CHAPTER I
INTRODUCTION

"Natural resources determine the course of development and constitute the challenge which may or may not be accepted by the human mind"

W. Arthur Lewis

Human desire for ultimate joy and comfort has led her/him to exploit nature's "free" goods to the extent of reducing its natural capacity for self-stabilization. As a consequence of this outright disregard for the impact of human activities on the environment, numerous environmental problems have arisen. It is an established fact that there exists a vital link between environment and life. The history of evolution of life has taught us that through the different ages, various forms of life appeared or became extinct in response to the prevailing environmental conditions. Human beings, in their pursuit of ever faster economic growth, are upsetting the environmental equilibrium and destroying their life-support system. Their capability to transform the environment can bring the benefits of economic development and an opportunity to enhance the quality of life. But the same power, when incorrectly applied, can also cause incalculable harm to the natural environment and consequently to human life itself.

There should be no delay in tackling the task of solving these environmental problems, as these problems have a cumulative impact. Delayed remedial action will cost considerably more and the damage may become irreversible. There is only one world to pollute; if this is ruined, there is no other. We survive only as long as the earth survives. Hence, environmental
management must regulate the demands and activities of human beings in such a way that the ability of the environment to sustain future development remains unimpaired. Efficient environmental management is a pre-requisite for sustained economic development.

One primary object of good management is provision of the maximum benefit to the greatest number of people for all time (Prakash 1986). Environmental management is the integrative ecological, cultural, economic and social process by which the environment is developed in a holistic and systematic manner through the optimal use of existing and potential resources in the biosphere for the ultimate improvement of human well being. It aims at the maintenance of long-term sustained yield from the biosphere, and should be designed to provide greater personal and social opportunities for present and future generations (Trivedi et.al. 2000). Thus, environmental management is a positive, not a negative “halt progress” or “back to nature” concept.

Ramade (1984: 9) defined resource as “a form of energy and/or matter which is essential for the functioning of organisms, populations and ecosystems”. A resource in his words is “any form of energy or matter essential for the fulfillment of physiological, socio-economic and cultural needs, both at the individual level and that of the community” (ibid.: 9).

Environmental management is the process of allocating these resources, both natural and man-made, so as to make optimum use of the environment in satisfying not only the present basic human needs but also those of the coming generations. Thus, natural resources management falls under the wide canopy of environmental management. “Natural resources can be defined as objects, materials, creatures, or energy found in nature that can be used by humans” (Camp et. al. 2002: 4). According to Agarwal (1987: 130), “Natural resources are
raw materials obtained or derived from nature”. Others like Kerr and Swarup (1997: 6) opine: “Resources that are not man-made, including all of the earth’s natural elements and environmental factors”. Natural resources can be broadly classified into renewable resources — those that can be replenished rapidly through natural cycles, e.g., solar radiation, tidal and wind energy, and all biological organisms like forests, grasslands, wildlife etc. — and non-renewable resources or those that cannot be replenished rapidly or not replenished at all through the natural processes like ores of aluminum, copper, mercury, fossil fuels and nuclear energy.

Human beings are heavily dependent on natural resources for their very survival. Natural resources of all kinds, particularly water, soil, forest, vegetation (flora) and animals (fauna) are the major resource base supporting and sustaining the human and cattle population. As a result of exploding human population, the pressure on limited natural resources has increased immensely. With an additional burden of population, the requirement of water, food, shelter and other essential commodities are expected to grow rapidly in future. Already, the resources are facing serious threat due to over exploitation, unplanned, unscientific and haphazard developmental activities associated with mismanagement in North-East India. The situation is expected to only become worse which will jeopardize the resource sustainability.

Expanding human population has resulted into expanding needs of humans. With scientific progress and technological development people have started utilizing natural resources at a much larger scale. Continuous increase in the population has caused increasing demand for resources. This has created a situation where the non-renewable resources may be
exhausted after some time. In order to have maximum production, we have started even taking loans from the resources meant for the future that cannot be paid back. As a result, we are using all those resources, which are in fact the property of future generations.

Till recently, we took all natural assets viz., air, water, soil, flora and fauna for granted, considering them as infinite and went about utilizing and exploiting these resources to the hilt. It is only recently that we have come to realize that these resources are finite and limited. These thoughts are reflected in our ancient works and sayings of great men. “During the Vedic period, the importance of maintaining the man-nature balance appears to be the dominant thought in our scriptures. Thus, conservation of resources was considered as a prerequisite for the well being of society. Conservation ethics also places emphasis on the equitable sharing of the benefits of natural resources, as stipulated in the doctrine of Manusmirti(7/99)” (Ghosh 2003: 8). In the Christian context, Rose and Fletcher (2007) write: "The gospel paints a vision of society that is relationally and environmentally sustainable" (2007: 7). The following stanza from the Isavasya-Upanishad is outstanding testimony to the best idealistic concept of ecological harmony in Hindu religion: “This Universe is the creation of Supreme Power meant for the benefit of all; individual species must, therefore, learn to enjoy its benefits by forming a part of the system in close relationship with other species. Let not the other species encroach upon the other’s rights” – Isavasya Upanishad, chapter 1, verse 2 (Dwivedi 2003: 44). The gospel of Buddha and Ashoka’s edicts also mirror this view. During Ashoka’s time (272-232 BC), perhaps for the first time in the history of the world, ecological concerns became state concerns. His imperial edicts laid down rules of conduct that had to be obeyed with respect to the environment. Non-compliance was met with
punishment (Pant and Khanduri 1998). We have also heard of the Bishnois of Marwar of the 15th century, sacrificing their lives to protect the Kheidi trees. All this is indicative of the fact that though man was aware of the importance of environment, he got caught in the whirlpool of rapid modernization, development of science and technology and industrial revolution. Hence, the need to manage our natural resources has become crucial for sustainable development.

Agarwal (1987:131) defines ‘natural resource management’ as “planning and management of resources so as to secure their wise use and continuity of supply while maintaining and enhancing their quality, value and diversity”. Natural resource management is an important issue that affects us all. Everyone’s well being, indeed livelihoods, depends directly and indirectly on natural resources. The science of natural resource management is based on the ecologically sound traditional wisdom of farmers and its contribution towards augmenting productivity. Traditional values which are sustainable in nature need to be compared with values of modern systems. Projects to develop ecology should start with traditional knowledge as they are proven technology for natural resources management. In a real sense, every culture is the result of people’s effort to survive and their attempts to optimise the use of available resources, i.e., soil, water and vegetation (Mishra 1998). In recent years, degradations of these resources and the environment have increasingly become the focus of attention because of their harmful impact on people’s lives. Water scarcity, air and water pollution, energy scarcity, deforestation, soil-degradation — all of these natural resource degradation problems hamper people’s ability to earn a living and reduce the quality of their lives.
Natural resource degradation problems can be analyzed as biological, physical or socio-economic. While all of these perspectives offer important insights, it is worthwhile to ask the following three questions: What factors lead people to degrade natural resources? What are the economic consequences of natural resource degradation? And what kinds of policies can be taken up to strengthen the way people manage natural resources?

The classic subdivisions of resources include renewable and non-renewable resources. Renewable resources are resources that can be replenished rapidly through natural cycles, e.g., direct solar radiation, tidal energy, wind energy, water energy and biomass energy (solar energy stored in wood, organic matter, food and other agricultural products) and all biological organisms (forests, grasslands, wildlife etc.). Non-renewable resources are resources that can be replenished slowly or not replenished at all through the natural processes. Non-renewable resources can be further divided into two categories, viz., recyclable and non-recyclable. The recyclable resources can be collected after they are used and can be recycled. These are mainly the non-energy mineral resources which occur in the earth’s crust, viz., ores of aluminium, copper, mercury and other metals, deposits of fertilizer nutrients, e.g., phosphate rock and potassium and minerals used in their natural state (asbestos, clay, mica, etc.). Non-recyclable resources are those resources that cannot be recycled in any way, e.g., mineral energy resources such as fossil fuels (coal, oil and natural gas) and nuclear energy (uranium and thorium).

Renewable resources should not be taken to mean inexhaustible resources. All renewable resources are limited by the capacity of natural systems to renew them. For example, good soil is renewable only if protected from erosion. Similarly, ground water is
renewable only if water continues to percolate in the soil at a rate at which it is removed. Moreover, renewable resources are dependent upon non-renewable resources for their replenishment and vice-versa. For example, production of agricultural crops (renewable resources) depends on iron, copper and other metals used in agricultural machineries, and phosphate and other fertilizer components (recyclable non-renewable resources).

Although the above classification of natural resources is the most widely accepted one, yet different scholars have given different classifications. The major classes of natural resources, according to Howe (1979) are agricultural land; forest land and its multiple products and services; natural land areas preserved for aesthetic, recreational or scientific purposes; the fresh and salt water fisheries; mineral resources including fuels and non-fuels; renewable non-mineral energy sources of solar, tidal, wind and geothermal systems; water resources; and the waste-assimilative capacities of all parts of the environment. More generally, natural resources fall into four categories: basic natural resources such as land, water and air; natural resource commodities such as timber and fish; environmental amenities such as clean air and scenic views; and environmental processes such as pollution, soil erosion, groundwater recharge and species regeneration (Kerr and Swarup 1997).

Some authors prefer to classify resources into biotic or living resources, e.g., forest, agriculture, fish and wildlife, and abiotic or non-living resources, e.g., land, water, minerals etc.
Owen (1971) proposes a broader classification of resources. He gives a schematic representation of classification of natural resources as follows.

**NATURAL RESOURCES**

- **INEXHAUSTIBLE**
  - Unlimited or un-ending quality may be degraded, not quantity.
  - Quality may be degraded by man's activity e.g. atomic wind power, precipitation, tidal power of running water.

- **EXHAUSTIBLE**
  - Limited. Both qualitative and quantitative degradation possible.
  - Quality may be degraded by man's activity e.g. solar radiation, hydropower.

- **IMMUTABLE**
  - Quality not degraded by men's activity e.g. atomic wind power, precipitation, tidal power of running water.

- **MUTABLE (Mis-Usable)**
  - Quality may be degraded by man's activity e.g. solar radiation, hydropower.

- **MAINTAINABLE**
  - Availability depends upon method of use by man.

- **NON-MAINTAINABLE**
  - Total quantity static when consumptively used, not replaced.

- **RENEWABLE**
  - Perpetual harvest possible e.g. fertility of soil, bio-products of land, fresh water and sea, and human power.

- **NON-RENEWABLE**
  - Once gone, no replacement e.g. species of wildlife.

- **RE-USABLE**
  - Consumptive use small e.g. gems, non-consumptively used metals like gold, platinum, silver, iron, copper, zinc.

- **NON-REUSABLE**
  - Consumptive use high, e.g. fossil fuel, non-metallic minerals like gypsum, sand, salt, consumptively used metals like lead in gasoline and paints, zinc in galvanized iron, tin in toothpaste containers.
According to Sharma (1998), resources may be classified into the following types:

**Based on Continual Utility**

Some resources are exhausted soon, whereas others last for a long period. Thus, depending on the availability of resources, during our continuous use, a resource may be renewable (inexhaustible) – resource that can be renewed along with their exploitation and are always available for use like forests. However, formation of some resources like iron ore, coal and mineral oil takes several thousand years. Once they are used in unlimited ways they cannot be easily replaced. Therefore, if exploited at large scale, they will deplete fast. Hence, such resources are called non-renewable resources or exhaustible resources. For certain resources there is no final use, as they can be used continuously, such resources are known as cyclic resources.

**Based on Origin**

On the basis of their origin, resources may be biotic (organic) or abiotic (inorganic). Biotic resources are obtained from the biosphere, e.g., forest, wildlife, crops, coal, mineral oil, etc. resources composed of non-living inorganic matter are called abiotic resources, e.g., land, water, minerals, etc.

**Based on Utility**

Every resource has some utility, e.g., some are used as food, some as raw materials and others as sources of energy.

Natural resources are made by nature and the energy to make them comes from geochemical, geophysical and solar power. Humans may only modify natural resources. The monetary value of natural resources is what people believe the value to be. Our ignorance can
cause them to be greatly undervalued, which is a major problem. Humans are inherently ignorant; we simplify complex things and processes because we do not understand the "whole". Natural resources and the ecosystem processes producing them are the most complex systems we can imagine. Also, there are human values - ethics and morals - that give non-monetary value to natural resources. Humans themselves are a natural resource, and certain qualities of humans extend beyond their possessions and the direct services they render for other humans and the rest of the biosphere. This condition is expressed in our art and culture. Resources are the bases of both security and opulence; they are the foundations of power and wealth, they affect man's destiny in war and peace alike (Zimmerman 1951). The changing functions and utility of resources can be attributed to socio-cultural and technological evolution. Modernisation, lack of effective planning, population growth and other forms of exploitation have played a key role in the degradation of natural resources.

The ecological vantage point in anthropology was expressed as early as 1930s by Julian H. Steward (see Hardesty 1977). Some of the areas of interest to anthropologists are human ecology, ecological problems, and pollution effects on human population. Haeckel defined ecology as "The economy of nature – the investigation of the total relations of the animal both to its inorganic and its organic environment; including, above all, its friendly and inimical relations with those animals and plants with which it comes directly or indirectly into contact – in a word, ecology is the study of all those complex interrelationships referred to by Darwin as the conditions of the struggle for existence" (quoted by Dodson et.al. 1998:2). In other words, "Ecology is the study of the interaction between living things and their environment" (Sutton & Anderson 2004: 2). An integral part of this relationship is the
adaptation that these organisms make to their environment. Adaptation in man is the process by which he makes effective use of productive ends of the energy potential in his habitat (Durham 1976). Man's interaction with his environment in terms of economic ties, resources, geographical links, social structure and inter-cultural influences, etc. has been changing through the ages (Bhasin 1998). Neither man nor the environment is considered as static or constant. Adaptation has been viewed as a process by which man makes effective use of the energy potentials in his habitat. It can also be viewed as consequence of changes and transformation in cultural behaviour. These changes may be technological, organizational or ideological. Technology is the tool used by man in his search for food, protection and reproduction. Organizational aspect of culture relates to the network of social relations, roles and statuses that can be obtained in a human group. Ideology includes values, norms, knowledge, religious beliefs, sentiments, ethics, morals, etc. Cultural ecology is a methodological tool for determining how the adaptation of a culture to its environment may lead to certain changes in the culture.

The urge to exploit the resources to meet the varied requirements of the people in the ever changing scenario of dynamic change towards modernization and industrialization and the vast improvement in the technologies has led to a situation where our resources are exploited indiscriminately leading to faster depletion of the resources which has an adverse impact on the environment affecting the process of sustainable development. Due to industrialization there has been a larger flow of resources into the industries and these industries have been utilized indiscriminately, with no perspective on the need for future requirements undermining their economic and real values in relation to the human population.
Appropriate strategies are yet to be evolved for the efficient natural resource management and its efficient exploitation through conservation, afforestation, increase in watersheds, strengthening the conservation of water flows through bunding, development of green cover, development of alternative techniques of collecting and harvesting the forest produce to maintain the ecological base and to protect the natural environment. Anthropologists dealing with tribal societies have pointed out that those tribes or indigenous people who depend on natural resources for their livelihood have elaborate traditional systems of natural resource management. In the past, such traditional indigenous systems of natural resource management have often been judged backward, wasteful and destructive. But in recent times there has been a growing appreciation of such traditional methods of resource management. There is a very close relationship between water, soil and forest. It is impossible to delink one from another. The vicious circle of soil erosion has its origin in the defective land use and destruction of the vegetative cover of the soil itself. Once there is a defective land use, the vegetative cover is destroyed which in turn increases the run-off and soil erosion. The immediate aftermath of the above is abrupt reduction of the water retention power of the soil. If this happens, then land becomes barren and forest cover is destroyed.

The wisdom of farmers with respect to forest conservation and management, agricultural management, watershed development, and conservation of soil, water for sustained production in the selected villages are documented in the present study. This study is an attempt at deepening the understanding of traditional methods of natural resource management through an analysis of the forest, land and water conservation and management practices followed by the Khasis of Meghalaya over centuries. The present study attempts to
critically evaluate the status of resource availability, future demand, potentials for development and harnessing, and also tries to suggest ways and means of exploiting the natural resources for sustainable development of the state in the 21st century. It also attempts to examine and describe the role and impact of traditional institutions in natural resource management with special reference to forest, land and water.

REVIEW OF LITERATURE

Research in the area of natural resource management has followed several avenues. Initially, it was tribal or village communities living in the vicinity of forest which were responsible for using and managing natural resources like forest produce of various kinds according to their needs. Their institutions grew and took shape accordingly. Any such community has got prescribed and established procedure determining how each member will use different species of herbs, shrubs and trees and in which measures (MacIver and Page 1974). Not only that, even the pattern of seasonal utilization of the resources was prescribed by the complex of values, norms and procedures, i.e., institutions of the community and more or less accepted by its members. The village and community economy depends on the natural resources, say non-timber forest products (NTFP), available and the pattern of seasonal utilization (Malhotra et.al. 1992).

A clear distinction has to be made between renewable and non-renewable natural resources with the central feature underlying the distinction being the variation in resource utilization possibilities over time. Tahvonen and Kuuluvainen (2000) discuss the economics of natural resource utilization and outline some historical debates on the scarcity of non-
renewable resources like the British Classical Economists Debate, the US Conservation Movement 1890-1920, and the first neoclassical studies on natural resources. Grundy, Turpie and Jagger (2000) made a study on the implications of co-management for benefits from natural resources for rural households in northwestern Zimbabwe. The study examines the short and long-term uses of natural resources in northwestern Zimbabwe in a complex ecological-economic setting and addresses issues of resource management in Sub-Sahara Africa which has prompted the consideration of joint management policies that incorporate the needs of several stakeholder groups. They conclude that co-management provides for slightly greater net benefits, but the transaction costs associated with the establishment of co-management may be too high to justify this option. A number of studies have also focussed on the extent of extraction and use of wild biota (chiefly plants) by indigenous societies. The works of Malhotra et. al. (1992), Panayotou and Ashton (1992), Plotkin and Famolare (1992) have focussed on these issues. The estimation of their economic value has been illustrated in the illuminated works of Malhotra et.al. (1992), Neumann and Hirsch (2000), Chopra (1993) and Fui and Ismail (1994) and Godoy and Lubowski (1992).

Few natural resource economists in the country endeavour to expound the economic aspects of forestry and allied subjects. The basic object in doing so is to knit the various aspects of forestry with the principles of economics - theory and practice - and to show that silviculture, forest and wildlife management, forest utilization, land use for environmental and ecological stability, forest based economic growth and development, etc. are not isolated strands of knowledge but are integral components of the same fabric - that of man's behaviour in the ordinary business of life for resource use and its management in Indian context (Pant
1984). Shashikant (2000) makes an analysis of a dynamic approach to forest regimes in developing countries by incorporating the socio-economic characteristics of the user groups viz. the heterogeneity of the user group with respect to forest management and the direct dependence of the user groups on forests.

Case studies of management and profitable use of forest resources have flooded the Indian scenario. Researchers have in course of time studied various communities and explored their management practices. It has come to light that communities throughout the world do engage in some form of management practices, be it for forest, land or water. Sacred species, groves, forests and other ecosystems, which have been conserved for religious and cultural reasons, offer an opportunity to build on an age-old traditional ethos of conservation. Descriptive accounts of origin, religious and cultural practices and related to sacred groves/forests/eco-systems/landscapes have been extensively published in recent years in the works of Gadgil and Vartak (1976), Frazer (1980), Khiewtem and Ramakrishnan (1989), Ramakrishnan (1996) and others. Gupta and Rout (1987) have conducted a case study of management and profitable use of forest resources of Morni Hills of Ambala District in Haryana. Das Gupta (1996) has studied the forest management practices by the War Khasis of Meghalaya. Tiwari et al. (1999) have written on the sacred forests of Meghalaya. Heltberg (2001) has analysed local institutions for forest conservation and management from a protected area in Rajasthan. Athparia’s (2000) work on the forest resource management practices among the Karbis of the Hill Areas of Assam shows that they have no definite tradition to preserve or conserve their precious forest resources, although, to some extent and perhaps unknowingly, they follow some kind of natural resource preservation. D'Souza
(2001) writes that while the commercial forces and the people themselves are destroying forests in many parts of Nagaland, the Angamis have preserved them in one of the exemplary ways. Darlong (2002) has made a comprehensive study of forest policies and legislations in the Northeastern region and has cited the Mizos who had a long tradition of establishing village safety reserve forests and similarly the Khasis and Jaintias have a long tradition of maintaining sacred groves. These researchers have made immense contribution to this field and their case studies on the various tribes and people of India suggest that Indian traditional knowledge is alive today and very operational. They found that forest played a vital role in maintaining ecological balance and influenced to a large extent the socio-economic condition of local population. They view forest resources from the point of view of their protective role, maintenance, improvement and maximum production. Case studies of Mizo’s safety reserve forests, Angami’s practice of private ownership of land and forests, method of cultivation of both terrace and jhum fields, religious beliefs, and the sacred grooves of the Khasis have shed much light on the importance of traditional knowledge which have immensely contributed to the continued richness of forests and forest resources of the Northeastern region of India.

The value of land as a capital asset cannot be accentuated enough. Land is non-reproducible, but in conjunction with water and forests, it is expected to meet most of our needs on recurring basis (Satapathy 2000). His study shows that India’s productive land base has been shrinking owing to social, economic, and political factors taking precedence over considerations of land capability. Studies by Tiwari and Singh (1995), Singh and Ghose (2000), Iyengar and Shukla (2000), and Satapathy (2000) have pointed out that there is a serious problem of land degradation in the Northeastern region due to human intervention
which have brought about a decline in the productivity capacity of land and this has caused a decline in soil productivity, deterioration in vegetative cover, decline of resources, pollution of air and ground water and has ultimately led to resource crunch. There is a compelling need for proper management of the Common Property Land Resources (CPLRs) in India (Iyengar and Shukla 2000) and eco-restoration of degraded land (Tiwari and Singh 1995). Soil conservation practices tend to slow down these degradation processes and increase soil productivity. Therefore, to achieve sound management of degraded soil, one has to adopt proper soil, nutrient, and water management practices (Singh and Ghose 2000).

The water requirement scenario calls for a sustainable development taking into account technical, economic, social, environmental, and institutional factors. Civilizations have even been compelled to shift from the region where water became deficient in amount, inferior in quality and erratic in behaviour (Mahajan 1989). Khulbe's (1989) study on the Kamaun Himalaya has brought to light the fact that degraded conditions of most of the watersheds are limiting factors for the development of the region and can be addressed only by the implementation of short and long term strategies for proper development of micro and macro watersheds. There is a need for proper water resource management which would require irrigation management, flood management, water supply facilities, hydro-power, industrial requirement and other uses. A sound and effective water management approach in the Northeast may come to the rescue of the neighbouring countries as well (Mitra 1999). Studies by Singh, Pradhan and Devi (1999) on the integrated water resource management of Manipur and by Agnihotri (1999) on the legal issues in the management of water in Meghalaya have highlighted the importance of a coordinated approach towards the better
utilization of water resources for different objectives - irrigation, hydro-power generation, flood control, transportation and environmental protection and the need for a proper legal framework for water resource management.

Gadgil et.al. (1993) state that due to the failure of pure legal protection in guaranteeing biodiversity conservation, it became necessary to search for solutions in the traditional conservation and resource management systems based on indigenous knowledge and local communities. Folke and Berkes (1995) consider traditional ecological knowledge as differing from scientific knowledge in being moral, ethically based spiritual, intuitive and holistic and having a large social context. But Gadgil and Berkes (1991) state that in contrast to the traditional ecological perception of nature found in indigenous societies, modern scientific management, with its roots in the utilitarian and exploitative worldview, assumes humans have dominion over nature. Maikhuri et.al. (1998) opine that there is a need for scientific evaluation of traditional conservation practices as all traditional practices may not be the best options in the present day world. Sustainable economies certainly cannot survive in the new circumstances. Monetary economy is increasingly becoming an attraction to the traditional people too. This line of thought has been well highlighted in the works of McNeely (1988) where he has tried to establish the relationship between incentives and conservation and Wells et.al. (1992) who opines that the Integrated Conservation Development Project (ICDP) attempts to use this approach of 'incentives and conservation' and is so designed to integrate conservation with the social and economic needs of the local communities. Dobriyal et.al. (1997) addresses issues on how traditional knowledge and conservation practices have served as the source of clews for many pharmaceutical innovations but local communities
have not been able to benefit from such indigenous potential. Posey (1990) estimates that less than 0.001 percent of the market value of plant-based medicines have been returned to indigenous peoples from whom much of the original knowledge came. Gadgil (1998) suggests value addition to biodiversity by building capacity of local communities and financial inputs should be organized as a national biodiversity conservation fund, which should be rationally allocated to local communities. Boojh (1992) suggests that the strategy for conservation should aim at the preservation of flora and fauna in their natural habitat in order to ensure and perpetuate their survival and this has helped in cementing the fact that traditional knowledge of management holds true even today. There is a need to preserve these ecosystems using successful traditional management practices appropriately blended with modern management techniques. There has to be a constant effort to raise awareness at all levels of the society, both about policies and legislations, and the need to manage the resources therein on sustainable principles as Misra (1992) has precisely pointed out that the impact of industrialization, modernization and the corresponding exploitative nature of humans on their environment has brought about a drastic effect on the environment and the culture of a society. There is urgent need for fresh thinking in the management of natural resources as there is a lot of concern about the erosion of local knowledge. Gadgil (1998) attributes this to the loss of community control over resources and Gupta (1997) blames it on insensitive state systems, which have taken over the resources. The use of forest resources for industrial development need not be regarded as an unmitigated evil. What must be sought is a right balance, to avoid destruction of forest resources and of tribal life in the name of industrial progress. Therefore, he feels that there is a need to stem the erosion of knowledge which
sometimes is a greater threat than the erosion of resource itself, develop contingent mechanisms among children and young people to keep the knowledge stream flowing, persuade biotechnology and other companies and institutions to develop greater reciprocity towards conservator of biodiversity and strengthen reciprocity amongst the beneficiaries of, and contributors towards green (crop), white (milk) and blue (fish) revolution. The empowerment of local knowledge experts will require building bridges between the excellence in formal and informal science (Gupta 1999). Vohra (1992) elucidates the idea that management of our water resources is inextricably interlinked with that of our land and biotic resources and cannot be understood in isolation. Therefore, he feels that an institutional arrangement should be created which would make it possible for a synoptic and integrated view of their various requirements. He therefore suggests that there is a clear case for transforming the Central Ministry of Water Resources into a Ministry of Natural Resources which would place under one administrative umbrella the various disciplines, agencies and programmes related to water, land and forest management.

OBJECTIVES OF THE STUDY

The objectives of the present study are:

- To study the natural resources management practices in Meghalaya with special reference to forest, land and water.
- To understand the role of traditional institutions in the natural resources management practices.
- To assess the impact of degradation of natural resources on the culture and economy of the people.
METHODOLOGY

“The central activity in anthropological research method is fieldwork” (Ericksen 2004: 43). Intensive fieldwork has been considered for nearly seven decades, to be a major, if not the distinctive, method of social and cultural anthropology, and until recently, the discipline has been concerned primarily with the study of small scale societies, primitive and peasant societies (Srinivas 2002: 1). Franz Boas in America and B. Malinowski in Great Britain set up ethnographic fieldwork tradition in anthropology towards the turn of the twentieth century. Intensive fieldwork, however, has traveled far since Malinowski did his fieldwork in the Trobriand Islands both with regard to the methods and techniques used, and the kind of communities and problems studied. The present study is primarily based on fieldwork in two purposively selected villages; the purpose being to identify villages where natural resources management practices exist but are significantly different.

Data were collected on the basis of household census, interview schedules and observation. In-depth interviews of key informants were also conducted which helped in procuring qualitatively rich data. The question of sampling the respondents did not arise as the researcher covered each and every household within the one village and two hamlets of the other village. The respondents were both men and women from different age, occupation, educational, religious and clan backgrounds. Villagers were generally busy with their work, so with tact and patience I had to wait for an opportune time to interview an individual. Secondary data related to the thesis were collected from various sources like government reports, books and journals, Internet and publications that involved similar studies.
Though the present researcher was an insider to the larger community under study she was an outsider in the villages. Hence, instant acceptance and rapport building were problematic. Therefore, contact was established directly with the headmen of the respective villages through local people. The purpose of the study was explained to them after which the people were generally friendly and cooperative.

The Villages under Study

Fieldwork was conducted in Thad Village, a low-altitude area, which falls under the Ri-Bhoi District and Nongkrem village, a high altitude area which falls under the East Khasi Hills District. People practise wet paddy cultivation in the former and in the latter they practice *bun* cultivation, a modified version of *jhum* cultivation, where plantation is done on raised beds after the initial clearing and burning of the vegetation in a chosen area and is basically a ridge and furrow method which has been developed locally to suit the difficult mountainous hilly terrain and high rainfall conditions of the area. Since the farming systems are very different in the two villages due mainly to different geographical terrains, there are significant differences in the way they manage their resources. The sole purpose of taking the two villages is to be able to contrast and compare the ways and means of natural resource management.

Another important reason for taking the above two districts is also the fact that the International Fund for Agricultural Development (IFAD) in its North Eastern Region Community Resource Management Programme (NERCORMP) project was concentrating its research on natural resource management in the West Khasi Hills and the West Garo Hills districts of Meghalaya. Therefore, the investigator has opted for Ri-Bhoi and East Khasi Hills
so that the data collected by her would not duplicate what the IFAD team was collecting, besides making it possible for her data based on intensive research to be compared with those collected by the international agency. Doing so would also mean a more comprehensive understanding of natural resources management of Meghalaya. However, in 2004 IFAD funded the project titled Meghalaya Rural Development Society in five districts of the State including Ri-Bhoi and East Khasi Hills, yet the two villages under study were not a part of the survey villages of the IFAD project.

The fieldwork for the present study was conducted between 2003 and 2005. The journey to Thad village, which is about 10 kilometres from the National Highway 44, was along the jeepable road for about 3 kilometres. Transportation posed a big problem as there were no vehicles available to reach the village except once in a week, that is, on the market day. If there was heavy downpour then it was very hazardous to travel by car and it was safer to travel on foot. Nongkrem village being quite near the capital of Meghalaya there was no problem of transportation.