CHAPTER TWO
THE ECOLOGICAL AND SOCIAL DIMENSIONS OF MALARIA:
THEORETICAL AND METHODOLOGICAL ISSUES

Though the available literature on malaria in Nepalese context is scanty, there is a plethora of literature dealing with different aspects of malaria including socioeconomic and cultural dimensions in the context of tropics and sub-tropics. Therefore, I have gleaned most literatures from different sources and South-East Asia, South American and African contexts. Conceptual, theoretical and empirical aspects of literature directly and indirectly related to this study have been reviewed in order to explore the research problem, identify important variables and conceptualize the problem in interdisciplinary perspective. The first part of this chapter presents the ecological and social dimensions of malaria, while theoretical and methodological issues related to the study of health behaviour are discussed in the second part.

Socioeconomic Development and Ecological Factors in Malaria Transmission

Health, development and poverty are inextricably linked. Socioeconomic development has contributed to improving the quality of life and health status of people (Phillips and Varhasselt, 1994; Narayana, 1997). However, it is crucial to note that economic development, infrastructure expansion and agricultural intensification do not always lead to improvement in the population health status equitably. The by-products of development efforts are often reflected in the changing epidemiological profile. There is a close link between malaria and economic development and changes in the environment due to the development efforts. Malaria in the United States of America virtually disappeared from broad areas of the country because of social and economic transformations rather than specific control measures (Packard and Brown, 1997). At the same time there are ample data showing that certain forms of development have been detrimental to the control of malaria and other diseases and thus to the health condition of the people. The resurgence of malaria in many parts of the third world countries during the 1970s and 1980s was ascribed to new settlement patterns, large-scale agriculture developments and labour utilization with the development of agriculture related industry (Packard, 1986).
Socioeconomic conditions and malaria

Socio-economic inequality exists between developed and developing countries, and within individual countries due to unequal distribution of resources and capitalist mode of production. Economic inequality within countries has further increased in countries following a neo-liberal path of economic development (MacEwan, 1999). Inequalities in resource and income distribution aggravate health situation and lead to disparity in health status, which is highlighted by the Black Report (Black et al., 1988) and the Health Divide (Whitehead, 1988).

In a stratified and hierarchical society, where resources are limited, groups of people who are at the bottom of the hierarchy have the least access to all kinds of resources including health services and are deprived of health as they are more exposed to disease in their unhealthy environment (Qadeer, 1991). Like other infectious diseases, malaria is also related to the socioeconomic condition of people. A major reason for the modern resurgence of malaria is the worsening problem of poverty resulting from the increased inequality/social stratification both within and between nations (Brown, 1997). Malaria disproportionately affects the poor people, with 58 percent of malaria cases occurring in the poorest 20 percent of the world’s population (Barat et al., 2004). Both malaria and poverty are concentrated in countries situated in the tropical and subtropical zones, where the rate of economic growth is lower than that of non-malarious countries (Sach and Malaney, 2002). 'Poverty' means that people do not have adequate housing, protection from mosquitoes, inadequate health care, and sufficient resource to access anti-malaria therapy, which results in incomplete treatment with inadequate dose of treatment (Brown 1997). Poor treatment practices can have major impact on development of parasite resistance to anti-malaria drugs.

Malaria is also associated with hunger and poverty. Malaria epidemics occurred in Punjab during the colonial period of India. Zurbrigg's historical analysis of malaria epidemics data shows that rainfall and scarcity of food created by annual wheat price are both significant (Zurbrigg, 1992). Price hike in food triggered by crop failure and massive increase in export to Britain is associated with severe epidemics in Punjab. The rise of price in wheat created food scarcity for the village poor and landless. It was found that hunger/malnutrition played an important role in the severe epidemics of Punjab before 1909. Likewise, famine, heavy rainfall, rise in maize price and decline in economic conditions were found to be associated with major epidemics and severity of
malaria in colonial Swaziland (Packard, 1984). A linkage between poverty and malaria still exists in India. Malaria situation in States with higher below poverty line population (Bihar, Utter Pradesh, West Bengal, Orissa) is appalling. Declining trend of malaria in well-performing States and reverse situation in States with stagnant growth and development has been observed in the past three decades (Sharma, 2003).

Certain occupational activities may place individuals at greater exposure to mosquito and malaria than others. A study of socioeconomic aspects of malaria in Kheda District, Gujarat, reveals that education, occupation, income, housing pattern, and social groups play an important role in malaria transmission (Bhati et al., 1996). Socio-economically upper castes had very low malaria incidence in both urban and rural areas. In rural areas, the labour population is at higher risk of malaria infection due to their outdoor sleeping habits, sleeping without bed nets, frequent movement and lack of access to proper treatment. Poor people often suffer from malaria because they live in poor houses nearby the forest, river and places, where malaria vectors are abundant. A prospective study (Subramanian et al., 1991) conducted in a rural community of Orissa in India found that the incidence of malaria is highest in the thatched-houses without false ceiling and risk of contracting malaria (relative risk) is higher among people living in thatched-houses with (RR = 6.7) and without false ceiling (RR = 11.3) than people in tiled houses (RR = 1.0). The risk of acquiring malaria infection varied significantly within a village stratified by proximity of breeding sources to human dwelling.

In Sri Lanka, individuals living in houses with an incomplete roof, windows without shutters, and doors with holes were subjected to repeated malaria infections while others in houses without these characteristics experienced little infections (Mendis et al., 1990). Another similar study in Sri Lanka shows an association between poorly constructed houses and higher risk for malaria, and when houses were structurally improved malaria was reduced by 36% in the whole population, reduced by 75% in the communities whose houses were improved (Gunawardena et al., 1998). The risk for malaria is high among those living close to the stream even in early of the transmission season (van der Hoek et al., 1998). Results of a study conducted by Ghebreyesus et al. (2000) in hypoendemic highland in Northern Ethiopia coincide with the findings of the studies in India and Sri Lanka. These studies clearly suggest that structural factors are clearly associated with the prevalence and incidence of malaria.
A matched case control study of socio-economic risk factor for malaria in Gambia found that the quality of house such as the use of mud for wall construction, the absence of ceiling, crowding and poor cleanliness of the house were associated with the occurrence of malaria; however after multivariate analysis, only cleanliness was statistically significant (Koram, 1995). Similarly, only the possession of a refrigerator indicating improved socio-economic status was significantly associated with protection against malaria. Another Gambian study using similar index for measuring socioeconomic status found that the prevalence of malaria decline significantly with increasing wealth (Clarke et al., 2001). Butraporn et al. (1986) reported that various risk factors such as income, educational level, housing construction and location, and occupation were significant for predicting malaria in Thailand.

Human behaviour including location and types of housing, sleeping habit, outdoor activities, poor knowledge about the disease and its treatment seeking behaviour are found to be significant determinants of malaria transmission in tribal areas of Orissa (Sharma et al., 2001). A poor knowledge of transmission, low use of mosquito nets and residing or working in forest areas were found significantly associated with malaria occurrence (Fungladda et al., 1987). In some cases, local environmental factors are more important for the risk of contracting malaria than the knowledge and human behavior concerning malaria (Ittiravivongs et al., 1992).

A prospective study of forest malaria in Vietnam found that males and young adults who usually entered into the forest were significantly more at risk than female and children. Regular forest activities (wood cutting and agriculture) were the main risk factor for clinical malaria (Erhart et al., 2004). Another study of the risk factor for malaria in urban setting also reported that infection was positively associated with people with rural occupation involving in the forest activities (Mendez et al., 2000). In many parts of Southeast Asia, where the principal vector of malaria is forest breeder, living in or near forest and involving in forest related activities are found to be a predictor of malaria (Singanetra-Renard, 1993; Kondrashin et al., 1991; Fungladda and Sornami, 1987; Butraporn et al., 1986).

The above mentioned studies reveal that groups of lower socio-economic status are more vulnerable to the consequence of malaria infection compared to those with better socioeconomic status. But these studies have not defined and stratified the
population into different socioeconomic strata. The socioeconomic conditions measured by using assets or money alone or occupations and locations/constructions of the houses cannot fully capture the multidimensional nature of poverty. Due to the methodological limitation, relationship between socioeconomic status and malaria are not properly explored. Most of the observed differences in malaria incidence by the socioeconomic status appear less significant after multivariate analysis. It is partly due to the biased in selection of the cases and partly due to the problem in determining the socio-economic status. Also very limited and inadequate efforts have been made for exploring the relationship between caste/ethnicity, class and malaria.

**Development, ecology and malaria**

There is a link between the development, ecology and malaria since development efforts alter the local ecology and may create breeding sources for the malaria vectors that intensify the malaria transmission in a certain locality. Malaria fever, officially designated as Burdwan fever spread in different parts of the Colonial Bengal from the middle of the nineteenth century when construction of railways started, which created burrow pits and obstructed natural drainage systems due to the railway embankments that contributed to the prolific breeding of Anopheles mosquitoes (Kazi, 2001). In Nepal, irrigation and road construction projects directly or indirectly contributed to the resurgence of malaria during the 1970s (Shrestha, 1985). The construction of canal systems of irrigation and reservoir/dams creates intense breeding ground for *Anopheles* mosquito and caused an increase of malaria in rural areas of India (Hyma and Ramesh, 1980).

Several studies have assessed the impact of dam building on the incidence of malaria. For example, after the construction of Bargi Dam of Narmda river development project in India, a 2-4 folds increase in malaria cases and more than four-fold increase in annual parasite incidence among children were recorded in the villages closure to the dam compared with more distant villages (Singh, Mehra and Sharma, 1999). Likewise, with the onset of peak construction of Sardar Sarovar Project, the largest dam construction in India, the rate of fever increased two and a half times, while malaria increased by six times (Morse and Berger, 1992). Opening of the Indira Gandhi Canal has increased agricultural colonization and labour migration in Rajasthan, which contributed several epidemics of malaria in the nineties (Mankodi, 1996). Barmer
district of Rajasthan, a hypoendemic area for malaria, came in the grip of severe malaria epidemics during the 1990s. The epidemics affected almost all district and API and AFI (annual *falciparum* incidence reached at 17.20 and 5.83 (Mathur *et al*., 1990). Major ecological changes brought by canal are responsible for the resurgence of malaria and spread of *falciparum* malaria (Shiva and Shiva, 2004).

As paddy agro-ecosystems favour mosquito breeding, it is possible that irrigated farmland may contribute to higher vector populations and thus enhancing malaria transmission. In Meerut and Gurgaon, the incidence of malaria increased up to nine-fold in canal irrigated villages (Sharm and Uprethy, 1982). Another study carried by Sharma, Shrivastava and Nagpal (1994) using the state level data, showed negative or non-significant correlation between rice cultivation and Annual Parasite Incidence (API) in 23 States and significant positive correlations observed only in Punjab and Nagaland. In some African Countries where malaria is stable, the irrigated villages had lower malaria prevalence rather than non-irrigated villages (Keiser *et al*., 2005). The lower prevalence of malaria has been explained by improved socioeconomic status and effective control programme. However, changes in agro-ecosystems and labor utilization, which are associated with large-scale agriculture development, may equally contribute to the reappearance of malaria and its spread into non-malarious areas in Swaziland (Packard, 1986). In El Salvador, Guatemala, Mexico, and India, the growth of the cotton industry was strongly associated with a rise in malaria and in some cases increased insecticide resistance in *anophelines* (Chapin and Wassertrom, 1983).

The prevalence of malaria in Nepal is higher among the people living in the forest and forest fringe areas of the Terai and inner Terai. About 31% population of Nepal living at malaria risk in the forest account for 50% malaria cases and 72% of all Pf cases in the country (Shrestha *et al*., 1991). Climatic conditions and forest ecology with slow running water streams/seepage support the breeding of malaria vector- *An. fluviatilis/maculatus* and hence provides favorable condition for the persistent of malaria. Poor and non-immune people from mountains have moved to the forested areas in order to colonize land. They live in poorly constructed houses where mosquitoes easily circulate and invade them. In Dhanusa, and Sindhuli districts, people from the forest fringe or low transmission areas take their cattle for grazing in the forest of Churia hills where they construct *goth* (cattle shed) and live there for nine months (Banerjee *et al*., 1991). Malaria vectors are abundant in *goth* sub-ecosystem of Churia hills where
people usually contract malaria. Frequent movement between villages and goths of the forest helps to maintain malaria transmission in both areas. The Churia goth in the forest, paddy and riverine sub-ecosystems of the village; frequent population movement inside the forest; and poor socioeconomic conditions of people are contributing to persistent malaria in the forest and forest fringe areas (Banerjee et al., 1991).

Approximately, 42 million tribal peoples in the plains of India are settled in areas closely linked to the forest areas with potential malaria transmission. Annually, this population contributes 33 percent of the malaria cases in the country and 52 percent of the P. falciparum cases (Sharma, 2002). An epidemiological study conducted in 13 villages in forest as well as plain ecotypes of Sundargarh District of Orissa (Sharma et al. 2004) shows much higher incidence rate of malaria in forest (347.9 per 1000) than on plain (61.0). Tribal peoples suffer the most from malaria because they are poor, settled in the forest and inaccessible areas and have poor access to health services.

A descriptive study of environmental factors as determinants of malaria risk carried out in the northern coast of Peru also shows that the risk of malaria is related to three major factors: the season of the year, the location of the village within the area and the location of the house within a village (Guthman et al., 2002). The presence of water for irrigation around villages and houses play a major role in determining the risk of malaria. Settlement patterns are likely to influence the occurrence of malaria. In the Garki Project in West Africa, a higher rate of malaria infection was found in the clustered settlement than scattered ones (Molineux and Gramiccia, 1980). However, these studies have some methodological limitations and have ignored some important confounding factors such as the use of bed nets, occupation and socioeconomic status.

The above mentioned studies basically view malaria as the natural consequences of conducive environment created by development activities without considering political economy of development. Most literature attempts to naturalise the development that clouds the relationship between malaria and socio-economic change. Development is considered as value neutral, rather than reflective sets of political and economic interest. In many contexts, the adverse health effects of development are not result of impersonal forces and ignorance, but result instead of conscious decisions about allocation of resources, and cost-benefit analysis of various project. The reasons for living and working risky environment for malaria are not described.
Population movements are associated with development programme of the country and socioeconomic activity of the people. The movement/migration can play a significant role in transmission and distribution of malaria because migrants generally live in temporary housing without walls and located near roads, drainage ditches, river and forests that serve as breeding sites for local malaria vectors. Non-immune people from the hills of Nepal migrated and settled in different parts of the Terai region including Chitawan valley. This has led to ecological changes and resurgence of malaria in the Terai (Shrestha et al., 1971).

A case study of migrant labour working for a Construction Company in Vellor of South India reported that migrants began to manifest symptoms of malaria fever within a week of their arrival. They were poor and powerless, and forced to reside in hutments on the riverbank marked by overcrowding and poor sanitation, which are ideal for malaria transmission (Pai et al., 1997). Jayawardene (1993) found that there was a steep rise in the incidence of malaria (50% slide positive) resulting from many non or semi-immune settlers moving into new areas, which was hyperendemic for malaria in Sri Lanka. New settlers were displaced people from the catchments areas of the irrigation development programme. Many labourers in urban areas who come from malaria endemic as well as chloroquine resistance _P. falciparum_ live in temporary hutments with unhygienic surroundings. They usually suffer from malaria and other illness and create foci for malaria transmission (Kondrashin, 1987).

A study of malaria mobility in Thailand found that the poor family migrated / settled in available land of the foothills closed to malaria vector breeding sites and adapted swidden farming and other economic activities inside the forest, which resulted in high prevalence of malaria (Singhanetra-Renard, 1993). Another interdisciplinary study on mobility and malaria risk in the Naya River Basin of Columbia (Sevilla-Casas, 1993) found that malaria was concentrated in Delta zone of the Naya River basin where more people gathered two periods of year- March / April and August / September to take advantage of agriculture economy. An anthropological study in the Basin area of the Brazilian Amazon reveals that the new highways, dams, and colonization projects have attracted thousands of migrants and the massive influx of people has resulted in rapid environment changes with marked increase in the rate of malaria infections (Coimbra, 1988).
Religious pilgrimage is another factor that exerts human movement periodically in different parts of the world. Rameswaram Island of Sri Lanka is a fishing centre as well as a holy place where fisherman usually move from one coastal to another for fishing purpose and some fishing camps are highly vulnerable and receptive to malaria transmission. The Island being a Holy place receives pilgrims from all over India and Nepal, who also maintain malaria transmission in the Island (Rajagopalan, 1986). It was assumed that pilgrims from northern India might have introduced chloroquine resistant \textit{P. falciparum} strains into the Island.

In many African countries, there are a large scale movement of people between permanent villages and farms for cultivation, intra and inter regional movement in the form of seasonal labour migration, and as forms of nomadism and pastoralism (Prothero, 1961). Such population movement in the late 1950s and early 1960s hampered the limited eradication projects initiated in Africa. Such warnings were frequently expressed at WHO, but attention was not paid in human factors in anti-malaria programmes.

Refugee movement also causes rapid transfer of persons from one type of malaria region to another, resulting in a shift in malaria endemicity. In the 1980s two and a half million Afghan refugees entered North West Frontier Province of Pakistan and settled in the western tribal districts. Immediately this refugee movement led to rise in the prevalence of malaria, a high share of the refugees either arrived already infected with the disease or contracted it shortly after arrival due to the decline in their disease-resistance caused by malnourishment and exhaustion (Kazmi and Pandit, 2001). Crowded and unsanitary camps also contribute to the rapid transmission of malaria. It is obvious that malaria has caused high rates of both illness and death among refugees and displaced persons in diseases endemic country such as Somalia, Burundi, Rwanda and the Democratic Republic Congo (Martens and Hall, 2000). It is obvious that different types of population movement pose different kinds of problem, each requiring a unique understanding and solution. There is continuous cross border movement between Nepal and India. But there is no systematic effort to assess the impact of cross border movement on the spread of malaria and its consequences.
People’s Perceptions of Malaria Fever and their Responses to the Problem

All over the world, people’s perceptions and response towards disease varies according to the prevailing context and environment (Williams and Jones, 2004; Espino et al., 1997; Jayawardene, 1993; Foster and Anderson 1978). People in different society hold a variety of concepts and beliefs about disease aetiology and transmission that vary according to their socioeconomic and cultural context, have direct impact on preventive and treatment seeking behaviour (Heggenhougen, Hackethal and Vivek, 2003). Only this notion reinforces the importance of such studies in South Asia. There are very few studies about the people’s perceptions and treatment seeking behaviour for malaria in Nepal including South Asia. Most of the relevant literatures reviewed here have been gleaned from African context. These studies do not take into account rural/urban or class difference in perceptions. They are largely from homogenous village communities and areas with high prevalence of malaria.

Identification/recognition of malaria fever

Traditionally, rural Terai people in Nepal ascribe malaria illness to many causes: eating fishes or yogurt, sleeping in the midday sun on grassland or under tree shadow, walking through the early morning dews (Skerry, Moran and Calavan, 1992). Malaria has been known by different local names—Juditap (hot and Chills) and Judi-Bukhar (chills and fever) in the Terai region; aulo-jwaro (fever of swampy areas) in inner Terai and kam jwaro (shivering fever) in the hilly region (Jung, 2001). Tribal people in Mandla of Madhya Pradesh call ‘fever with shivering and rigor’ as attrala, which closely matches with term malaria (Singh et al, 1998).

A qualitative study of malaria in relation to herbal traditions and Ayurveda in Sri Lanka examined the folk perceptions of illness including malaria (Silva, 1991). According to folk tradition, people recognized many febrile illnesses including unahembirissawa (fever and cold), nakahihembirissawa (fever, cough and cold), gahena una (shivering fever), kala una (jungle fever), mura una (fever that recurs at fixed intervals), unasaniptaya (fever caused by upsetting of three humours), sanniya (chill, coma), kolegaya (chest pain) and walippuwa (fits). A folk phrase, gahena una associated with agues was widely used to describe malaria fever as ‘shivering fever and vibrating like the coconut flower’. After introduction of western anti-malaria therapy, the local people adopted the new terms ‘malariyawa’. People in Morong of the
Philippines use the term *malaria* derived from English word ‘malaria’ for a discrete set of symptoms, high fever and intense chills, with or without a severe headache (Espino *et al.*, 1997).

Local people consider malaria in a broader cultural meaning of local illness using various terms and symptoms that overlap with the biomedical concepts of malaria. In the Pacific coast of Colombia, people use the word *bazo* (spleen) to describe endemic malaria associated with an inflammation of the spleen (Lipowsky *et al.*, 1992). In Ghana, the local term *asra* is widely used for fever including malaria (Agyepong, 1992; Ahorlu *et al.*, 1997). *Asra* is characterized by headache, fever, chills and bitterness of the mouth, yellow eyes, deeply coloured urine, and loss of appetite, body-aches and weakness. Severe and complicated form of *asra* is called *asraku* in which patient becomes very feverish, talk wildly and acts like a madman.

In Tanzania and in the Swahili speaking parts of East Africa, *homa* (fever) is a widely used illness term as a symptom of almost every illness including malaria. *Homa ya malaria* or *mbu* which is just one among many fevers is used as synonyms for malaria (Hausmann-Muela *et al.*, 2002; Winch *et al.*, 1996). The term *homa ya malaria* closely corresponds with the biomedical terms malaria; however, there is a subtle difference between them. Furthermore, *homa ya malaria* is said to be caused by mosquitoes and be readily treated with chloroquine. Many people do not view it as a severe type of illness and it is placed in the group of routine or mild fevers. Severe malaria is recognised as a *degedege* characterized by convulsion (Hausmann-Muela, 2000). Similarly, in rural Uganda, malaria is known as *omusuja* ‘folk illness’ that covers a broad symptoms including, fever, malaria, feeling unwell and it does not consistently correspond to the clinical case definition of malaria (Kengeya-Kayonda *et al.*, 1994; Nuwaha 2002).

Very high-grade fever, headache and chills (sometimes sweating) are common symptoms of malaria fever recognised by local residents of the study areas (Espino *et al.*, 1997; Agyepong, 1992; Lorio sa, 1986). Jayawardene (1993) quoted a narration of one of his informants in Mahaweli Scheme in Sri Lanka as “The fever comes, the fever goes. Suddenly we sweat, feel very cold and the fever leaves. You take a Pandol, feel better for a day, fever drops and then it rises. That’s malaria” (Jawardene, 1993:1171). Based on symptoms recognition, people could differentiate between malaria and other febrile illnesses (Espino *et al.*, 1997). These studies were conducted using mainly
anthropological approaches assuming study village as homogenous community and focusing mainly on cultural perceptions and practices. All these studies deal with the recognition of malaria in the particular communities and do not report the differential understanding of malaria fever across different strata of the community.

Perceptions of malaria causation and transmission

Sherchand and his colleagues (1996b) conducted a study of socio-medical aspects in relation to resurgence of malaria in Dhanusa district of Southern Nepal adopting multiple methods such as household survey, serological and microscopic examination of blood samples. They found that most of the villagers from both rural and urban areas were familiar with the signs and symptoms of clinical malaria. About 70 percent (73% in rural areas, 68% in urban areas) correctly identifies mosquito as a cause of malaria. People in malaria endemic areas of the Kavre district are aware of malaria and they know that malaria is acquired by mosquito bites (Karkee et al., 2000).

Dhillon and Kar (1965) inquired into cultural patterns and beliefs about malaria among tribal populations in India. There are common beliefs that evil spirits, anger of local deities and black magic in most cases and climatic as well as dietary factors in a few cases are responsible for illness. Villagers perceive fever as mild, self-limiting illnesses. Fever including kampoожar (shivering fever, probably malaria) is believed to have resulted from climatic factors. They are not aware of the role of mosquitoes in causing malaria fever, except for nuisance of mosquito bites. Since people are not aware of benefits of DDT spraying, they do not like it and mud plaster their houses after spraying to remove its bad smell and white stains from the walls. The workers and planners of NMEP were not aware of the prevailing cultural practices and illness beliefs and they faced difficulties in achieving people’s cooperation (Dhillon and Kar, 1965).

In Mandla of Madhya Pradesh, 98 percent of the tribal peoples are still unable to link malaria with mosquito bites; rather they perceive that drinking contaminated water, bathing in dirty pools and streams, and weakness may bring malaria fever (Singh et al., 1998). Rural communities of Thar Desert of Rajasthan are not aware of the real cause of malaria. Rather they attribute multiple factors such as changing environment, weather, impure water and lack of sanitation and hygiene (Yadav et al., 1999). They attribute fever associated with convulsion to the evil spirits. Another knowledge, attitude and practice (KAP) survey of tribal community about malaria reveals similar results and
only 21 percent of the household heads were able to link mosquito with malaria problem (Panda, Kanhekar and Jain, 2000). These small-scale studies do not reflect awareness of the entire tribal community of the State. KAP related study regarding malaria among non tribal patients attending a Primary Health Centre in Delhi reveals some different results that majority (57%) of respondents mentioned mosquito or parasite as cause of malaria and they recognized fever with chills and rigor as main symptoms of malaria (Rasania, Bhanot and Sachdev, 2002).

Many studies reveal that people allude the malaria to various natural causes such as eating too much ‘cold’ or sour and hot nature of food (Kin, 2000), drinking contaminated water (Kengeya-Kayondo et al., 1994; Espino et al., 1997; Loriosa, 1986), weather change, exposure to heat, bathing too often and over work (Liposky et al., 1992; Agepong and Manderson, 1994; Sherchand et al., 1996b). Many people perceive that malaria is an environmentally induced disease which occurs mainly during summer when the water in the streams and river flows slowly, and consequently water gets polluted and mosquitoes lay eggs in the water (Espino et al., 1997). They also found that 28% of 1341 surveyed population knew that malaria was transmitted through mosquito bites, 15% through drinking polluted water, and 10% both from water and mosquito, and only 4.4% from other people with malaria. Traditionally, asra in Ghana is perceived to be caused by prolong contact with excessive heat while spending too much time in hot sun or walking, working or playing in the hot sun or near fire (Agyepong, 1992; Agyepong and Manderson, 1994; Ahorlu et al., 1997).

The sudden onset of mental changes associated with cerebral malaria lead many people to believe that it is due to supernatural rather than natural causes. In Ghana and Uganda, a type of fever accompanied by convulsions and abdominal tenderness are believed to be caused by spirits or witchcraft (Ahorlu et al., 1997, Nuwaha 2002). Mwenesi et al. (1995b) reports that the Mijekenda and Luo community in Kilifi, Kenya have local names for childhood convulsions (Mijikenda- nyago, dege and nyuni; Luo people- oíre). Among Mijekenda, convulsions are attributed to a figurative ‘animal or bird’ which enters a child by frightening the victims and causes fits. Luo people believe convulsions may be caused by the intestinal worms when it reaches in to the child’s head (Mwenesi et al., 1995b). Among Abagusii in Kenya there are various folk explanations for cerebral malaria. Cerebral malaria may develop when foreign agents (spirit, animals) introduced by witchcraft, and social problems affect the normal
functioning of brain of a person (Nyamongo, 1998). People also have an idea that cerebral malaria affects the brain of the victims.

A KAP survey on malaria in rural communities of Zimbabwe reports that majority of the respondents identified mosquito as a factor in causing disease (Vundule and Mharakurwa, 1996). Other KAP related studies conducted in Africa and South America reveal that most people are aware that mosquito bites lead to the febrile malaria (Govere et al., 2000; Booth and MacLean, 2001; Nieto et al., 1995). Mosquitoes are perceived as the cause as well as transmitter of malaria because local people cannot distinguish between causation and transmission. In malaria endemic regions, most people perceive that malaria is caused and transmitted by the mosquito bites (Booth and MacLean, 2000; Ahorlu et al., 1997; Klein et al., 1995). However, they have no clear idea about how mosquitoes acquire and transmit the parasite from one person to another person.

Awareness about correct mechanism of malaria transmission is still low among the rural people of many countries. Only 42 percent people of Sabah of Malaysia were able to state broadly that malaria was transmitted from an infected person to another person by the bite of infected mosquito (Kin, 2000). Although 80 percent people in Oo-Do village of Myanmar knew that mosquito bite could lead to malaria, over 40% had no clear idea about malaria transmission (Shein et al., 1998). In northern Cameroon, only 1% respondents identified mosquitoes as sources of the transmission and 94% believed that it could be spread from rain, dews and cold (Einterz, 2003). In Essequibo Coast of Guyana, majority of the population (77%) believed that mosquitoes transmitted malaria from one person to another and 31% believed that malaria can be contracted by drinking dirty water (Both and MacLean, 2001). About 50% of the respondents in South Mexico indicated that malaria was transmitted by mosquito bites, and 47.8% had no idea (Rodriuez et al., 2003). People with complete elementary education were more aware of malaria transmission than those with less or no education. Although most people have known that mosquitoes bring malaria, malaria is believed to be transmitted by bad air and drinking polluted or un-boiled water (Nuwaha, 2002).

People’s cultural perceptions of malaria causation and transmissions overlap with the biomedical concepts of malaria because their understandings are derived from the folk theory of diseases as well as ethnoscientific models. Local understanding about the causation transmission may be correlated with level of exposure to the disease, purposive interventions from the outside and socioeconomic condition of people. Most
studies have not examined factors influencing the perceptions and the distribution of the perceptions across the different sections of the populations.

**Pattern of Treatment seeking for malaria**

Care of a sick person is a dynamic process in which caretakers diagnose illness on the basis of symptoms perceptions and past experience; then initiate home remedy or seek advice from neighbour or seek treatment from traditional-healers or medical shops or health facility. At the onset of symptoms of malaria, fever tends to be treated at home without resort to traditional-healers or professional healers by using herbal preparation or with analgesic and antipyretics and some times chloroquine which are available in small markets (William and Jones, 2004; Hausmann-Muela et al., 2002; Baume et al., 2000; Espino and Manderson, 2000; McCombie, 1996; Agyepong and Manderson, 1994). The leaves and barks or root of neem plants and cinchona or bitter plants are boiled and juice extracts are given to the malaria patient. Some people reported using papaya seeds equating their taste with neem plants and chloroquine (Nyamongo, 2002).

In rural communities of Ghana, people make use of home remedy consisting of the leaves of Kinto (neem) or Manotso (cassia simea) which can wash the blood of illness caused by asra through sweat and urine (Agyepong, 1992). Self treatment of asra often combines herbs and paracetamol, aspirin, cotrimoxazole and chloroquine (Ahorlu et al., 1997; Agyepon and Manderson, 1994). However, in Nepal herbal remedy for malaria is uncommon among villagers. Only two percent people reported having tried herbal medicine, mainly leaves of neem and bark of the Sal tree (Sherchand et al., 1996b). However, a large number of patients seek advice and treatment from private practitioners or drug retailers and faith healers, despite the availability of free malaria treatment at government health facilities (Mills, 1992, 1993).

The tribal peoples of Madhya Pradesh receive the first line of treatment through ‘guniyas’ the village traditional healer or quacks who give injection. In Thailand, initially home remedies or self-medication are given or traditional healer is consulted if paroxysms recur. When symptoms persist and condition worsens, they seek help from doctors (mostly private practitioners) or visit the district hospital (Kamolratankul et al., 1992; Loriosa, 1986).

Self-treatment of malaria is common among the residents of the Pacific coast of Guatemala because a wide variety of antimalarial drugs are readily available (Ruebush
II, Weller and Klein, 1992). Mwenesi et al. (1995a) found that 91 percent mothers who had diagnosed their children having malaria prior to survey had done something about it. Of these 29 percent had given antimalarial drugs, 30 percent gave antipyretics, 25 percent took the child to health facility, while 7 percent gave home remedy. Most of mothers in rural as well as urban areas of Coastal Kenya initially use home treatment and shop-brought drugs in responses to the onset of fever among their children on the first day and visit clinics, dispensaries and hospital on the day or later if symptoms persist (Molyneux et al., 1999). In the same area, majority of mothers who reported using shops claimed they would buy chloroquine-based drugs (Snow et al., 1992). Espino and Manderson (2000) found that more than 80 percent of the undiagnosed malaria illnesses were treated with antimalarsials of inappropriate dosages. Left over drugs from previous illness episodes are also used to treat when another family becomes ill, particularly in poorer communities (Biritwum and Welbeck, 2000). In malaria endemic countries, anti-malarias are frequently sold without medical prescription at the pharmacy and people purchase even single tablet when they experience some symptoms similar to malaria. Sources of self-medication are drug from retail outlets, shop and from health workers, use of left over drug of previous treatment and some times sharing of treatment among family members (Nuwaha, 2002).

If the home remedy or self-medications fail to cure or improve the conditions, then medical help is generally sought from more qualified health care providers (Williams and Jones, 2004). In Accra region of Ghana, over 85 percent said that they would go to hospital or clinics if their fever did not respond to self-medication (Agyepong and Manderson, 1994). In a rural community of Kenya, only 47 and 65 percent used government facility as second and third choice respectively (Nyamongo, 2002). Likewise, about 38 and 18 percent used private facility as second and third choice. In rural Gambia home treatment of childhood malaria with chloroquine was not common since majority (63%) of the children received treatment from a health centre or MCH outreach clinic, which is less expensive than home treatment with chloroquine (Clarke et al., 2003). This pattern of treatment depends upon situations in which anti-malaria are difficult to obtain outside the health care facility and or these public facilities are the closest and reliable source of free or inexpensive anti-malaria (Clarke et al., 2003; Baume et al., 2000). Decision about choice and sequencing of treatments are often based on the perceived effectiveness of available alternative of medication or treatment.
Some studies report that care outside home is also sought from traditional healers. Even after hospital treatment, symptoms persist or reappear or become worse, suspicion of witches may arise and traditional healers are consulted (Hausmann-Muela, 2002).

**Factors influencing treatment-seeking behaviour**

Perception of severity or threat of illness is one of the most important predictors for seeking rapid treatment at a health facility (Williams and Jones, 2004). In Malawi, mothers whose children had cerebral malaria (convulsion) waited less in taking their children for medical help than did mothers whose children had other kinds of malaria (Molyneux et al., 1989). In fact, mothers took children to hospital within 8 hours if they perceived that the children had severe illness—cerebral malaria while mothers whose children had moderate fever (without convulsion) waited for an average of 47 hours. Many people in Tanzania perceive malaria fever as mild illness that can be cured easily with drugs such as Aspro or chloroquine or recovered without treatment (Winch et al., 1996). More than one third of respondents waited for several days before seeking medical attention because they thought they had no serious illness (Booth and MacLean, 2001).

Many studies suggest that local knowledge, belief and illness categorization influence health seeking behaviour (Stone, 1977; Fosu, 1981; Helitzer-Allen and Kendall 1994; Lipowsky et al.; 1992). Locally, illnesses are categorized as naturally caused and supernaturally caused illness (Stone, 1977 in Nepal) as well as both naturally and supernaturally caused illness (Fosu, 1981 in Ghana). If illness is believed to be affected by natural causes, people tend to manage it within household with home remedies. In the case of supernaturally caused illness, traditional healers are usually consulted. Generally, the tribal peoples of India believe that diseases are caused primarily by evil spirits or wrath of a deity where diagnosis and treatment is usually sought from traditional healers (Sharma, Pradhan and Padhi, 2001; Singh et al., 1998). It is also reported that a type of fever accompanied by convulsion is attributed to supernatural forces, like, spirits and witchcraft and treatment is usually sought from the traditional healers in many countries (Mwenesi et al., 1995a; Nuwaha, 2002). In some areas of Tanzania, people make clear distinction between ‘normal malaria’ and ‘cerebral malaria’ (degedege). Degedege is a folk concept of illness characterized by convulsion and understood as a consequence of malaria (Hausmann-Muela, 1998). However,
traditionally 'degedege' is attempted to treat with traditional practices (herbal concoctions, elephant dung and urine). Traditional therapies are believed to be effective for some complications of malaria like convulsion/degedege, splenomegaly, while modern medicine is superior to traditional ones for normal malaria (Hausmann-Muela, 1998; Baume et al., 2000; Nuwaha, 2002).

Health seeking behaviour has been associated with the socio-economic status of people (Kroeger, 1983). Individuals with relatively high incomes are more likely to have a usual source of medical care than those with low incomes (Rundal and Wheeler, 1979). If people have sufficient cash at home for treatment, they visit hospital or clinics (Hausmann-Muela, 2000; Young, 1981a). In Kenya, Nyamongo (2002) found that the cost of accessing treatment options was the main reason for not utilizing some available options of health care. In Malawi, population groups with the richest income quintile are almost twice as likely to seek treatment for fever as those in the poorest quintile (Worrall et al., 2003). In Swaziland, following an increase of user fees up to 400% at the government hospital, average attendance in all health care facilities dropped by 17% (Yoder, 1989). It appears that high fees can discourage people to visit a clinic and hospital. Baume et al. (2002) in a study of pattern of care for childhood malaria in Zambia found that the lack of money is main reason for not taking the child to the clinics as clinics charge for both registration and medicine. Cost consideration caused them to delay their use of government facilities until the illness was not self limiting or curable with simple drug (Waddington and Enyimayew, 1989). In addition, educated mothers are found to be more aware of biomedical disease causation, symptom and alternatives treatment. In Zambia, the use of chloroquine was positively correlated with age and level of education. In Tanzania, higher educational level was associated with promptness in seeking care from health care providers and with higher knowledge about antimalarials (McCombie, 2002).

Distance and commuting time to health centre or hospital can also affect the treatment seeking behaviour. Tribal peoples in India do not utilise government health facilities- PHCs because they are generally away from their village (Singh et al. 1998, Sharma, Pradhan and Padhi, 2001). In a study of malaria treatment along the coast of Kenya, Snow et al. (1992) found that mothers preferred to buy medicine for childhood febrile illness from over the counter stores close to home because the women were busy in carrying on their household chores and other activities. In Maiduguri of Nigeria,
majority of people are in habit of using retail pharmacies where they can get expeditious treatment (Igun, 1987).

In Guinea, rural mothers living farthest from health facilities are less likely to attend them and are tardier in administering medication to their sick children than mothers living close to health clinic (Glik et al., 1989). Kroeger et al. (1988) found that distance of health services is inversely correlated with the utilization of health services. Arduous transportations/traveling in rural areas are responsible for difficulty of treating malaria at health centre. In addition, waiting times, availability of drugs and perceived quality of services, attitude of health staffs influence the treatment-seeking pattern of people (Baume et al., 2000; Nieto et al, 1999; Ruebush et al., 1995; Mwenesi, 1995b).

Caste/ethnicity, gender and age are important aspects of culture which may directly or indirectly influence the treatment seeking behaviour of people. In a tribal area of Orissa, people preferred to use home remedy, which is one of the factors leading to delay in reporting at the nearest health centre due to their ethnomedical perceptions of illness and distance to the health facility (Sharma et al., 2001). The findings of the study conducted in Benin and Guinea show that poor use the health centres more frequently than do rich (Soucat et al., 1997). In Southern Nigeria, the most poor are more likely to seek treatment from traditional healers and community based health workers (Onwujewe et al., 2005). Residents of the higher socioeconomic neighbourhoods in Addis Ababa of Ethiopia use modern medicine more and traditional medicine less frequently compared to the residents of the poorer neighbourhoods (Kloos et al., 1987).

Another study in the Philippines found that individuals in the under-fifteen age group were significantly more likely than those in older age group to seek treatment at health facilities for febrile episodes perceived to be malaria (Espino and Manderson, 2000). Adults in the observed households tended to self-medicate rather than seek treatment at a clinic and men were more likely than women to self-treat rather than go to a clinic, but the difference was not significant. This is because the majority of clinic consultations were arranged for mainly young children.

Treatment-seeking behaviour is influenced by mainly symptoms recognition, severity, occupation and economic condition of individuals and quality of available health services. Some studies only focused on the cost of treatment and possession of money. Differential health-seeking behaviour among different social and economic groups of community has not been explored in the above mentioned studies due to
methodological limitations that avoided the class characteristics of the community. Condition and quality of available health services in the given communities have not discussed and reasons for low and delay utilization of the health services have not been explored.

**Preventive Action against Malaria**

People have adopted different types of preventive and protective measures against mosquito bites and malaria fever according to their local tradition, perceptions and availability of protective means. About 70 percent and 55 percent of respondents from urban and rural areas of Nepal mentioned that malaria is preventable one, but majority of them did nothing (Sherchand et al., 1996b). Based on small scale survey, it is estimated that approximately 50 percent of the people in the malarious area sleep under net (EDCD, 2004). Use of bed nets and mosquito repellents are more popular in urban than rural areas. Most people in both areas believe that burning and making smoke would drive mosquitoes away.

In tribal areas of Orissa, people burn twigs and leaves as a means of protection against mosquito bites (Sharma et al., 2001). In tribal communities of Madhya Pradesh, only 11 percent reported using bed nets and 13 percent burning cow dung and tree leaves (Panda et al., 1999). In Sri Lanka, traditionally, there has been a long established practice of burning certain local herbs/husks during the night for driving mosquitoes away (Silva, 1991). Localised herbal tradition such as the use of herbs for both curative and preventive purpose can be described as an adaptive and cultural response to endemic malaria. Describing the use of traditional methods as adaptation to the environment, the researchers fail to link cultural practices concerning malaria with socioeconomic development and political issues of the control programme.

Aikins et al. (1994) found that the use of bed nets varied from 44% in Ghana to 86% in Gambia. In Guatemala, more than seventy percent families use bed nets and more than 90% of residents believe that burning materials such as leaves, corn cobs, cow dung, rags and coconut husks will help to drive away mosquitoes (Klein et al., 1995). On the contrary in rural areas of Zimbabwe only 9 percent of study population used mosquito nets (Vundule and Mharakuruwa, 1992). In rural areas of South Africa, 51 percent respondents reported having used some means of personal preventive measures against malaria, but the use of bed nets was very low (Govern et al., 2000).
Moreover, mosquito nets are mainly used during the rainy season and most of the existing nets are used by adults particularly married couple and heads of households (Nuwaha, 2001). In most areas, people use bed nets according to the perceived advantage such as the reduction of bedbugs and nuisance of mosquitoes; unrelated to the perception of mosquitoes role in transmission of malaria (Okrah et al., 2002; Klein et al., 1995; 1996; Aikins et al., 1994).

Government and international agencies have been showing interest in promoting insecticide treated nets (ITNs) through social marketing approach since the last few years. RBM and Global Fund for malaria have also advocated the use of ITNs to reduce the burden of malaria. In this connection, some studies have been conducted to assess the acceptance/willingness to pay for ITNs. People of Dhanusa District of Nepal are familiar with ITNs and most of them are not ready to buy ITNs due to their weak financial conditions; but they would be ready to buy if it is provided at subsidized rate not exceeding NRs.50.00 per net (EDCD, 2004). Bhatia and Fox-Rushby (2002) found that about 79 percent of the respondents in Surat of India were willing to buy ITNs at Rs. 57. Those who were not willing said that they have no money and government should provide free of cost. The poorest socioeconomic groups were less likely to have previously purchased ordinary nets and to purchase ITNs in the future (Onwujekwe, Hanson and Fox-Rushby, 2004). This study indicates that poverty is main impediment to the purchase and use of bed nets (both treated and untreated).

Factors influencing preventive/protective behaviour

Preventive health behaviour is a part of life styles affected by various factors (Mechanic and Cleary, 1980) including perceptions, knowledge of malaria, available resources and socioeconomic conditions. Local perceptions of malaria illness and its causations are important for preventive behaviour. In Uganda omusuja (malaria) is perceived to be caused by what is eaten or drunk, environmental conditions and mosquitoes. The main preventive actions mentioned are boiling water, cleaning utensils, avoiding eating raw mangoes and eating a lot of roasted maize (Kengeya-Kayondo et al., 1994). In the Philippines, boiling water or putting medicine in the water is one of the common preventive measures among people those who believe that malaria may be acquired by drinking contaminated water (Espino et al., 1997). In rural Tanzania, amulets containing elephant dung are prepared and worn around neck or ankle for the protection against
degedege (Hausmann-Muela, 1998). If the cause of malaria is thought to be due to the spirits and witchcraft, biomedical approaches to malaria prevention cannot play an important role in the use of malaria-prevention methods (Winch et al., 1994).

There is evidence to show that educational attainment is associated with the acquisition of malaria specific knowledge. In Zambia, knowledge of malaria was found to be associated with the level of education, but there is no significant relationship between education and the use of mosquito nets (Worrall et al., 2003). Specific knowledge about the causation, prevention and treatment of malaria was found to be positively related to the net ownership in Uganda (Nuwaha, 2001). Knowledge of malaria transmission is related to the practice of preventive measures as has been shown in Zimbabwe (Vundule and Mharakurwa, 1996) and in Sabah of Malaysia (Kin, 2000). But education/knowledge is not always an important determinant in the utilization of preventives measures. A study of mosquito avoidance and bed net use in Ghana shows no linear relationship between knowledge and practices of preventive methods.

Seasonality is also an important factor affecting the perceived risk of malaria and bed net use. Bed net use may fluctuate as per seasonal variation in density of mosquitoes and perception of risk. In Tanzania, Winch et al. (1994) found that people could relate homa illness (fever) to homa ya malaria during the rainy season when mosquitoes are abundant. During dry season and harvesting time, density of mosquitoes is very low and homa illness is often ascribed to spirit and witchcraft. During the season when mosquitoes are relatively very low, there will be less likely to use bed nets (Winch et al., 1994).

Of the components of socio-economic status, income is found to be main factor influencing preventive behaviour (Coburn and Pope, 1974). A lot of evidence suggests that the use of protective and preventive measure against malaria is related to family income and the capability of purchasing bed nets (Nieto et al., 1999; Stephen, 1995). Poverty appears to be the most important barrier to the bed net use. In Burkina Faso, it was fond that about half of the respondents reported to have owned at least one bed net and net ownership was higher in urban (55%) than in rural areas (Okrah et al., 2002). The people from wealthier ad educated households in Kenyan cities are more likely to sleep under bednets and use several preventive measures (Macintyre et al., 2002). The high cost was the most frequently stated reason for not owning bed nets. The poorest socio-economic groups are less likely to have used untreated nets (Onwujekwe, Hanson
and Fox-Rushby, 2004). Social class and price greatly influence the acquisition and use of impregnated bed nets because such nets are more expensive than untreated nets (Nuwaha, 2001). The levels of poverty and socioeconomic groups of the community have not been properly determined in these studies. So the relationship between socioeconomic status and bed net use was not clearly illustrated.

In some countries, ethnicity and gender are also important factors that affect acceptance and use of insecticide-treated nets. Some studies show marked variation in bed net use among the different ethnic groups of Ghana (Thomson et al. 1996; Aikins et al. 1993; MacCormack & Snow, 1986). Wolof, Fula, Mandinka and Serahuli are the main ethnic groups in the area. Fulas are least likely to use bed nets. Another survey conducted by Bradley et al. (1986) reports that bednets are used more frequently by Mandinkas ethnic group (99%) than Wollofs (64%) or Fulas (58%). The usage of nets was correlated with age, sex, polygamy, children and mothers in a rural area of Ghana and Gambia (Agyepong and Manderson, 1999; Aikins et al., 1993). Besides these, perceived efficacy of the nets against malaria, family size, sleeping habits and housing structure and availability of nets in local markets influence the utilization of bet nets (Nuwaha, 2001; Aikins, 1994).

Perceptions and practices for malaria vary according to eco-epidemiological situations of malaria in different regions. Malaria transmission occurs in all the seasons of the year and *P. falciparum*, which causes sever headache, convulsion and death is predominant species in Africa. Malaria fever associated with convulsion is believed to be induced by supernatural forces and initially help is sought from traditional healers, although people are aware of high-grade fever, headache and chills/rigors as symptoms of malaria related fever. But a variety of local terms are used to describe the malaria related fever in different part of the continent (Ahorlu et al, 1997; Winch et al, 1996; Mwenesi et al., 1995; Agyepong, 1992). Likewise, in subtropical region of South America where environmental capacity for both *P. vivax* and *P. falciparum* malaria is high, people are aware of both modern as well as traditional concepts of disease, including treatment strategies (Lipowsky, Kroeger and Vazquez, 1992).

Unlike Africa, South East Asia region has wide climatic and ecological variation between countries and within a country. Within this region (Nepal, India, Bangladesh, Bhutan, Sri Lanka, Myanmar and Thailand), the distribution of malaria is highly uneven. An estimated 35 percent people live in the areas of moderate to high malaria
risk whereas majority (65%) live in low risk or malaria free areas (Sharma, 2002). About 75 percent of the total cases of the region occurred in India. People in the tribal areas of India are less aware of etiology of malaria and the use of protective measures such as bed nets is low among them. Malaria fever and convulsions are often ascribed to evil spirits and seek healing from traditional-healers or quacks that are readily available in the villages (ICMR, 2004). The understanding and practices related to malaria differ from one community to another and one State to another or region.

In addition, while it is true that climatic conditions in the tropical and sub-tropical environment make the people particularly susceptible to malaria, it is not true that malaria is only a natural consequence of such environment. There is clear evidence that social conditions and economic transformations create conducive environment to mosquitoes and malaria. Ignoring the social and economic determinants of malaria and human behaviour related to malaria allows the researchers and development agencies to concentrate on mosquitoes and disease not to be concerned with the thorny problems of poverty and in the distribution of land and other resources.

Community Participation and Health Education in Malaria Control Activities

With the failure of vertical programme and the Alma Ata Declaration of 1978 on primary health care approach, greater focus has been placed on ‘bottom up’ approaches in disease control. Governmental and non-governmental organizations have increasingly been attracted towards the concept of community participation including health education. Many field trials and studies have been conducted to determine the feasibility and effectiveness of community participation approach in vector disease control.

In Dhanusa district of Nepal, village level community participation for malaria control was initiated in 1983 (Shrestha, 1986). The study area is cultivated plain land and located on the bank of Kamala River of Dhanusa. Health education, surveillance of disease and simple environmental manipulation such as clearance of vegetation from ponds, filling and draining of useless small water collection and clearance of marginal vegetation in the irrigation canal and repair of embankments were carried out with the help of local voluntary participation. It was supposed to continue for at least three years. But it continued for one year because of financial constraints and other problems which were not assessed before implementing the programme. Community participation ended up and its noticeable impact on malaria control could not be seen.
Rajagopalan and Panicker (1984) set up a community-based malaria control project in Pondicherry, India to assess the feasibility of community participation for vector control in villages. The study was carried out over a three-year period and a volunteer for the project lived in each village and worked with villagers involving in many activities. During this period, the volunteers built interest in the malaria control programme. There was an extensive door to door education campaign to raise the awareness of the inhabitants about the transmission of malaria, mosquito breeding sources and the role community can play in controlling the disease. While discussing the community need and incentive, economic benefits for the villages were unexpectedly developed through the harvest of algae from the ponds to use in making paper product. Some of the ponds were turned into prawn culture ponds. Such activities created income generation opportunities for the community. The programme was highly successful to control vector and malaria in the community. The success of the programme is due to the participatory approach that also attempted to integrate vector control with the overall socioeconomic development of the communities. Similar results were observed in malaria control project in Kheda District of Gujarat through community participation approach that helped link the control activities to socioeconomic aspects of the villages (Sharma and Sharma, 1986).

Through understanding and integration of social tradition, religious/cultural customs, health practices, migration, land tenure system and national development policy can contribute to the success of malaria control efforts in a multicultural society (Ault, 1983). Multiethnic Sri Lanka where Buddhism, Hinduism and Islam coexist have different important socio-religious traditions including purdah, the seclusion of Muslim women from the public, caste system of Tamil; Shramdan, free cooperative volunteer labour contribution for local public work project; Arthacharya, and Sarvodaya Shramdan, a national social movement and medical pluralism. Attempts were made to incorporate the community’s traditions and custom in malaria control programmes. According to Ault (1983), Sri Lanka’s successful malaria control programme is due to the incorporation of various socio-cultural practices, plural medical systems, social tradition and indigenous social movement (Sarvodaya Shramdan) in malaria and vector control.

Another study of a community based Aedes aegypti vector control programme in Merida, Mexico which was mainly based on four months health education intervention
aimed at women shows significant changes in knowledge and behaviour related to vector control in treatment groups and there was a greater tendency for people to clean up their compounds by removing tyres and unwanted bottles (Lloyd et al., 1992). But six months afterwards there was no significant difference in the Breteau index (number of positive containers/100 houses surveyed) before and after the intervention. Despite the fact, the researcher concluded that a community based health education programme can be effective in stimulating changes in both knowledge and behaviour, and in helping to reduce breeding of vector *Ae. aegypti* (Lloyd et al., 1992, 1994). There was failure to participate in a malaria chemo-suppression programme in North Mara, Tanzania due to bitter taste and side effect of the drugs, poor communication, irregular supplies at local level and exclusion of socially marginalized children and women (MacCormack and Lwihula, 1983). The improved health education message was found to be effective to increase in the use of chloroquine by 45 percent among the pregnant of women in Malawi (Helitzer-Allen et al., 1994). The use of chloroquine increased by 64 percent when the product (sugar-coated chloroquine) was changed. The study shows that improving the product was the most important factor in increasing the use of the programme.

It is often said or recommended that health education could play important role in making malaria control success, but there is very little evidence to prove it. Gramcia (1981) identified three important reasons for why health education has failed in malaria control programme at the community level in many countries: 1) health education is unlikely to succeed in rural population of poor countries where illiteracy, poor housing and sanitation, poverty, lack of physical and social resources including health services are widespread; 2) people in malarious areas have accepted malaria as part of every day lives if programme would rather have paid attention to the cause of their poverty and poor living conditions and 3) existing control methods have been formulated without sufficient understanding of the target population and have not been well adapted to local situations.

Health education messages are often delivered as ‘flat statements’ with no attempt to select and integrate the content of messages with what is locally understandable and culturally acceptable (Stone, 1992). MacComrak (1984) suggests that villagers can grasp biomedical concepts if those ideas are presented using local analogies and terminologies which are easily understandable. Anthropological study about perceptions
of disease would help to select relevant educational message and develop appropriate
educational tools (Robert, Bouvier and Rougemont, 1989). The lessons from above
studies are that community participation and health education have not been always
successful and sustainable in malaria control activities because of several reasons. They
are failure in planning phase to apply epidemiological, social and behavioural sciences;
and failure to incorporate various aspects of community such social tradition, cultural
norms, economic factors and political institutions.

Efforts to Measure the Impact of Malaria on Socioeconomic Conditions

The burden of malaria is greatest among the world's poorest countries. At macro level,
there is inverse relationship between malaria and country's per capita GDP. The
economic burden of malaria to household can be extremely high. Even in the poor
countries, households have been found to spend between $2 and $25 on malaria
treatment, and between $0.20 and $15 on prevention each month (WHO, 1999).

Household cost and economic loss due to malaria

A survey of the costs of malaria falling on households in six districts of Nepal reports
that about 6-14 days of work and 4-14 days of school were lost on average, the precise
figure varying considerably by districts and strongly influenced by species of parasite
and delay before obtaining treatment from malaria control agencies (Mills, 1993). Mill
(1994) in a study of the economic consequences of malaria for household in Nepal
reports that the cost of treatment and the period of incapacity caused by malaria differed
considerably between the districts. The average cost of treatment per person was $3.40
in Dhanusa and $2.19 in Nawal Parasi. But 94 percent of the cases from Dhanusa got
treatment free of cost because they attended malaria control services; in contrast only 33
percent did not pay in Nawal Parasi. Mean days disabled per person illness were 4 in
Dhanusa and 10 in Nawal Parasi. On average, 4 percent (Dhanusa) and 8 percent
(Nawal Parasi) of available workdays were lost due to illness, with malaria accounting
for 2 percent and 5 percent respectively, of total workdays. Malaria patients are more
likely to have wage labour as their main or secondary occupation. The most adverse
consequences are probably experienced by those households dependent for their living
on wage labour or cutting wood for sale (Mills, 1994).

Another study of the 695 matched patient-control pairs in two district of Nepal
(Picards and Mills, 1992) indicated that P. falciparum was responsible for 10 days loss
of total disability and 2.5 days loss of partial disability and that *P. vivax* for 5 days total and one day of partial disability. Poorer patients lose more time. The study has not deliberately addressed the questions of the value of lost time; mean monetary loss per episode and how the household responds to the illness of one of its members. This and above mentioned studies try to corroborate past assumptions of the debility that malaria's effect on effective work time may vary between socioeconomic groups; but the differential effects of malaria across socioeconomic groups have not been analyzed and discussed.

The first in-depth study on financial loss in the community due to malaria was carried out by a great malariologist, J. A. Sinton and he estimated in 1935 that at least 100 million people suffered from malaria with resulting in economic loss 12.3 crores (£10 million) annually to the country of Rs (cited in Ray, 1981). The estimated economic loss due to malaria in India from 1990-1993 is $506.82 million to $630.82 million (Sharma, 1996). A survey of the nine experimental and four control villages of Kheda district, Gujarat reveals that economic loss due to malaria is higher in the control villages where integrated vector control is not practised (Sharma, Malviya and Bhati, 1990). An average total expenditure for each malaria case is Rs 73 in experimental villages and Rs 151 in control villages. Another study compared the economic loss due to malaria between rural and urban areas in the same district. It is found that mean monetary loss per malaria episodes is more than double in urban respondent (Rs. 393.56) as compared to rural (Rs. 157.97) (Sharma, Malviya and Bhati, 1990). A recent survey of malaria in Orissa shows an average loss of 9 mandays per malaria patient with an average loss of 3.84 mandays to other family members (Sharma, Pradhan and Padhi, 2001). Mean total loss arose from the loss in wages and other expenses including treatment and travel cost comes to about Rs. 335 per episode of malaria infection. The average cost of treatment for malaria in Sri Lanka is Rs. 375, of which Rs. 80 is borne by patient directly, Rs. 95 by public sector, and Rs. 200 by the patients indirectly (economic lost due to disability) (Attanayake, Fox-Rushby and Mills, 2000).

In Bukina Faso, a study about the expenditure undertaken by families for the prevention and treatment of malaria in urban setting reveals that the average US $ 42 and US $ 33 per family were spent on the total cost of treatment and prevention for a period six months malaria seasons respectively (Guiguemde et al., 1994). Expenditure pattern varies when moving from town centre to outlying zone. There was significantly
more expenditure by families in the town centre. Another study conducted in Benin reported that both adult and children had an average of 1-5 episodes of fevers per year and the average cost of treatment febrile episodes was US $ 1.74 (Rashed et al. 2000). The average cost is significantly more in the urban areas. It might be explained by higher income, more expensive health care (private) and more readily accessible health care in the urban zone. However, average spending on chloroquine treatment is higher in the rural than urban since rural population gets more episodes of malaria fever. Similarly, average annual expenditure on prevention (mosquito coil and insecticide spraying etc) was higher in the urban than rural zones. It is obvious that malaria directly and indirectly affects socio-economic life of the people.

Malaria control programme and its impact on populations and development

Mills (1993) attempts to assess the impact of malaria control on population and economic development of Nepal. Before implementation of malaria eradication programme, malarious areas were very sparsely populated and a large number of people were not affected by the scourge of malaria. There is no direct evidence of the effect of malaria control on mortality, fertility or population growth-rates. High fertility rate remained almost the same between 1952 and 1981. But crude death rates markedly fell from 27 in 1952/4 to 13.5 in 197-81. Infant mortality also decreased. Nepal's declining mortality is affected by mainly smallpox and cholera control activities other than malaria, and improved nutritional status through immigration of hill people in fertile land of the Terai. As a whole, the population growth-rate accelerated in the 1960s and 1970s; but malaria control was not the main cause of population growth since only 35 per cent of the population had been at risk of malaria. Some 1.56 and 1.74 million people migrated from hills and settled in the Terai and the Inner Tearai between 1961 and 1981. As a result, at least 256,000 hectares of the land have been gained in those areas since malaria control started. These land areas have primarily been used for subsistence farming without irrigation facilities. She concludes that malaria control programme increased the densities of populations and extended the cultivable land in the Terai and inner Terai; but could not play a major role in the economic development of the nation.

Brown (1983) evaluated socioeconomic impact of the eradication of endemic malaria in Sardania by exploring the relationship between disease control, population growth and economic development. Before eradication, malaria was sufficient cause of
underdevelopment which was characterized by low population densities and low agriculture productivity. The greatest growth of population occurred between 1931 and 1961 when malaria control activities were implemented successfully. But population growth during the post-eradication was not as high as expected because previously, malaria endemic communities lost their population due to out migration. The contribution of agriculture to the regional gross product has decreased from 48 percent in 1931 to 29 percent in 1951 and finally 17 percent in 1971. The decline of agriculture has coincided with a further expansion of pastoralism for cheese production and temporary labour migration to the continental Europe influenced by Italian political economic policy. The kinds of economic and demographic changes which occurred in Sardinia are more influenced by political economic policies than health improvement through disease control programme (Brown, 1983).

Brown (1986) compares socio-economic and demographic effects of malaria eradication in Sri Lanka and Sardinia. He found that the malaria burden was quite similar in terms of overall morbidity and mortality at the time of implementing eradication programme. The control programme coincides with a marked decline in general mortality and acceleration of population growth in both cases. But malaria eradication programme was not the single main cause to shift in demographic situation. Malaria control has resulted in economic development in neither case. This lack of economic development on both islands appears to be caused by two diverse factors. Sri Lanka’s problem of underdevelopment stems from overpopulation and historical economic factors maintaining the vicious circle. Sardinia’s economic policies, participating in the European common market has led to a near abandon of agriculture and temporary out migration. The author concludes that population growth and economic development are affected by social, ecological and political factors and the impact of malaria eradication on socio-economic and demographic situation without considering these factors.

Malaria like other important communicable diseases has a high socioeconomic and political relevance. Morbidity due to malaria causes loss of working capacity and wages during acute illness, reduction of production due to worker’s absence or reduced output. Malaria increases morbidity/mortality, family expenditure and reduces income as well as social capital. Effective control programmes could help to reduce malaria related morbidity and mortality and socio-economic burden at the household and community
level, and contribute to the economic development. However, the evaluation of the eradication programme in Nepal, Sri Lanka and Sardania cannot establish the significant relationship between the control efforts and economic development. It is obvious that malaria control programme alone cannot accelerate the economic growth.

**Theoretical Approaches to the Study of Health-seeking Behaviour**

There are many theories that conceptualize, describe and predict health and illness behaviour from different perspectives. Some important concepts of health, illness and health-related behaviour, and theoretical approaches have been briefly discussed in this section.

**The concept of illness and health behaviour**

From the very beginning of existence of human group/society, people have had their ideas (traditional and scientific) about why they become ill and what to do to try to prevent and treat illness (Polgar, 1962). Meanings of health and illness depend upon who is making this interpretation on what basis because general people, professionals and medical doctors differ in their ways of thinking about health and illness. At this point, it is essential to make some distinction between the terms ‘disease’, ‘illness’ and ‘sicknesses.’ ‘Disease’ is a state of biological or physiological dysfunction and abnormality within an individual, which is diagnosed by the physician through medical or physiological examinations. On the other hand, an illness is a subjective state pertaining to an individual’s psychosocial experience, feeling and awareness of having a disease (Cokerham, 1989; Kleinman 1981). We would like to point out that the parts of subjective and objective are never pure and are always combinations. Sickness refers to a social condition that ascribes a particular role or behaviour of a person in a society (Radley, 1994).

Health behaviour may be linked to any disease or illness and sickness. People’s perceptions of health status or illness or bodily affliction, and their responses to health status or illness refer to health behaviours (Gochman, 1997). Health behaviour can be categorized as preventive/protective behaviour, illness behaviour and sick role behaviour. Kasl and Cobb (1966) conceptualize preventive and protective behaviour as health behaviour that denotes those medical or non-medical actions undertaken by persons who believe themselves to be healthy for the purpose of preventing diseases and remaining well. People engage in different actions to protect, promote and maintain
health whether actions are medically approved or not. Preventive health behaviour relevant to given problems is determined by the extent to which a person sees the problem as having both serious consequences and high probability of occurrence (Rosenstock, 1974).

Illness behaviour is also any activity undertaken by a person who feels ill, to define the state of health and evaluate symptoms in order to discover a suitable remedy. Mechanic and Volkart (1960:87) introduced the term illness behaviour, which refers to the ways in which symptoms may be differentially perceived, evaluated and acted (or not acted) upon by different kinds of persons. That is, in the presence of symptoms, an individual has at least three choices: he may seek diagnosis, enter into some treatment, or absent himself from work. One may do all of these, some of these or none of these. Similarly, recognizing symptoms, falling ill and willing to seek medical help depend on the extent to which the symptoms are perceived as serious, i.e., the extent to which they disrupt normal activities. In addition, socioeconomic status of patients directly and indirectly influence illness behavioural patterns (Mechanic, 1969:192)

Sick role behaviour refers to those actions undertaken by persons who consider themselves ill/sick or who have already been labeled as being sick by others (Gochman, 1997). Sick role constitutes a social role since the sick person is exempted from normal work and expected to behave according to the social and institutional norms, and to seek medical care complying with physician for the purpose of getting well (Parson, 1951). The Parsonian paradigm attached the duties of the sick person to the power of the medical doctors to regulate entry into the sick role. Initially, sociological studies of health and illness behaviour were heavily influenced by Parsonian sick role concepts and behaviour. But these concepts would mainly be applicable in western societies where people have access to the physician services. And it does not provide a relevant explanatory framework for understanding behaviour of persons who suffer from chronic illness and disability (Segal, 1997) or acute illness in developing countries, where people have no or less access to the physicians. Moreover, this functionalist conceptual model failed to consider other potential factors such as culture, class, gender and health services.
Social Cognition Approaches

Most social psychologists use social cognition models (SCMs) for the study of health-related behaviour by assuming that human behaviour is best understood as a function of people's perceptions of reality including disease and illness. Commonly used social cognition models include the health belief model (HBM) (Becker, 1974; Janz and Becker 1984; Sheeran and Abraham, 1996), theory of planned behaviour (Ajzen and Fishbein 1980; Conner and Sparks, 1996), self-efficacy theory (Bandura 1982, Schwarzer and Fuchs, 1996) and health care utilization model (Anderson and Newman, 1993; Aday and Awe, 1997). Among these HBM is the most well-known theoretical model in the field of public health. The HBM is based on the four central premises of health beliefs of individuals that govern individual perceptions, action, and behaviour. The first of these beliefs is the individual’s perception of susceptibility or vulnerability to disease. The second belief is that of severity of the disease. Third is the perceived efficacy of the behaviour in dealing with the condition. The fourth key belief is composed of the perceived barrier to adopting the behaviour. Cues to actions such as advice from others and mass media, health education are also important in this model. In the case of malaria, individuals are likely to take action to prevent malaria if they believe that the severity of malaria will affect some parts of their lives and specific action will be beneficial by reducing susceptibility to the disease (Kin, 2000). However, many people who seek health services are motivated to take actions only by the appearance of symptoms. Health behaviour is shaped not only by health beliefs and perceptions, but also by social and political context of health care systems, which are not taken into consideration in HBM. Nor does it take the service into account.

The theory of Planned Behaviour (TPB) assumes that the proximal determinant such as perceptions, attitudes and intentions determines individuals’ health behaviour. This helps to depict behaviour as a linear regression function of behavioural intentions and behavioural control. Behavioural change is facilitated by a personal sense of control. Those behaviours which require skills, resources or opportunities that are not freely available are not considered to be within the domain of the TPB (Conner and Sparks, 1996).

Health service utilization model is developed by Anderson and Newman (1973), Aday and Awe (1997). In this model, predisposing, enabling and need factors are grouped in logical sequence to show how these factors act upon health services
utilization behaviour of people. Predisposing variables include family composition, social structure and health beliefs (value of health services, physician, good health, knowledge of disease, and attitude toward health services). The enabling component includes family resources and attributes of the community in which they live (residence, region, doctor and hospital, clinic). Need refers to health status or illness, which in the most immediate and important cause of health services use in this model. This is actually ‘prediction model’, which provides useful insight about the level of utilization. A major problem of this model is that it does not take into account in the manner in which how a individual evaluates his or her own symptoms and seeks services. The earlier mentioned social cognition approaches are rigid theoretical frameworks that guide researchers to select variables and procedure for developing reliable and valid measures, and how these variables are combined in order to conceptualize and predict health behaviour. These may be useful in quantitative type of research focusing on cognitive aspects of behaviour. Focusing mainly on cognitive variables, and neglecting other variables such as socioeconomic status, resources that are potentially important in understanding a particular behaviour or outcomes are major limitations of these theoretical models. Behavioural theories and models basically focus on individual cognition and behaviour. Individual approaches are class biased and unable to include broad economic, social and political determinants of health and health behaviour (Turshen, 1989).

\textbf{Explanatory models (EMs) and health culture}

Medical anthropologists and sociologists have been interested in people’s ideas (cognition) about illness and illness narratives, and their response to illness. Traditionally such approach deals with the study of beliefs and practices associated with illness by persons from diverse cultures. The process of social theorizing of health, illness and behaviour starts from the patient understanding of illness and symptom’s meaning (Amstrong, 2000). This means that health-seeking behaviour can be linked to patient’s ideas about illness or lay explanation of illness.\textsuperscript{1} Kleinman (1980) terms these ideas as the ‘explanatory models’ (EMs, forms of theoretical knowledge) which are held by both patients and practitioners involved in health care systems.\textsuperscript{5} Lay explanatory models, which may differ from practitioners’ EMs, helps ones understand how they make sense of given episode of illness, and how they choose and evaluate particular treatment. More specifically, the explanatory model for a particular illness consists of
signs and symptoms by which the illness is recognized; assumed causes of illness; recommended treatments; how the illness is believed to work inside body; and expected prognosis. They are based on health belief systems but applied to particular episodes of illness. This model is mainly useful for analyzing and explaining patient’s understanding of illness in terms of her or his experience and belief systems in the context of culture. But EM approach emphasizes on cognitive structure and medical efficacy of individual cases and mystifies the social origin of disease, the social determinants of sickness (Young, 1982).

Health behaviour is related to cultural perceptions and meaning of health problems, and cultural mechanisms for coping with health problem in given sociocultural and economic setting (Banerji, 1992, 1989). Depending on the perceptions and meanings of a health problem, communities develop their own devices and institutions for coping with their problems through their own innovations or innovations from other cultures which get diffused into their culture. These three factors and the behaviour of individuals in a community are closely related with one another; changes in one will lead to changes in all others. These inter-related factors form a sub-cultural complex of the community, which Banerji (1982) terms ‘health culture’. Health culture undergoes changes with a result of cultural innovations, cultural diffusions and purposive interventions from outside, and with change in the overall culture. There is also obvious relationship between the cultural meaning/practices and socio-economic setting. Thus, health behaviour ought to have been seen as a component of a complex whole and it should be studied only in the context of the overall culture of the community. This concept of ‘health culture’ provides valuable framework for researchers to explore cultural perceptions and meaning of health and illness, and health behaviour, and analyze socio-epidemiological aspects of health problems in a given socio-cultural context.

**Ecological models**

Ecological and bio-cultural theories, influential in the early 1970’s view the human species as part of environmental systems interacting with other animal and plant species in energy exchange cycles. Disequilibrium of ecological systems or changes in environment affects the epidemiological profile of diseases (Dubos, 1959, 1980). This perspective emphasizes on adaptive response (behaviour) of human being to their environment (McElory and Townsend, 1996). Development of the sickle cell traits
among people of tropical Africa was the biological response to the increased incidence of malaria (Livengstone, 1958). Construction of house with living quarter above the mosquito’s flying high, 10 fee ceiling among the hill tribes of Vietnam (May, 1961), use of bed net, smoke and herbal medicine in fact, socio-cultural response to malaria problem. Ecology model is still a logical framework for investigating patterns of diseases including malaria in geographical context, epidemiological change, and differential access to health care resources. Though ecology of health model is a holistic concept, it has been restricted to bounded ecosystem and fails to link local condition to larger macro-processes such as the economic systems (Singer, 1997) and ignores the socio-economic determinant of health (Tursen, 1989).

Although the term ‘health culture’ is essentially derived from medical anthropology, it goes beyond the limits of conventional medical anthropology. This concept seems akin to the emergent paradigm of medical anthropology, known as critical medical anthropology (Singer, 1992, 1995), which focuses on politics, economic and class structure. Critical medical anthropology is a theoretical and practical effort to understand the problems of health, illness and treatment in terms of the interaction between the macrolevel (political economy, class structure, health policy and health care systems) and the microlevel factors (illness experience, behaviour, beliefs and cultural meaning). Poor socio-economic circumstances and structural arrangement create the options of risky behavior to which McKinlay (2001) calls the activities of manufactures of illness. Concepts of illness disease, and health related behavior vary from higher to lower class due to differences in social and material conditions (Stacy, 1988). Therefore, health related issues need to be understood within the context of political and economic condition that influence human relationship, shape social condition and behavior, collective experiences and cultural meaning (Singer et al., 1992).

In a society, different components of the system are integrated through social relationships among individuals and groups in particular setting (Coreil et al., 2001:11). For instance, a woman as a mother has a relationship to her child and the family members; she likely interacts with people at work place and with other community groups, and she belongs to a social class, gender and ethnic group within the larger society. How she responds when her child gets sick is influenced by various factors at different level of the system. She may evaluate certain symptoms of illness based on local concepts and norms shared with her reference group. Her ability to seek care is
constrained by her work situation, the type of job, availability of cash at home, available health care services and their distance, transportation and so on. It is obvious that treatment seeking behavior is likely to be influenced by interpersonal, social, cultural and physical environmental variables which are likely to interact.

People's perceptions and behaviour concerning particular illness/disease—malaria are determined by a wide range of factors including both macro (political, social, economic, ecological and cultural environment) and micro factors (illness experience, beliefs, social and cultural meanings, and individual's characteristics). Explanatory model is useful in exploring existing meaning and explanations about a particular illness/disease in a society, but it is not concerned how sociopolitical structures of the society create different perceptions and behaviour. Rigid cognitive and structural models which may be useful for quantitative study/survey using predetermined set of variables do not provide appropriate frameworks for the study of health behaviour in a particular socioeconomic context. Hence, single theoretical perspective in health behaviour research of the community may lead to victim blaming situation (Brown and Inhorn, 1990:214). Instead of single theoretical model, synthetic models that attempt to combine both the micro and macro-sociological level of analysis, and that would provide the researcher valuable framework to understand and analyze perceptions of illness and health behaviour regarding malaria in socio-cultural, ecological and epidemiological context of the study areas. Therefore, theoretical concepts of health culture, critical medical anthropology and health belief models have been used in this study to conceptualise the problem of research and analyse the data.

Methodological Approaches to Health-seeking Behaviour

Various approaches such as ethnographic, sociological, epidemiological, survey methods, quantitative and qualitative methods have been applied to the study of health-related behaviour. Knowledge, attitude and practices (KAP) survey method is a widely used approach to the study of health-seeking behaviour including use of preventive measures. Community knowledge in developing countries is usually assessed in terms of biomedical concepts and their reported knowledge which does not correspond to the scientific concepts is described as beliefs, superstitions and misconcepts (Good, 1994; Stone, 1992).
The investigators of KAP assume that there is linear relationship between knowledge, attitude and behaviour and changing knowledge/attitude would automatically lead to change in behaviour. For instance, if people recognize signs and symptoms of malaria, its mode of transmission and if they know that malaria can be prevented by using mosquito nets and best treated by anti-malarial drugs, they will act accordingly and tend to use nets and attend a health facility. People who have positive attitudes towards particular actions or health facility are more likely to utilize health services during episodes of fever. However, the relationships between knowledge, attitude and practices have not proved to be quite simple. This over-simplistic assumptions neglect other many variables that influence people actual behaviour.

The survey method including KAP study approach was basically designed for respondents in developed countries, where literacy are high and participants are familiar with the way in which questionnaire are administered (Higginbotham et al., 2001). Even literate respondents may face problems while comprehending and responding to the questions. Despite the fact that surveys are widely used in health research in cross-cultural settings of the developing countries where majority of people cannot read and understand questions. Communication and recall problems make survey research problematic in cross-cultural research (Kroeger, 1983). Recall period should be as little as 2 weeks. But period for illness reporting as long as 12 months were used in the health survey of the least developed countries. One respondent from a household is asked to mention illness perceptions, health status and behaviour of other family members. Such a way of proxy reporting may not be useful for estimating the prevalence of illness and measuring health related behaviour of families. Moreover, in KAP related health survey hypothetical questions are asked to report health behaviour, which rarely obtains actual practices. And such survey data would be inaccurate and inadequate to explain health-seeking behaviour.

Stone and Campbell (1984) attempted to measure the degree of inaccuracy of a knowledge, attitude and practice (KAP) family planning survey in Nepal. Initially, KAP survey questionnaire was administered to over 600 people. Again researchers including Nepalese interviewers asked the same questions to a purposive sample of Nepalese villages comprising people which were included in previous survey. Simultaneously, qualitative data were collected from the same informants using informal conversations and unstructured interview. Results of their questionnaire, a duplicate of the survey were
compared with the data obtained from the same respondents through conversations and unstructured interviews that revealed a huge difference on many variables. The authors found that the KAP survey did not obtain accurate information and knowledge of family planning methods and raised question about the validity of the KAP Survey approach. Stone and Campbell further argued that their small-scale study using qualitative techniques led to a lesser degree of measurement error than a large-scale survey. Therefore, KAP survey methods are inappropriate and inadequate to study treatment seeking and preventive behaviour of people. However, KAP survey are useful for assessing distributions of diseases and knowledge about etiological concepts, symptoms, household resources for tackling problem and alternative medical care in large scale project.

As a response to the limitations and drawbacks of KAP survey studies for explaining health behaviour, anthropologists plead for the use of ethnographic studies. Traditional anthropologists conduct intensive fieldwork including ethnographic interview and participant observation to contextualize human behaviour and beliefs and social values. But ethnographic details and their sophisticated language hardly match with the expectations of health policy makers, public health specialists who usually prefer to have biomedical and quantitative/epidemiological data. Methodological perspective of anthropology and epidemiology are often dichotomized into qualitative and interpretative vs quantitative and explanatory mode of inquiry (Trostle and Sommerfeld, 1996)

Health and health behaviour is determined by myriads factors which cannot be examined through narrow biomedical and disciplinary approach. Over the past decades, traditional approaches have been modified to bridge the different disciplines through the collaborative work of applied anthropologist, sociologist, public health specialists and epidemiologists in the field of public health and to evolve interdisciplinary or transdisciplinary approach in health research (Albrecht, Higginbotham and Freeman, 2001). Social sciences approach along with critical social theory in health that integrate the social, cultural behavioural, economic, institutional, political and historical facets of health are essential for the formulation of interdisciplinary research programme (Nayar, 1993). A classical example of a collaborative study (a form of interdisciplinary study) is a study of tuberculosis carried out by National Tuberculosis Institute in Bangalore in 1959 to formulate effective national tuberculosis programme, in which social scientists
including anthropologist, epidemiologist, microbiologist, statistician and public health administrators worked together (Banerji, 1986).

Gradually, it was realized that social and anthropological concepts and techniques are essential to produce valid results and gain an understanding of health and illness from community perspective. In the eighties and nineties, anthropologists/sociologists were actively involved as researchers or consultants in WHO/UNICEF funded programmes such as Child Survival Initiative including Diarrhea, Acute Respiratory Infections (ARI) and other infectious disease research programmes (Inhorn and Brown, 1997). Some of them also developed study guidelines such as the focused ethnographic studies (FES) for ARI programme (Gove and Pelto, 1994), the rapid assessment manual for malaria (Agyepong et al. 1995) and rapid assessment procedure (RAP) for general health issues (Scrimshaw and Hurtado in Pelto and Pelto, 1997) by combining anthropological concepts and techniques with survey and other rapid data collection methods. Both FES and RAP, efforts to find a common ground between anthropological theory and the practical exigencies of programmes in community health have been used to understand specific disease conditions and programme in the 1990s (Pelto and Pelto, 1997). These manuals were developed and used primarily to identify local concepts and categories. The 'emic' perspective (insider's views) became increasingly central in anthropology as applied to public health investigations. 'Emic' concept of illness which could be obtained from the traditional or focused ethnographic approach that opposed to the 'etic' (outsider's or professional's views) concept of biomedicine or health professional view (Harris, 1995). FES and rapid assessment studies are strongly influenced by Kleinman's concept of 'explanatory models' (EMs) that mainly emphasizes on individual perceptions and clinical role. Attempt to rapidly collect ethnographic data using these tools in order to provide valuable information to health policy makers and implementers is certainly a great step for better collaboration between social scientists (anthropologist/sociologist) and public health specialists/epidemiologists (Hahn, 1999). Unfortunately, these ethnographic and rapid assessment studies go barely beyond cognitive aspects (identifying knowledge gap) and tend to undervalue the importance of contextualizing the findings in people's real life situations.

Ethnographic or anthropological approach can provide valuable tools to study illness perceptions and behaviour from the etic perspective assuming study community
as homogenous group. It is, however, not appropriate to accurately assess morbidity rate, distributions and determinants of illness, perceptions and behaviour across different strata and group of people in a study area. Epidemiological study requires quantitative data produced from various techniques including survey. Therefore, combination of qualitative (anthropological/sociological) and quantitative (epidemiological/biomedical) approaches and merging interdisciplinary approach would be an appropriate approach to explain health, illness and treatment seeking behaviour of people. In an interdisciplinary approach, the researcher tends to make knowledge claims on pragmatic ground and use both quantitative and qualitative data sequentially or simultaneously according to the nature of the study (Creswell, 2003). Banerji (1982) carried out a study of health behaviour of rural populations in nineteen villages of India by employing such approach. Health behaviour is conceptualized around the entire way of life in rural populations, including social, economic, demographic and political factors, interaction between different segments of rural populations, and interlink age between these factors, different programme and health behaviour. An attempt to investigate into health-seeking behaviour essentially requires interdisciplinary research work equipped with multiple methods, multiple data and multiple level of analysis.

**Gaps and Issues**

Despite the emerging body of knowledge about the social, economic and ecological causes and consequences of malaria described in the previous sections, our understanding of these complex issues remains incomplete and inadequate (McMichael et al., 1998). In particular, no study has comprehensively dealt with socioeconomic, cultural, behavioural, ecological and health systems facets of the malaria problem. The complexity of malaria and human behaviour cannot be understood without considering the above mentioned inter-related factors. But most studies have failed to capture the complexity of relations among various determinants of malaria.

The occurrence of malaria is not only a natural consequence of the relationships between host, vector and parasite, but also the production of socioeconomic conditions and development efforts consciously geared by government and development agencies in favour of particular communities. So, the problems of malaria and consequences of the development efforts should be linked and viewed with broader political and economic reforms. Except for few studies (Kazi, 2001; Harrison 1994), all research
reports related to the adverse effect of development have viewed and legitimized the malaria problem as natural consequences of ecological change promoted by the development efforts, and have not taken other factors such as socioeconomic conditions, resource allocations and available health services into account.

Like other infectious diseases, malaria mainly affects poor people living in tropical and sub-tropical environment. It is evident that population groups of lower socioeconomic status are more vulnerable to the consequence of malaria infections than people belonging to socioeconomic status. Many studies attempt to describe the malaria situation considering socio-demographic factors of the study population. Most of the observed differences in malaria incidence by socioeconomic status are less significant after multivariate analysis. At least it may be due to partly methodological limitations and difficulties involved in measuring SES (socioeconomic status) in poor countries or the study populations were not properly stratified to measure the associations between economic conditions and the occurrence of malaria. There could be biases while selecting samples including cases with better socioeconomic conditions that are more likely to use health services. The very limited and inadequate efforts have been made to explore the relationships between caste/ethnicity and malaria, which has social and political relevancy in South Asia.

Various studies conducted in different parts of South Asian, South American and African regions show that people in different societies hold a variety of understanding and beliefs about causation and transmission of malaria that vary according to social, cultural, educational and economic factors. A few studies that focus on socio-medical aspects of malaria in Nepal providing little information about socio-behavioural aspects of malaria fail to delineate the perceptions and behaviour of people across the different castes, ethnic groups and economic strata. Even in South Asia, there are still lack of social studies describing cultural perceptions/understanding of malaria and health-seeking and preventive behaviour of people in their social, economic and ecological contexts. Most studies carried out in different countries and regions fail to establish the association between perceptions, behaviour and socioeconomic conditions of people because study communities were considered as homogenous groups and they were not stratified into different socio-economic strata. Social issues such as occupation, income, economic class and caste/ethnicity and living conditions have often ignored in behavioural dimensions of malaria. Some studies identified income, occupation and
distance of health services as determinants of health care seeking behaviour, which
cannot capture the complexity of the problem.

Health behaviour regarding malaria is determined by a variety of factors such as
cultural meaning and perceptions, cultural devices and practices, socioeconomic
conditions, ecological settings and available health institutions including purposive
interventions from outside. Thus health behaviour ought to be studied in the holistic
context using interdisciplinary approach. ‘If health behaviour is not seen in that holistic
context, there is real danger of it getting distorted in the process of the study’ (Banerji,
1989: 1475). Most studies reviewed earlier were done with a disciplinary perspective
such as anthropology, sociology, social psychology and epidemiology. Therefore, the
study problems were narrowly conceptualized and the relationships between health
behaviour and various factors were not explored in the given context.

There are very few studies that combine both qualitative and quantitative methods
with interdisciplinary/multidisciplinary approaches (Espino et al., 1997; Winch et al,
1997; Sevilla-Casas, 1993). Many studies have been conducted using conventional
survey methodology. Recently, KAP survey and epidemiological design are supported
with some qualitative data. Therefore, these studies suffer from various limitations and
drawbacks. Ethnographic studies can produce a rich ‘emic’ understanding of people’s
perceptions and beliefs about health and illness, but do not predict the people’s health
and health seeking behaviour and do not explain the variations of the behaviour in
different sections of people. Survey and epidemiological studies explain the
determinants of diseases and behaviour using quantitative data and socio-demographic
factors with or without categorizing population into different socio-economic groups.
Therefore, it is deemed necessary to study the perceptions and health behaviour related
to specific disease/illness using interdisciplinary approach so that the new knowledge,
which is lacking in previous studies in the given context, can be produced.

An Overview of Conceptual Framework and Research Questions

The reviews of health and social science literature on malaria strongly reveal that socio-
cultural, political, economic circumstances and ecological conditions not only influence
human behaviour, but also are themselves key factors in determining risk of the disease
in individuals, families and communities. It is obvious that the occurrence of malaria is
influenced by the interplay of various factors such as climate, biophysical environment,
rainfall, economic development and socioeconomic transformation, human activities and population mobility, malaria control/prevention programme and health services. Like diseases, health behaviour related to malaria is determined by various inter-related factors such as cultural perceptions and meanings of diseases, local institutions and practices, control programme and health services, diffusion of new ideas and technology from other culture, economic development, socioeconomic conditions and ecological settings. Such complexity of health behaviour can be understood through a holist perspective and interdisciplinary approach.

Basing on the literature review, a general framework has been developed for the study of the health behaviour regarding malaria in rural communities of Nepal. The framework identifies two types of health behaviour (treatment-seeking and preventive behaviour), which are influenced by five conceptual domains (ecology, cultural environment socioeconomic conditions, health institutions and services, and perceptual factors). ‘Ecology’ encompasses location of villages, climate, natural and man made mosquito-breeding places, pathogens and housing conditions. The socioeconomic environment includes poverty, occupation, income, economic class, caste, ethnicity and gender. Cultural devices, practices, beliefs and healing traditions are conceptualized as culturally constructed environment. Modern health services are important domains that include the government health facilities such as SHP and Hospital and their services and district health services and malaria control programme. Knowledge of febrile illness, awareness of malaria and its perceived threats, and felt needs are perceptual factors that also govern health behaviour of individuals in the social context.

Research Questions

1. What is the epidemiological situation of malaria in the study areas?

2. How do different socio-economic groups perceive febrile illnesses including malaria fever and how do they behave towards preventions and treatment of fever?

3. How is behaviour related to malaria affected by knowledge, caste/ethnic and class background of individuals and available health services?