study, Clyde concluded that from the age of two years, the progressive diminution in parasite rates and densities is indicative of the rapid acquisition of immunity under the extreme conditions of holoendemicity that prevail in Bondei country. It has also been shown that there are differential immune responses between native populations and immigrants from areas of less malaria.

A study carried out at Nderema tea plantation in the Usambara range near Amani, showed differences of infection between the Bena laborers from Njombe and the somewhat more immune Sambaa, indigenous to the area. The Bena laborers showed higher parasite levels than Sambaa laborers (Clyde and Msangi 1963). Table 10 shows the increase of immunity with age from the study of 136 women and children in Tongwe village.

The women were those sampled for the follow-up study of disease management. The parasite readings were done during the third week of March 1984 before the rains started. The figures also show the relationship between age and parasite density. The number of negatives in the groups above five years old, as well as the low parasite levels in this group shows that children who are under five years of age are at greater risk of malaria than are older people.

3.2.3 The Prevalence and Severity of Malaria - General Data

Epidemiological data from Muheza, as well as much of Tanga Region, show that malaria is the most common disease. Malaria is the leading cause of morbidity and mortality (Tables 10 - 12, Appendices B and C). There is a triad relationship within vector-born diseases in that they require an agent, a vector and a host in order to proliferate. In the case of malaria, the agent (Plasmodium) goes through the vector (an Anopheles mosquito) which passes the agents from one host (man) to another. Until recently, malaria control measures have emphasized attack on the vector through sprays to eliminate that vector in its developmental stages. Control of the agent through chemoprophylaxis started in the last decade. In all the various control measures, the human host has played a minor participatory role. Current malaria control strategies are increasingly realizing the indispensable role which the host has to play if malaria control is to have appreciable success.

The prevalence of malaria in Tongwe village during the time of this research can be seen in Table 10 which shows the results of parasitaemia checks taken at the time of this field research. The monthly

records from the dispensary in Table 13 show clearly that for all the four months during which the records were made, malaria was the leading single disease. The monthly records from the district hospital also show that throughout the year malaria is the major cause of hospital attendance as well as hospital admission (Appendices B and C).

3.2.4 Prevalence of Clinical Malaria - Pregnant Women and Children Under Five

The relation between malaria and pregnancy has also received considerable attention (Blacklock and Gordon 1925; Menon 1978; Kortman 1972; Nhonoli et al. 1975). Kortman (1972) whose study was in Muheza, showed that malaria adversely affects the immune mechanisms of the mother. More recent studies have shown that malaria infection is most frequent and severe in primigravidae both during pregnancy and at the time of delivery. In the study of pregnant women living under holoendemic conditions in western Kenya, Brabin found that the peak prevalence of infection in primigravidae (85.7 percent) and multigravidae (51.7 percent) occurred at 13-16 weeks of gestation (Brabin 1983).

The interaction between malaria and pregnancy has received considerable attention of researchers. Bruce-Chwatt (1952); Bray and Anderson (1979) and others confirmed that in endemic regions there is an increased incidence of clinical malaria and density of parasitaemia during pregnancy compared to non-pregnant states. Jelliffe (1968) and Kortman (1972) showed that malarial infection of the placenta has a marked effect on fetal growth and results in low birth weight of the newborn, an adverse developmental factor. Reinhard (1980) recommends that in regions where malaria is endemic, anti-malarial prophylaxis should be given to all

pregnant women in order to protect the mother from the disease itself as well as from its consequences, which are anaemia and increased susceptibility to secondary infections. Quite often, such consequences of malaria are intensified by nutritional deficiencies.

In his study of pregnant women using prophylaxis at Magila Hospital, Kortman did not succeed in getting full cooperation from all of the women who started his study. Only one-third of the total group was able to participate for the whole period (Kortman 1972). Unfortunately, Kortman did not follow up to see what made two-thirds of his study population unable to participate fully. Such a follow-up study would have contributed toward better understanding of both the factors which contributed to noncompliance and the behavior patterns of pregnant women. Nevertheless, data from one-third of the women (twenty-four), gave useful results. Ten of the twenty-four pregnant women who were under protection in Kortman's study had clear malarial parasitaemias at their initial visits. With regular protection, howerver, all malarial infections were cured and the development of new parasitaemias was prevented. However, Kortman noted some side effects. He noted the significance of the decrease in antibody levels as a side effect of the regular administration of malaria prophylaxis. He suggested that a few months of protection (the last trimester of pregnancy) have little effect on a well-established immunity (Kortman 1972:49).

Tanzania was among the very first African countries to adopt the World Health Organization (WHO) recommendation of availing malaria chemoprophylaxis to the most vulnerable groups, that is, the pregnant mothers and children under five years of age. This policy was carried out

through the Mother and Child Health Services (MCH). The MCH is the institutionalized health service which is the closest to the people in rural communities. It is part of the dispensary service (see Figure 7).

The organization of the Mother and Child Health Services (the MCH Unit) is under the Preventive Service Division of the Ministry of Health. The Unit was established in the mid-70's to carry out mother and child health services which hitherto were part of the general medical service. The service is well-established at all levels including the village level. At the village level (see Figure 7), a Maternal and Child Health Aide worker delivers basic maternal and child health services at clinics attached to dispensaries and rural health centers. Problem cases are referred to the district hospital.

The MCH Aide works under the administrative direction of the Rural Medical Aide who is in charge of the clinic and cooperates with other health auxiliaries.

The primary function of the MCH Services is preventive health care. Need was felt for better child health services because of high infant mortality rates (159/1000) as well as under five mortality rate of 286/1000 (the United Republic of Tanzania 1979). Since most of the deaths are caused or contributed to by malnutrition and other preventable diseases, it was felt necessary to expand the preventive service to include the education of the mother.

The MCH clinic therefore offers comprehensive services which includes prenatal and postnatal care, immunization, and education on child spacing, nutrition and general health, malaria chemosuppression and conducts normal delivery. She also dispenses chloroquine and iron pills to all

Health Facilities	Number	Medical Personnel and Facilities
Consultant Hospital	3	- Several doctors, specialists, laboratories and equipment, plus other skilled personnel for dealing with complicated cases.
Regional Hospital	17	- Several doctors and five specialists (public health, pediatrics, obstetrics and gynecology, internal medicine, general surgery. Other skilled personnel.
District Hospital	160	- One or more doctors and other personnel.
Health Center	195	- One medical assistant, two rural medical aides, one nurse/midwife, two MCH aides, two nursing assistants, one health auxiliary, one laboratory auxiliary, and other supporting staff.
Dispensary	2,590	- One rural medical aide, one MCH aide, one health auxiliary, and a nursing assistant.

Figure 7. Chart of Health Facilities in Tanzania.

Source: United Republic of Tanzania (1979).

pregnant women, chloroquine for the under-fives and food supplements. This means that the MCH Aide is the source of medication as well as health education. How effectively this is done is an important question. Several factors play an influence. (1) In every community in Tanzania, there are "community specialists" to whom individuals turn for advice on matters of health and diseases including pregnancy and child care. The MCH service is therefore in many cases only a supplement to the health service provided by

community specialists. It is a known fact that many babies are delivered by traditional birth attendants who are in the community. (2) The fact that "community specialists" are elderly who are well-known in the community while the MCH Aide is a young woman would also influence the degree of effectiveness of the health education. This does not mean that the women are necessarily conservative. It only means that they are placed in a situation where they can make a choice for behavior. As will be further discussed, there are social and attitudinal factors which influence individual behavior.

Reports show that in the five-year period between 1975 and 1980, the number of chloroquine tablets issued through government stores jumped threefold, from 102 million to 300 million (Chiduo 1982). In the long run, this is likely to prove too costly for a poor country like Tanzania.

3.2.5 The Problem of Improper Chloroquine Use

With regard to therapeutic management of malaria using chloroquine, there are problems apart from side effects often encountered which lead to increased noncompliance. Kilama (1984) gives a list of limitations hindering the use of this lifesaving drug. Among these he includes: (1) improper dosing, (2) insufficient labeling, (3) use of nonstandard measures, (4) vomiting, (5) bitter taste, (6) varying base contents in different brands, and (7) human beliefs. One of the basic problems behind the observations is one of inadequate training given to the MCH aide. The basic primary education and a couple of years of training cannot be expected to place the student in a position where she can effectively play her role. Problems often arise due to the inadequacies of the communication

between the nurse and the patient as well as a result of the inadequacies inherent in the drug itself. In terms of the latter, the bitter taste of the drug can influence one not to complete the therapeutic dosage. Some experiences of side effects can also lead to failure of compliance. A mother who is receiving malaria therapy for herself or her child can easily fail to complete the dosage because the nurse did not spend more time explaining the importance of frequency of dosage. Often the nurse will hand the medicine with instructions to take two tablets once each day and a formula (2x1) written on the medicine paper. A second medicine may be given with instructions to take two tablets three times a day and a formula (2x3) written on top. While for the nurse such instructions may seem simple enough, they may not be clear to all recipients of such drugs. Unlike the community specialist who generally takes time with the patient and relatives of the patient, the nurse often spends too little time explaining things to the patient or mother of the patient. More details about the problem of communication will be discussed in following sections.

Partial compliance to the management of malaria is not without negative consequences to malaria control. According to Dr. Irare, a malariologist based at Amani, the development of drug-resistant strains of Plasmodia can be facilitated through inadequate treatment of malaria (personal communication). Bruce-Chwatt (1980) also stresses that:

> With most of the drugs that have important therapeutic action it is necessary to produce an effective concentration in the blood as quickly as possible and to maintain this concentration for an adequate time. (Bruce-Chwatt 1980:186)

Failure to comply effectively with the prescription can be explained as the result of failure of communication and other factors.

The Garki project in Northern Nigeria concluded that a combination of vector control with insecticide and mass drug administration which achieved a high level of control by means of adequate planning, staff and supervision was too expensive to be used on a large scale or for a long period. With regard to chemotherapy and chemoprophylaxis, the study recommended attack on transmission, and the use of chemoprophylaxis for the most vulnerable groups of the population (Molineaux and Gramiccia 1980). The current study suggests an approach for malaria control which utilizes community or local resources where these exist. Research is needed to explore and evaluate local resources which are useful for disease control.

3.3. Patterns of Respondent Behavior in Malaria Illness and Prophylaxis

Tanga Region is one of the few malaria endemic regions of Tanzania where various studies of malaria have been done. The people are therefore cooperative to researchers, as well as open to new ideas. In spite of the fear expressed about "blood sucking" for parasite reading, keen interest is shown to know what goes on regarding malaria research.

3.3.1 Survey Data

In this study, out of the total sample of 300 women interviewed in the two villages of Tongwe and Bombani, 84 percent had had some experience with malaria prophylaxis during pregnancy. These need not have taken the prophylactic drug with required regularity, but the fact that most women

report their having taken the drug shows their awareness of the program and their readiness to take part in it. With regard to problems which they might have experienced with the program, a high percent, 91.7 percent, replied that there were no use problems experienced. However, regarding therapeutic experience with chloroquine, 67.3 percent expressed various side effects. The therapeutic side effects which were reported included itching, vomiting, dizziness and nausea. In spite of such side effects, chloroquine is in great demand at the dispensary as well as in stores. Dispensary reports show that supplies of chloroquine run out faster than those of any other medicine. It is possible that chloroquine is used for diseases other than malaria since the dispensary uses clinical diagnosis for all conditions. It is possible that the dispensary makes mistakes as well as the people develop new chloroquine use patterns.

Analysis of the current study shows that 67 percent of the women who were interviewed reported that chloroquine is the most necessary medicine, the next being aspirin. Asked as to where one can get these medicines when the dispensary runs out of them, 70.7 percent said they buy from local stores and 27.7 percent said they would get the medicines from the district hospital. The practice of buying non-prescription medicine is not without negative consequences. Maitain (1981) found a serious lack of knowledge on the proper usage of non-prescription medicines by sellers as well as those who use the medicines. We have noted the importance of knowledge in compliance behavior, and more will be discussed in the following sections.

3.3.2 Case Studies Data

A follow-up study of a sample of households showed a picture of the management of illnesses and diseases within a household. What is interesting to note is the degree of observable pragmatism which, unless one knows the sociocultural beliefs of Sambaa people, can easily miss the logic behind such pragmatic behavior. The case of Mwalimu Mary's baby's illness and how it was managed appears later in this thesis. What is important about the case studies is that the women take medication or go to the dispensary or to a specialist in the community as a result of thinking about the illness and the possible medical services.

Household Number 1:

Salome is a 26-year-old mother of two little children. She is single and lives with her parents in a household of seven people. They are a Christian family. Salome's father is a retired schoolteacher who for ten years before his retirement was teaching at his home village primary school. Salome's mother works in her fields and keeps some chickens. The father is a ten cell leader which means he is also a member of the village government. The house in which they live has six rooms with a separate kitchen. The main house has iron roofing but no ceiling. Salome's father is relatively well off in comparison with other members of the village. He owns several goats and has enough land on which he grows oranges, maize and cassava. The swampy valley between his fields is generally planted with rice every season. Salome's father was one of the key informants, and it was always easy to find him for discussions. He seldom left the village and spent his time either at his home, in the

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fields or at the beer club. Some of the interviewing took place in the field.

Managing diseases: On July 13, Salome's four-year-old boy cut himself with a broken bottle while playing outside the house. After the bleeding had stopped, the mother examined the cut and decided to take him to the dispensary where the boy got treated. On July 15, Salome herself developed diarrhea and went to the dispensary for treatment. On July 20, Salome developed a cold which she treated with aspirin which was stored in the house. The cold persisted and on July 31, she went to the dispensary to get treatment.

This household uses hospital medicine most of the time, at least, they gave no report of using traditional medicine. However, when Salome's father was asked about it he explained that there were diseases related to Sambaa culture which are only treated with traditional medicine. Such diseases include those which are related to ancestors' demands and the wishes of bad people.

Household Number 2:

Amina is 19 years old and lives with her parents. She is single and has one little child. There are five people in the household and they are Moslem. Amina's father is a 60-year-old traditional healer. He owns a house in Tanga town where he often goes to practice his profession. Two of his daughters are married in the village. Three of his grand-children were initiated on February 19, 1984 during this project. He was one of the key informants. Their house in the village has four rooms with an iron roof. Amina's mother is the senior wife. The father owns a big

piece of land part of which is planted with coconut trees. His medical practice includes divinations, using Koranic script. He explained that diseases such as malaria, diarrhea and others are more easily treated at the dispensary, but other diseases which have to do with mazingara require the expertise of the traditional healer. The concept of mazingara needs explaining. The Swahili word "mazingara" means "expertise." In traditional medicine, it includes the belief in the practice of sorcery, witchcraft and other supernatural believed causes of diseases. Therefore, when a diviner says that a certain disease is due to "mazingara", he actually means that the disease or illness has a magical etiology.

Managing diseases: On May 7, Amina's two-year-old boy developed mchango and was treated at home. A week later when Amina was visited again, the child was still under mchango treatment. He later recovered. On May 25, Amina herself started coughing, probably from bronchitis. She drank some hospital medicine stored in the house (vidonge), the Swahili word for tablets. On May 27, she went to the dispensary for treatment.

It is important to explain how hospital medicine comes to be stored in the house. It has already been pointed out that people buy medicine from the local stores when the dispensary runs out. Well, when the dispensary is re-stocked, patients are generally given one dose to take right there and a supply for two to three days to take home. As already pointed out, the instructions on the frequencies of taking the medicines may not always be clearly understood by the patient. Therefore, what often happens is that the patient may take another dosage the next

day and if the condition improves, the rest of the medicine may get stored to be used next time when someone in the household gets sick, problems which may occur as a result of such a practice have already been pointed out.

It is difficult to tell what the little boy was suffering from. It is also difficult to know what medicines were used to treat him. Amina's father and other healers often refer to "dawa za tunguli" "Dawa" is a Swahili word for medicine. "Tunguli" is a specialist term for one kind of medicine. Tunguli medicine is a combination of mixtures of herbs and other ingredients, and is stored in a special gourd. Amina's little boy was treated with medicine from a "tunguli". A healer is known for the number and quality of his "tunguli".

Household Number 3:

Joyce is 40 years old, married, and has five children. The two youngest are eight-month-old twins. There are seven members in the household. They are Christians. The house in which they live has four rooms including the kitchen. The roof of the house is made of coconut palms like most of the houses in the village. Joyce's husband has no special social status in the community. He owns some land which he says is not enough, therefore, he cultivates part of the land which belongs to his father-in-law. Now and then, the husband takes wage employment in town, but most of the time he works in his fields in the village.

Management of diseases: Joyce's six-year-old girl is asthmatic. Whenever she has a bad attack, she is taken to the dispensary for treatment. On July 12, the child had one bad attack. The mother explained

that the cold season is very bad for asthma. On July 24, the four-year-old boy had malaria and the mother gave him a half tablet of choroquine from those stored in the house. The following day, the child started playing again with his friends and at bedtime he was given another half chloroquine tablet. The next day the child had no symptoms of malaria any more. In May, the twins got malaria and she took them to Muheza District Hospital where she had to stay for two days before she was allowed to go back home with her twins. Joyce also explained that sometimes the asthmatic child has to be taken to the district hospital for treatment because the dispensary runs out of medicine. On June 26, the father took her to Muheza for treatment and managed to return home the same day. According to Joyce, traditional medicine is not as good as hospital medicine for the treatment of asthma.

Household Number 4:

Zubeda is twenty-three years old. She is married and has two little children. She lives in a house which has two rooms with coconut roofing. They are a Moslem family. The household has five people. Zubeda's husband has no special social status in the community. He owns some land which is planted with cassava. He often has to leave home to look for employment so that he can buy clothers for the family and sometimes food as well.

Management of diseases: Zubeda's two-year-old child had mchango on July 1 and the mother put the child on her back and took the child to the traditional healer. The healer observed the child and prepared some medicine for the child to take. Some was taken home with instructions to

continue giving to the child during meal time. A week later when the mother was visited, she reported that the child had recovered. On July 11, the mother felt that the child had malaria and she took it to the dispensary. The child got treated and the mother returned to her home. When the mother was visited on July 21, the child still looked weak and the mother reported that the child continued to take the medicine which she was given at the dispensary.

Zubeda explained that most people prefer using hospital medicine, but because the dispensary oftentimes has no medicines, more of them are using traditional medicines. However, even when the dispensary has enough supply of medicines, traditional medicines are still used because experience has proved it appropriate.

3.3.3. Interpretations

The social structure based on the family is important in disease management. The behavior follows a structural process of linkages cross cutting other social differences.

The four cases illustrate the respondents' management of diseases, the extent to which individuals exploit the resources available to them in a rational manner with the aim of alleviating disease conditions and restoring good health. What is important to bear in mind is the fact that the reasoning which leads to the final behavior is influenced by beliefs and knowledge which the people have. Proper understanding of the rationale behind the observed behavior requires knowledge of the cultural beliefs and knowledge which are shared by members of the community. These shared beliefs override other social differences of religious affiliation,

education and marital status. This means that individual behavior is governed by a deep paradigm which is stronger than manifested institution based differences. The cultural beliefs and knowledges provide alternatives which are considered important by most people.

With regard to malaria prophylaxis, the knowledge a person has about malaria and its management is the cause of the beliefs and attitudes which that person has about malaria. Since as we have already said, a person processes the information she gets to arrive to her evaluation, we can say that the basis of attitude is also information.

The four case studies and others which are described in this dissertation point out the realities of health problems in a rural African community. It shows that malaria is only one of the many problems of health which people have to deal with. What the case studies illustrate is a pattern of illness behavior in general, that is what individuals do in response to lliness, malaria included. The symptomatic basis of disease diagnosis often leads ot misdiagnosis, so that it is probably appropriate to use multiple resources as the villagers practice. The community-based management of health problems is likely to continue until better approaches are developed and appropriately introduced to the communities.

3.4 Determining Factors for Malaria Behavior Patterns

Information is a two-way system, with a source and a receiver. Information about malaria, for example, comes from community specialists and external professionals to community members. It is transmitted through formal and informal channels. Regardless of source and channel, an individual processes the messages received and forms ideas (attitudes)

regarding the object of information. The field of communication and persuasion has received considerable attention from researchers. Hovland, Janis, and Kelley (1953) and others have made important contributions toward understanding attitude change. Hovland and the whole Yale School of Communication have one significant limitation. In their research work, no adequate treatment is given to the content of the communicated message. In the context of the theme of this thesis, the content of the message is important in that, it is a cultural message.

The factors which influence malaria behavior have their base in the various kinds of information communicated to the individual through formal and informal channels. To discover the factors involved in malaria behavior, one has therefore to go into the fabrics which constitute a person's knowledge. One has to elicit information and measure its intensity to find out the degree of influence exerted by specific kinds of information. Malaria behavior patterns are under varying degrees of influence from the information that the individual gets exposed. In many African societies, the community's own information sources have greater influence on the individual's behavior than other externally derived knowledge sources including formal schooling. This has been shown from the results of the current study. It is clear that the individual's behavior is the result of deeply held beliefs and values which are supported and justified in everyday life experiences. Later in the analysis, it will be seen that the community specialists are the source of primary and salient beliefs which are held in the community. These beliefs exert considerable influence in

the management of malaria. Since such beliefs cannot be directly observed, we can deduce them from responses to questions. The responses to the basic questionnaire which was administered to the 300 respondents show that people's attitudes which are derived from people's beliefs play a greater role in determining individual behavior than do social characteristics.

3.4.1 The Theory of Reasoned Action and Its Application

The applicability of the theory of reasoned action to behavior is based on the fact that it demonstrates the link between beliefs, attitude, and behavior. The explanatory value of this theory is what makes it a valuable tool in anthropological research. Fishbein and Icek (1975) define attitude as: "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (Fishbein and Icek 1975:6). With regard to belief, they say belief, "represents the information one has about the object. belief links an object to some attribute" (Fishbein and Icek 1975:12). Ajzen and Fishbein make clear that:

> According to the theory of reasoned action behavior change is ultimately the result of change in beliefs. This implies that in order to influence behavior, we have to expose people to information which will produce changes in their beliefs. (Ajzen and Fishbein 1980:81)

The link between external variables and the primary beliefs is demonstrated through a systems analysis of the various factors which are involved in the complete process of influences of behavior. The external variables are those of the social structure which give rise to beliefs responsible for the attitudes. The attitudes are in turn responsible for the intentions

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which lead to the observed behavior.

The relationship between belief and behavior is not lineal, the model shows the process which link the various levels of variables which cause the final behavior (see Figure 8). Prophylaxis use is not a simple response to availability of the drug, but a result of decision-making of the individual.

With regard to malaria prophylaxis, the knowledge a person has about malaria and its management is the cause of the beliefs and attitudes which that person has about malaria. Since as we have already said, a person processes the information she receives to arrive at her evaluation, we can say that the basis of attitude is also information. The relationship between the information received and the formation of beliefs depends on the effects of the information. New information can produce either an increment, a decrement, or no change in the attitude. See Tables 27 and 29 for the results of the current study. Fishbein and Ajzen (1975) have used the expectancy-value model to interpret the information basis of attitudes. According to the expectancy-value model, a person's evaluation of the attribute contributes to her attitude in proportion to the strength of her beliefs (Fishbein and Ajzen 1975:222-255). In the following sections of this chapter, we will see the various information which the young woman receives from the community specialists and from the external professional. We will notice how these medical practitioners and their social relationships to the community members play an important role in influencing malaria behavior. The responses to the current study have shown that the beliefs

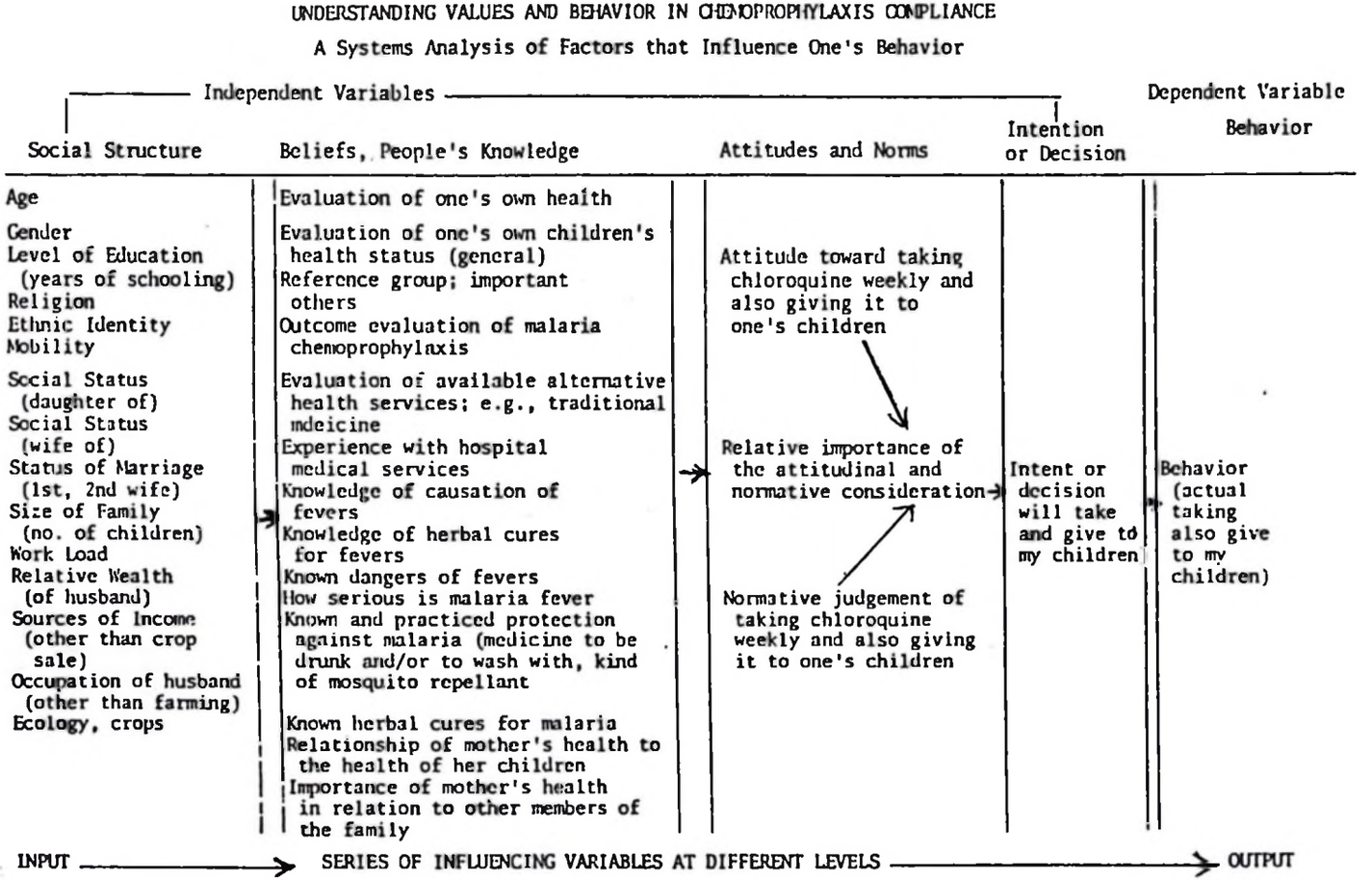

Figure 8. Diagram of Categories of Variables.

Note: Arrows point towards the direction of influence. The social structure gives rise to beliefs. These two form the independent variables of the system. The attitudes and norms, intention and outcome behavior form the dependent variables. The diagram is an expanded form of Fishbein's (1980) behavior model.

which people hold have a strong influence in their malaria management behavior (Tables 27 and 28).

If we accept that a person's attitude toward an object (A) can be looked at by the degree of that person's beliefs and evaluation, that is

$$A = \Sigma b_i e_i$$

whereby,

A is the attitude toward an object,

bi is the belief "i" about the object,

ei is the evaluation of attribute "i",

we should be able to predict a person's behavior by controlling the beliefs and attitudes. Thus, for example, the attitude toward the behavior of taking chloroquine prophylaxis can also be changed by influencing beliefs about the object (malaria control). Peoples' attitudes are based on their practical experiences with the problem (malaria) and with its various management techniques, therapeutic and prophylactic.

This study has shown that the people of Muheza accept the use of chloroquine against malaria, but that they also use other measures, e.g., traditional medicines and mosquito repellants. This means that their awareness of the hazards of the environment in which they live makes them willing to add resources to what exists already in an effort to maximize their chances of effectively managing the problem to ensure their own survival. Their behavior is therefore rational.

What is needed in order to improve malaria control is to provide better resources for environmental action and increased support for dealing with medical crises. It is the improvement in the quality of

services which will bring about the development of positive attitudes toward Western approaches for malaria control. In other words, what is required in order to improve malaria control is change in terms of the services on the side of "external professional". There is need to narrow the existing social gap between Western medicine practitioners and the people they serve. We shall see in the following sections how the experiences which people get for health services influences not only their attitudes toward the service but their behavior itself.

3.4.2 Community Structure, Respondent Social Positions and Their Affects

We saw earlier in this thesis the age structure of the population of Bombani and Tongwe villages (Table 1). Besides the two broad categories of the native-born versus immigrants, we find further subgroupings within them. The first category of native born can be split into two groups. The native-born who have always lived in the community constitute one category. Those born in the village but who left the village for employment and came back to the village to retire are a different group of native-born villagers. The group of outsiders, that is, the immigrants who are not village-born, belong to one group. We noted earlier that the latter group forms a small minority of the population of Tongwe. The outsiders tend to associate more with each other and with those who speak the same mother tongue. Group conflicts are more clear between the subgroups of native-born than between them and the outsiders.

Out of the 300 respondents, 53 percent are natives, born in the village and 24 percent are recent immigrants. The remaining 23 percent are immigrants who came to the village more than a decade from the time of

this study. Most of the immigrant women followed their husbands. We noted in Table 3 that the community is made up of Christians and Moslems almost in equal numbers. However, case studies of medical behavior show no distinct differential pattern of behavior.

It was pointed out earlier that the village government is run predominantly by the "Returnees". Although the village government is democratically elected by the villagers, the actual running of the village affairs is not made easy. The chairman of the village who is also the village chairman of the political party, is elected every five years. We learned also that the ten cell leaders (TCL) are also members of the village government. Decisions of the village government reach the villagers through the TCL. The secretary of the village government sends notices for public meetings through the TCL as well as informally at beer clubs and at other social gatherings. Criticisms by the villagers about the services and running of the village government are often directed to the TCL who lives closest to them. The villagers feel freer to talk about their grievances to their local representative rather than airing them publicly during general meetings. In other words, there is a feeling of the returnees being external even though they are recognized by their lineage membership as rightful villagers. The TCL hears complaints and grievances which are not given at the public meetings. Some of the complaints were about the distribution of limited supplies of basic necessities such as sugar, detergent, and radio batteries. It has already been pointed out that in 1984, Tanzania was hit by shortages of most basic supplies. The shortage was experienced at all levels and difficulties arose on how to distribute their inadequate supplies to the satisfaction

of all who needed them.

The returnees are grouped by villagers with the teachers and dispensary staff who are not like other villagers by virtue of their employment which ensures them a monthly salary income. In times of hardship, this group which has an income, pension or salary has greater chances of providing for their families than the rest of villagers who have no regular cash income.

Only 26 (8.7 percent) of all respondents reported that their father had a social status in the village, and 38 (12.6 percent) had a husband holding a social status in the village. Three of the respondents themselves had a social status in the community. These social statuses include membership in the village government, community specialist and religious leadership.

If we take housing as an indicator of social status, we note that 67.7 percent of the respondents live in temporal houses, 29 percent in semi-temporal and 3.3. percent in permanent housing.

In terms of education, 31.3 percent of the respondents completed primary education, 47 percent attended part of primary education, 1.7 percent have more than primary education and 1 percent have Koranic education. Nineteen percent never attended any school.

What is interesting to note is the fact that the social differences do not show significant correlations in management of malaria. The discriminant analysis results on page 145 (Tables 27 and 28) shows that compliant behavior is influenced more by attitudinal factors than the community's social structure.

3.4.3 Information, Decision-Making and Communication

Sources of information in the village include formal and informal media. The formal sources are the radio broadcasts from Dar es Salaam and Zanzibar for national and international news, and the daily newspapers from Dar es Salaam which reach Muheza the second day of their printing. The radio is also used for various campaigns. In 1972, there was a successful health campaign which employed a special weekly radio program. The campaign "Mtu ni Afya" which literally translated means "Man is Health" was organized by the Institute of Adult Education in selected regions of the country. Mhaiki and Hall (1973) report the success of the campaign. There is high demand for the Uhuru, the national newspaper which is always sold out within a few hours of delivery in the community. The informal sources of information are through visitors who pass through the village, and the villagers who travel frequently between the village and the big towns. The new tax bill, for example, had been heard and discussed informally long before the government officials came to explain it to the villagers.

In terms of decision-making at the community level, the villagers are represented in the village government by their respective ten cell leaders. The ten cell leaders (TCL) are elected leaders of ten households in their hamlets. The TCL once elected, become full members of the village government. The fact that the TCL is resident in the community places him in closer communication with community members.

The villagers have a say in matters regarding the village school through their representative in the village school committee. There are three committees through which the village government runs the affairs of the village. The committee for education and cultural affairs is

responsible for matters related to the village school, adult education programs and cultural activities. Other committees include the health and economic committees. These committees are headed by a member of the village government with the members coming from the government and the community. The committee for health, for example, is headed by a school teacher and the rural medical aide (in charge of the village dispensary) is a member, plus other elected community members. Problems which relate to community health or, for example, that of shortages of drugs, get discussed by the health committee to seek possible solutions. Its suggestions are then sent to the village government for further discussion and approval. The researcher of the currently reported study was received by the chairman of the health committee who wrote a notice to mothers of young children in the village asking them to show cooperation in the study.

The implication of the structural makeup of the community on the control of malaria is clear. The degree of involvement in the village programs can serve to expose one to information about the programs. Since information implies knowledge, the more information people get about malaria, the more knowledge they get. Knowledge influences attitudes which account for behavior. If more people take part in the decision-making about malaria control, they can be expected to participate in its control. The fact that the dispensary personnel lives apart in itself creates a social distance which limits effective communication.

3.4.4 Sources of Community Knowledge on Malaria

Community knowledge and beliefs related to malaria originate from three sources: (1) the population which is at risk; (2) the community

specialists; and (3) external professionals. The population at risk comprises the pregnant women and mothers of small children, i.e., the respondents, the community specialists include traditional healers, elders and other individuals who have some knowledge of cultural tradition and custom, and who are at times consulted for their knowledge. The external professionals include nurses, rural medical aides, doctors, health officers and others who are representatives, so as to speak, of Western medicine. The acceptance or nonacceptance of malaria prophylaxis is the outcome of the relationships between these three sources of knowledge. In the course of managing malaria, the individual is using all the resources available with the aim of maximizing the beneficial contributions of each resource. However, this inclusive behavior may not have positive consequences toward the goal. We have already noted the negative effects which partial compliance to chloroquine chemotherapy may bring. Moreover, the level of knowledge which one person has may also differ from the actual principles of the medical system itself.

The resource systems are not static either, they undergo change and cause change in other parts, thus bringing a change in the total system. In other words, when we study malaria control behavior, we are in reality dealing with processes of cultural change. Alland (1970:158) points out that, "change in cultural systems depend upon innovation and borrowing." Innovation comes from the community's own resources while borrowing implies contact with other cultures. It can then be expected that change will necessarily contain elements of tradition as well as elements of other cultures. This analysis is applied in the study of malaria behavior in Tongwe village. The individual's relationship to the community specialist

and the external professional is important in understanding the management of malaria. The problem with malaria control is therefore seen as the problem of the interaction between these groups. The young mother and the two medical systems need further analysis. An analysis of the various systems which are involved in the behavior enables us not only to find out the factors which play the greatest role, but it also facilitates identifying loci of conflict which, if dealt with, may bring about improved malaria control.

3.4.5 Respondents and Family Networks

The households of the respondents are big as can be seen in Table 6. It is obvious from Table 7 as well that the extended family is strongly practiced in the survey communities. The structural-functional characteristics of the African extended family has been clearly summarized by Shimkin and Uchendu (1978). The case studies which are described in this dissertation also show the important supportive role which the extended family continues to function strongly in Tanzania communities because of the Ujamaa policy whose foundation is the African extended family (Nyerere 1968).

One demonstration of the operation of the extended family was during a funeral of a woman who died in September 1984. One truckful carried mourners from Amani, several came from Tanga town, and other family members flew in from Dar es Salaam and Mombasa in Kenya.

The knowledge which the young mother has can be traced from the time of her childhood. Since she grew up under malaria endemic conditions, it is likely that she has had repeated attacks of malaria from early childhood. By the time she has her own child, she knows the symptoms of

malaria and probably knows some names of medicines used to treat the disease. The responses of the questionnaires administered to 300 young women in Muheza show that only 35 women (11.7 percent) replied they did not know the symptoms of malaria at all (Table 22). The great majority of the women, 84.6 percent, mentioned symptoms which agreed with many of the symptoms accepted by hospitals. The responses also showed that the women know and use various plants for protection against mosquito bites (Table 23). Seventy-five percent of the respondents gave names of plants which are used to repel mosquitoes.

Medical pluralism in management of diseases is commonly practiced in African societies like many other societies. The current study has shown that a number of herbs are used for treatment of malaria (Table 24). This shows that studying prophylaxis compliance behavior from exclusively etic models is likely to conceal what actually goes on in the community itself after the drug has been collected from the dispensary or the MCH clinic. Disease management has to be viewed in terms of a dynamic process constantly evolving and changing in adaptation to both external and internal forces of change. As mentioned already, the individual community member finds no conflict in using both medical resources. The mother of young children has a life experience with community specialists and her knowledge as well as experience with hospital medicine also have shown her the power it has in relieving pain and other disease symptoms. Whatever proscriptions and prescriptions are given with one system of medicine are taken in good faith, at least in far as these are made clear enough and are well understood.

Table 23

Plants Used as Mosquito Repellants

Plant	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
Hangazimu[1]	159	53.0
Mvumba Mpuku[2]	28	9.3
Vumbasa[3]	13	4.3
Muarobaini	11	3.7
Msagati-kivumba[4]	8	2.7
Others	7	2.3
Don't know	20	6.7
No reply	54	18.0

Botanical identifications:

1. Chenopodium procerum Hochst. ex moq. (Chen.); (Ait.) E. Mey (Rhamn.) Hyptis suaveolens Poit. (Lab).
2. Ocimum americanum L. (Lab.).
3. Ocimum Suave Willd. (Lab.).
4. Acalypha fruticosa Forsk. (Euph.).

Source: Sangai, G. R. 1963 Dictionary of Native Plant Names in the Bondei, Sambaa and Zigua languages with their English and Botanical Equivalents. Mimeo, East Africa Herbarium, Nairobi.

These local names were collected through a questionnaire administered to a sample of women in Muheza district.

Table 24

Plants Used to Treat Malaria

Plant	Distribution of Respondents	
	Number	Percent
All cases	300	100.0
Mzugwa[1]	8	2.7
Vumbasa[2]	8	2.7
Hozandoghoi[3]	5	17.0
Others[4]	10	3.3
Don't know	4	1.3
No reply	259	86.3

Botanical identification:

[1]Mzugwa, Colens kilimandschari Guerke (Lab.).

[2]Vumbasa, Ocimum Suave Willd. (Lab.).

[3]Hozandoghoi, Hyptis pectinata Point. (Lab.).
Plectranthus amaniensis Guerke (Lab.)

[4]Others,

Mwengee, Cissus adenocaulis Planch.,
C. engleri Gilg. (ampel.).

Mtula, Solanum campylacanthum Hochst.,
S. incanum L., obliquum Damm. (Sol.).

Fivi, Artemisia afra Jacq. (Comp.).

Mhasha, Veronia iodocalyx O. Hoffm. (Comp.).

Muuka, Microglossa densiflora Hook.f. (Comp.).

Source: Sangai, G. R. 1963 Dictionary of Native Plant Names in the Bondei, Sambaa and Zigua languages with their English and Botanical Equivalents. Mimeo, East African Herbarium, Nairobi.

These local names were collected through a questionnaire administred to a sample of women in Muheza district.

Most of the respondents (76 percent) indicated no problems in the use of plants to treat malaria. We have also seen that malaria is reported as the most common disease by most of the respondents (Table 14), as well as one which easily kills the patient (Table 15). Chloroquine is reported as the most accepted drug and some herbs are also known to cure malaria. This high level of awareness of the disease can explain why the mothers show pragmatic malaria-control behavior. The medical resources which are available are used to maximize the chances of successful management of disease. Cerebral malaria, which often assumes the symptoms of mchango, is generally treated by a community specialist even if later the patient is taken to the dispensary or hospital for further treatment.

A high percent of the young mothers (79 percent) also reported that use of malaria prophylaxis was the best measure to take for protecting one's family against malaria. Given this high level of reported acceptance of prophylaxis raises the interesting question of why follow-up studies indicate general noncompliance to the program. To get a clear picture of what governs compliance behavior, a closer look at the elements which are involved in the behavior is necessary.

Compliance behavior is governed by relationships between factors which form part of the total medical behavior of a group of people. Out of the 300 young women who were interviewed, 252 (84 percent) reported having used chloroquine prophylaxis during pregnancy. The pattern of the prophylaxis use cannot be established since no follow-up was done. What the responses to the questionnaire tell us is simply that the clients are aware of the program and that, except where there are some problems, they

are prepared to participate in the program.

This opens room for search of improved approaches to further compliance behavior. With regard to the side effects experienced with prophylaxis use, only 4 percent reported having observed side effects from use of the drug. The kind of side effects mentioned include nausea and dizziness which could have been due to inappropriate use of the drug or some other cause.

Regarding the use of chloroquine for treatment of malaria, more women reported having experienced side effects. Sixty-seven percent of the total sample indicated some kind of chloroquine therapeutic side effects, including itching, vomiting, nausea and dizziness. In spite of the side effects experienced from chloroquine, the drug was given as the most necessary medicine available to the respondent, followed by aspirin. During field research, neighbors often stopped to ask if the researcher had any chloroquine to spare. The level of popularity of chloroquine can explain why there is concern at higher government levels for the high amounts of the drug being imported in the country each year. The possibility that the drug is being used for conditions other than malaria and the short or long-term effects it may produce raises interesting questions for health professions.

From the responses of the young women interviewed, we get some ideas about the contemporary rural African woman:

(1) She knows the symptoms of malaria.

(2) She knows plants which repel mosquitoes and uses them.

(3) She knows about malaria prophylaxis and is ready to use it for protecting her family.

(4) She has used chloroquine prophylaxis during pregnancy.

(5) She observes side effects from therapeutic use of chloroquine but still considers chloroquine a useful drug.

(6) She is ready to buy chloroquine when not available freely at the dispensary.

(7) She probably uses chloroquine for diseases other than malaria.

(8) She consults the community specialists for mchango.

These characteristics of the young woman in Muheza have to be considered not only according to a synchronic perspective but in terms of cultural tradition under which the woman grows up. From the findings of this research, it becomes clear that the young woman is not conservative as is often considered to be the case with rural societies. Instead, she often has to make decisions and act according to her evaluation of the consequences of the action she takes. A description of a case of a young mother and her sick baby can illustrate the family's role in the management of a disease crisis.

Mwalimu Mary (24 years) lives by herself in a village where she teachers at a primary school not far from her home village, a distance of about a two hour's walk. She was born in Tongwe village where she later came to live with her grandmother. Her parents live in the city where her father works for the government. Mwalimu Mary spent part of her childhood in the village with her grandparents. She attended the village primary school and upon completion she got employed as a teacher. While teaching, she became pregnant from a fellow teacher but had a miscarriage after four months of pregnancy. She became pregnant again by the same boyfriend. In April 1984, she gave birth to a baby boy. After her three months of

maternity leave which she spent with her grandmother, she went back to her work. On August 30, 1984, the baby developed a light fever. The mother gave a half aspirin tablet to the baby. The next day the baby's temperature was high and Mwalimu Mary observed that the baby's abdomen had become harder. The school where she teachers is on the road to Muheza and buses pass there going to or coming from Muheza town. Mwalimu Mary went and told the head teacher that she had to take a leave and attend to her sick baby. Then she placed her baby on her back and headed for Tongwe to her grandmother. On arrival, the grandmother observed the baby and advised her granddaughter to take the baby to the dispensary. The baby received malaria treatment at the dispensary and then they went back to the grandmother's house. After about a half hour, the grandmother suggested that a zongo specialist be consulted. Meanwhile, another community specialist, Kalage, was called to come and help. On arrival, Kalage observed the baby and commented that the disease was too advanced for her to give medication that could work. Nevertheless, she gave some medicines which she said might be of help. That same day at night the baby died in the grandmother's house.

Next morning, word reached everyone in the village, and in the afternoon a funeral was held. The following night mourning continued and church songs went on throughout the night at the house of the grandmother. Mwalimu Mary's parents received word of the death of their grandchild, and her father took some days off from his work and traveled to the village. The father arrived a week later and he called for another night of mourning and prayer (Mkesho).

Word had gone around the village that the baby had died from zongo and not from malaria. Mwalimu Mary received the sympathy and

consolation of relatives, neighbors and friends. No one blamed the mother for not having taken the baby to the hospital instead of the village where her grandmother lives. Taking a sick child to the village where one's relatives and family live is seen as the best alternative as taking the child to the hospital. At the school where Mwalimu Mary lives, there are her boyfriend and other families with children. But after observing her baby's condition, Mwalimu Mary decided to go to her grandmother with her baby. Her behavior was based on family considerations. She was seeking help and advice, perhaps the family was seen as the best source.

3.4.6 Community Specialists

Community specialists define malaria as "nyongo" in the Sambaa language. One says, for example, "natoozwa ni nyongo" meaning "I have malaria." The symptoms of malaria, according to the traditional healers, include a rise of body temperature, weakness of arm and leg joints, a period of chills and sometimes vomiting. The color of the urine is reddish. One key informant added that he feels the chest of the patient with his hand to tell whether the fever is malaria or not. A yellow color of the eyes is also a sign of malaria. Most of these symptoms are the same as those which Bruce-Chwatt (1980) reports for malarial haemoglobinuria (Blackwater fever) which occurs in individuals who have experienced repeated and severe attacks of falciparum malaria. Malarial haemoglobinuria is a syndrome of acute intravascular haemolysis accompanied by haemoglobinaemia and haemoglobinuria. It is characterized by an abrupt onset, passage of dark red or almost black urine, vomiting of bile-stained fluid, jaundice, early prostration and a high mortality

(Bruce-Chwatt 1980:69). It is not surprising that people who live in a malaria endemic region have clear and well-established ideas of the different forms and stages of malaria. However, the basic problem in dealing with malaria has dual difficulty. On one hand, there is biologically an inevitable parasite-host relationship. Despite the purported resistance acquired through exposure, the population is still vulnerable. Thus, as pointed out, there is a major social feedback which disturbs realtionships and must be managed. The community specialists, unlike the hospital, are concerned with both aspects.

We shall discuss the people's beliefs from interviews of some key informants in Tongwe village. Since beliefs or the total world-view of a people are not directly observable, we can only infer from what we learn about the popularly-believed causes of diseases, attitudes toward alternative medical systems, and their forms of disease treatment, the operative values and rules of behavior including proper child pregnancy care.

The key informants who were interviewed on the following information are mostly elders who have knowledge of traditional medicine and/or traditional midwifery. In the treatment of malaria all the key informants agreed that hospital medicine, injection in particular, can cure faster than herbal medicines (miti shamba). According to them, the injection places the medicine directly into the affected part of the body. It is noted that things have changed. One elder added that mothers were having children too close to each other, and that the health of these children was very poor. One informant who was in his eighties recalled his own childhood when he said bottled milk and tea were unknown but they

were fed good food. He traced changes in diet to the starting of the sisal plantations and the influx of immigrants. According to him, the traditional staples of the Sambaa people were millet, maize and potatoes. Cassava was brought by Nyamwezi laborers and since it was easy to grow and process into flour, it quickly got adopted by the Sambaa and Bondei and replaced millet altogether. This shows that there is a perception of relationships between health status and type of diet, particularly that of children.

Like many other Bantu people of Africa, Sambaa believe in the influence of their dead ancestors upon the living. This is one of the basic religious beliefs of the people. It concerns the beliefs about life and death and the relationships between people. The ancestors (mizimu), the deceased members of lineages, are remembered through sacrifices by the living members of the lineage. An illness or disease which does not respond within a reasonable time to hospital and traditional medicine is likely to be ascribed to a forgotten ancestor. A diviner can identify through his technique, the particular ancestor who needs sacrifices. After the sacrifices are performed, the patient continues to take medicines with the hope that the condition will improve. We have discussed in the previous sections of this thesis about the structure of the Sambaa family and the maternal and paternal relationships. The relationship between the living members of the family is only part of a system which relates all family members including those no longer living.

Besides beliefs in the power of ancestors in controlling people's health, there is a belief in spirits which cause illnesses. Such spirits can cause miscarriages for pregnant women and other forms of morbidity.

Therefore, a pregnant woman has to take certain medicines as part of the system of pregnancy care. These medicines which have not been identified botanically come in a package and they include:

Mtua (Sambaa) for preventing fever during pregnancy.

Ngwiza (Sambaa) for increasing blood to the woman;

Mhafa (Sambaa) for the development of the foetus;

Mwinikangu (Sambaa) for protecting the foetus in the womb.

This list was given by specialists interviewed; there may be other herbs which a larger sample of specialists would have given. What is important in the present context is to know what knowledge gets to the young women from the community specialists about health and illnesses. Community specialists agree also that there is no harm in one using traditional medicines as well as clinic medicines for pregnancy care. In fact, pregnant women are encouraged to attend clinics regularly. What this shows is that every resource is exploited to maximize chances of a successful pregnancy.

One case of a nurse's aide which occurred during fieldwork can illustrate pregnancy care behavior.

A nurse aide who worked at the village clinic and lived in the village became pregnant with her first child. Kalage was approached for a package of pregnancy medicine which she prepared and gave to the nurse aide with instructions on how and when to use the package. There were no proscriptions regarding diet or behavior given. Since the nurse's aide worked at the clinic, she had greater chances of using whaterver hospital medicines she needed for her pregnancy care. She got transferred to

another clinic before she had the baby, and news came later that she lost the baby. What is important in this case is the fact that, in using the herbal package, the nurse aide was acting in accordance with traditional beliefs about pregnancy care. Her knowledge of Western medicine did not replace these beliefs but added more ways of ensuring a safe and successful pregnancy.

Some inds of spirits which are popularly believed in by the people of Muheza and which are associated with illnesses include djins. Belief in djins is more popular in Muheza than belief in witchcraft. It is believed that an evil person can throw a djin on someone he or she dislikes. One talks of a sick person believed to have a djin as "ametupiwa jini" (Swahili) which literally means "a djin has been thronw on him or her." Some of the signs of a person who is a victim of a djin are that he does not eat food and cannot talk; for women, that she fails to take care of her little ones. The belief in djin spirits is associated with the spread of Islam. Since much of Tanga is Islamic, it is not surprising that the belief is common. There are some traditional healers who are specialists in treating cases of djin possession. These are generally Moslems who use the Koran in the treatment of the sick.

Children who cry a lot and sometimes develop a hardened belly are believed to suffer from "Zongo". It is believed that a person with evil intentions can cast an eye on a baby and cause Zongo. It is therefore possible to suspect anyone who stops at the house upon whose departure the childs starts crying. One informant commented that Zongo practice was on the increase because of envy in many people. One Sambaa resident in the city explained that Zongo was a term used in the traditional education system

of Sambaa people. It is a concept which is used, for example, to train children in hygienic practices. A child is taught not to eat snacks in public or fruits without washing to avoid Zongo sickness. Zongo sickness is common among women as well. The symptoms of Zongo in women are hard to tell. But there are specialists of Zongo treatment, both men and women, and the members of the community know when to go to the specialist for treatment. A woman Zongo specialist who was interviewed, explained that Zongo can easily be diagnosed without even the use of divination. She also said that it was women and little children who were the victims of Zongo. Medical research to establish what the conditions are believed to be Zongo still needs to be done. The treatment of Zongo includes a short ritual which involves symbolic cleansing of the patient to remove the sickness, and the administration of medicines in the middle of incantations. These processes deserve more detailed analysis than can be given here. The ritual processes described by Turner (1968) can be compared with those practiced by the Sambaa. For the present purpose, it is enough to note that the management of some kinds of illnesses among Sambaa people include ritual processes and employment of symbols.

From the above review of beliefs and knowledge of the community specialists, we can draw the following conclusions:

1. Community specialists have ways of identifying malaria.
2. Community specialists believe that chloroquine is better cure for malaria than their own medicine.
3. If a disease does not quickly respond to hospital treatment, it is believed to have spirit causation.
4. Pregnancy care according to Sambaa beliefs is practiced along with clinic pregnancy care.

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2. Community specialists believe that chloroquine is better cure for malaria than their own medicine.
3. If a disease does not quickly respond to hospital treatment, it is believed to have spirit causation.
4. Pregnancy care according to Sambaa beliefs is practiced along with clinic pregnancy care.

5. Ancestors are believed to cause illnesses.

6. Djins are believed to cause illnesses.

7. Spirits are believed to be possible causes of miscarriages.

8. Zongo is believed to cause illnesses in children and women.

The case of Mwalimu Mary's baby described in the last section shows how confusing and difficult it can be to define a disease and get the right treatment before it is too late to save a life. Keeping in mind that community members are in daily contact with community specialists socially and as family members, the knowledge which prevails in the community is shared to some degree by each member. It is this shared knowledge which makes a young mother go to the community specialist for consultation in matters of her own of her children's health.

We have seen in the preceding chapters that the historical experiences of the people of Muheza influences their behavior, not only their beliefs and knowledge. We also mentioned that the people of Muheza exhibit pragmatic responses to new ideas. The above review of knowledge and beliefs shows a high degree of continuity of traditional beliefs and at the same time, an accommodation to new ones. This is particularly true in the case of management of malaria and pregnancy care. Hospital medicines are accepted and used along with other specialist medicines. What we find is a co-existence of ideas of Western and traditional medicines, as well as of Arabic beliefs about djins. These different ideas provide alternative resources which can be explored and used according to one's decision. We have also indicated that one's decision can be influenced more toward one kind of knowledge than others. Through improved communication and a well-worked out program, one of behavior can become dominant.

In the village setting, the continuing relationship between family and community members encourages the establishment of new community knowledge and beliefs. Yet, in actual practice, as we have seen in the case of Mwalimu Mary's baby, different ideas can constitute potential sources of conflict in the efforts to manage disease. For example, to which extent does the use of herbal medicines along with clinic medicine help or hurt the actual health of the pregnant woman and the growing baby? Research is needed in this area to provide more knowledge of the herbal medicines used and their reaciton when used along with other drugs such as chloroquine.

There is a parallel between scientific belief in malaria as a potential cause of miscarriages and the community belief in spirits as potential causes of miscarriages. Can these two beliefs work together to improve pregnancy care? Present approaches to health care through health education have attempted to negate the presence of spirits and seek to replace such beliefs, by ideas of Western medical practices.

In the following section, we shall review the group of external professionals who represent the principles and practices of Western medicine. We call them external in the sense that the knowledge and skills which they have are not shared, or at least not well-known, by the community members whom they serve. The Western medical institution, including its actual location, has historically also been outside the community. The missionaries who were the first people to introduce Western medicine to the rural areas, built their churches, shcools and hospitals away from the community. And even though the communities have grown to engulf the mission center, these structures are still regarded as external to the community. Hospitals and dispensaries are built separately from the village so that villagers have

to travel in order to get the service. The community specialist, on the other hand, can be easily contacted since she or he is in the community. Van Etten's study of rural health services in Mwanza, Tanzania showed clearly that there is not only a cultural difference between the medical institution and the population which is served, but that the sturcture itself is an impediment to the development of rural health (van Etten 1976).

3.4.7 External Specialists

In his book on rural health development in Tanzania, van Etten (1976) made an analysis of the problematic nature of the structure of the health service itself as well as the role which is played by the health worker. According to van Etten, the root of the problem of health development is not in the social and cultural factors which influence the disease and its treatment, but in the structural bias of the health sector and the curative emphasis of the hospital. He sees the structural problem not only in the technical aspect of the service, but in the content of the training received by the health personnel. The problem created by the training of personnel is fundamentally a cultural one. Training in principles of Western medicine is actually learning to accept a cultural medical system. And since a society often has its own medical system, a conflict can be expected in the meeting of the two systems unless effort is made to find ways to minimize the possible conflict points. The health worker learns new values of health and disease which she/he then tries to impose on the community he/she serves. The community's efforts to resist the new values is revealed in noncompliance behavior to the proscriptions and proscriptions of Western medicine. In her study

of the health worker in rural India, Banerji (1973) reported similar problems of social distance between the community and the health worker as a major contributing factor to failure of rural health programs.

In a recent article on anthropological research perspectives on health problems, Foster (1984) suggests the study of health care delivery systems as the effective approach to explore the sociocultural aspects of health and illness (Foster 1984). He goes on to suggest that this can be done by studying health care delivery systems in terms of community/patient behavior. What is important to keep in mind is the fact that health care delivery systems in many parts of the world imply interaction between different medical systems which unless clearly analyzed and recognized can give wrong interpretations of the resulting behavior. The current study has been an attempt to analyze and understand malaria control behavior.

Interviews were held with the village dispensary and MCH clinic staff at Tongwe and Amani villages. The rural medical aides who are in charge of the dispensary and the nurse's aide in charge of the MCH clinic related the poor health of the people to the low economic status of the area. Poverty as a major cause of poor health of the people was also stressed by the health personnel at the district hospital at Muheza. As pointed out earlier in this thesis, it is important to remember that the year 1984, prarticularly during the time when this research was going on, was one of scarcities of various commodities including medicines. Therefore, the emphasis on economic low status may have been greater than at other times when commodities were more easily obtained. Discussions with medical professionals at Muhimbili hospital showed that there is no direct relationship between economic level and health, particularly in

relation to nutrition. National figures indicate that the highest malnutrition figures are recorded in some of the wealthiest parts of the country (Dr. B. Singanao, personal communication). This is because food or diet as a cultural aspect may not change as fast as the economic aspects of the same culture. In other words, food has deeper cultural roots which may not easily be touched by any other external changes. Food ways are slower to change than economic ways. The fact that tea, bread and cookies are popularly eaten is only supplement to the main diet of the people. We noted earlier that elders realize that adding these new items to the diet does not improve the quality of the diet. It is interesting to note that cheese and butter have not been introduced in the diet along with bread even in those regions where cattle are common. These two items would add the protein content of food particularly for children who are in most need. Food like medicine is affected by cultural contact.

The historical origin of hospital services has not only created a lasting image of the curative function of Western medicine, but has set a model which has continued. As already mentioned, the hospitals were not integrated into the community and provided limited preventive services. To a large extent, until today, most people would refer to the dispensary or the health center and its staff as sources of curative medicine. For the community, services of the Health Education Unit as well as that of the Nutrition Units, have yet to prove their value to match that of therapeutic medicine. If we compare this image with that of the community specialist, we note that the traditional healer is referred to

not only in cases of illness, but for questions of preventive health care as well. One often sees small children around the community wearing amulets and bearing marks of incisions which are elements of preventive health care.

We have learned about the traditional medicines used for pregnancy care, and also have learned that the community considers the use of these medicines together with those prescribed by clinic staff as quite acceptable. This is because the traditional approach to pregnancy care is more understood by the people than the clinic-based care which is used as a supplement. The dual nature of health care, which is sometimes referred to as medical pluralism, requires detailed study which is beyond the scope of this thesis. What effects such a pluralistic medical behavior may have on the health of individuals and the effective management of health problems needs study. It would be important to know. for example, the effect which chloroquine may produce on a system which uses other drugs from traditional medicine as well.

Just as we have attempted to describe the knowledge of the community specialist, it is important to review the position of the external professional. We have already discussed in an earlier section the work of the Mother and Child Health Care Unit of the Ministry of Health. The Mother and Child Health Care aide (MCH) in Tongwe reported that attendance to the clinic was poor due to the absence of vaccines. According to her, mothers attend the clinic mainly for their children's immunizations. Absence of a refrigerator makes it not possible to keep vaccines in the clinic. Nevertheless, some do come to the clinic. What is interesting to note is the fact that when a sample of women were asked to come to the clinic with their small children to be checked for malaria parasites,

their responses were alarming. Even other women not included in the sample, turned up to be checked. The MCH aide is herself married and a mother of a two-year old. She lives in an extension of the clinic next to the dispensary.

The MCH nurse aide is herself, Sambaa but grew up in town where her father worked for the government. She had worked in another part of Muheza for two years before being transferred to Tongwe. Her background training is primary school (seven years) and two years training in the Mother and Child Health Service.

There are some basic problems which the nurse aide has to deal with. First, her training prepares her for a specific kind of service which means that her knowledge of Western medicine is very limited. Second, we have already learned that the village has some members who have retired from different services. This means that there are villagers who probably know more about Western medicine than the nurse aide does. Third, the nurse aide is young (26 years) while many mothers are older than she is. The only identity shared is the ethnic identity. What we are dealing with here is a question of sets of roles. According to Alland (1970):

> The process of change is influenced not only by the relationship between new elements and existing theories and the reward value of certain types of behavior, but also by similarities and differences between role systems in donor and receptor populations. (Alland 1970:1571).

When analogous roles exist in two different behavioral systems, change need only involve a shift in the content of existing roles. When no such analogues exist, change may require the adoption of an entirely new role

or set of roles (Alland 1970:157). However, when Western medicine was introduced in African societies, no attempt was made to look for existing analogous roles. What about the rural medical aide?

The rural medical aide (RMA) as we have already noted, is in charge overall of the dispensary and the MCH clinic at the village level (see Figure 6). His training is broader than that of the MCH aide and takes three years after primary school. His work at the dispensary includes treatment of minor ailments and preventive health care. He is perhaps the closest counterpart to the community specialist. However, the two are different.

First of all, unlike the community specialist, the rural medical aide is a young, unmarried man who lives in a permanent house built next to the dispensary. He is from a different ethnic group. During an interview with him, he explained that the community people believe in Zongo and Mchango which makes them go to traditional healers first so that by the time the patient comes to the dispensary, it is too late to save life. This young RMA who was new to the village got transferred and was replaced by an elder RMA in his fifties. His years of experience, and the fact that he spoke Bondei language made a difference in terms of communicating with patients and parents of patients. However, his problem of alcoholism cut short his life. During his brief service, the elder RMA spent much of his free time in the beer clubs and therefore interacted with the people socially. In such contacts, he was able to know the community members personally as well as hear what was going on around the community. In many ways, this RMA had learned to adapt his role to the community which

he served. In some ways, he was closer to the role of a community specialist than external specialists normally are able to achieve.

Therefore in essence, there is a basic difference in the structural relations of community/external specialist as visualized by the community, and by the external specialists. In the former case, a new set of roles has been perceived and a relatively complete functional paradigm created. In the latter case, perceptions and role sets are incomplete and the communications are ineffective.

A clear case of the demonstration of Western medicine including its bureaucratic structure is at the level of the district hospital. Here patients have to go through registration and diagnostic checkups before treatment. There are more different kinds of hospital staff, i.e., laboratory technicians, clerks and nurses with different levels of training wearing different uniforms. The patient may have to go through all these different "specialists" in different offices before he or she gets the medical treatment he/she came for. This is very different from the visit to a community specialist who at most may only have an apprentice who can be asked to go and collect such and such plants, or to bring such and such tunguli. Who runs the district hospital?

The district medical officer (DMO) has full medical training (MD). He treats all referral cases from the health centers and dispensaries in his district. Besides his medical practice, he is in charge of administrative matters regarding health in the district. He is therefore a busy person, difficult to get for an interview but he was able to give some of his time for this discussion. He also gave permission to use hospital records for some of the data included in this thesis. The DMO

is Bondei and has worked as Muheza district medical officer for more than ten years.

The interview held with the district medical officer at Muheza also raised the problem of economic constraint as the cause of health problems. He compared Muheza with Lushoto district which has coffee as a cash crop and practices horticulture. According to him, in Lushoto, people live in better houses and can afford good clothes and food. However, the DMO also raised the fact that the ecology and climate of Muheza also contributes to the prevalence of diseases which have an environmental base. Measures required to control the disease are developed through the health education program which he said was acceptable but required time for people to understand.

With reference to malaria, the DMO was of the opinion that there is no real increase in disease prevalence in the rural areas. It is the awareness of the people about the disease which has increased. Patients seek more hospital medical treatment for malaria now than they did in the past. He saw more of a real problem when it came to the urban areas where financial constraints and increases in population have made environmental control of malaria difficult. According to him, the best way to control malaria is by using vector control through insecticide sprays and personal protection, that is, using mosquito nets and screening houses. But he also added that the second measure is beyond the ability of the majority of people. The economic standard of living has to rise before people can live better lives.

In summary, we can compare the community specialist and the

external professional as follows:

Community Specialist	External Professional
Generally an elderly person	Generally a younger person
Lives among villagers	Lives apart
Lives in a local house	Lives in a "modern house"
Believes in ancestors	Believes in ancestors
Knows malaria causes	Knows malaria causes
Knows social history of villagers	Knows no social history of villagers
Simple direct approach	Bureaucratic approach
Has sympathetic attitude	Has technical approach
Believes in spirit powers	Believes in spirit powers
Knows herbal medicines	Knows less about herbal medicines
Treats in presence of family	Treats patient privately
Takes time with patient	Spends less time with patient
Clinic is in the community	Clinic is apart from community
Respects tradition	Criticizes tradition
Knows cures for malaria	Knows cures for malaria
Knows local repellants	Knows no local repellants
Employs incantations in treatment	Uses no incantations

We can note from the above general observation that there are some areas of overlap between the two medical practitioners but that in many ways there are differences between them. The community specialist is more easily accessible by the community members not only because of actual proximity to the people, but for the beliefs which they share in common.

In concluding this section, we can note the nature of the knowledge which exists in the community as a whole. We have also seen that the group at risk is generally aware of its susceptibility either from knowledge which they receive from the dispensary and clinic or from the knowledge which they receive from their community specialists. Whether the women

believe that malaria causes abortion and anaemias during pregnancy, or that spirits can cause abortions, it would appear that there is no real conflict of belief except difference in names of cause of ill health during pregnancy. The important point is that both medical systems treat pregnancy with special care. The awareness of susceptibility during pregnancy is by itself a locus for improved health. As we have noted earlier, the community specialists recommend that pregnant women use the clinic health advice along with herbal medicines for pregnancy care. If there is conflict, it may be one of the working of the drugs due to improper use of drugs which can be controlled through adequate communication between the nurse and the patient.

3.4.8 Respondent Beliefs and Their Behavioral Effects

Beliefs about ancestors are not only related to the people's religious beliefs about God, but are also related to concepts of illnesses and health. Therefore, the community-based knowledge is based on deep-rooted religious beliefs. The goal of the Christian missionaries who introduced Western medicine was to replace the native religious ideologies with the Christian one. But as we have seen, what has resulted is a form of adaptation which accommodates the traditional ideologies along with the new ones. The community members see no conflict in maintaining the different ideologies. After an Islamic funeral, for example, a Sambaa funeral ritual was observed which involved holding a goat's ear and chanting a verse in accordance with the Sambaa tambiko the "Ukagone".

Popular belief among Sambaa has that Mchango is best treated by xommunity specialists, and not at the dispensary. The reported causes of

the condition are as shown below. Most of the women interviewed attributed Mchango to cold weather (31.3 percent) (see Table 18). Also many respondents attributed Mchango to high fever in general, (26 percent). Those who attributed the disease to supernatural forces which is grouped under "Other" constitute ten percent of the total sample which is not insignificant either. This shows that Mchango is often recognized to have natural causation, but it does not mean that it cannot be attributed to supernatural causes. Most diseases which are taken to traditional healers are believed to have this kind of dual causation. Natural forces are believed to cause the disease coupled with supernatural forces which could be spirits of some kind including djins and/or ancestors (Mizimu) and ghosts (vizuka).

The observed dual medical behavior, that is, the simultaneous use of hospital and traditional medicine indicates a high level of adaptation at the ideological as well as the practical levels. This adaptation serves to foster some level of stability and continuity of the community. In order to facilitate effective malaria control, focus needs to be placed on the knowledge which spreads in the community. By increasing knowledge which will have greater positive influences on malaria control, it will be possible to guide adaptive behavior itself.

The implication of the adaptive behavior on the management of malaria is clear. On the one had, we notice a high level of awareness of the disease as well as acceptance of chloroquine for its management. This is the level of behavior which is observed and interpreted as compliant behavior. However, all reports show that malaria is prevalent in spite of the popularity of chloroquine. This means that the pragmatic

management of malaria is actually noncompliance behavior to chloroquine use. Therefore, while the behavior may be adaptive in terms of exploiting available resources, it may result in observed failure to control malaria. As one approach for the improvement of the management of malaria, the current study is suggesting a model which uses the locally available community-based resources to increase community participation in the effective management of malaria. Community specialists are a highly potential resource for effective disease control.

The results of the discriminant analysis to the basic data of this study are presented in the following pages. The discriminant analysis is useful in research for two objectives, analysis and classification. In the present study, discriminant analysis was used to evaluate the degree of importance of social and attitudinal variables in malaria prophylaxis behavior. What the discriminant analysis does is to make it possible to distinguish groups of variables and the characteristics which make them different. By using the discriminant analysis, we are, for example, able to evaluate the relative importance of different variables in determining the probability that the 300 respondents will be classified as compliant, partially compliant, or noncompliant. Compliance criteria were created from variables on prophylaxis use and reported protection methods against malaria. The method is thus useful in weighing and combining the discriminating variables in a way that the groups are statistically distinct. Klecka (1974); Southwood (1984); and Morrison (1969) have described the method and the computer procedures of discriminant analysis.

The next step is to identify the possible determining variables.

The social variables used for discriminating include age, education, religion, marital status and number of children. It was expected that age differences, education, religion, marital status, number of children and period of residence would show significant influence in compliance behavior. The results of a discriminant analysis of these social variables however, showed low classification results of grouped cases correctly classified of 39.58 percent (Table 25). What these results tell us is that the social factors do not have a high influence in determining the pattern of compliance behavior.

Table 25

Classification Results of Social Variables[1]

Outcome Group[2]	Number	Predicted Group Membership		
		1	2	3
Group 1 Noncompliant	61	13 21.3	28 45.9	20 32.8
Group 2 Partially compliant	93	17 18.3	48 51.6	28 30.1
Group 3 Compliant	129	24 18.6	54 41.9	51 39.5
Ungrouped cases	17	3 17.6	8 47.1	6 35.3

Percent of grouped cases correctly classified - 39.58.

Note: 1. Variables utilized include: religion, age, education marital status and number of children.

2. Outcome criteria: a new composite variable (NEWBEH) was created which classified responses into the three compliant groups. The four variables which were used to group expressed opinions into the three categories of prophylaxis behavior include: experienced side effects with chloroquine; experience with prophylaxis; experience of malaria protection and protection for pregnant women.

Attitudinal variables used for discriminating compliance behavior included were 17. Out of these 17 variables, 13 were selected and included in the coefficients. The 13 variables showed a high degree of separation as indicated by the final Wilks' Lambda of .097019 and a canonical correlation of .9439420 for the first discriminant function and .3312125 for the second function (Table 26). The four basic attitudinal factors and their significant levels of decrement can be seen in Table 27.

The results of the discriminant analysis of these attitudinal variables also shows high classification results of grouped cases correctly classified 95.22 (Table 28). Tables 29 and 30 show further detailed calculations and classification results.

These results indicate clearly the high level of influence played by attitudinal factors in the compliance behavior toward malaria management. My interpretation of this finding is that the basis of the malaria behavior is rooted in the beliefs of the people which give rise to the attitudes which people have with regard to the problem. The strength of the attitudinal variables is a strong indication of the significance of attitudinal factors above the social factors of age, education, religion, marital status, etc., which in the analysis showed less significant decrement. What this means is that the individual's behavior is more under influence of factors which are rooted in the primary beliefs than those of the social structure. It means that the social structure may change, e.g., marriages become monogamous more than polygynous, individuals become Christians, but the basic beliefs still prevail. This is an important finding since it shows that the mere presence of, for example, an improved technology does not necessarily result in a meaningful change. Real

Table 26

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Cumulative Percent	Canonical Correlation	Wilks Lambda	Chi-Square	D.F.	Probability
1*	8.17655	98.52	98.52	.9439420	.0970189	566.88	26	<.001
2*	.12322	1.48	100.0	.3312125	.8902983	23.236	12	.05

*Marks the two function(s) to be used in the remaining analysis.

Table 27

Four Basic Factors and Their Levels of Decrement

Basic Factors	Wilks Lambda	Interval Decrement
Therapy experience	.57	.43
Pregnancy care	.41	.16
Malaria protection	.26	.15
Prophylaxis experience	.11	.15

Table 28

Classification Results of Attitudinal Variables [1]

Outcome Group[2]	No. of Cases	Predicted Group Membership 1	2	3
Group 1 Noncompliant	60	55 91.7	5 8.3	0 0
Group 2 Partially compliant	91	0 0	89 97.8	2 2.2
Group 3 Compliant	121	1 .8	5 4.1	115 95.0
Ungrouped cases	1	0 0	0 0	1 100.0

Percent of grouped cases correctly clasified - 95.22.

Note: 1. Variables utilized include those on reasoning in compliance behavior in medical knowledge in general and experience with medical services.

2. Outcome criteria: a new composite variable (NEWBEH) was created which classified responses into the three compliant groups. The four variables which were used to group expressed opinions into three categories of prophylaxis behavior include: experienced side effects from use of chloroquine; experience with therapeutic use of chloroquine, methods of malaria protection preferred; and protection for pregnant women against malaria.

Table 29

Summary Table Showing Weight of the 13 Variables

Variable Code	Vars. In.	Wilks Lambda	Variable Labels
THERPPRB	1	.577777	What therap prob do you exper with cloquine?
PREGWOW	2	.497889	Pregnant women need malaria protection.
MALPROT	3	.253518	What can a mother do to protect family?
PROFILUS	4	.112269	Have you used prophylaxis during pregnancy?
CONVEAKL	5	.109624	Does mchango easily kill?
NOCOMPFE	6	.107342	Noncompliance is due to fear.
NOCOMPBI	7	.105397	Noncompliance is due to bitter taste.
OWHEGEN	8	.103489	How is your health generally?
NOCOMPST	9	.101842	Noncompliance is due to storing drug.
NOCOMPAB	10	.100323	Noncompliance is due to fear of abortion.
PROTECT	11	.098972	How can one protect oneself?
PLATRMAL	12	.098071	Do you know any plants to treat malaria?
EASIDMAL	13	.097019	How easy is it to identify malaria?

Table 30

Standardized Canonical Discriminant Function Coefficients

Variable Code*	Func 1	Func 2
NOCOMPFE	.01821	.42570
NOCOMPAB	.14082	.01565
NOCOMPST	-.08529	-.37255
NOCOMPBI	.10116	.50003
PLATRMAL	.06455	-.27799
EASIDMAL	.05391	-.28862
THERPRB	1.323387	-.06878
MALPROT	1.22648	-.53710
PROFILUS	1.07700	.10622
PREGWOW	1.21290	.10012
CONVEAKL	-.05462	.46467
OWHEGEN	.07076	.39234
PROTECT	.12502	.09605

*Variable Labels are the same as those in Table 29.

change involves changing basic beliefs, something which perhaps is not the goal of the national health services.

What is interesting to note in Tanzania is the fact that traditional practitioners or community specialists are not considered under the Ministry of Health but under the Ministry of Culture. What this means is that the traditional practitioners are not recognized for the medical practice they perform but rather for their role as sources of traditional cultural beliefs and knowledge which they use in their practice of medicine. In terms of Western medicine, there seems to be no question of its "cultural" base. There are two possible interpretations of this: (1) that Western medicine is taken for its superiority as part of the Western medical cultural system, or, (2) that traditional practitioners are not accepted as medical practitioners. The second interpretation is one which was believed and held by the colonial government. But the fact of the matter is that these traditional practitioners are still actively involved in management of diseases in much of the rural communities in Africa. Therefore, what has to be resolved is the basic question of whether the traditional practitioner is part of the national health care system or not. If he is, it should be resolved whether he should not be incorporated in the national health care system.

One basic important and necessary role which the traditional practitioner could play is that of filling in the social gap in medicine the practice which has been referred to in this thesis. Since he/she is a recognized medical person by the community, it remains only for the government to recognize this role and exploit it for the improvement of

the health of people in the communities. It should be possible to provide short training to this cadre of health personnel and make them serve as liaisons between the dispensary service and the community members. Since the traditional practitioner is referred to by community members for health and disease issues, his/her services would be improved with an orientation of Western medicine principles and public health concerns. Incorporating the traditional practitioner into the national health care services would serve two important functions. (1) Traditional medicine and Western medicine will complement each other for the benefit of the people who use both. (2) It will also be possible to place a degree of control on the practice of harmful aspects of traditional medicine.

In terms of how this can be done, community members would be asked to name the specialists they trust most within their community. This individual would then be picked and given some training for the role. This community specialist would fit the role better than seventh graders.

PART FOUR

CONCLUSIONS AND THEIR APPLICATIONS

4.1 General Conclusions

In reference to the two objectives of this study which were stated at the beginning of Part One, we are able to conclude with some findings. One, we have found out and shown using a discriminant analysis that compliance behavior is more influenced by basic cultural values and beliefs which are important not only in prophylaxis use behavior, but in the treatment of malaria itself and other diseases. The cultural values are based on the social structure. The extended family and community specialists play important role in disease matters.

Using Fishbein's model of reasoned action we have shown the relationship between the social structure and the action which an individual takes with regard to compliance and non compliance to malaria control. It has been shown that the behavior is a final point in a series of processes of decision making. The behavior is a result of a process of decision making. The mother of the under-fives makes use of resources available to her after assessing them within her social and cultural background.

Two, based on the findings from the first objective, it is suggested that community based approaches be employed in disease management. The national health service should use the community specialists to facilitate the development of effective ways at the individual and community levels to generate health programs which are adaptive to the culture of of the people and improve the control of malaria. The practicalities

of such an approach in the case of Tanzania can be through the institution of Ujamaa villages. Each Ujamaa village will identify community specialists, the number depending on the size of the village, who will continue their traditional community service but also receive general orientation on Western principles of medicine. Their role will therefore be one of advicing patients on appropriate services they may require and explaining to the doctor the social and cultural background of a patient's disease.

In concluding the discussion about community response to malaria in an endemic area, it is important to spell out the concrete findings of the study and define their implications for the control of malaria. The case of Muheza may be unique only in terms of the specific handling of a particular disease, but the behavioral model has general applicability. We have tried to see the link between the beliefs of the Sambaa people of Muheza and their way of managing malaria. In terms of the basic governing ideology, however, an ideology based on ancestor belief and a social structure resting on family and lineage relationship, the findings may be true for the greater part of Africa. It is also common in all communities in Africa today, and elsewhere most probably, that Western medicine co-exists with other native ways of managing diseases. Therefore, the findings of this study of Muheza may have wider applicability.

In this final part of the thesis, we shall review the current two approaches used in the community management of malaria, that which is based on the community specialists and the approach which is based on external professionals. We have seen in the preceding chapters that while community members make distinctions between the different health resources available to them, they do not see conflicts in using the resources in various

combinations. A person can take tablets for an illness or give one to a child who is ill and then later go to a community specialist who may give her/him medicines to take care of the suspected illness. Or a person may start with herbal medicine and later take tablets. However, as already noted, medical pluralism is not unique to Africa. Chen (1974) reports practices in South East Asia, and there are other reported case studies from India and other parts of the world.

The conservative and progressive processes of cultural change are part and parcel of the process of total cultural change. In the end, the cultural behavior that prevails is different in many ways because it is adapted to new environmental conditions. In other words, it is expected that in the face of environmental change a culture will tend to adapt itself, maintaining aspects of its past while at the same time changing in its external outlook. According to Sahlins and Service (1960), the traditional aspect of change has a stabilizing role especially where the change does not include a meaningful change in other aspects of a culture, for example, the technology, social structure and basic ideology. The degree to which the various elements of culture adapt or get modified depends on the character of the environmental factors which are present as well as the resources which a culture has to itself. In the absence of sudden and devastating environmental changes, a cultural system will tend to maintain stability rather than be extinct. The stability is the result of continuity of tradition and acceptance of a certain degree of change.

Sambaa social structure is based on the family and lineage unity which links the living members of a family with their deceased members of the family. This belief is particularly meaningful in the highly

mobile (seemingly fragmented) people of Muheza. We have seen how after many years of absence from the village family members return to their home villages to spend their last years. This is the case even though we have seen that there are almost no more primary followers of traditional religion. Almost all members of the community in Tongwe are either Christians or Moslems. Nevertheless, family bonds which include ancestor belief are strongly held and maintained. What has happened in terms of cultural change is that those basic principles of the indigenous culture have survived while other aspects have change. This is a culture's own survival mechanism in the face of overwhelming encroaching forces of change. The survival of the social structure and its ideology is particularly strong because of the absence of meaningful technological and general economic change in the society. The role of the extended family is social, emotional as well as economic security.

A technology requires a social organization for its maintainence. And a social organization works to maintain the technology that gave its rise. If we take the products of Western medicine to represent Western technology, we cannot expect them to function properly in an African social organization which is based on a different ideology from that of Western culture. The ideological system of a culture is always conservative since it is sanctioned and supported by tradition. When Sambaa people practice their ritual for the dead or the sick, they fulfill their obligation as well as reinforce the existence of the practice of the ideology. The ideology is strong because it governs all other forces and processes of life. For example, when rains fail, ancestors are referred to just as in

cases of life-threatening diseases. The initiation of the young also is referred to the ancestors. The belief in ancestors, according to Peristiany (1954), is particularly important for the predominatly agricultural societies of Africa.

What is interesting to note is the fact that the ideology continues to be strongly held even though the society has become mobile within the plantation economy around it. We have seen the degree to which young people migrate and go away from the rural villages after their 14 years. This means that the agricultural labor which is expected to come from these youths to maintain the family is not available. This means that the ancestor belief is not restricted to peasant societies. In fact, it seems to maintain the lineage bond between peasant and non-peasant families. How does the ancestor-based ideology continue even when family members are not around the family? How does the ideology continue while family members are living in towns and not helping on the farm for all their productive years? These questions can be partly explained by the common practice of keeping big households which include other members of the extended family. Children belong to a lineage and not to parents only. From Tables 6 and 7, we have seen the degree of this practice in the community studied. The big households are a reflection of the degree of functioning of the extended family system. The extended family is for African societies what the caste is to Indian society, a principle for integration and grouping people. We have also seen in the case of Mwalimu Mary how the case of her sick child who died after a short illness was handled by the family. Such situations of crisis management show the existence and strength of fundamental ideologies

which people use to manage situations. The young mother goes to her grandmother with her sick child which does not survive. On receiving the news, the father travels a long distance to come and play his role. These cultural practices are, however, not without eceonomic cost. Individuals travel for hundreds of miles regardless of their income to "celebrate" the extended family.

The progressive aspect of culture change encompasses levels where new forms evolve which show greater influence of the external environment. This is the level where the pragmatic behavior in malaria can show a high degree of acceptance of hospital medicine. But we know well enough that other reasonings are also at work. What we are able to observe is actually a new culture. According to Sahlins and Service, the progressive development of a culture entails:

> The total transformation of energy involved in the creation and perpetuation of a cultural organization. A culture harnesses and delivers energy; it extracts energy from nature and transforms it into people, material goods and work, into political systems and the generation of ideas, into social customs and into adherence to them. The total energy so transformed represents a culture's standing, a measure of its achievement. (Sahlins and Service 1960:35)

We have seen in the case of Tongwe that Sambaa traditions are strongly held even though the social organization indicate the presence of a new culture. We have seen that the village has a church, several mosques, a dispensary, and a MCH clinic, a local government office, a school, a milling machine and other non-traditional institutions. These things have come to the village over time and are only representative of what exists in the country at large. In the first chapter we saw the structure of regional

administration and in another chapter we saw how the village is organized and governed. These forms of organization represent the overall pattern of development. This general or what we have called progressive change, facilitiates the creative aspect of change in all aspects of human life. Progressive change enables man to master nature and facilitates a good life. However, such changes do not happen by revolution, they develop gradually during a process of adopting new ideas and technologies.

In the context of the current study, chloroquine represents a new technology. It is a new technology for partial control of malaria. It is also a technology that has appreciable adverse and even lethal side effects. The rational community response is not a mechanical compliance but a mixed strategy of use that seeks to maximize advantages and minimize ill effects. It is important to note that this strategy has yet to be evaluated clinically in comparison with the officially advocated pattern. Is ad hoc use the best? Even one of the best epidemiological studies, the Garki project, had to conclude that local transmission interruption is not possible. What is most important, however, is the need for objective clinical evaluations of what the community does, accepting its capacities to behave progressively and rationalize. The new approaches for malaria control should be developed from within the community using the locally available resources.

4.2 Specific Conclusions and Implications of the Study for Improved Management of Malaria

This study of community management of malaria has revealed not only the significant factors in malaria prophylaxis behavior, it has also shown the causes of the problem and the need for alternative, more effective

strategies for malaria control. The implications of the study are generally speaking of two kinds. One concerns the drug itself, its usefulness, and availability. In 1984, policy makers in the Tanzanian government were discussing whether to continue with the malaria prophylaxis program for the susceptible population given the fact that medical reports continued showing no significant control of malaria, after ten years of the program. The main question is perhaps not one of whether the program should continue or not, but one of whether its approach for implementation of the program shouldn't change to adopt more effective ones. From the findings of this study, it appears that what is needed is an effective approach perhaps one which uses persuasive techniques. The second implication of the study is related to the implementation of the program. Community specialists can play a role of bridging the gap between the community and the professionals. We have noted in our findings that there is a gap which van Etten found existed in rural Mwanza as well as between the health professionals and the people they serve based on "cultural conflict." Health professionals and policy makers need to learn and respect the pragmatic knowledge of a community in regard to a major health problem faced constantly. Respected individuals in the community could be trained to diagnose and refer cases to medical institutions. Dispensary services should also expand to include facilities for admitting serious cases to monitor drug use.

One of the basic problems with malaria control as we have seen from the findings is one of knowledge and beliefs or information. It is lack of adequate information which leads to most of the experienced side effects of chloroquine. Bruce-Chwatt (1980) confirms that when chloroquine is

taken in an empty stomach it may cause abdominal discomfort and vomiting (Bruce-Chwatt 1980:199). Experienced side effects cannot be underestimated even if they result from other causes. The fact that side effects such as itching, nausea, vomiting, dizziness, etc. are ascribed to chloroquine use creates negative attitudes toward the drug and this leads to noneffective use of the drug. The negative experiences people have with the drug, that is the side effects, leads people to either skip dosages or reduce the amount of the drug as a precautionary measure. However, in terms of actual management of the disease such a behavior will not produce expected results. The new developing problem of drug-resistant strains of malaria parasites is said to be related with drug use patterns. Improved information is therefore necessary for more effective malaria control. The perceived lethality of malaria needs reassessment. It is also necessary to evaluate clinically the advantages and limitations of chloroquine use by the population so that the communities learn proper use of the drug to avoid side effects. Clinical evaluation would also check the development of drug-resistant parasite strains. The problem of parasite drug resistance is new to Africa.

According to Bruce-Chwatt (1980), drug resistance is:

> The ability of a strain of a parasite to survive and to multiply in spite of the administration of an active drug given in usual or higher than usual doses. (Bruce-Chwatt 1980: 195)

Problems of malaria parasite resistance to chloroquine were first observed in Latin America in 1960, 1961 and then in Southeast Asia. In Africa, the problem is new probably because of the fact that malaria control

measures were introduced in Africa much later than they were in these other tropical parts of the world. More research needs to be done in African populations to establish the extent to which new approaches to malaria can be more effective especially those which have long been established in the communities. As was revealed by this study, there are different measures which people take to deal with malaria and other diseases. It is important to study and analyze these before new approaches are introduced. The detailed study of cultural systems and ways of dealing with problems is an area where anthropology can make a contribution. In the final analysis, the management of malaria by a community involves processes of cultural diffusion and cultural change. An attempt has been made in the four chapters of this thesis to show how the process takes place in an endemic area of Tanzania.

It is important to review from time to time health policies implementation and find better ways of making the programs more acceptable to the communities. It is necessary to monitor the interaction between cultural factors and external changes in order to direct the process toward the desired goal. Since the kind of change we are dealing with is planned change, it is important to employ appropriate communication approaches between the health personnel and the communities involved. Such an approach can be used in any society which is in the process of development.

The context specificity of Muheza may in some ways be unique because of its historical experiences. However, at the level of culture processes of change, it is important to tecognize that medical behavior is

in many ways cultural behavior and therefore necessary to take note of cultural values of the people and their response to new ideas and practices of medicine. We have seen for example, how in Sambaa culture pregnancy problems can be ascribed to the work of spirits while Western medicine ascribes similar problems to malaria. Both beliefs can be used to facilitate increased malaria control in pregnant women. With regard to concepts of children's diseases, there are also areas of convergence. The fact that according to Sambaa culture children are more susceptible to diseases such as zongo and mchango indicates that children are considered special and that greater health care is expected to be given to them. This as a point of agreement between both Sambaa and Western medical ideas should provide a basis for improved services. If community specialaists are incorporated in the health services they will facilitate this bringing together of ideas.

The other important point which has been discussed in this thesis is that concerning the communication between the population at risk and the external professional. As we have pointed out, there exists a social gap between the community being served and the professional. The professional has spent a number of years learning the principles and practices of Western medical system. In the course of practicing the profession, the professional tries not only to practice the knowledge but to impart it as well. Since the population which is being served does not share the training and knowledge of the Western trained professional, conflict is bound to develop in the meeting of the knowledge and beliefs of the population being served and those which the professional tries to

impart. It is therefore suggested that Western trained professionals learn about community structures and explore ways of employing the community structure in the management of diseases. For example, the family, since the patient is often under the care and help of family members, it is important that family members are informed about the illness and the prescribed therapy.

What such an approach does is bring about a convergence between the people's own adaptive mechanisms and those of institutionalized medicine. What has been overlooked in medical studies is the medical behavior of the patient which is in the actual sense a social cultural behavior. It is necessary to recognize the community's own response to malaria in the social cultural dimension by which it occurs. In the first place chloroquine prophylactic and therapeutic use leads to new drug use patterns and medical behavior which involves the use of traditional medicine together with chloroquine in alleviating health problems. Secondly, malaria management with chloroquine becomes associated with the relationship between the external professional and the community. It is therefore important that this relationship be improved to facilitate effective management of malaria. The external professional needs to be aware of the cultural aspect of his work and be prepared to handle the situation appropriately. For this, the professional needs to have as part of the professional training, some anthropological background orientation.

4.3 Significance of Anthropological Studies in Malaria Control

Ethnographic studies have seldom been employed in medical or disease control research. It is only recently that we have started seeing

publications in medical anthropology from studies done in different societies in Africa and other places. Such works, e.g., Janzen (1978) have made a contribution toward better understanding of the sociocultural aspect of disease and its management in African societies. More recognition is developing among disease control authorities that the communities' knowledge about the diseases needs to be improved. According to Kilama:

> If Tanzania is to control malaria effectively, she must turn to her people. It is therefore, the duty of health workers to undertake health education campaigns aimed at modifying the community's understanding of the public health importance of malaria so that the masses can undertake mosquito control by self-help efforts under expert guidance. (Kilama 1980: 143)

This quotation has three sides to it. In the first place, it states that the people ought to be involved in malaria control instead of their looking out to the Malaria Unit or other external-based intervention solutions. Secondly, it is realized that there is a need to influence the people's understanding of the disease problem. Thirdly, the role of the external professional in the development of a community-based malaria control is recognized. The significance of the context and historical experience of a society makes it necessary to study each society in detail (ethnography) while at the same time making some comparisons with other societies and looking for areas of generalizations. It is only when we take each society in its context specific situations, that we can be better informed about the real factors which govern the individual's behavior. As we have seen in the findings of this study, there is a level of generalization in terms of the basic religious beliefs of African

people but in terms of practical everyday living, we can make better interpretations of behavior only if we know more about ecological and historical factors which influence individuals' behavior.

Finally, the problem of malaria management is not solved with one single approach. Therefore, detailed studies of communities in specific contexts must be a prerequisite to effecting disease control programs. The factors which have come forward as important in the current study may be context specific, which means that they may hold true only in other similar contexts outside which others may hold true. Understanding the complexities of one context provides a view or approach for looking at problems. It shows the need and importance of micro studies in revealing the problems involved in a particular situation. The contributions of the current study are therefore general as well as specific.

An approach of studying disease problems using community-based micro or anthropological tools is shown to give the picture of the complicated processes which are involved. This approach can be used in all kinds of societies, particularly those experiencing fast cultural changes like those of Africa. Secondly, the current study shows the mechanisms at work in the management of malaria in an endemic area of an African population. What is specific in this situation is the fact that the African societies have a social structure based on an extended family and a deep belief in the power of ancestors which facilitates their adaptation to external forces of change. The findings of Muheza can therefore to some extent be true to other societies in Africa, particularly Bantu societies. The structure of the Tanzanian society has specific advantages which can

facilitate the achievement of the desired change in the community management of malaria.

4.4 Ujamaa, a Favorable Ideological Orientation

Researchers have attributed poor rural health to inadequacies within the structure of the medical institution (van Etten 1976), others have blamed it on the neo-colonial political economic systems (Turshen 1984). In this thesis, we have attempted to show that there are ideological problems inherent in the practice of medicine. We have pointed out that the co-existence of different medical systems can create problems of reaching set goals. We also noted the differences between professional and community specialists. Incorporating the community specialist into the health care service is giving a role to a member of a community who is socially and culturally suited for the role. In terms of ideology, it is important to build the health program around a philosophic principle with which the people can identify. Tanzania has for the last decade and a half tried to introduce in the neo-colonial political structure, an alternative principle which should guide further national development. The principle of "Ujamaa" is applied in the development of the national economy as well as health.

Tanzania's political philosophy of Ujamaa and self-reliance and the policy for rural development which emphasize group work and the management of problems which face a community without waiting or expecting solutions from outside the community, supports the peoples pragmatic behavior. Ujamaa philosophy, as stipulated in the Arusha Declaration, is a powerful ideology for implementing community-based activities and programs. In

his original writings on Ujamaa, Nyerere (1966, 1968b) has clearly defined the ideological principles which form the basis of all kinds of national development in Tanzania:

> The Arusha Declaration (of 1967) is a commitment to the principles of self-reliance and Ujamaa. It is a declaration of intent to live a certain kind of life and act in a certain kind of manner for desired ends. The policy of self-reliance means we must make maximum use of the resources which we have. (Nyerere 1968:145-146)

Kilama has been quick to realize and explore the Ujamaa principle and structure in the fight against mosquitores and mosquito-borne diseases. In his article on parasitic diseases and the community's health (Kilama 1980), Kilama pointed out areas where a community can take its own responsibility in the spirit of self-reliance to reduce mosquitoes in their home vicinity. Quote:

> In the field of environmental modification, a well-guided and motivated community would be capable of undertaking such simple mosquito control measures as filling, draining, clearing of water banks and edges of reservoirs of vegetation and debris which may shelter Anopheline larva. (Kilama 1980:143)

Realizing the inadequacy of a single approach for malaria control, Kilama went on to suggest integrated approaches which include the use of chemoprophylactic drugs and the environmental modification which destroy mosquito breeding sites, as well as biological controls (Kilama 1980). From the current study it is suggested that the social structure of the community should be considered in as far as this can facilitate malaria control.

4.5 Summary of Findings and Suggestions

(1) This study of malaria has employed survey and classical methods of informant and personal observation plus local assistants.

(2) Assistance from Amani Center for Medical Research was provided for the test of parasitaemia as well as other background materials thus enriching not only anthropological perspectives, but also the actual health problems.

(3) A powerful Fishbein Model capable to handling complex decision-making processes and effective statistical systems data analysis permitted clear cut analysis of data.

(4) Fundamental results:

1. The community, including young mothers and relevant others, have considerable knowledge of malaria.

2. The community has an adaptive pragmatic approach toward malaria unlike that for zongo and mchango.

3. The community is faced with a severe problem of malaria for adults and children and chloroquine is widely used prophylactically and therapeutically but is only partly effective, in that the disease is not under control, probably due to misuse of the drugs.

4. Given a limited drug effectiveness and the presence of side effects, the community also uses traditional medicines and other methods to fight malaria particularly among children.

5. The national health service representatives in the area seek actively to control malaria, but also need better understanding of the problems of the community and the efforts of the community.

6. One of the factors complicating control of malaria is the presence of other diseases particularly measles in children. In general, the health status of the community is poor so that malaria acts only synergistically. The dispensary needs to monitor patient drug use, particularly in acute illnesses, by keeping the patients for aday or more.

7. The community is also affected by intense outmigration among men which places a heavy burden on women economically and socially which reduces the life expectancy of women before that of men. The workload of the mothers also reduces the level of child care.

8. Although food resources of the area are limited, especially for animal protein due to trypanosomiasis, severe protein malnutrition appears to be rare probably because of the popularity of Dagaa (a kind of dried fish) and legumes.

9. While significant differences exist within the Tongwe-Bombani social structure, particularly regarding Moslem/Christian contrasts, the deep common elements of social behavior surrounding the extended family and other relationships of the maternal line are of central importance in the management of health and illness particularly malaria.

10. The study illustrates the value of medical anthropological studies for the development of malaria evaluation and control programs. It suggests the incorporation of community specialists in the national health services. These specialists will facilitate to bridge the cultural gap between Western and traditional practices of medicine. The community specialist will advise individuals about health practices and suggest cases which need hospital/dispensary attention.

11. For Tanzania specifically, the study indicates the possible use of the Ujamaa village structure to manage health problems at the community level. Each Ujamaa village can have a community specialist who will be recognized by the hospital for his service role.

FOOTNOTES

1. The terms "hospital medicine" and "Western medicine" as used in this thesis are interchangeable. They are used to refer to the knowledge and practice of medicine known by different terms like biomedicine or cosmopolitan medicine. The people of Muheza use the Swahili term "dawa za hospitali" to distinguish Western medicine from traditional medicine. Traditional medicine is the knowledge and practice of medicine according to local traditions and Islamic beliefs.

2. In the Swahili language "m" prefix signifies singular for personal pronouns, the plural forms would take prefix "wa", thus making "Wasambaa" and "Wabondei" to mean Sambaa people and Bondei people consecutively.

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APPENDIX A

ASSESSMENT OF VARIABLES INFLUENCING MALARIA CONTROL IN TANGA

Serial No. _____

Basic Questionnaire: Interview of Young Mothers.

Interviewer: _____ Date: _____

Village Number: _____ Name of Hamlet: _____

I. THE HOUSEHOLD: Demographic Information

1. Age of Respondent: ___ 20 ___26-30 ____ 31-38 _____ 34
2. Number of Children Ever Born: _____
3. Number of Surviving Children: _____
4. Number of Under Five-Year-olds: _____
5. Education:
   - A. Beyond Primary Education: _____
   - B. Completed Primary Education: _____
   - C. Part of Primary Education: _____
   - D. Koranic School Only: _____
   - E. No Formal education: _____
   - F. No Reply: _____
6. Marital Status:
   - A. Single: _____
   - B. Married, Monogamous Marriage: _____
   - C. Married, Polygamous Marriage: _____
   - D. Divorced: _____

E. Separated: _____

F. Widow: _____

G. No Reply: _____

7. Respondents House:

A. Permanent: _____

B. Semi-Permanently: _____

C. Temporal: _____

8. Number of Rooms:

A. Two or Less: _____

B. Three: _____

C. Four and More: _____

9. Religion:

_____ Christian _____ Islam _____ Traditional ____ Other

Specify: _____

10. Proximity of Respondent's Mother's Residence:

A. Share the Same House: _____

B. Same Village: _____

C. Neighboring Village: _____

D. Long Distance, Bus Trip: _____

E. Not Applicable (mother deceased): _____

F. No Reply: _____

11. Length of Residence in the Village:

A. Native, Born in the Village: _____

B. More Than Ten Years Ago: _____

C. Since Villagezation (1977): _____

D. More Recent: _____

(If native, go on to Question Number 13.)

12. If Not Native, What Made You Move to This Village?:

A. Marriage: _____

B. To My Parents: _____

C. Transfer of Job: _____

D. Better Social Facilities: _____

E. Return to Ancestral Land: _____

F. Other, specify: _____

G. No Reply: _____

13. Social Status of Father or Respondent:

A. Member of Village Government: _____

B. Religious Leader: _____

C. Community Specialist, e.g., Healer: _____

D. Community Specialist and in Local Government: _____

E. Other, Specify: _____

F. None: _____

G. Not Applicable: _____

H. No Reply: _____

14. Social Status of Husband of Respondent:

A. Member of Village Government: _____

B. Religious Leader: _____

C. Community Specialist, e.g., Healer: _____

D. Community Specialist, and in Local Government: _____

E. Other, Specify: _____

F. None: _____

G. Not Applicable: _____

H. No Reply: _____

15. Social Status of Respondent:

A. Member of Village Government: _____

B. Religious Leader: _____

C. Community Specialist, e.g., Healer: _____

D. Community Specialist and in Local Government: _____

E. Other, Specify: _____

F. None: _____

G. Not Applicable: _____

H. No Reply: _____

16. De Facto Household Composition:

Number: _____

17. Household Members:

	Name	Gender	Age	Relationship
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

18. De Jure Household Composition:

Number: _____

19. What Besides Farming Is Your Source of Income?

_____

20. What Is the Major Cause of Money Expenditure?

_____

II. MALARIA AND HEALTH EVALUATION

21. Is It Easy to Identify Malaria?

A. Very Easy: _____

B. Easy: _____

C. Not Sure: _____

D. Difficult: _____

E. Very Difficult: _____

F. No Reply: _____

22. What Are the Symptoms of Malaria?

A. Fever: _____

B. Fever and Periods of Chills: _____

C. Weak Body Joints: _____

D. Combination of the Above Symptoms: _____

E. Vomiting: _____

F. Other, Specify: _____

G. No Reply: _____

23. What are the First and Second Common Diseases in this Village?

A. _____

B. _____

24. What Period of the Year Do More People Get Sick?

Category Label:

A. Rainy Season

_____

B. Cold, Dry Season

_____

C. Whole Year

_____

D. Hot Season

_____

E. Vuli (Short Rains):

_____

F. Don't Know

_____

G. No Reply

_____

25. What Do You Think Is the Cause of Disease?

A. Mosquitoes

_____

B. Dirty Water

_____

C. Heat

_____

D. Cold

_____

E. Pollution

F. Change of Weather

G. Excessive Work

H. Dust

I. Other, Specify

J. Don't Know

K. No Reply

26. How Can One Protect Oneself from Getting Sick?

A. Taking Malaria Prophylaxis

B. Keeping Environment Clean

C. Seeing A Doctor

D. Boiling Drinking Water

E. Using Mosquito Nets

F. Burning Mosquito Coils

_____

G. Other, Specify

_____

H. No Reply

_____

27. During Other Periods of the Year What Causes Disease Reduction?

A. Less Mosquitoes

_____

B. Heat

_____

C. Good Weather

_____

D. Absence of Cold Weather

_____

E. Abundance of Food

_____

F. Clean Water

_____

G. Drought

_____

H. Less Arduous Work

_____

I. Other, Specify

_____

J. Don't Know

_____

K. No Reply

_____

III. ATTITUDE TOWARDS HEALTH AND DISEASES

28. How Do You Evaluate Your Own Health at Present?

___ Very Good ___ Good ___ Average ___ Bad ___ Very Bad

29. How Is Your Health Generally?

___ Very Good ___ Good ___ Average ___ Bad ___ Very Bad

30. How Do you Evaluate the Health of Your Youngest Child at Present?

___ Very Good ___ Good ___ Average ___ Bad ___ Very Bad

31. How Lethal Are Each of the Following Diseases?

Disease	Least Lethal	Less Lethal	Not Sure	More Lethal	Most Lethal
A. Malaria	1	2	3	4	5
B. Diarrhea	1	2	3	4	5
C. Zongo	1	2	3	4	5
D. TB	1	2	3	4	5
E. Measles	1	2	3	4	5
F. Pneumonia	1	2	3	4	5
G. Headache	1	2	3	4	5
H. Djin	1	2	3	4	5
I. Fever	1	2	3	4	5
J. Mchango	1	2	3	4	5

32. What Is Your Opinion About the Following Statements?

Statement:	Strongly Disagree	Disagree	Not Sure	Agree	Fully Agree
A. Mother's Health is Most Important In A Family	1	2	3	4	5
B. The Health of the Youngest Child Is Most Important.	1	2	3	4	5
C. A Frequently Sick Child Is Sign of A Careless Mother.	1	2	3	4	5
D. Some People Do Not Get Malaria Because of Herbal Medicine Use.	1	2	3	4	5
E. Malaria Combined with Other Diseases Is Most Lethal.	1	2	3	4	5
F. Chloroquine Is Only Good for Malaria.	1	2	3	4	5
G. Pregnant Women Get More Protection From Malaria.	1	2	3	4	5

33. Name A Plant Used to Repel Mosquitoes:

_____

34. Do You Use It?

____ Yes ____ Sometimes ____ No

35. If Yes, Do You Experience Any Side Effects from Use?

____ Yes ____ Sometimes ___ No

36. If Yes, Explain:

_____

37. Give Name of A Plant Useful for Malaria Treatment:

_____

38. Do You Use It?

____ Yes ____ Sometimes ____ No

39. Do Others in the Community Use It?

____ Yes ____ Sometimes ____ No

40. How Effective Is Traditional Medicine to Treat the Following Conditions?

	Label:	Least Effective	Not Effective	Not Sure	Effective	Most Effective
A.	Bewitching	1	2	3	4	5
B.	Spirits	1	2	3	4	5
C.	Ancestor-Related	1	2	3	4	5
D.	Zongo	1	2	3	4	5
E.	Abdominal	1	2	3	4	5
F.	Colds	1	2	3	4	5
G.	Pregnancy-Related	1	2	3	4	5
H.	TB	1	2	3	4	5
I.	All Problems	1	2	3	4	5

41. Why Do You Think Women Do Not Take Or Give to Small Children the Weekly Prophylaxis?

	Reason:	Totally Untrue	Untrue	Not Sure	True	Totally True
A.	Forgetting	1	2	3	4	5
B.	Drug Shortage	1	2	3	4	5
C.	Causes Vomiting	1	2	3	4	5
D.	Storing for Use When Sick	1	2	3	4	5
E.	Bitter Taste	1	2	3	4	5
F.	Bad for Pregnancy	1	2	3	4	5
G.	Causes Abortion	1	2	3	4	5
H.	Lack of Understanding	1	2	3	4	5
I.	Lack of Time	1	2	3	4	5
J.	Mere Fear	1	2	3	4	5

42. What Can A Mother Do to Protect Her Family Against Malaria?

_____

IV. EXPERIENCE WITH MALARIA PROPHYLAXIS

43. Did You Use Malaria Prophylaxis During Your Last Pregnancy or Previous Ones?

____ Yes ____ No

44. If Yes, Did You Experience Any Side Effects?

____ Yes ____ No

45. If Yes, Describe the Kind of Side Effects You Experience:

_____

46. Do You Experience Side Effects with Therapeutic Chloroquine?

____ Yes ____ No

47. If Yes, Describe.

_____

48. Give Names of the First and Second Drug Which Are Most Needed and Which the Dispensary Should Keep.

A. _____

B. _____

49. When the Dispensary Does Not Have, Where Can One Get These Medicines?

A. Buy From Local Stores

_____

B. The District Hospital at Muheza

_____

C. Neighbors

_____

D. Others, Specify

_____

V. CULTURAL REASONING

50. Whom Would You First Consult When Your Baby Develops Fever?

A. Husband

_____

B. Mother

_____

C. Nurse

_____

D. Neighbor

_____

E. Decide Myself

_____

F. Other, Specify

_____

51. When Fever Continues After A Baby Has Received Hospital Treatment, What Does A Wise Mother Do?

_____

52. What Do You Think Is the Cause of Mchango?

_____

53. Why Do You Think Local Custom Requires That A Young Mother Has Her Baby at Her Mother's Place?

_____

_____

APPENDIX B

SOME OF THE MOST COMMON DISEASES IN MUHEZA DISTRICT

Outpatient Figures From Teule District Hospital, Muheza By Month and Gender For 1983

	Jan. M / F	Feb. M / F	Mar. M / F	Apr. M / F	May M / F	June M / F	July M / F	Aug M / F	Sep. M / F	Oct. M / F	Nov. M / F	Dec. M / F
Bacillary dysentery	32 /46	14/ 6	143/85	32/9	34/10	140/174	25/34	155/149	78/114	409/472	94/101	67/127
Other specific enteritis and diarrhoeal diseases	331/447	425/394	1504/1245	451/482	577/409	391/183	249/336	408/352	319/247	811/647	381/270	417/537
Streptococcal sore throat and scarlet fever	172/194	429/356	185/107	547/363	209/334	194/107	221/147	356/247	240/109	224/174	194/179	158/122
P. falciparum (malaria)	5742/5229	3749/3091	4264/3781	7639/5821	3750/4117	6345/5816	6004/5672	6941/7348	7001/6849	5237/5845	8470/7952	8974/9231
Gonococcal infection	1124/1537	974/1227	1642/1375	975/1885	1364/1671	1684/1371	952/1349	1201/1377	1652/2007	2463/2708	639/871	1417/1250
Schistosomiasis hematobium	1051/745	1591/844	1892/1439	1452/649	1402/1241	1572/873	394/186	541/216	704/337	1114/845	327/144	641/189
Ankylostomiasis (hookworm)	1721/1946	1571/1843	1755/2431	381/492	1492/1669	902/788	445/568	491/517	394/452	621/785	447/521	1304/1527
Ascariasis	2441/1001	2461/2694	952/1071	294/185	1312/1791	846/742	311/375	227/394	279/399	327/409	119/373	974/625
Scabies	3470/4507	1047/1414	1251/1475	791/1116	708/916	1637/1864	904/541	1347/1624	1791/1225	1329/1018	1257/1278	1509/1498

APPENDIX C

INPATIENT FIGURES FROM TEULE DISTRICT HOSPITAL, MUHEZA BY MONTH AND GENDER FOR 1983

	Jan. M/F	Feb. M/F	Mar. M/F	Apr. M/F	May M/F	June M/F
Measles	19/14	12/15	11/3	2/2	2/0	1/0
P. falciparum (Malaria)	28/34	46/46	59/68	67/53	92/95	28/48
Ankylostomiasis	7/11	5/8	19/14	19/13	13/20	8/8
Bronchopneumonia	5/9	20/18	11/7	13/10	9/12	7/6
Spontaneous Abortion	-/10	-/10	0/19	-/16	-/17	-/8
Skin Infections	6/7	19/9	22/11	29/13	18/10	8/5
Hydrocele	6/-	12/-	13/-	15/0	17/0	8/-
Gastroenteritis	0/0	15/11	24/11	21/11	12/12	9/9

	July M/F	Aug. M/F	Sept. M/F	Oct. M/F	Nov. M/F	Dec. M/F
Measles	2/3	1/0	0/0	1/0	12/13	13/11
P. falciparum (Malaria)	79/88	91/87	46/56	69/63	62/57	62/47
Ankylostomiasis	11/12	9/14	10/15	14/7	8/4	8/10
Bonchopneumonia	16/11	10/7	6/9	10/8	15/10	5/5
Spontaneous Abortion	-/16	-/18	-/12	-/30	-/17	-/24
Skin Infections	15/11	20/16	20/15	23/13	16/16	26/11
Hydrocele	15/-	12/-	21/-	17/-	16/-	25/-
Gastroenteritis	20/15	20/15	2/18	15/18	6/11	15/11

Source: Inpatient Tally Sheets, Teule Hospital, 1983 figures.

APPENDIX D

Some Usambara Timbers and Their Botanical Identification

Mkunguni	=	Clausena melioides
Mlankala	=	Combretum schumanii
Kogoeka	=	Elaeodendron stuhlmanii
Mbokoboko	=	Etandrophragma sp. nr. ntile
Rosirosi	=	Hagenia abyssinica
Mkulo	=	Octea usambarensis
Mziragembe	=	Olea chrysophylla
Ngwe	=	Olea hochstetteri
Mse	=	Podocarpus usambarensis
Mukula	=	Pterocarpus zimmermanii
Mkomahoyo	=	Pygeum africanum
Mshwizo	=	Rapania rhododendroides
Mwerete	=	Ranwolfla inebriens
Kuti	=	Sideroxylon
Mromberombe	=	Mitragyna rubrostipulata
Mwangati	=	Juniperus procera
Mzizi	=	Faurea saligna
Monko	=	Ekebergia rupelliana
Mwandama	=	Catha edulis
Mhombo	=	Calodendron eickii

Source: Pitt (1939).

KEY TO THE PLATES

1. The villages of Tongwe and Bombani are located in the lowland plains of Muheza District. Tongwe village houses are more scattered than in Bombani and different shady trees grow in between houses. These trees give cooling effect as well as breeze to the warm and humid climate of the area. At the end of the rainy season, weeds still grow at the edges of the house compounds.

2. Amani Medical Research Center is situated less than 20 miles from Muheza town but is at a high altitude (1500 feet above sea level). Here one finds dense forests, and much cooler climate. These volcanic eastern Usambara Mountains are fertile and allow the production of all kinds of food crops.

3. Coastal houses are rectangular in shape and are mostly built of poles and mud. The roof of the semi-permanent houses is made of corrugated iron sheets. In the backyard, there is the kitchen and the bathroom. The eaves of these houses are often open, and the ceiling is seldom present. This allows mosquitoes to move freely in and out of the houses thus exposing the residents to mosquito bites and malaria parasite transmission.

4. Not all houses are built of poles and mud. This second house is built of mud bricks. Houses of the category of permanent are built of cement blocks or baked bricks, and these are few in the rural areas. At the left corner of the picture there are cement blocks which someone has made planning to put up a permanent house some day in the future.

5. The temporal type of houses are also built of poles and mud but have a thatch of pressed coconut palms. This builder (to the right), can build all the different types of houses for much less pay than would be the case in towns. At the back is a kitchen and latrine. Ducks are kept by some people and so are chickens.

6. The coconut palms are twisted on a yard-long stick before they are placed on the roof. Schoolchildren and the elderly do the preparation of the roofing and get paid by the number of sticks (vipande, in Swahili).

7. Bombani is at the confluence of the Muheza-Amani and Tongwe Road. Crops from up the mountains and surrounding areas are sold at this Bombani market. The most common things sold at the market include oranges, onions, bananas, and dried fish. People from the area also get their salt, paraffin and other supplies from Bombani stores.

8. Bombani village houses are more compact. One finds more permanent houses here. There is a post office box, a bakery, a butcher and is a final stop for buses which come from Muheza town. Like Tongwe, one also finds several mango trees, coconuts and other trees around which provide shade.

9. Mzee Athumani Sekiondo and one of his wives Ma-Mganga live with some of their great grandchildren. Several times, I had to follow Ma-Mganga to the fields where she was guarding rise against birds. I learned a great deal from both of them. At the back of where they are sitting to the left, some cassava (makopa) is put on an elevated stand to dry.

10. Mzugwa, Colens kilimandschari Guerke (Lab.), is used to treat diseases that are self-diagnosed as malaria. Its effect is reported as good. However, no further laboratory screening has been done. Such medicines need to be scientifically studied and screened to know how safe they are. People grow Mzugwa outside their house. This one is grown outside the house in Tanga town.

11. After the church service the pastor talks to some village women. The church is more than 60 years old. Saint Joseph is the patron saint of the church. The first Sunday of July is always commemorated as the Patron's Day. Participants are invited from other churches as well as other religious groups.

12. The celebrations which followed the church service on Saint Joseph's Day included a performance by schoolchildren and dance groups from outside the village. Representatives of Islamic religion were also present at the celebrations. The two buildings are part of the school classrooms. Note the green mango trees surrounding the place.

13. Bernardeta (on the left) at an interview session outside the house of the respondent. Notice had to be sent a day before informing that researchers were coming to interview. When the respondent was not home, she was followed where she was working.

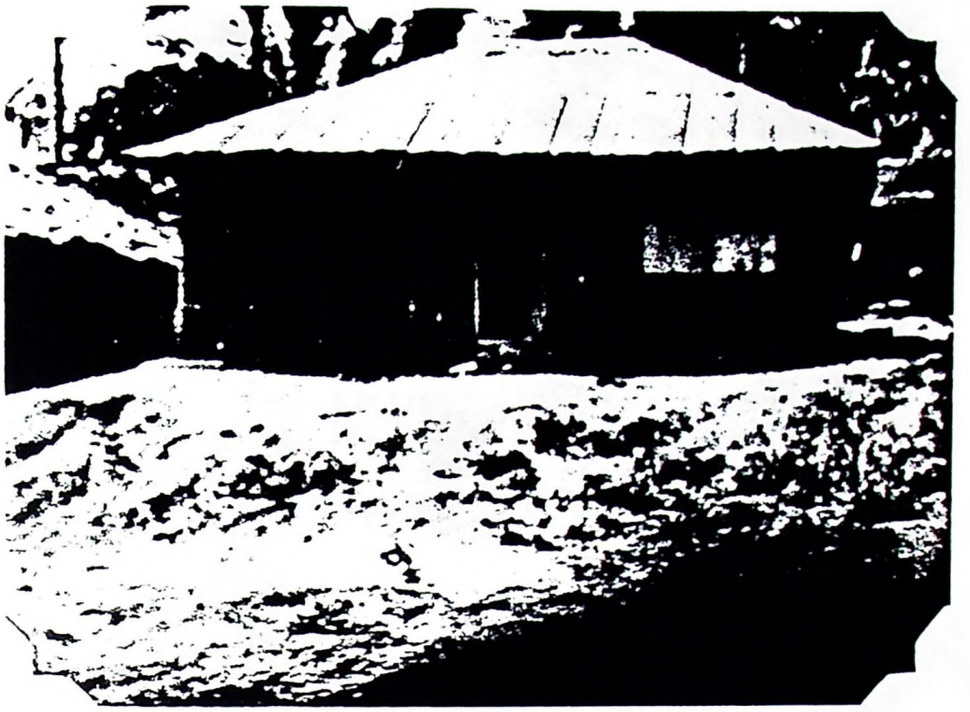
14. Rice has to be guarded from the time when it begins to mature. The presence of many trees around makes it possible for the birds to build their nests close to the source of food. When the researcher decides to help, she has to make sure that she does not use big stones which will cause the rice to fall to the ground.

15. At the end of the day, work for the women still continues. Food has to be processed, and in African societies that is not done by men, may be boys in rare cases. After cassava is pounded, it has to be put to dry.

16. Enid Fischer (right) and Mwanaidi Juma (left) pound rice to remove the husks before it is winnowed (between). This means that for the researcher, as well as for the assistants, work continues until late in the evening. Field notes of the previous day have to be written the next morning.

1. Environment of Research, the Lowland Plains

2. Usambara Mountain Landscape, the Wet Highlands

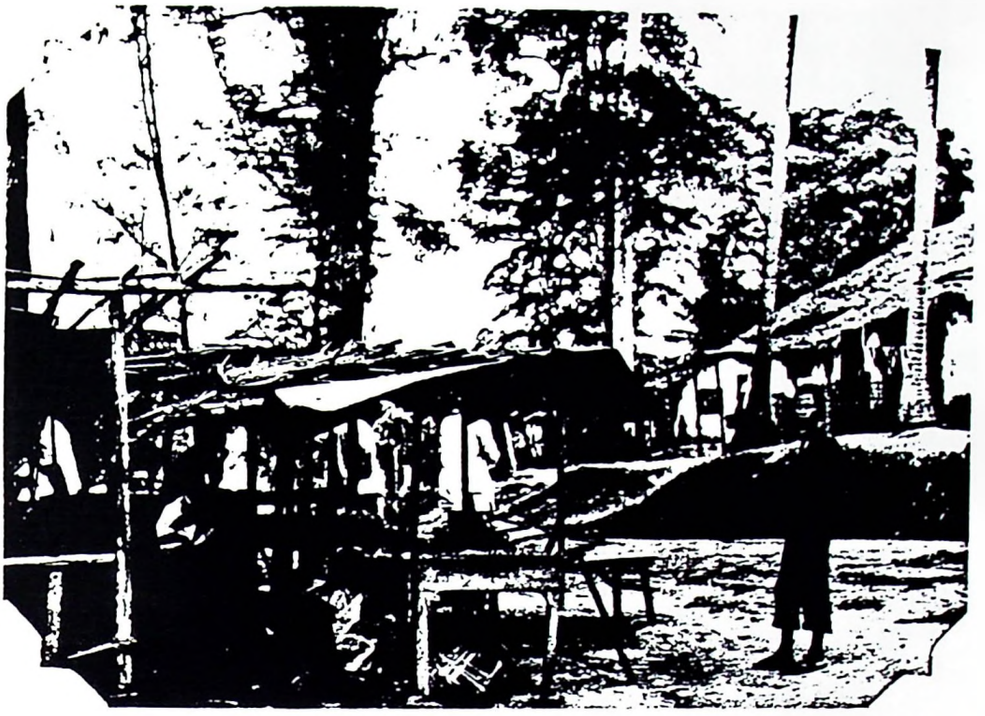


3. Coastal Type of Housing, the Semi-Permanent, A Close Front View

4. Coastal Type of Housing, the Semi-Permanent

5. Coastal Type of Housing, the Temporal

6. Coconut Palm Roofing Used for the Temporal Type of Housing

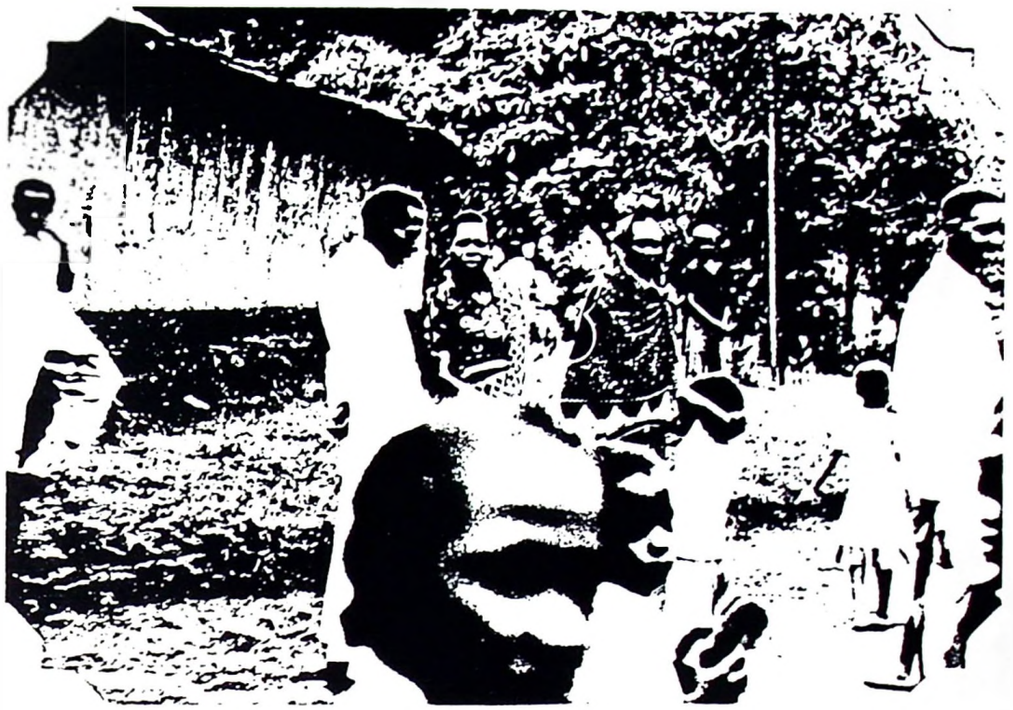


7. Bombani Village Market Place

8. Bombani Village and Some of Its Houses

9. Two Key Informants and Some of Their Great-Grandchildren

10. Mzugwa, A Plant for Malaria Treatment



11. Outside the Village Church on Saint Joseph's Day

12. Going to Saint Joseph's Day Celebrations

13. An Assistant and Respondent During an Interview

14. A Key Informant During an Interview

15. Food Processing, Placing Cassava to Dry

16. Food Processing, Researcher and Assistants

VITA

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PLACE OF BIRTH: Iringa, Tanzania

EDUCATION:

1954 - 1957	Primary School, Wasa
1958 - 1961	Middle School, Tosamaganga
1962 - 1965	Secondary School, Kilakala
1966 - 1970	Social Academy, Breda, Holland
1975 - 1976	M.A. University of Dar es Salaam
1980 - 1985	Ph.D. University of Illinois at Urbana-Champaign

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1970 -1972	Research Assistant, Faculty of Arts and Social Sciences, University of Dar es Salaam
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1982 - 1984	Society for Medical Anthropology
1983 - 1984	Association of International Women in Development