

**THE HOUSE HOLD INCOME STATUS AND MALARIA CONTROL
MEASURES AND PRACTICES IN BAGAMOYO DISTRICT**

BY

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ABSTRACT

The study examined the relationship between household income and malaria control measures and practices in Bagamoyo District. It specifically aimed at: examining the extent to which households use their income in preventive measures and practices; determining the extent to which malaria is an income problem. The study used cross-sectional research design, and data were collected using structured questionnaires and standardised interview guides as well as personal observation. Data analysis employed SPSS for simple descriptive statistics; frequencies and percentages. The study was undertaken in Bagamoyo District, the entire sample size of the population was 120 respondents who were heads of households and were randomly selected. The findings have shown that poor income status at the household level leads to low interventions in malaria control measures and practices. Major negative effects of malaria which were obtained from the study included reduced households income, reduced households production, reduced farm performance and poor school performance. It was clearly shown that malaria affected more the low income generating households than high income generating households. Not only that but also the level of education was seen to be too low in low income generating households compared to high income generating households. This brought a very big difference regarding the capability of fighting the diseases. After all these assessments it was clearly found that high households' income contributes very much in malaria control measures and practices. Raising the households' income status will contribute to the well being and development of the households and communities at large in solving their problems.

DECLARATION

I, NARCIS NESTORY MUCHUNGUZI, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work, and has not been submitted for a higher degree in any other university.

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Date

The above declaration is confirmed

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Date

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This work is dedicated to my wife Judith Alinda, my daughter Narda Abayo, and also to my parents who through their sacrifices and encouragements have paved the way for my academic development. These have been my fortified wall of bronze; they delivered me out of the hands of the wicked and redeemed me from the grasp of the ruthless (Jeremiah 15: 19-21).

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LIST OF ABBREVIATIONS

ACTs	-	Artemisinin Combination Therapy
BDH	-	Bagamoyo District Hospital
DDT	-	Dichlorodiphenyltrichloroethane
GDP	-	Gross Domestic Product
GNP	-	Gross National Product

HIS	-	Health Information Systems
HIV	-	Human Immune-deficiency Virus
ICON	-	Non toxic Insecticide Chemical
ITNS	-	Insecticide Treated Mosquito Nets
MARA	-	Mapping Malaria Risk across Africa.
MDGs	-	Millennium Development Goals
MoH	-	Ministry of Health
NGOs	-	Non Governmental Organizations
NSGRP	-	National Strategy for Growth and Reduction of Poverty
OAU	-	Organization of African Unity
RBM	-	Roll Back Malaria
REPOA	-	Research on Poverty Alleviation
SNAL	-	Sokoine National Agricultural Library
SP	-	SulphadoxinePyrimethamine
SPSS	-	Statistical Package for Social Sciences
UMCP	-	Urban Malaria Control Project
UNDP	-	United Nations Development Program
URT	-	United Republic of Tanzania
WHO	-	World Health Organization
WMR	-	World Malaria Report
VEO	-	Village Executive Officer
WEO	-	Ward Executive Officer

CHAPTER ONE

1.0 INTRODUCTION

This chapter presents the general background of the study by discussing the link between income and malaria control measures and practices, problem statement, justification of conducting the research and objective of the research.

1.1 Background Information

Man's struggle to master his environment goes hand in hand with improved knowledge. Having discovered the scientific approach in knowing his environment, he was able to explain various problems facing him basing on scientific methods such as putting in writing what was discovered, use of microscope and experiments to test various findings discovered. It was the time for the decadence of relying on nature in explaining the reality of his environment (Bardhan, 1991). This was the time of improvement in the households' income status as man was able to live in better-improved houses, and better living standards and the increase in surplus that led him to concentrate on different findings. This situation is attributed to the developed countries.

In developing countries such as those in Africa, the phases explaining clearly human development in building his income status are attributed to the time of contact with outsiders that is to say during the time of colonization and after colonization. At the time before colonization, man's status was explained basing on mysticism that is to say his struggles to develop his income status was dominated by nature (Kamara, 2004).

During colonialism various scientific approaches were shared to Africans so as to raise their level of income status in mastering and knowing well their environment and mastering it effectively through improved agricultural production. Some who have put in consideration of these approaches have come to build a higher household income status through increasing production, knowledge and education and building better improved houses and improving child and maternal health and family planning (Chambers, 1983).

Sixty percent of those households with low-income status, that is families living under poverty line in developing countries such as in Tanzania, are living in the conditions opposite to households with higher income status. Their whole life is still dominated by nature. For these households what are important are food, clothing and shelter without considering the quality. This leads them to die of serious diseases as most of their income is spent on food acquisition, they cannot meet the conditions necessary for controlling malaria due to ignorance, poor knowledge and abject poverty (Mboera *et al.*, 2007).

In developing countries such as in Sub Saharan African countries, agriculture is the major source of income for most households and the major employing sector for economic development of these countries. Tanzania in particular its economy still depends much on agriculture as its main stay and 80% of its inhabitants especially in rural areas are involving in agriculture as main source of income and livelihood. Agriculture in Tanzania contributes 70-80% of total employment but this agricultural sector is far from modernization. Most of the agricultural outputs are

produced by using rudimentary technology, mainly by smallholder farmers scattered in rural communities without access to markets; hence leading into low output and low income (World Bank, 2005).

Financial barriers limit access to both preventive and curative services and commodities essential for malaria control. It has been estimated that direct and indirect costs to prevent and treat malaria was as high as 25% of households' annual incomes in Tanzania. In rural Tanzania for instance, studies have shown that the least poor quartile of the population were 2.74 times more likely to own treated nets (ITNs) than the poorest quartile due to different income levels; similarly some studies examining access to and use of treatments have found some disparities by identifying that children less than five years in the least poor households were twice receiving 62% appropriate treatment of fever (malaria) than the poorest households whose children received 31% treatment of fever. Also mortality in children less than five years old following acute fever was 39% higher among the poorest compared with the least poor (REPOA, 2007).

In terms of cost implication in relation to gross domestic product (GDP) Tanzania is considered to be one of the poorest countries in the world (partly as a result of the burden of malaria), with an annual GDP of US dollars 284 per capital (2008) that is 6.96%, and 37% of the population living below the basic needs poverty line. Malaria is estimated to consume 3.4% of the GDP or 240 million US dollars every year. Tanzania spends 214 million dollars on malaria services. Approximately 75% of the expenditure for malaria is borne by households, with the government

contributing 20% and development partners 5%. Approximately 30% of this expenditure at the household level is spent for anti malaria drugs and 50% for mosquito nets, insecticides, coils and other strategies. The burden of malaria is greatest especially among the poor, given the vicious circle of poverty and ill health (URT, 2008).

A study on Malawi found that expenditure on malaria prevention showed a positive correlation with income, indicating that the poorest households cannot afford commodities such as ITNs and other malaria preventive measures and curative measures (WHO, 2006).

Raising the households' income status of the poor in developing countries will help them to fight and eradicate human suffering caused by poverty, ignorance and diseases. This will make the world equal and the best place to live as stated in the World Millennium Development Goals (MDGs) of 2000. Without casting our attention to malaria the most killing disease, development in real sense of the word will never come into its perfection in the world particularly in Tanzania due to the manpower lost because of malaria (UNDP, 2005).

1.2 Problem Statement

Despite the decade's attention to the issue of building the high households income status so as to make man the most responsible being in solving his problems, still households' income status to some citizens in Tanzania is low. About fifty percent of the families in rural Tanzania are living below poverty line. Low-income status

leads to less effective malaria control measures and practices programmes and inadequate local epidemiological profile (URT, 2008).

In Tanzania mainland, with regard to malaria control measures and practices, the priority is being given to curative services rather than the necessary alternative of preventive services. If human and financial resources will be directed towards malaria control measures and practices, suffering due to malaria especially over the vulnerable group of children under five years and pregnant women will be reduced (Mboera *et al.*, 2007).

About eighty percent of Tanzanians live in rural areas. Poverty is pervasive in rural Tanzania with over a third of the households living below basic needs poverty line set in 2000/01 at 250/= per adult equivalent per day; even in purchasing parity terms well below 1 dollar per day. Nearly twenty percent of these households live below the even lower food poverty line. This implies that such households do not command income sufficiently even to provide enough food to satisfy their basic minimum nutritional requirements; with consequences for physical and mental development, economic and social well being (UNDP, 2007).

Therefore directing financial support in rural areas in Tanzania will lead to development in real sense of the word. The goal will be reached when the households' income status is raised to reduce malaria at the level of not being a major public health problem or an obstacle to socio-economic development.

This work is an awakening strategy of more exchanging views between the medical researchers, social scientists researchers, the government and the people in rural areas at large. Also it is a proper response to the 2000-Millennium Development Goals (MDGs)

1.3 Problem Justification

The findings from this study are reflected in the Millennium Development Goals number 1 and 6 also mostly from the National Strategy for Growth and Eradication of Poverty, (NSGRP -MKUKUTA) Cluster Number 2.

All these programs aim at bringing good life to all people making the world a better place to live. Also the study is significant to other communities and other development partners whom from their own will, shall incorporate some interventions to their integrated community-based programs.

1.4 Objectives

1.4.1 General objective

To examine how the household's income status affects malaria control measures and practices.

1.4.2 Specific objectives

1. To examine the extent to which households use their income in malaria preventive measures and practices.
2. To determine to what extent is malaria an income problem.

3. To rank different factors that reduce household's income hence influencing malaria preventive measures and practices.

1.5 Hypotheses

1.5.1 Null hypothesis

Households' income status has no contribution on malaria control measures and practices.

1.6 Conceptual Framework

In this study, there is a relationship between the dependent and independent variables. The independent variables are categorized into economic factors and socio-cultural factors. The former included income status, employment status, and the level of production status. The later included traditional beliefs and the size of the family. These independent variables have direct influence on malaria control measures and practices, also there were background variables classified according to age, sex and education status as variables influencing dependent variable as it is shown in the Appendix 1.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definition of Some Variables

2.1.1 Household

It is a socio- economic unit that consists of one or more persons with common living and catering arrangements. Such persons are not necessarily related to each other by blood or by marriage (URT, 2003).

2.1.2 Household Income

This is made up of wages, salaries, bonus, and net profit from farming and non-farming activities as well as remittances. Income determines the level of the household in terms of standards of living of an individual, command over resources, levels of food security and intake, property, health, schooling, working conditions and housing (URT, 2003).

2.1.3 Malaria

It is a fatal and a serious disease caused by *Anopheles gambiae* and *Plasmodium falciparum* parasite transmitted by mosquitoes. This parasite has developed a resistance to conventional drug therapy and afflicting hundreds of millions of people causing among them socio-economic sufferings including a vicious circle of abject poverty, irreversible disabilities and over one million deaths per year in sub Saharan Africa and about one twenty four thousand and five hundred and twenty-five deaths in Tanzania (Rowe, 2005).

2.2 Gravity of the Pandemic

Malaria is one of the serious killing diseases in the world especially in the developing countries compared to the developed countries. The world malaria report showed (WMR); an estimated 300-500 million people in the world a year are affected. One million malaria deaths occur each year in the world. According to Health information system (HIS) of the world, seventy percent of the deaths in developing countries are due to malaria, however, the malaria epidemic in sub-Saharan Africa is even more severe and causes much higher damages. In addition, this public health challenge in sub-Saharan Africa is compounded by poverty, the determining factor of malaria control. Sub-Saharan Africa is the home to the most deadly vector, the *Anopheles gambiae* and *falciparum* parasite (Sachs *et al.*, 2000).

The United Republic of Tanzania has a population of 38.4 million, all of whom are at risk of malaria. However, endemic and risk of transmission varies as it has recently been mapped by the MARA (Mapping Malaria Risk across Africa) collaboration. Tanzania has the third largest population at risk of stable malaria in Africa after Nigeria and the Democratic Republic of Congo. The burden of malaria in Tanzania has remained highly. Every year 14-18 million new malaria cases are reported in Tanzania resulting in 120 000 deaths of these deaths 70 000 are in children less than five years of age and 50 000 are in pregnant women. The disease has caused major obstacles to social and economic development to the citizens of Tanzania leaving them into abject poverty (URT, 2003).

The variations in endemic in Tanzania are conveniently classified as unstable seasonal malaria, stable malaria with seasonal variations and stable perennial malaria. Unstable seasonal malaria occurs with a transmission period of not more than 3 months a year. In such situations malaria may occur in epidemics when there is increased transmission, morbidity and mortality (Mboera & Kitua, 2001; Mboera, 2004). Areas with unstable malaria transmission include the highlands with altitudes up to 2000m, temperatures up to 20°C and mean vapour pressure of 13-15 millibars. In higher altitude areas, there is usually no malaria transmission. Recent studies indicate an expansion of malaria areas to include the highlands of Tanzania, which previously were malaria free (Mboera *et al.*, 2001; 2004; Kamugisha *et al.*, 2005; Maegga *et al.*, 2005; 2006). Such areas have been experiencing malaria epidemics in recent years.

To date, about 33% of the Tanzanian population live in epidemic prone areas, generally with little immunity. Heavy rainfalls, long drought seasons, high temperatures, change in host preference by the vectors and increased anti malaria drug resistance have been common features in the history of malaria epidemics in Tanzania (Mboera, 2007).

Stable malaria with seasonal variations occurs where there is seasonal intense transmission for 3 to 6 months in a year. It occurs in high altitude plains, with temperature above 15°C and mean vapour pressure of 10-20 millibars (MoH, 2002). Stable perennial occurs along the coast extending inland as far as 240km. Areas around the lakes Nyasa and Victoria experience a similar endemic. These areas

have mean annual temperatures of 24-32 °C, mean vapour pressure of 26-29 millibars, and are inhabited by about 42% of the Tanzanian population. Most age groups have considerable immunity increasing with age. In such areas, malaria is common in children under 5 years of age and pregnant mothers.

In Tanzania malaria is mainly transmitted by *Anopheles gambiae*, *Anopheles arabiensis* and *Anopheles funestus* (White *et al.*, 1974; Mboera, 2004). *Anopheles Merus* is also an important vector in some coastal areas of the country (Mnzava, 1991; Kigadye, 2006). *Anopheles rivulorum* and *Anopheles Marshallii* have also been identified as vector distribution in Tanzania following the distribution of malaria endemicity. In the humid coastal and humid lacustrine areas where malaria is holoendemic, the predominant species are *Anopheles gambiae* and *Anopheles funestus*. In the dry and semi arid areas, where malaria ranges from the epidemic to hyperdemic status, *Anopheles arabiensis* is the main vector (Mnzava, 1991).

In socio-economic terms, directly, malaria causes illness, death and disability. Indirectly, it causes loss in terms of time spent with sickness and treatment costs in terms of family time spent to care for the sick. Furthermore, loss of productive time, time spent by families and communities to grieve for the dead and funeral costs are also indirect costs due to malaria. In many rural areas of sub-Saharan Africa and Tanzania in particular, malaria is the major cause of illness and hence, it undermines productivity and incomes (Ukoli, 1990).

2.3 Malaria Interventions

The first intervention on malaria control was done by the Romans advocated by Hippocrates in 1880's who described malaria manifestations and related them to the time of year and where patient lived against the old beliefs that malaria was due to supernatural powers. His invention was that the parasite causing malaria was associated with stagnant waters the breeding sites for Anopheles mosquitoes, thus the government of Italy immediately started the draining programmes to control malaria.

Laveran did another scientific study on the cause of malaria in 1889 while working in Algeria, where he elicited protozoa to be the cause of malaria. His work led the anopheles mosquito to be demonstrated in 1897 as the vector of protozoa. From this time the major features of the malaria epidemic seemed clear and control measures started to be implemented (Heggie, 1995).

In developing countries the boon to malaria control efforts was during the Second World War whereby the measures to protect the warring powers into the tropics where malaria was highly terrifying were vital. During this period *Dichlorodiphenyltrichloroethane* (DDT) and *Sulphadoxine Pyrimethamine* (SP) were introduced. After the Second World War both DDT and *Chloroquine* entered into civilian use for instance in Vietnam (Kitron *et al.*, 1989).

In particular, the Organization of African Unity (OAU) in April 2000, called a summit in Abuja on Roll Back Malaria (RBM) with the aim of achieving a great

political commitment to the prevention and control of malaria on the continent. The Roll Back Malaria campaign provided an opportunity for mobilizing resources to support malaria control activities in the member countries. The salient features of the declaration were to improve access to prevention and care through the reduction or waiver of taxes and tariffs on mosquito nets and materials such as insecticides, anti-malaria drugs and other malaria related commodities. Heads of state endorsed the goals of the declaration by halving the prevalence of malaria in the world by 2010 and designated 25 April each year as Africa Malaria Day (OAU, 2000).

In Tanzania (formerly known as Tanganyika) malaria control efforts were initiated to protect the German colonial personnel in the late 1890s. Efforts were gradually increased during the British colonial era and Tanganyika participated in the malaria eradication efforts through the Pare-Taveta scheme, which conducted indoor spraying with prompt treatment. Since from 1961 a number of managements and control measures have been instituted such as environmental management, effective housing design, personal protective measures, and anti-malarial drugs were simultaneously used (World Bank, 2005).

However financial constraints form a major impediment in the implementation of malaria interventions in Tanzania. Some control activities have been implemented at a pilot stage in some districts and sustainability of such initiatives has been a major problem. For example, the urban malaria control project (UMCP) was conducted for eight years from 1988 to 1996, the Japanese government provided 17 million dollars and the Ministry of Health provided 2.7 million dollars. Although

the UMCP provided many lessons for malaria control in Dar es Salaam and Tanga areas the project ended in 1996. The government of Tanzania did not have financial resources to sustain the project and scale it up in other towns and villages (URT, 2003).

Another challenge that hinders malaria control measures and practices in Tanzania is the human resources crisis in the health sector. It is estimated that currently there is 65% gap, which means that only 35% of the qualified staff available if we compare the available personnel and the Ministry of Health minimum required personnel.

During the 1970s and 1980s districts in Tanzania had malaria focal persons who were instrumental in control activities. Malaria control activities at the district level currently are under district health officers who also deal with other pressing health problems of the district. In situations of other health problems at the district level, malaria intervention activities are given low priority (REPOA, 2007).

An important related challenge to the implementation of malaria interventions in Tanzania is weak health system at the district level. The district health system is weak in translating malaria policies at operational activities at the districts and villages levels partly because of weak district management capacity, poor coordination, inadequate monitoring and lack of key staffs. The prevailing weak health system at the district level results into the burden of malaria remaining high because the health care approach replaced vertical control efforts. Thus, delivery of

intervention and health care to the poor remains a major challenge, and particularly a difficult one when working through weak health systems (REPOA, 2007).

Because of the renewal of global emphasis on vector elimination as one of the effective strategies, introduction of artemisinin based combination therapy (ACTs) is another challenge facing Tanzania (Tanzania introduced ACTs in Nov. 2006), one of the key issue is the cost of ACTs which are 20 times higher than the conventional therapies that cost about 2.44 dollars per adult dose. Although ACTs seem to be the best hope for malaria treatment they are currently not accessible to the rural poor people partly due to the low income. The monthly income for these rural poor in Tanzania is estimated to about 14 dollars of which 11% of the total household income is spent on malaria treatment (URT, 2008).

Malaria interventions in developing countries are hindered by high costs and other subsequent maintenances such as political commitments, inadequate resources and lack of scientific knowledge on malaria control. The investment in malaria prevention and treatment is crucial for the well being of the population (WHO, 2003).

2.4 Current Interventions

Developing countries especially sub-Saharan African countries are struggling to eradicate malaria. One of such countries is Zanzibar. For a longtime Zanzibar has been a typical malaria endemic area. To remedy this situation the government came up with four key intervention strategies which are: use of insecticide treated

mosquitoes' nets (ITNS); insecticide spraying indoor residual spraying on households with a non-toxic insecticide chemical known as *Lambda-cyhalothrin* (ICON); and environmental cleanness as an effort to control the breeding of mosquitoes that transmit malaria, treatment for pregnant women (intermittent preventive treatment) and children under five years by providing them with insecticide treated nets at no cost, hastily introduction of the rapid diagnosis for malaria, also use of life saving drugs (artemisimin) based combination therapies.

All these strategies went hand in hand with regular monitoring and evaluation of activities, also arising awareness to the people so as to rectify some wrong perception on the chemical used in spraying their houses. Positive cooperation of the households with the government helped Zanzibar to reduce malaria to the minimum level of about two percent. Still the Government of Zanzibar continues with more campaigns of spraying insecticide to eradicate malaria completely (URT, 2008).

Another current intervention done on eradicating malaria completely in the world especially in the developing countries is the use of malaria vaccination in order to help the people to be free from malaria infections (Palma, 2005).

2.5 Effects of Malaria on Households

2.5.1 Loss of human labour and vulnerability

Malaria is the major cause of child mortality and malnutrition as it affects appetite that is food intake as well as the body's use of energy and other nutrients consequently undermining the child's nutritional status and threatening death. Young children are at risk because of lack of clinical immunity that occurs later in life. Twenty percent of all childhood deaths in sub Saharan Africa are attributed to malaria. Pregnant women are particularly at risk because during pregnancy immunity to malaria is temporarily impaired. Vulnerability is exacerbated not only by the loss of production and income, but also the costs of treatment. A large percentage of women in developing countries such as in Tanzania have the problem of getting money to access health care (REPOA, 2007).

Malaria reduces the capacity to work. In adults recurrent bouts of fever lower labour productivity. The transmission period of malaria coincides with the planting seasons where rains are so constant that result into more breeding of the mosquitoes. It is an aspect of the ill health that lowers agricultural productivity. About eighty percent of the population of Rural Tanzanians engages in agriculture producing food for consumption and income. Ill health from malaria causes a decline in crop output, reduction in inputs, a decrease in area planted, changes in crop patterns and loss of agricultural knowledge. At the core of the impact on agriculture is the loss of potential able-bodied adult labour as well as reduction in labour quality, time diverted from agricultural activities towards caring for the sick and attending funerals, and reduces funds to hire seasonal casual labour. In addition, households

often sell their capital goods (farm equipment, cattle) in order to get funds for paying for health and funeral expenses. The loss of human capital and lower productivity results in a lower economic growth and higher poverty levels (URT, 2003).

2.5.2 Lowering of education status

Episodes of malaria cause stunting in children's physical and mental development. This in turn contributes to impaired cognitive development, lower completion primary school rates and lower returns to education. Recurrent bouts of fever result into children starting school at late ages, poor educational performance, high dropout rates, and an increase in the number of children requiring special education. In addition, teachers with ill health are absent from school for long periods of time. This affects the children's education; leads to over crowding in classes, lowering the quality and efficiency of education system. Also education system comes to be burdened with students with special needs, such as orphans experiencing psychological trauma after caring for sick parents (Chima *et al.*, 2003).

2.5.3 Reduction of household income

Malaria has significant effects on human capital accumulation and decreases economic growth. Malaria affects the working population. In adults recurrent bouts of fever lower labour productivity as the adults absent themselves from work. Lower productivity contributes to lower economic growth and the poverty levels. The costs spent on malaria prevention and treatment lower household income.

Households often sell their capital goods (farm equipments, cattle) in order to get funds for paying for health and funeral expenses (Filmer, 2002).

2.6 The Linkage between Malaria Control Measures and Practices and Agricultural Development

Agriculture has for many centuries played a pivotal role in economic growth world wide, $\frac{3}{4}$ of the world's extremely poor 800million out of 1.16 billion live in rural areas. They depend on agriculture and other rural jobs for their livelihood (Chima *et al.*, 2003).

Presently there is widespread recognition among African leaders, international organizations and the donor community that improving the productivity and income generating capacity of agriculture is essential in poverty reduction and economic growth. The induced dynamics would indeed constitute a significant source of economic growth in Africa (World Bank, 2008).

The interactions between health and agriculture are bidirectional; health affects agriculture and agriculture affects health. Agriculture is essential for good health through the production of food and other raw materials for shelter and medicines. Health plays a key role in agricultural production in two ways. Poor health limits the capacity of the labour force to work leading to a decrease in productivity and its spillover effects on agrarian economies. Illness and death from malaria reduce innovations in agriculture through loss of knowledge of productive adults working in the sector and the loss of assets used to carry out innovations. Good health and

productive agriculture work hand in hand in the fight against poverty (Mboera, 2004).

Since the majority of the world's poor work in agriculture and the poor suffer disproportionately from related illness and disease an integrated view of agriculture and health is necessary to promote agricultural growth and development and reduce pervasive rural poverty. To foster progress towards agriculture, developing countries especially sub-Saharan African countries such as Tanzania, need to formulate policies to address malaria and its linkages with agriculture so as to increase food security and economic growth as a key for sustaining social and economic progress in all countries (World Bank, 2008).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of the Study Area

The research was conducted in Bagamoyo District in Pwani Region. The District lies between latitude thirty eight degrees to thirty-nine degrees South and Longitude six degrees to seven degrees east. It shares borders with the Indian Ocean in the East, Kinondoni Municipal Council in the Southern part and Kibaha District in Coast Region, Morogoro in the west, Pangani and Handeni in the North.

The District covers an area of nine thousand eight hundred and forty two square kilometres. The District is divided into six divisions, sixteen wards and eighty-two registered villages and four hundred sixty seven hamlets. Bagamoyo Township is its headquarters.

According to 2007 Pwani Region population census the district had two hundred and twenty eight thousand nine hundred sixty seven (228 967) of which one hundred and thirteen thousand nine hundred and ninety one (113 991) were males and one hundred and fourteen thousand nine hundred and seventy six (114 976) were female.

The district was chosen because of its general economic situation. Bagamoyo District is among the fifty percent most deprived Districts in Tanzania being at the rank of eleventh. Poverty is pervasive in this District with over a third of households living below a basic needs poverty line set in 2000/01 at 400/= per adult

per day, even in purchasing power parity terms well below 1 dollar per day having the GDP per capital of one forty four thousand Tanzanian shillings (144 000), according to the poverty and welfare indicators of NGP for 2008 of the vice president's office as cited by Mswia *et al.* (2008). This implies that such households do not command income sufficiently even to provide enough food to satisfy their basic minimum nutritional requirements; with consequences of slow development, economic and social well being.

Bagamoyo is the leading Districts in Pwani region to be highly influenced with malaria pandemic. Malaria in this District inflicts highly the low income households where as generally malaria deaths were 52.6% among children below five years and 46.6% to the adult people especially pregnant women and others (BDH, 2008). The study involved selection of four wards where by one village from each ward was selected as a sample.

3.1.2 Climate/ weather of the area

The District has a humid tropical climate with seasonal average temperature ranging from 13⁰c- 30⁰C. Moreover the district has two ecological zones namely; the Coastal Strip which is characterized by Savannah, Bushy, and then the up country which is covered with dense forest. The Coastal strip receives relatively more precipitation than the upcountry part. Rainfall ranges between 800 – 1200mm per annum. The short rainy season is between July to October while the long rainy season may start from February/ March to June.

3.1.3 Drainage pattern of the area

The district has two major rivers in the Northern part. These are Wami and Ruvu. These two rivers are the source of water for human consumption, livestock and irrigation in the district. These rivers discharge water in the Indian Ocean. In most cases rivers are wide, shallow and sandy which allows irrigation to take place.

3.1.4 Topography, vegetation and land use of the area

The topography of Bagamoyo District is characterized by gently undulating plains; which are covered with low sparse vegetation. The North East and Western part of the District are covered by the natural forest. The coastal belt is covered by mangrove swamps as well as mangrove trees and the soil type is sand, loamy and clay soil. The district has a total arable land of 836 579 hectares. The area which is under crop production is 56 119 hectares only. The production effected includes both food and cash crops. The major cash crops in the district are coconut, fruits, cashew nuts and cotton. The major food crops include maize, sorghum, paddy, rice, cassava and sweet potatoes.

3.1.5 Economic activities in the area

Generally, agriculture is the major source of income in the area; maize, fruits, beans, vegetables, cassava, sorghum, cotton, sunflower, simsim and rice are grown. Other economic activities include livestock keeping, fishing and bee keeping at low scale. The main food crops in the study area are maize, cassava, rice, beans, sweet potatoes, fruits and vegetables and the excess are sold to get cash. Cotton,

sunflower, sisal, pineapples, simsim are the main cash crops sold at large for sustaining household cash.

3.2 Research Design

A Cross – sectional research design was used. The approach enabled data collection from different groups of respondents at relatively the same time. The cross-sectional research design is cost effective in terms of economic aspects because of the resource limitations for data collection. The design is used in descriptive study and for determining the relationships between variables.

3.3 Sampling Procedure

3.3. 1 Sample population

The study involved rural farmers at the household level and some key informants such as ward executive officers (WEO), village executive officers (VEO), village government leaders such as village chair persons, medical or health personnel, hospital and other health service providers from the selected wards and villages.

3.3.2 Sampling unit and sample size

The sampling unit was household members, and the total sample size consisted of 120 respondents. The study was conducted in four wards namely: Magomeni, Kiromo, Kiwangwa and Zinga where by in each ward 30 respondents were selected. At the household level 25 members were selected from each ward whereby information from the key informants involved 5 members from each ward.

3.3.3 Sampling method

A simple random sampling technique was applied in the study. A simple random procedure was applied to select respondents from four villages. Individual participants were purposively selected with the help of community leaders to reflect the views of different age.

3.4 Data Collection Methods

3.4.1 Primary data

The study was subjected to quantitative (more in numbers) and qualitative (more in words) data collection methods. Quantitative data were obtained through interview schedule that is face to face and questionnaire, qualitative technique was employed for collection of data through key informants' discussion (Appendix 2).

3.4.2 Secondary data

Secondary data sources were obtained from the published documented materials from government reports, research reports, hospital and health centres reports. Different references and books from Sokoine National Agricultural University Library (SNAL) and NGOs were also used.

3.5 Data Management Procedures

3.5.1 Data processing and analysis

The data processing and analysis was done at Sokoine University of Agriculture Morogoro, Tanzania. The Statistical Package for Social Science (SPSS) computer software was used in analyzing and coding the data. Descriptive statistics such as

frequencies and percentage were used to find the simple means for studying variables and show the linkages between independent variables and dependent variables.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

This chapter presents results and discussion of the research findings basing on the research specific objectives and questions giving out detailed information on the households' income status and malaria control measures and practices in Bagamoyo District. The Chapter is subdivided into three main parts namely: demographic information of the respondents; the extent to which households use their income in malaria control measures and practices; the extent to which malaria is an income problem and assessment of the different factors that reduce household income hence affecting malaria control measures and practices.

4.2 Demographic Information of the Respondents

This section describes the characteristics of the sampled respondents in Bagamoyo district. These demographic parameters include age, sex, marital status, education level as well as occupation

4.2.1 Age of the respondents

The respondents selected were mature enough to cooperate and give clear information on the questions asked because they had a practical experience and awareness on the importance of income in overcoming health problems. The ages of the respondents ranged from 20 years to 65 years. The respondents interviewed in their households were from four wards namely: Magomeni, Kiromo, Zinga and Kiwangwa. The respondents were cooperative open and active thus gave the

answers that enabled the researcher to meet the intended specific objectives of the research.

Table 1: Distribution of the respondents by age

Age (Years)	Frequency	Percent
20-24	4	3.33
25-29	19	15.83
30-34	16	13.33
35-39	18	15.00
40-44	19	15.83
45-49	19	15.83
50-54	12	10.00
55-59	6	5.00
60-64	6	5.00
65-69	1	0.83
Total	120	100.00

Table 2 Distribution of respondents by wards and villages

Wards	Frequency	Percent
Magomeni	30	25
Zinga	30	25
Kiwangwa	30	25
Kiromo	30	25
	120	100
Village		
Makurunge	30	25
Pande	30	25
Msinune	30	25
Changalikwa	30	25
Total	120	100

4.2.2 Sex of the respondents

During the research it was found that most of the respondents at the households' level 70 percent were female headed families; only 50 percents of the respondents were male headed households; despite of the fact that selection of respondent was regardless of sex. The cause of such difference was due to the cultural background

of the societies in Babamoyo. Most of the Bagamoyo inhabitants are Zaramo, Kwere, Doe and Zigua. These inhabitants are still practicing matrilineal type of social organization hence leading to most of the households to be female headed.

Another cause of such distribution difference is that most of the males tend to move to towns such as at Mbegani township in Bagamoyo to seek for employments in the fishing industries, salt making industries and also at tourist hotels at the Indian Ocean; others move to Dar es Salaam city to seek employments in processing and manufacturing industries and other works related to the levels of education. Apart from seeking employments by males, another factor which has led to have male headed households in matrilineal society is HIV/AIDS pandemic which has resulted into deaths of the males heads hence remaining females as heads of the households.

Modern religions such as Islam being dominant and Christianity have also transformed the minds of the inhabitants leading to some of the households to be male headed.

Table 3 Distribution of respondents by sex

Sex	Frequency	Percent
Male	50	41.67
Female	70	58.33
Total	120	100.00

4.2.3 Marital status of the respondent

The marital status distribution in the surveyed villages in the households showed that most of the respondents were married; that is 94% of the household heads were married; only 26% of the household heads were single. Majorities are married due to social cultural influences on the importance of marriage. Any grown up person is obliged by the society to marry or to be married.

Table 4: Distribution of the respondents by marital status

Marital Status	Frequency	Percent
Married	94	78.33
Unmarried	26	21.67
Total	120	100.00

4.2.4 Education level of the respondent

Education is very important phenomenon in making man the responsible being in solving his problems encountering him. Poor education leads to low intervention in mastering or managing the environment especially the problem of health. The more an individual is educated the more it is expected of him or her to take measures that favour his/her health status.

Generally the inhabitants of Bagamoyo District have poor education compared to other districts of Tanzania main land; it is at the rank of 2nd district from the last after Mtwala region. As a result, rural farmers' ability to overcome diseases such as malaria or to take up new innovations against malaria is relatively low, as they have only limited access to medical or health information from written sources and the media.

During the study it was found that most of the heads of the households do not know how to read and write; only 74 percent of the surveyed households had attained primary education but among of these few completed standard seven; 36 percent heads of the households had never gone to schools; only 10 percent of the respondents had secondary education and above.

From the survey it was revealed that some household members do not know the importance of formal education in human life. They perceived formal education as a worthless thing in human life. This attitude has led some parents in these societies to convince their children to leave schools and engage in income generating activities or get married.

The major cause of these variations are due to low income, there was low production hence the area was neglected, the inhabitants practiced shifting cultivation characterized by communal mode of production basing on no surplus, also historical back grounds of slave trade made these inhabitants not to have permanent crop cultivation. These factors made the government to allocate the essential social services to them.

Despite the efforts made by the government to allocate these services to them still the parents in some of the households do not see the importance of education hence convince their children to remain at home, others to engage in fishing activities , others to seek employment in towns so as to get cash for their parents. All these

factors lead the society to remain ignorant hence more sufferings with abject poverty and diseases due to lack of sustainable education.

These findings imply that, supplementary sensitization on malaria cannot be undertaken intensively due to the fact that, people have the only low education that does not necessarily imply sufficient knowledge on the malaria and environments that harbour the disease.

Table 5: Distribution of respondents by level of education

Level of education	Frequency	Percent
None	36	30.00
Primary	66	55.00
Secondary	4	3.33
Tertiary	6	5.00
Adult	8	6.67
Total	120	100.00

4.2.5 Occupation of the respondent

The respondents in the study area were engaging in different income generating activities so as to build their society especially in solving their problems. One's occupation determines the income status and the ability to encounter various problems facing him or her.

Majority of the people in Bagamoyo District are small scale farmers. The results showed that 113% of the respondents at the household level interviewed were farmers. They grow maize, fruits, rice, cassava, coconuts and vegetables also some of these farmers engage in fishing activities. About 14% of the respondents at household level were both farmers and petty traders. Petty traders in the study area

sell different food products to customers and middlemen from Chalinze (Pwani region), and other regions like Dare es Salaam and Tanga. Only 7% of the interviewed respondents in the study area were government employees (key informants), but also some of these government employees own small farms for agriculture.

Despite the achievements attained in agriculture, it has been observed that most of the people in the study area are poor. This terrible situation has brought adverse effects to rural farmers in the District partly due to poor farming practices, poor accessibility to markets, poor road transportation and lack of access to financial services to invest in modern agriculture. But of these mentioned problems it was clearly seen that crops are carried in many kilometres by head portage to the assembly markets or roadsides. Problems in the transport sector affect agricultural production in two ways. Firstly the time and energy spent on transport related activities reduce labour productivity because the transport charges make the price of the fertilizers to be very high, hence reduces the profits which a farmer could obtain; secondly, increased market costs reduce total income of the farmer hence low interventions in malaria control measures and practices.

But critical examination revealed that the agricultural gains were not equally distributed between men and women. Analysis of gender basis revealed that, at every village, men were more market oriented than women. A critical issue in visited village areas was that men frequently controlled income from agricultural production and spent it badly, while women had both limited control over financial

resources, and limited ability to control or own any kinds of agricultural produce hence low income at the household level. Farming is the heart and the machine for these respondents; poor farming, poor road transportation, poor markets and lack of gender parities implies poor income hence inability to control the fatal diseases such malaria at large.

Table 6: Distribution of respondents by occupation

Main Occupation of the respondent	Frequency	Percent
Agriculture	99	82.50
Agriculture and petty trade	14	11.67
Agriculture and government employment	7	5.83
Total	120	100.00

4.3 Awareness on the Gravity of Malaria Pandemic

In conducting research it was taken first into consideration to determine the extent to which the disease has been known to the community members. The households' members were aware with the disease due to the negative impacts of it on their households.

Malaria in Bagamoyo District inflicts highly the low income generating households where as generally malaria deaths were reported to be 52.6% among children below five years and 46.6% to the adult people especially pregnant women and others (BDH, 2008).

Malaria has influenced greatly the life of the members; in one way or another, respondent's families has encountered the negative impacts of malaria, either by caring for the sick for a long time or has experienced death. This awareness was

activated by ant malaria campaigns in the district done through different NGOs and the village council meetings on improving the livelihoods of the coastal people. But with such awareness, still Malaria inflicts these members of the households as it limits income generating activities at large. Due to income limitations caused by malaria, the society has undergone abject poverty hence a chain of suffering. Poverty was said to contribute to the disease burden in the district. Most of the community members lived below the poverty line and were unable to pay for health care services. The community was aware of the fact that poverty was one of the major reasons for increased disease burden in their households.

4.4 Economic Status of Households

Having identified the awareness of the households' members on the fatal disease, it was then necessary to measure the economic status of each surveyed household. The economic status was measured by using housing standard and other assets as indicators also another criterion used was observing production status basing on farm size ownership.

The study explicitly showed that malaria inflicts on the household treatment expenses that alter the income of the family hence marginalising its livelihood. It is from this point a household that is frequently attacked by diseases is infringed from livelihood improvement and thus remain poor. From this scenario the study attempted to study the poverty level of the respondents.

The study discovered that 81% of the respondents owned very poor houses. The walls of the houses were made of grasses while others were made of sticks, mud and mud bricks and roofed with grasses, poor windows and doors that allow mosquitoes to pass and to host, also these houses had no cement only earth like cement were in these houses. Poor housing is an indicator of low income; low income leads to low intervention in malaria control measures and practices. Low intervention in malaria control measures and practices chains the family into abject poverty.

Another asset which was used to determine the income status was assessment of sleeping status quality. The household members were asked to state if they owned the modern wooden beds and the modern mattresses as the assets essential in malaria preventive measures and practices. These assets are costly, a modern wooden bed in Bagamoyo district costs 90 000/= while the mattress costs 75 000/=. The income status determined by occupation status of the households determines the purchasing power of these important assets. These assets are important in determining the livelihood of the household. Of the households respondents interviewed only 39% owned modern wooden beds and mattresses; but out of 81% of the households' heads owned traditional beds and mattresses. The traditional beds and mattresses are made from palm fronds thus allow highly the mosquitoes to host hence the increase of malaria vulnerability. Low income led to the members to give priority to the immediate needs such as food and clothing.

Table 7: Showing the distribute of average income

Average income in a day	Frequency	Percent
More than 1000/= a day	17	14.17
About 800/= a day	13	10.83
About 500/= a day	23	19.17
About 450/= a day	67	55.83
Total	120	100.00

4.5 The Extent to which the Households use their Income in Malaria Control

Measures and Practices

Control of the disease is the obligation of each grownup person in the society. Malaria is considered as the enemy of the people as it hinders development. Following the ideas of the father of the nation Julius Kambarage Nyerere on controlling malaria he said that malaria is the enemy of the community of Tanzania so using all energy and all resources namely income will lead into economic development of the country. For him a healthier community can participate actively in income generating activities (Rweyemamu, 1973).

Having examined the awareness on malaria as the fatal disease, the occupation status and the income status of each household, the members were requested to state how they use their income in preventing and eradicating this fatal disease. They stated that they were using their income to both preventive measures such as buying treated mosquito nets, insecticide spraying, draining stagnant water, cleaning residence surroundings and doing fumigations around residences to control breeding of mosquitoes, and curative measures such as attending hospital treatments (diagnosis) and use of drugs and medicines after contracting with the disease.

4.5.1 Preventive measures used

4.5.1.1 Cleaning residence surroundings and draining stagnant water

The foremost and important measures to be taken into consideration in malaria control are to stop the breed places of the mosquitoes. Cutting short the grasses and draining stagnant water around homes was neglected from the district level up to the household level partly due to limited financial resources at the district level, poor governance of the district leaders giving priorities to other development strategies. At the household levels individual income and level of education determined ones participation in draining water and cutting short the grasses, cleaning and burning all rubbishes to put the house surroundings clean. The households with high income and had attained better secondary education and above (Tables 5&6) used their income to drain stagnant water through constructing trenches to drain water to the other channels, built better toilets that could not allow mosquitoes to breed, cut short the grasses around their houses, sprayed insecticides on their flowers to stop breeding of mosquitoes and bought dust bins for collecting remnants of food, vegetables and papers.

In the households with low income and poor education status 81% of the respondents participated lowly in the practices; they had poor toilets not cemented or covered on their tops that allow mosquitoes to breed, vegetable and food remnants scattered here and there around their poor houses, grasses are left tall until the dry season when are burnt or dry themselves. Because of low incomes, for these poor households they give priority to very immediate needs such as food and clothing compared to malaria prevention. During the discussion one woman from a rural village commented: *“You cannot incur costs through buying cement, stones*

and cement to build a modern toilet when you don't have something to eat, no kerosene for light, no clothes for children etc". In this way the district will remain highly inflicted with malaria due to poor malaria intervention.

The study is similar with the research done by Randen (2006) on Environmental Management for Malaria Control: Knowledge and Practices in Mvomero District. The results reveal that, respondents with high income and better higher education had greater knowledge of mosquito ecology and environmental management thus performed better the practices of draining stagnant water and cleaning their surroundings to control breeding of mosquitoes.

4.5.1.2 Use of mosquito nets

The majority of the respondents participated in the commonest practice of buying mosquito nets as the first aid measure to prevent their families against malaria. A total of 36% of the households' members used the treated mosquito nets and treat their nets several times to prevent themselves against the mosquitoes that spread malaria. But out of 84% of the respondents had no treated mosquito nets and do not treat their nets in preventing themselves against malaria.

The reasons of such variations are because of low income of some of these households members to buy mosquito nets; one treated mosquito net costs 5000/= and the insecticide to treat the net (Ngao) costs 600/=, while a non treated net costs 3000/= in Bagamoyo township but the prices of these items increase from one ward to another due to the distance from Bagamoyo township capital of the district. So

for members to travel from their wards to Bagamoyo township the centre for business for example from Kiwangwa to Bagamoyo township costs 2500/=, thus to spend about five thousands shillings as a fare to and from Bagamoyo township leads to one to fail in doing so, thus suffering of his family with Malaria. Lack of money was given as the reason for not buying treated nets and treating nets even though the insecticide was not considered expensive. If there was no money at hand when nets were washed, people were not treating the net until the next washing; one of the female participant from a low income household expressed her views saying *“If you have 1500/= and you want to buy Okra and corn, at the same time you need Ngao (insecticide) to treat your net, you have to buy food and let the mosquitoes bite you!”*. This reflects the tight budget constraints faced by many households, thus low malaria intervention.

An ITN Social Marketing Project in Tanzania found similar results that pervasive poverty and the expense of the nets were the chief reasons for the lack of nets in the poor rural households with the most common constraint on net ownership reported as affordability. Majority of the rural families shared the nets due to lack of money to buy them (Hanson, 2004).

Another factor for such variation is caused on lack of nearby government health centres around the villages of the respondents where the facilities for malaria prevention can be obtained easily. Thus the petty traders sell these items to the near villages at high price , for example one treated net at Kiwanga is sold at high cost 7000/= that cannot be afforded by the low income families.

Sustainability of the control and preventive measures and practices by low income households was difficult, mosquito nets worn out were not replaced and re-treatments of nets were not done in a time to provide continuous protection against mosquito bites.

Family size was negatively associated with the net use at the individual level, the inverse relationship between family size and net use was associated with costs whereby on average, larger families found it costly meeting more basic household needs such as food and were left fewer resources for net purchase hence continued to be bitten by mosquitoes.

4.5.1.3 Insecticide spraying

4.5.1.3.1 Buying mosquito repellents

Another measure and practice that was taken to prevent malaria pandemic was to buy other mosquito repellents such as insect sprays namely *lungu*, burning coils, *ngao* apart from buying treated mosquito nets. Only 36% of the households' respondents bought other repellents and used treated mosquito nets to prevent themselves against malaria. The totals of 84% of the households' respondents were not able to afford to buy those mentioned repellents due to low income.

The more the preventive the repellent is, the more expensive becomes; the more effective insecticide spray costs 4000/= but its effects last longer depending on the quality of the house. Due to limited income, poor housing facilities and poor

knowledge on the necessity of eradicating the disease the more an individual became reluctant on malaria measures and practices. Furthermore these low income households were not well informed about the importance of these insect sprays and the ITNs as one of the respondent during the discussion commented *“When you look at us and the clothes we are wearing would you really think we cannot buy Lungu, burning coils, or Ngao?(insecticide sprays). For me I think we don’t have good knowledge about those things and how important they are in fighting malaria”*.

Poor income and poor knowledge on the importance of insecticide sprays have contributed to these low income households to use traditional measures to prevent themselves against malaria such as the burning of smokes in the house at night to keep away the mosquitoes, but these traditional measures were not effective as insecticide sprays. These respondents from low income families perceived the chemicals to be ineffective in repelling or killing mosquitoes and therefore a waste of resources (money), thus turned to traditional measures of burning leaves rather than use of coils or sprays. The study is also similar with the study done in Malawi on malaria control measures and practices found that net ownership, use of insecticides spraying and net re-treatment and ITNs was less common in households where the head or care taker had not completed primary schools and in homes where the household had mud walls or a grass roof as a sign of poor income (Holts, 2003).

4.5.1.3.2 Doing fumigations

Doing fumigations using ICON as an indoor residual house spraying chemical around the households was taken into consideration as a most effective way of controlling malaria transmission.

The households' respondents were requested to state how they use their income in doing this important practice and measure. Of the households respondents visited only 43% were using their income in doing fumigations around their houses in order to control and prevent their households against malaria; but a further analysis was made to how many times in a year, a month and a week are they doing so; only 12% of the respondents were doing fumigations around their houses at least twice after three months; these are families with high income generated from modernized agriculture, petty trade, government employment status and education thus gave a great consideration in preventing malaria. A total of 77% of the households' heads could not afford in doing fumigation around their houses due to low income related to poor farming and poor education. ICON chemical costs 4500/= per each packet of 50 g. This became a burden to low income generating families, thus households heads gave priority to other family needs such as payment of school needs, clothing and food.

People argued that affordability in buying ICON spray was a particular challenge in low income households where these households depended mostly on income from low value crops like maize, oranges and coconuts. Poor income and poor education led to the low income households to doubt on the safety of insecticide spray, thinking that the chemical could be harmful to their health since it could kill mosquitoes and other insects. One man from low income commented: "*For me I*

think ICON and Ngao (an insecticide for net) can damage our lungs since they can even kill mosquitoes”.

Inappropriate use of the insecticide (Ngao or ICON) by many of the poor households rendered the insecticide ineffective against mosquitoes. Community members mentioned misuse of the insecticide was common among crop and livestock farmers. Livestock keepers were using the insecticide to spray cattle against ticks and tsetse fly, while crop farmers were spraying crops against pests (for example maize stalk borers, aphids or stem borers).

Table 8: Distribution of the respondents by cost effective preventive measures

Measures used	Frequency	Percent
Draining stagnant water, bush clearing	10	8.33
Environmental cleanliness and fumigation	7	5.90
Use of treated nets, ITNs and other repellents	36	30.00
Lowly or no use these measures	67	55.87
Total	120	100.00

4.5.4 Curative measures used

4.5.4. 1 Diagnosis

The costs of treatment for malaria include out of pocket expenditures for consultation fees, drugs, transport and subsistence at a distant health facility. For Sub Saharan Africa, these costs ranged between 0.41 dollars and 3.88 dollars per person, equivalent to between 1.88 dollars and 2.26 dollars per household per month. Household expenditure on treatment in Sub Saharan African countries is usually highly regressive consuming a much large proportion of income in the poorest households (World Bank, 2008).

Attending to health centres or hospitals depended on the income one has; the majority of the respondents said. This was due to cost sharing policy of the government on medical services.

Poor income limited medical attendance as laboratory confirmations on blood slide examination are highly costing that is about 2500/=. These factors made the low earning income households members to rely on traditional healers, clinical judgement without laboratory confirmation, delayed health seeking and the use of less effective ant malarial drugs; hence increase of malaria cases and deaths in the households.

The respondents visited at household level, a total of 80% of households did not attend medical treatments, this was due to low income and the long distance and transport costs to the health centres; for example the cost from kiwangwa to Bagamoyo hospital where there are all facilities of health services is 2500/= which is high to low earning households. Only 40% of the respondents visited at household level were able to afford medical service treatments. Cost sharing and costs for medical treatment of malaria left the household members from low income to rely on traditional hearing methods.

Family size also influenced diagnostic measures in malaria control measures and practices. The larger the family size the more the income was used; likewise the small the family size the less the income was spent on diagnostic treatment of

malaria depending on the level of income of an individual. Most of the household respondents visited have many numbers of children and other dependants.

Due to the extended family nature of the most African societies, the household members with many dependants and with low income could not afford the costs for diagnosis and treatments hence did not attend medical examination and other health services hence suffered much from malaria, sometimes they relied on traditional healing methods to get relief from malaria.

Many household heads interviewed about 90% had many children starting from five and above, among of these families have low income hence could not afford to attend laboratory services to provide confirmatory diagnoses therefore suffered from malaria. Only 30% of the respondents in the surveyed households had few numbers of children thus afforded laboratory confirmatory diagnosis leading their family members to have good health hence serving their income for other developmental plans.

4.5.4.2 Use of drugs and medicines

An increase in the household income and household's level of education was strongly correlated with the use of proper malaria prevention methods. Only 30% of the households used their income to buy ant malarial drugs such as *chemoprophylaxis*, *sulfadoxine pyrimethamine* combination (dawa mseto) and bought injectables medicines. The use of these anti malarial drugs and injectables medicines depended on the diagnoses and the description given by the doctor at the

hospital after laboratory test. A total of 90% of the respondents at the household levels from the low income did not attend medical diagnoses; others got inappropriate prescription advice and ineffective drugs and medicines from private pharmacy at high costs after contracting the fevers and used them without reading descriptions properly leading to overdosing resulting into deaths. Another major barrier to the successful malaria case management was the poor adherence to drug regimens. Under dosing was quite common practice in these poor households. These poor households were not able to afford the costs for these drugs and injectables medicines thus turned to traditional medicines; also these members attended hospital treatment lately after high malaria fevers had happened and after traditional medicines had failed leading to them to use excessive injectables that increased the costs of treatment in this way leaving the household into abject poverty to cure the fevers.

Table 9: Distribution of respondents by curative measures

Measures Used	Frequency	Percent
Diagnosis and medical treatment	30	25.00
Use of traditional medicine	90	75.00
Total	120	100.00

4.6 The Extent to which Malaria is an Income Problem

4.6.1 Taking care of malaria patients for a long time reduced income

The malaria endemic was found to bring negative economic impacts on households. The pandemic affected production and other income generating activities at the household level. The respondents at the household level agreed to be highly

affected by malaria in terms of low production after being encountered with the pandemic, selling the household properties at low prices, using the banked salary or wage as a coping strategy.

All the respondents agreed that malaria limits their income hence lowers the households' progresses. Most of the households have remained poor due to malaria pandemic especially taking care for the sick of malaria for a long time. A number of 77% of the households' respondents went down of their income due to the caring of malaria patients for a long time; and about 43% of the inhabitants interviewed crumbled down of their income due to malaria deaths in their families.

Due to extended family nature of most African societies if one of the family members gets a problem the whole family gets involved in the problem the phenomenon that was clearly seen in the interviewed households. The low income households respondents said that in order to cope with the situation, they were obliged to sell their crops and land to petty traders at a take away price (low prices) so as to pay for medical treatments and diagnoses; others of these low income households respondents got remittances from other relatives; sometimes if a patient was taken lately to Bagamoyo district hospital for further accurate or intensive medical treatment, the transport costs were doubled than the common fare depending the distance of the ward and a village to Bagamoyo district hospital, thus families with low income suffered from the situation highly.

4.6.2 Malaria influenced family capital and production

To reduce malaria infections, patients with malaria use drugs which are strong and which are considered to be most effective. These most effective drugs to malaria are sold at high prices.

The dosage which cost low price costs about 3000/= depending on the manufacturing company. Thus to complete the whole dosage patients used about 20 000/= without including treatment costs at the hospitals or at health centres or dispensaries. Such situation led to many households living on 1000/= per day to suffer from malaria.

A total of 90% of the interviewed low income households' members were highly influenced by the malaria costs. Only 30% of high income households' dwellers visited was not influenced highly by malaria costs. This was due to the fact that most of the households in Bagamoyo district engaged mostly on production of food crops which are produced in small farms leading to them to have only food for consumption not food surplus enough for selling in order to earn income necessary for helping the family during the crises.

To get remedy from the situation these low income generating households sold their farms which is their capital to rich ones in the society so as to save life of the patient; in turn these households remain landless hence a chain of sufferings.

The results from this study concur with those from a study in Zambia by Chima et al. (2003) which found that in Zambia agricultural losses was due to ill health, households without an ill head of household planted on average 22% more area in 2002-2003 than the previous years. The well-off, but ill households in Zambia cultivated only 1per cent less area in 2002-3, relative to 2001-2. However in poor households the decline in cultivated area was nearly 70%. This brought worrisome implications for the long term viability of rural faming systems, as the ill health affected the poor households by selling land, farm implements and livestock, thus pushed them into abject poverty.

4.6.3 Malaria affected farm labour hence income

Malaria fevers always confine with the time of preparing the farms and harvesting at the coast of Indian Ocean where stable malaria with seasonal variations occurs and where there is seasonal intense transmission for 3 to 6months in a year.

Stable malaria also occurs in high altitude plains, with temperature above 15°C and mean vapour pressure of 10-20 mill bars. About 20% of the population in Tanzania lives in these areas. In such areas, malaria is common in children under 5 years of age and pregnant mothers (MoH, 2002).

Women played an important role in production in Bagamoyo district; during the discussion the researcher identified that pregnant women in the visited households also participated in production where majority of them especially from low income households had contracted with malaria fevers. A single bout of the disease costs an

estimated equivalent of 10 lost working days. As a result affected families managed to work only 40% of land available for crops, compared with the healthy families who were able to work up to 75% of the available land. Malaria caused illness, death and disability to this working population. Furthermore, loss of productive time, time spent by families and communities to grieve for the dead and funeral costs are also indirect costs due to malaria. A number of 86% of the low income households' respondents have denoted how malaria sickness and deaths had led into the stagnation of production at their households. Stagnation in production resulted into underdevelopment at the household level up to the community level.

The study is also similar with the study on Sudan on the effects of malaria on households which showed that a total of 8409 labour hours were lost due to malaria during the farming seasons. Farmers caring for the sick lost 1332 labour hours, and 1307 labour hours were lost due to incapacitation (Bolinger *et al.*, 1999).

4.6.4 Malaria caused poor school performance

A healthy person always performs his activities actively. Frequent fevers of malaria reduce body immunity. Poor body immunity leads to the failure of body to function properly hence mental stagnation.

In every day life malaria fevers hinder regular attendances to works and also to schools. Children with cute malaria never attend continuously to schools also teachers with malaria fevers cannot perform their duties properly. Poor attendances to schools by the children lead them to perform poorly in their exams. Poor

performance in exams leads to these children to drop school curricula. The drop out from school curricula result into poor self employments also chain of the ignorant community that does not know how to read and write and which cannot have enough creativity in solving its problems namely malaria pandemic.

A total of 98% of the respondents strongly agreed that malaria has resulted into school absenteeism; they also agreed that malaria led to teachers and students not to have regular attendances to schools. For the pupils who come from single parent headed households suffered mostly from traumas due to caring of their parents when fall sick hence lacked school programmes finally neglected to go to school and started to seek employments to get money to help their sick parents. Poor school attendances has led the community to remain ignorant the source of all evils of underdevelopment in their community.

4.7 Other Factors that Reduce Household Income

4.7.1 Food expenses reduced household income

In every day life food is one of the most important aspects of man. Expenditures on food reduced household income. Food shortage led to the suffering of the households with low income. On this aspect the respondents were inquired to state on which extent expenditures on food were the limit of malaria preventive measures and practices.

A total of 95% of the respondents from low income households had shortage of food in their families hence used their income mostly in acquisition of food. Expenditures on food influenced malaria control measures and practices.

Food shortage in these households was because the people lacked substantial budgeting of their food crops after harvesting without keeping for the future. Poor storage methods of food especially maize, rice and beans resulted into the absence of food in households. Also low income households have small size of farms that yield low produces that cannot sustain the number of the household members.

Improper budgeting led to the inhabitants to sell their entire food surplus without putting into consideration of the future during food crises. These dwellers sold their entire food so as to get money for their daily demands such as clothing, kerosene, sugar and salt to mention but a few; in long run the low income households became food insecure. In some of these low income households the food obtained during harvests was used in making local beer such as *Komoni* leading into food insecure.

Gender discrimination over the harvests also led to the food shortage. During the harvests the output obtained was controlled by men and sold by them to get money for leisure not for taking care of his family but the women who were overworked did not get any thing. Suffering to people due to poor meals persisted; only a single meal was taken per day in the low income generating households. Consequently the community was chained to malaria due to lack of proper meals that build strong immunity to malaria since there was no enough money to curb the wasted food.

4.7.2 Traditional ceremonies reduced household income

In every day life people give importance to leisure. But the types of leisure differ from one community to another community depending on income status of the people. The inhabitants of Bagamoyo give importance to traditional ceremonies. The traditional ceremonies especially marriage rituals and initiation rites are given much attention. Bagamoyo dwellers take much time preparing these ceremonies especially initiation rites. The initiation rights especially women initiation and boys circumcision take a lot of money and time indirectly. The household that does not fulfil these initiation rights seems to be against customs. In whatever means dwellers make sure that they participate actively in these ceremonies; in that way time and money which can be invested in production and development especially in eradicating diseases is wasted. A total of 97% of the interviewed respondents from low income households participated actively in traditional ceremonies which take much time and money as these festivals occur frequently each year in the society.

During the discussion, it was revealed that despite substantial income revenue obtained from agricultural produce (especially maize and rice harvest), many low income families put low priority on malaria control in respect to total household budgeting. Farmers spent their money in post-harvest entertainments such as traditional dances than in health issues. Such households were even hiring and bringing dancing groups (mchiriku) from as far as Dar es Salaam, and would take several days feasting and dancing. Such entertainments were consuming a large proportion of harvests and money hence low intervention in malaria.

4.7.3 Farm inputs reduced household income

For the farms to yield enough produces need good preparation and investments. Poor preparation and low investments lead to poor produces. Farmers were obliged to purchase farm inputs so as to boost efficient agriculture that will yield reasonable output.

The respondents were requested to state to which extent investments in the farms affect household income. The interviewed household respondents strongly agreed that farm investments reduce households' income hence affecting malaria control measures and practices. Respondents showed that investments in farms need much capital hence investing in the farms reduced income of the low household income.

Farm inputs such as a bag of two and half kilograms of well treated seeds of maize cost 7800/= at the time of planting, 1kg of fertilizers such as CAN, cost 4500/= and insecticides are sold at high prices in Bagamoyo district. Up to the time of harvesting these farmers had run out of the money hence suffered with malaria fevers highly due to lack of money to buy malaria drugs and other implements of malaria. A farmer who relied on traditional methods of farming ended up in poor produce hence poor income consequently low intervention in malaria control measures and practices.

Table 10: Distribution of factors that reduced income at households

Factors that reduced income highly	Frequency	Percent
Taking care of malaria patients and death	65	54.16
Food expenses and farm inputs	20	16.60
Traditional ceremonies	35	29.24
Total	120	100.00

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 Overview

The study aimed at finding how household income influences malaria control measures and practices. In doing that it carefully measured the extent to which households use their income in malaria control measures and practices; the extent to which malaria influences the income of household members hence affecting the economy of the household. It also ranked different factors which contribute to reduce households' income. This was to examine carefully how income as one of the factors contributes to the well being of household status economically, politically and socially and all spheres of the well being of the community. In measuring the household economic status, the number of indicators were developed particularly the household s assets so as to observe the relationship existing between the less income generating households, higher income generating and malaria endemic.

5.2 Conclusion

The objectives of this study were attained through the structured interview schedules, the study discovered that:

1. After the household has encountered the disease, the level of production is reduced as well as the income of the household falls; it was from that point when the coping strategies became crucial for the low income generating households. In finding these coping strategies some households found themselves entering in the other problems namely poverty.

2. There was a significant difference between households with high income generating and low income generating households, but the study discovered that despite the fact that people were aware of the problem still the mortality rate due to malaria was still high. This is explained by the study that people still need more sensitization not whether a disease exist but more about the preventive and curative measures. For instance, it was clearly seen that low income generating households do not use their income in doing fumigation around their houses nor do they seek proper medical treatments such as laboratory confirmations and use of frequently treated mosquito nets.

Low income households had no proper budgeting of their income obtained harvests, they used their income mostly in traditional ceremonies hence no or low intervention in malaria control measures and practices.

3. When measuring the extent to which malaria affects households in relation to income status, the findings showed that, the low income generating households were found to be more vulnerable to malaria endemic compared to the high income generating households which were well equipped economically and hence less vulnerable to the endemic.

5.3 Recommendations

1. The community should be sensitized not only of the existence of the disease but also the preventive and curative measures should be given the first priority. The Insecticide Treated Nets should be more encouraged, also the use of indoor residuals and non toxic chemicals should be highly practised in reducing mosquito host starting from the family level up to the community level.
2. Improving household income status through regular monitoring and evaluation of daily income generating activities at the household level especially in the rural areas where most are vulnerable, and where the knowledge about how to prevent a disease is still minimal will lead into the eradication of community sufferings.
3. Malaria control programs should also consider the family practices and the economy of the respective communities. Findings from this study indicate the need to design interventions that fit specific local context. Regarding the rural areas that are considered to be more victimized which portray the same reality in poor countries like Tanzania, it is therefore important that malaria control programs and agricultural development projects are planned and managed in a multicultural way so as to combat the problem.

4. The use of less effective ant malarial drugs, delayed health seeking, and reliance on clinical judgments without laboratory confirmation in most rural areas should be avoided.
5. There is a need to Increase the efforts of fighting against the disease by the policy makers and the ant malarial activists as well as the government as whole.
6. More efforts should be added more on gender issues especially on equality and equity so as to stop women discrimination and encourage family planning among household members in rural areas so as to increase house hold income hence more development.
7. Male dominance over the income that leads into underdevelopment should be discouraged through increasing formal education interventions at all levels of the community members so as to make these people to see beyond their traditions and mobilize themselves against poverty hence increasing the household income.
8. The people should also be encouraged to set up savings and credit societies through which they can get the starting capital they require for their development especially in solving their problems namely malaria endemic.

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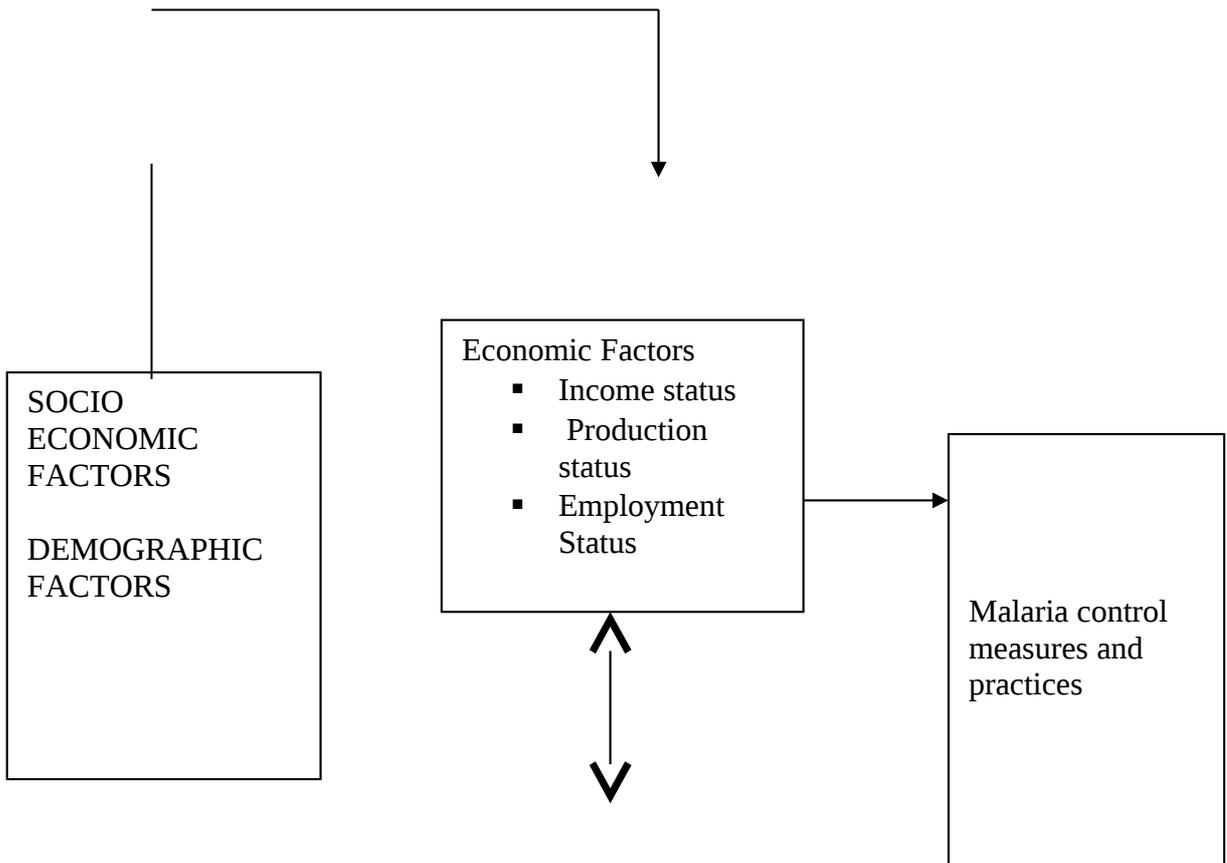
APPENDICES

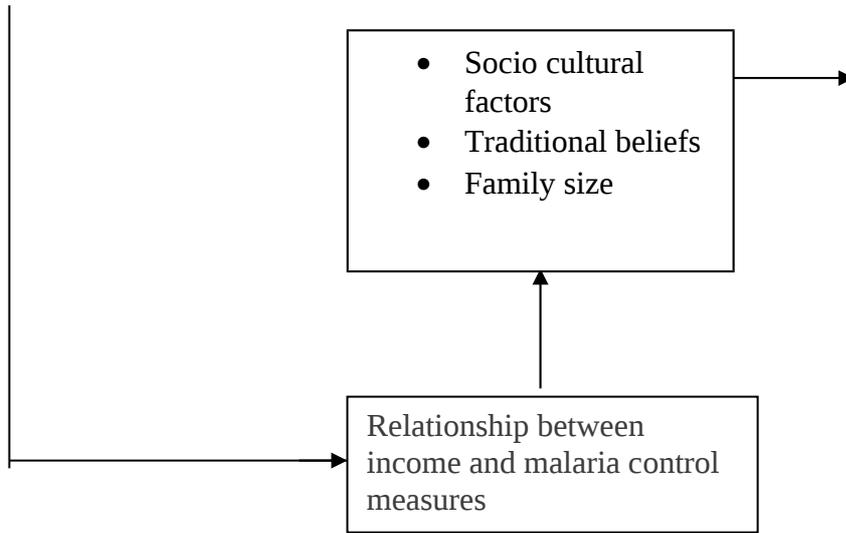
Appendix 1: Conceptual Frame work

Background variables

Independent Variables

Dependent Variable





Appendix 2: Structured questionnaire for households in Bagamoyo

**THE TOPIC TO BE ASSESSED: HOUSEHOLD INCOME STATUS AND
MALARIA CONTROL MEASURES AND PRACTICES IN BAGAMOYO
DISTRICT.**

Section A: Personal information

1. Questionnaire number.....
2. Name of respondent.....
3. Date of interview.....
4. Name of ward.....
5. Name of village.....
6. Sex of respondent
 - i) Male
 - ii) Female
7. Marital Status
 - i) Married
 - ii) Unmarried
 - iii) Living together
 - iv) Divorced
 - v) Other (Specify)
8. What is your age in years?.....
9. How many are you in your family?

10. Main occupation of household head

	1=farmer	2=herder	3=farmer	4=unemployed	5=employed	6=fishing
Father						
Mother						

11. Level of Education (Tick Where appropriate)

	1=None	2=Adult	3=Primary	4=secondary	5=Tertiary	Other
Father						
Mother						

Section B: Malaria Identification and recognition

12. Have you ever noticed a disease like malaria?

1= Yes

2= No []

13. In which year did you first notice it?.....

Section C: To determine to what extent is malaria an income problem

14. What is your average income in a day? (Check **for Household farmers**)

a) More than 1,000 Tshs in a day

b) About 800 Tshs in a day

c) Less than 500 Tshs in a day

d) Others specify..... []

15. Do you have another income generating apart from farming?

1= Yes []

2= No

16. Do you think your income helps you to contribute in Malaria control measures and practices?

1) =100%.....

2) =80%.....

3) =50%.....

4 = 35%.....

17. In which year did your household income drop most? Why? 1. Deaths, 2. Caring for the sick, 3. Burial Ceremonies, 4. Others specify.....

18. Following the severe malaria out break, did you maintain the same production in the succeeding season?

1= Yes (go question 17) []

2= No

19. How did you cope with question 16 situations?

1= sale of cash crops

2 = remittances from relatives

3 = wages

4 = sale of milk []

5 = merchandize or fishing

20. Please pick a number from the scale to show how you agree or disagree with each of the following statements: 1 = strongly agree, 2 = Agree, 3 = Undecided/neutral, 4 = Disagree, 5 = strongly disagree.

No	Item	Score
----	------	-------

1.	Using most of the time to care malaria patient causes low production hence low income.	
2.	Malaria causes school absenteeism, so poor performance later affects employment and income.	
3.	Malaria reduces the manpower in our farms due to being sick.	
4.	Deaths due to malaria affect production since the manpower is reduced	
5.	Costs due to caring malaria patients' affect capital and production.	
6.	Buying medicine for malaria patients reduces income.	
7.	Buying mosquito nets and other repellents to prevent malaria reduce income.	

Section D: To examine to what extent do communities use income in Malaria control measures and practices.

21. What do you do in order to prevent you self from malaria?

.....

22. To what extent do you prevent your self and your family in order to avoid Malaria?

- 1) To go several check-up.
- 2) To attend village meeting about Malaria
- 3) To attend official seminars
- 4) Others (specify)

23. Do you use any local and traditional methods in order to prevent Malaria?

.....

24. Have you ever slept under the mosquito net?.....

- 1= Yes
- 2= No

If yes why and explain.....

If no, why and explain.....

25. Do you buy other mosquito repellents such as insecticides like *rungu*,
burning coils?

1= Yes

2=No

If yes why?.....

If no why?.....

26. How many times in a month or a year do you do fumigation around you
house and your surroundings?.....

27. Which instrument do you use to do fumigation?

.....

28. Are the windows and doors of your house protected with mosquito nets.....

29. What other measures and practices are you taking to protect yourself from
malaria?.....

30. Do you use indigenous knowledge in order to prevent malaria?

1= Yes

2= No

If yes, do you use before illness or after illness?

31. Are there any important measures of using indigenous knowledge?

1) our forefathers use

2) to avoid cost

- 3) beliefs
- 4) avoid chemicals
- 5) religious will

32. Do you usually go to traditional healer while you fill sick?

1= Yes

2= No

If yes, explain.....

If no, explain

33. How do you come to make a distinction between a patients suffering from Malaria from other diseases?

.....

1. By taking him or her to medical examination?

2. By taking him or her to the traditional healers?

34. When one of members in the family falls sick what step do you take first?

1. Taking him or her immediately to the hospital?

.....

2. Taking him or her immediately to the traditional healers?

.....

35. How many times do you attend medical check up in a year?.....

Section E: To rank different factors that reduce household's income hence influencing malaria preventive measures and practices.

Please rank the most contributing factors that reduce household's income

Use 1= for the factor contributing most to reduce the household income, number 2 for the next, 3 and so forth.

	Factors	1	2	3	4	5
1.	Buying Food					
2.	Clothing					
3.	House repair and maintenances					
4.	Children's education					
5.	Costs for Burial Ceremonies					
6	Costs for Traditional ceremonies and different contributions for various development in the ward and village level					
7.	Paying farm labour					
8.	Purchase of farm inputs and fishing inputs					
9	Capital for farm investments					
10	Payment for the costs to the health centers					
.						
11	Buying medicine for malaria patients.					

CHECK LIST FOR KEY INFORMANT

VILLAGE LEADERS

- 1) Measure taken to educating villagers on Malaria
- 2) Regular meeting concerning with Malaria
- 3) Special agenda concerning with cleaning the environment
- 4) Indigenous knowledge and practices concerning with Malaria
- 5) Special agenda concerning with build dispensary nearby village

MALARIA CONTROL PROGRAMMES (NGOs)

- 1) How do you help people to control Malaria
- 2) Do you give them contribution on building hospital, toilets etc
- 3) Do you educate villagers to do scientific fumigation

HEALTH ASSISTANTS

- 1) How many patients attend in hospital par day
- 2) knowledge for preventing Malaria
- 3) Convincing them to attend several check-up
- 4) Relationship between Malaria and other diseases
- 5) Rate of malaria increasing or decreasing