Nothing in the world is static. There is constant change. Long before our hominid ancestor came on the scene, such all-embracing factors as plate-tectonics, worldwide changes of sea level, profound alterations in patterns of climate, and the evolution of new species of plants and animals have been continuously changing the face of the world. In response to such comprehensive change, more local changes of the kind we usually mean when we talk about environmental change were also taking place. Rivers changed their courses; rich alluvial soils were formed or swept away, the average annual rainfall of whole regions increased or decreased, and the balance of plant and animal populations altered. All these changes were ultimately due to the interplay of a multiplicity of factors, and our hominid ancestors initially must have been no more than an additional minor factor playing a very small part in all that was going on (Grove *et al.*, 1998: 30). Early humans therefore, in a real sense were dominated and at the mercy of the environment, where environment has been profoundly affected by human activities. The awareness of men’s dependence upon nature had a long ancestry; but the realization of the significant role of man as the maker and unmaker of nature has developed only recently (Arnold *et al.*, 1996:3). Human history has been a story of prudence and profligacy and man’s destructive role as far as his relation with the environment is concerned is quite evident today (Gadgil *et al.*, 1992: 1-5).

It is a common misconception that deforestation is only a contemporary incidence, gaining momentum in the tropical regions of the world dated back only to the 500s. The history of deforestation takes us back into the corridors of time when humans primarily occupied the earth. More than 40 years ago, H. Clifford Darby suggested that “probably the most important single factor that has changed the European landscape (and many other landscapes also) is the clearing of the woodland,” and he may well have been right. Indeed, perhaps more of the earth’s surface has been affected by this process than by any other single human activity.
(cited in William, 2006: XV). In addition to the natural, climatically induced changes, the human impact was early, widespread, and significant and the forests of the world changed accordingly. Across the globe, the first halting steps toward deforestation were under way. In the space of 10,000 years (a mere 500 generations) humans were going to have an effect on global vegetation only slightly less dramatic and widespread than that of the Ice Age in the 100,000 years before (ibid.: 11).

Studies have proved climate change even during Holocene period. Thought not characterised by the extreme climate fluctuations, it has been significantly variable (see Dansgaard et al., 1971; Denton and Karlen, 1973; Dunbar, 2000 and Fleitmann et al., 2003). A variety of geoscientific evidence also supports episodes of drought and forest fragmentation during the late Pleistocene.(Hafler and Prance, 2001: 582- 583) has also cited on Holocene climate change cycles of approximately 2500 years and 1500 years. Even in the Classical Age, there is mention of clearing of forest. The Greeks for instance, generally tended to fear and revere wild nature. They found meaning in the forest and thought of it as the original home of humankind where human sprang from oaks. But this ended with forest clearing; the fallen trees being linked to warriors slain in battle. In the Roman Age, there is evidence that nature was not being revered but being commodified, traded and sold and that its possessions was seen as a means to wealth and capital accumulation (ibid.:585-586). Man’s encroachment on the forest, clearing trees for space to set up communities and using wood for fuel, as well as for building houses, furniture, boats and other equipment is as old as human existence on earth. But in the distant past, the smallness of human population in the midst of the vastness of the forest wilderness made the steady process of deforestation to appear almost insignificant. However, all that has changed since the mid-twentieth century is that an ancient domain has processed, and irreversibly damaged has occurred.

The evolution of the process and practice of deforestation is an interesting one. For instance, chopping down trees is part of an age-old human quest for shelter, food and warmth. Trees provide wood for construction, shelter and making a multitude of implement; wood provides the fuel to keep warm, to cook food and make it palatable, and even to smelt metal. Clearing of forest also requires no sophisticated technology. Humans with stone or flint axes need boundless energy to fell tress; in contrast, fire and browsing animals can wreak havoc with little effort. The substitution of metal for
stone axes circa 3,500 years ago, and then for saws in the medieval period, eased the backbreaking task of clearing, and accelerated the rate of change, but it did not alter the basic process of destruction and land-use transformation. Power-saws during the last fifty years have made a major impact. Perhaps the only reason why there were no significant effects at that time is because of demographic issues. As population increased from circa 1000 BC to AD 800, deforestation increased, soil erosion accelerated, and essential nutrients such as phosphorous were rapidly leached out of the soils of this potentially fragile environment. Productivity must have declined dramatically. Certainly, population numbers plummeted. The collapse of the Copan Mayan state between AD 850 and 1250 is also attributed unequivocally to growing population, agricultural intensification, fuel wood demands, deforestation, soil erosion, and lowering agricultural productivity (William, 2006:50-51). Since the advent of industrialization began deforestation processes continued and even rose to bigger numbers. During those times, timber was in great demand, thus, business of logging grew in astounding counts. But the probable effect to the forest was not seen. Whenever forests were depleted, men went from place to place in search of new fresh source to meet their ends.

The use of soils in a slash-and-burn method for creating short-term goals contributes to deforestation. Slash-and-burn is a method of agricultural cultivation that involves the cutting and burning of plants in forest or woodlands to create fields for farming. It is typically practiced in shifting/jhum cultivation agriculture and in human migratory livestock herding (Walters, 2007:3). Areas of forest are burned and cleared for planting; the ash provides some fertilization and the plot is relatively free of weeds. After several years of cultivation, fertility declines and weeds increase. Traditionally, the area was left fallow and reverted to a secondary forest of bush. Cultivation would then shift to a new plot; after about a decade the old site could be reused. Historically, slash-and-burn cultivation has been an agricultural practice throughout much of the world, in grasslands as well as woodlands. Since Neolithic times, slash-and-burn techniques have been widely used for converting forest into crop fields and pasture (Awe, 2006: 104). Clearing fields by fire was practiced even before the Neolithic. Hunters-gatherers used fire to clear fields to attract game animals and to facilitating the growth of edible plants such as berries.
During the Neolithic Revolution, significant agricultural advancements were made. Groups of hunters-gathers domesticated various plants and animals, permitting them to settle down and practice agriculture. This practice provided more food per hectare than hunting and gathering. This happened in the river valleys of Egypt and Mesopotamia. As human populations increased with less dependence on obtaining food by hunting, agricultural cultivation became more important. There were people who could easily cultivate their crops in large fields along river valley. But there were others who had to clear forests to obtain farming land. Therefore slash-and-burn agriculture was the means used by ancient human populations to clear more land to make it suitable for plants and animals (see Steward, 1956). Slash-and-burn is a method of cultivation often used by tropical-forest root-crop farmers in various parts of the world and by dry-ice cultivators of the forested hill country of South East Asia. It likely is the main reason why gigantic land areas have been totally exhausted and eroded. Such lands are of no use for any form of cultivation at the present time. Beyond doubt, the demand of growing businesses have endangered the forests ever since (ibid.).

A significant percent of global population has a direct relationship with forest and trees. In every region of the world, there are communities that live within or immediately adjacent to forested areas that depend on them for sustenance. It has been estimated that one quarter of the world’s poor depend directly or indirectly on forest for their livelihood. The world vegetation cover under natural forests has been depleting fast and significant portion of such areas is being converted to man-made plantation forests mainly for timber trees, to meet the growing need of the ever increasing human population. Moreover, human activities have altered the earth’s environment by changing the land use and land cover in the past several centuries. More than 1.6 billion people depend to varying degrees on forest for their livelihood. Out of this, 60 million people are almost wholly dependent on forest and 350 million people live within or adjacent to dense forests for subsistence and income. Therefore, global environmental concerns have of late led some historians to study the environmental aspects of the past human societies. Environmental change is arguably the most pressing and potentially disastrous problem facing the global community. Population, global-warming, species extinction and massive disruptions of critical ecosystems have become common place topics (Cumley, 1994: 1).
Deforestation, in the strictest sense means the replacement of forest by non-forest. FAO and World Bank implicitly assume that both permanent and temporary removal of forest cover constitute deforestation. In so doing, they include as “deforestation” large areas of shifting cultivation that will eventually return to secondary forest status. This definition, therefore, greatly enlarges both the area assumed to be deforested and the role of shifting cultivation in overall deforestation (World Bank, 1990:3,147; also see FAO, 1990). Lund (1999) characterized deforestation as the long-term or permanent removal of forest cover and conversion to a non-forested land use. Although deforestation first became a serious concern in the 1950s, it has been an issue since humans began making fires hundreds and thousands of years ago. Small scale deforestation was practiced by some societies for tens of thousands of years before the beginnings of civilization. The first evidence of deforestation appears in the Mesolithic period (Brown, 1997: 133). It was probably used to convert closed forests into more open ecosystems favorable to game animals. With the advent of agriculture, larger areas began to be deforested, and fire became the prime tool to clear land for crops. According to Omer Stewart (1956), fire is, “the first great force employed by man,” and it was crucial in the story of deforestation. With fire, humans accomplished the first great ecological transformation of the earth, to be followed much later by two others of the same order of magnitude: the development of agriculture and animal husbandry 10,000 years ago, and the rise of large-scale industrial production a little less than 200 years ago. Humans assimilated fire into their biological heritage, thereby gaining access to the world’s biota, and the biota, in turn, acquired a new regimen of fire transformed by human society (William, 2006: 13). Jared Diamond, a geographer gives an extensive look into the collapse of the ancient Eastern Islanders in his book Collapse (2005). The disappearance of the island’s trees seems to coincide with a decline of its civilization around the 17th and 18th century. He attributed the collapse to deforestation and over-exploitation of all resources.

Global deforestation sharply accelerated around 1852. Estimates reveal that if the present day rate of development continues unabated, the depletion of the biosphere to the point of instability would occur in the second half of the next century. We are presently spending the potential energy of the biosphere at ten times the rate it is being accumulated by living organisms that can absorb sunlight. At least 60 percent
of the forests of the planet have been lost. It is estimated that about half of the Earth’s mature tropical forest, that is between 7.5 million and 8 million km² (2.9 million to 3 million sq m) that until 1947 covered the planet – have now been destroyed (Nelsen, 2006:35). Some scientists are predicting that if the present level of destruction goes on, by 2030 there will only be 10% of our forest remaining, with another 10% in a degraded condition and 80% totally lost (Wilson, 1988:4). Depletion of forest means, increasing the carbon dioxide in the atmosphere, which is the root cause of global warming. It was reported in May, 2013, that readings for CO₂ taken at the world’s primary benchmark site in Mauna Loa surpassed 400ppm₄. In 2012, studies suggest that in 20 years, 25% of all mammal species could be extinct. It is also estimated that if the present rate of extinction is not halted, up to 30% of all species will be extinct by 2050. Of these, about one eight of known plant species will be extinct⁵. Records of the geological past shows that ecosystems have some capacity to adapt naturally to climate change but this resilience has never been challenged by a large global human population and its multi-faceted demands and pressures on ecosystems. The resilience of many ecosystems is likely to be exceeded by 2100 by an unprecedented combination of change in climate, associated disturbances (e.g. flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources(State Forest Report, 2013:291-292) Humphrey in April 2006 refers that current trends of agricultural expansion and deforestation in the Amazon indicate that, by 2050, 40 percent of the Amazon forests will be lost, with one quarter of the 382 mammalian species examined losing two-fifths of their Amazon forest ranges. Humphreys says that — global environmental degradation is the most critical public welfare issue of our age. The Guardian also reported that razing of forests is a major contributor to the emissions that drive climate change. Trees provide a vital store of carbon, as well as providing livelihoods for a billion people. Destruction of the Amazon rainforest has increased by almost one-third in the past year, reversing a decade-long trend of better protection for the world's greatest rainforest⁶.

In many countries, deforestation, both naturally occurring and human induced, is an ongoing issue. The term deforestation is often misused to describe any activity where all trees in an area are removed. However in temperate climates, the removal of all trees in an area—in conformance with sustainable forestry practices—is correctly
described as regeneration harvest. In temperate mesic climates, natural regeneration of forest stands often will not occur in the absence of disturbance, whether natural or anthropogenic. Furthermore, biodiversity after regeneration harvest often mimics that found after natural disturbance, including biodiversity loss after naturally occurring rainforest destruction (Sahney et al., 2010: 1079-1082).

Deforestation occurs for many reasons: trees are cut down to be used or sold as fuel (sometimes in the form of charcoal) or timber, while cleared land is used as pasture for livestock, plantations of commodities and settlements. The removal of trees without sufficient reforestation has resulted in damage to habitat, biodiversity loss and aridity. It has adverse impacts on bio-sequestration of atmospheric carbon dioxide. Deforestation has also been used in war to deprive the enemy of cover for its forces and also vital resources. Modern examples of this were the use of Agent Orange by the British military in Malaya during the Malayan Emergency and the United States military in Vietnam during the Vietnam War. Among countries with a per capita GDP of at least US$4,600, net deforestation rates have ceased to increase. Deforested regions typically incur significant adverse soil erosion and frequently degrade into wasteland.

Disregard or ignorance of intrinsic value, lack of ascribed value, lax forest management and deficient environmental laws are some of the factors that allow deforestation to occur on a large scale. In many countries, deforestation, both naturally occurring and human induced, is an ongoing issue. Deforestation causes extinction, changes to climatic conditions, desertification, and displacement of populations as observed by current conditions and in the past through the fossil record. According to the United Nations framework convention on climate change (UNFCCC) Secretariat, the overwhelming direct cause of deforestation is agriculture. Subsistence farming is responsible for 48% of deforestation; commercial agriculture for 32% of deforestation; logging is responsible for 14% of deforestation and fuel wood removals make up 5% of deforestation (UNFCCC, 2007: 81). Other causes of contemporary deforestation may include corruption of government institutions, the inequitable distribution of wealth and power, population growth and urbanization. Globalization is often viewed as another root cause of deforestation, though there are cases in which the impacts of globalization—new flows of labor, capital, commodities, and ideas have promoted localized forest recovery. In 2010, the United Nations
Food and Agriculture Organization (FAO) found that during the period 2000-2010, worldwide deforestation mainly due to conversion of forests to agricultural lands, was responsible for the loss of 5.2 million hectares of forest per year of 140km$^2$ of forest per day$^{11}$. Thus deforestation, being a subject of prime concern of today’s fast deteriorating environmental scenario, needs to be seriously considered and treated with. Attention must be drawn to numerous discourses from particular to general, in order to comprehend the processes and to take effective measures there upon.

In Indian society, right from ancient times, forests played a dominant role in her history. Many tribal religions are founded on a community’s relationship with its natural environment. Shrines are situated deep in the forest and often there is a sacred grove of trees by the village, which express and make conscious people’s relationship with their environment and each other. The *Rig-Veda* establishes the symbolism of close kinship with the environment when it says: “Heaven is my father; my mother is this vast earth, my close kin” (*Rig Veda*, 1.164.33). The *Atharva-Veda* contains-Bhumi Sukta—in praise of the earth and invokes a balance: upon the immutable, vast earth support by the law, the universal mother of the plants, peaceful and kind, may we ever walk forever”. The elaborate Vedic ritual of “Athiratram” had, as its precise objective the generation of a positive impact on man and the environment and continues to be performed to this day with the same fervour and faith$^{12}$. The *Mahabharata* in one of its profound ecology perceptions compares the trees to the universe; it says that he who “worships the ashvattha (peepal, holy fig tree) worships the universe. The tree was seen as a symbolic representation of universe with a single trunk and its multiple branches of manifestation. The legendary philosopher of Tanrilakan, Therivalluvar, talks of nature as man’s fortress. If he destroys her, he remains without protection$^{13}$.

No doubt, there was wave of clearance of the forest in the ancient Indian history. The Smriti Vedas or the Vedas for Kali Yuga, which constitutes a branch of Hindu religious literature, includes two epic poems: *Mahabharata* (composed by sage Ved Vyasa) and *Ramayana* (composed by sage Valmiki), contains umpteen reference to forests. According to these, the land originally was under tree cover, but as human settlements expanded, trees were cleared to make way for cultivation. The legend is that king Prithu milked the earth (*Prithvi*) in the form of a cow, signifying the start of agriculture. Prithu is also credited with the feat of clearing forest and establishing the
organized agricultural settlements and townships (Kumar, 2008: 301). The
Arthashastra too advocates the clearing of forest. Nevertheless, there are people who
worship the big trees as a dwelling place of some deities. Felling of big trees is taboo
in many parts of the country. Ancient Indian History also mentions about the Indian
sages meditating and taking hermitages in the forest. In the third of the four stages of
life, an Aryan led the life of a forest hermit (Goswami, 2012: viii). Therefore forest
was an indispensable part of man’s life. The forest has always been revered by the
people in their daily life and is inseparably interwoven with the progress of
civilization. India’s forests constitute an integral part of the world’s widespread
ecosystem. Besides, ensuring ecological security to all forms of life and being used as
the very essence of life for a large section of the society, our forests are the vital
resources for development (Bora, 2012: 19).

The second half of the nineteenth century marked an important watershed in
the history of India, with the establishment of the British governance. In the name of
agricultural expansion, there are reports concerning the simultaneous onset of
deforestation. Deforestation, driven by agricultural expansion and aggravated by the
extraction of forest biomass at unsustainable levels, has long been recognized as a
dominant trend in the history of Indian land use. However, the displacement of forest
vegetation by agriculture has by no means been limited to the colonial period alone. A
reconstructed map of land use in the seventh-century India, based on reports by
Chinese traveler Huien Tsang (c.AD 624-642), indicates that extensive agricultural
development had already taken place at that time (Banerjee, 1966: 29). A second map,
based on sixteenth-century revenue records and contemporary traveler’s reports,
indicates that extension of agricultural land caused further deforestation of the
Gangetic plain, and also displaced woody vegetation on lowland Peninsular India
during the medieval period (ibid.).

In Aligarh district before 1820, the northern part in particular and then
Bulandshahar district was covered with thick dhak jangal. Most of this jangal was cut
down in the following three decades. The rest of the dhak jangal disappeared in the
second half of the nineteenth century. In the mid-1820s there was still dhak jangal
around Bharatpur but around 1850, there was no remaining forest in the area beyond a
small patch south of Bharatpur. According to a contemporary observer, the belt of
jangal up to 3 miles wide disappeared in the ten years following British arrival there.
The British often established their authority over newly acquired land with the method of forest clearance. Similarly, large areas of *jangal* were destroyed to deny robbers and other criminal elements, commonly known as “dacoits and bandits”, of their hiding places. To prevent any threat to agrarian expansion, the *jangal* was cleared when it offered protection to tigers and other wild animals (Mann, 1998: 408). In 1820s, however, attempts were made by medical surgeons to establish conservancies or teak plantations in Malabar, in Bengal, or in Burma between 1805 and 1822 (in connection with war-time timber shortage). As early as the 1820s, some of the surgeons lobbied heavily against the deforestation taking place during that decade and argued in favour of plantation programmes. Nathaniel Wallich, the director of the Calcutta Botanical Garden was pre-eminent among these early campaigners. In spite of these early efforts, a direct connection between decline in forest area and apparent regional increases in desiccation of forest in India was not put forward as an argument for controlling deforestation until the end of 1830. Throughout the 1820s and 1830s, anxieties about deforestation were already frequently expressed. Bishop Heber, for instance, warned in 1824 that excessive deforestation, of the kind he had observed in the Siwalik foothills, might lead to a more general aridity (Grove, 1997: 69-70). By 1847, then, the supremacy of the medical service in its hold over government environmental policy had become well-established and was further institutionalised in Gibson's Superintendency of the Bombay Forest Department. This department was formed with the prime aim, not of securing a steady supply of timber (though this was still a pressing concern), but of inhibiting the whole range of environmental and social consequences which deforestation might cause. The fear of these consequences, especially the fear of widespread climatic change, forced the colonial state to comply with a conservationist prescription (ibid.:78). The Imperial Forest Department was then established in India in 1864. British state's monopoly over Indian forests was first asserted through the Indian Forest Act of 1865. This law simply established the government’s claims over forests. The British colonial administration then enacted a further far-reaching Forest Act of 1878, thereby acquiring the sovereignty of all wastelands which in its definition included all forests. This Act also enabled the administration to demarcate reserved and protected forests. These colonial laws brought the forests under the centralized sovereignty of the State. Thus, in colonial times, forest was utilized for the interests of the government and was exploited. Forest areas became a source of revenue.
In the aftermath of 1857 Mutiny, the East India Company was replaced by the British Crown as the Colonial government of northern India. As a matter of military policy, the new administration invested massively in railway development (Flint, 1998: 437). The building of the railway network in 1853, for creating a market for British goods and the outlet for British capital seeking profitable avenues for investment, was a crucial watershed in the history of Indian forestry. In India, few timber species were sufficiently strong, tough and resistant to termites and fungal decay to be used as railway sleepers, and only three meeting these criteria were available in large quantities: Sal and deodar (*cedrus deodara*) in northern India, and teak (*Tectona grandis*) in the south. Accessible forests of all three species were ruthlessly over felled by zealous contractors responding to the unprecedented demand for timber during the first decade of railway expansion (ibid.). As a result, considerable areas of forest in northern and central India were subjected to ruinous over exploitation. Many trees were cut which could not be extracted economically, so left to rot unutilized where they had fallen, increasing the fuel load in the forest vulnerable to frequent fires.

The genesis of shifting cultivation as an indigenous agricultural system mostly in the hilly tribal regions that is the north-eastern states, Orissa, Central India and the Western Ghats also contributed to deforestation to some extent. Shifting cultivation evolved as a form of land use to circumvent major problems of tropical agriculture like soil erosion, low nutrient status and pest pressures (Mc Grath, 1987: 2). It is the brief period of utilization, small size of the plots and far-reaching preservation of the original surface roughness and soil texture due to residual tree stumps, absence of leveling etc, which prevented intensive erosion (Flint, 1998: 437). When population pressure on land was low and fallow periods long, much of the land under this system remained under various succession stages of natural vegetation. In other words, the forest always reclaimed what humans cleared. However, during the colonial rule, the pressure on land grew or was hugely intensified to generate an economic surplus from the forest. Therefore, a tendency arose to create fields by permanently clearing the forest. The Forest Department’s attempt to preserve the forest by forbidding tribal’s customary cutting of trees has had a divide-and-rule effect on tribal’s and the forest. Tribal’s reacted to the restrictions on their customary rights by cutting whatever they can get away with, of what they used to regard as their own forest (Padel, 1998: 899).
From the 1860’s and 1870’s, the reserving of India’s forest was motivated partly by concern that a vital source of government revenue was being depleted. But the forest service which was set up to protect the forest, from the start actually did the opposite, generating revenue by selling timber to supply the railway. The government blamed deforestation on the tribal practice of shifting cultivation. The Forest Service, therefore, set up a system of forest guards, towing tribal areas to register reserved forest and prevent the unauthorized cutting of trees. But the practice of shifting cultivation was, and is, such an integral part of the way of life of the tribal communities, that it could not be stopped (ibid.). Another important factor that posed threat to forest in India is grazing and forest fire. Against a sustainable 31 million cows unit per annum, nearly 99 million units are found in free and unrestricted grazing in about 78 percent of the forest areas. Annually, forest fire burn about 0.5 million hectares of forest. Research has established that burnt forests are the sources of flash floods and heavy sediment discharges (Bora, 2012: 31).

With India’s independence, in the name of development, a new form of oppression has accompanied the assault on the environment by the establishment of industries. The national interest for the development of industrial projects led to huge eviction of people and the land. Mining for coal, iron and other like minerals has also led to the displacement and hampering of the environment. During 1980-2005, close to 0.1 million hectors of land was diverted across the country to make way for 1,200 mines. This diversion has destroyed ecosystems as well as livelihoods (Centre for Science and Environment, 2012: 8). Between 1940’s and 1960’s, enormous reservoirs were created by the construction of dams in association with industrial expansions. For instance, the Hirakud dam in Orissa(1948), the Bhakra Nangal dams in Himachal Pradesh(1954), the Rihand dam and the reservoir in UP (1961) etc., were constructed. This big industrial project displaced not only the people from their lands but effects the environment in the long run and invites social disaster.

The National Forest Policy (1952 and 1988) stipulated to maintain one-third of the total geographical areas of the country under tree cover. The policy states that the forest should not be looked upon as a source of revenue but to be protected and enhanced for the well-being of the people and the nation (ibid.: 19). However, there was no halt in the process as many of the forest lands were diverted to other purposes. In 1953, the government nationalized the forests which were earlier with the
Zamindars. India also nationalized most of the forest wood industry and non-wood forest products industry. Over the years, many rules and regulations were introduced by India. In 1980, the conservation Act was passed, which stipulated that the central permission is required to practice sustainable agro-forestry in a forest area. Violations or lack of permits was made a criminal offense. These nationalization wave and laws intended to limit deforestation, conserve biodiversity, and save wild life. However, the intent to these regulations was not matched by thereality that followed. Deforestation increased, biodiversity diminished and wildlife dwindled. India’s rural population and impoverished families continued to ignore the laws passed, and use the forests near them for sustenance (FAO, 2001). As per the Desertification and Land Degradation Atlas of India published by the Space Application Centre in 2007 about 32.07% of the land is undergoing various forms of degradation and 25% of the geographical area is affected by desertification. About 69% of the country’s lands are dry lands, and degradation of these lands has severe implications for the livelihood and food security of millions. It is worth noting that India occupies only 2.4% of the world’s geographical area, yet supports about 16.7% of the world’s human population; it has only 0.5% of the world’s grazing land but supports 18% of the world’s cattle population. Thus there is tremendous pressure on our land-based natural resources, and sustainable land management is crucial for sustainable development (State Forest Report, 2013: 285).

Climate change is a global phenomenon but adversely affects developing countries particularly as their capacity and resources to deal with the challenge is limited. India is already vulnerable to a large degree of climate variability. Climate has played a major role throughout the Indian history. The rise and fall of the Indus Valley Civilization is strongly linked to climate. The ancient cities of Harappa and Mohenjodaro in the northwestern region of ancient India that flourished between 2800 and 2600 BC had large granaries, an evidence of strong agriculture. However, cities were abandoned in 1900 BC. Among many hypothesis, climate drying is considered a plausible explanation (see Singh, 1971). The rainfall at that time ranged between 400 and 800 mm per annum (see Lamb, 1982: 387). Fairservis (1967) also concluded that too many demands were being made on the soil and water resources of the region. Deforestation of the galley forest (riparian forest) may have exacerbated flooding of the cities developed along the river and the floodplains. Recent studies indicate that
climate change may exacerbate the problem of existing climate variability in India. It is projected that, by the end of 21st century, rainfall in India may increase by 15-40% with high regional variability. Warming may be more pronounced over land areas with northern India experiencing maximum increase. The warming could be relatively greater in winter and post-monsoon seasons. The annual mean temperature could increase by 3°C to 6°C over the century (ibid.).

1.1: Deforestation in North-East India

The North Eastern Region (NER) comprises of the states of Arunachal Pradesh, Assam, Manipur, Nagaland, Mizoram, Sikkim and Tripura. The region stretches between 21°50’ and 29°34’ N latitude and 85°34’ and 97°50’ E longitude. The region has a geographical area of 26.2 million hectare which is 8% of the area of the country. Assam is situated in the center and hill states (except Sikkim) are situated around it. Out of the total geographical area, 28.3% has an elevation more than 1200 m, 17.9% between 600 and 1200 m and about 10.8% between 300 m and 600 m above mean sea level. The hilly areas of the region are sparsely populated (63 people/km²) compared to plains (369/km²). The region has about 72% area under hilly ecosystems. The region has inaccessible terrain, fragility, marginality, excessive sloping land with rolling topography, rich biodiversity, unique ethnicity and socio-ecological set up (Das et al., 2009: 32).

It is a common knowledge that the economy of North east region remained dominated by forest based activities. Shifting cultivation, which began during Neolithic period, is still practiced in many areas and at least 1.5% of the region still practices this type of cultivation (Maiti and Chakrabarti, 2002: 1-10). According to State of Forest Report 2013, Ministry of Forest and Environment, Government of India, a major threat of forest of India are in the NE states. From ancient times, the locals have practiced slash-and-burn shifting cultivation to grow food. The tribal people consider it a traditional and economic ecosystem. However, the slash and burn causes damage to a dense forest, to soil, to flora and fauna as well as pollution leading to climate change. Large scale deforestation has attributed to the decline in rainfall in Cherrapunjee, which was once famed as the recipient of heaviest rainfall in the world. The decline in rainfall was strengthened by the chronic crisis of drinking water (Nag, 2008: 23). The assigned reasons for the scarcity were that the soil was not able to absorb, retain and store the rain water. The obvious cause was found to be large scale deforestation resulting in
loss of top soil (ibid.: 25). Khasi Hills Meghalaya, an area where natural hazards viz.,
earthquake and rainfall induced landslides combined with high biotic pressure viz.,
deforestation, surface mining of limestone and coal, shifting cultivation have
accelerated the environmental degradation processes, leading, in many places, to
complete degradation of vegetation cover and soils (Prokop and Bhattacharyya, 2011:
258-262). Between 2010 and 2012, satellite studies confirmed a net loss of forest
cover over these NE states (StateForestry Report, 2013).

Besides, there are different kinds of forest ownership system in this region. Almost
half of the total population of the rural areas in N-E India would be depending
on forest for their food, fodder, fuel, shelter, fiber, timber etc. The episode of
deforestation in NE India is indifferent from the state of deforestation as a whole in
the country. The change in forest area cover in this part of the country clearly
indicates the process of deforestation to some extent. Accounting to an area
approximately 2,62,230 sq km, and the zone was highly saturated with thick forest
cover, which was conspicuous up to the 7th decades of the nineteenth century. As per
the 1971, census the population density in the forested track stands at 52 people. On
the contrary, the 2011 census displays a substantial increase in the population density,
which stands at 148. As such, through a survey conducted by the FSI (2009-2011),
confirmed that the overall net rate of deforestation was relatively high in the NE
region with -0.90 to -5.29 destruction of forest (Reddy et al., 2013: 1492). Even after
the enactment of New Forest Policy, 1988 by the Ministry of Environment and
Forests, Government of India the process of deforestation still continues. Large scale
deforestation has already put a threat to the mode of life of the people. NE India, like
other parts of South Asia, faces problems interfacing population pressure, and the
absence of alternative living means other than agricultural activities has been
stimulating people to encroach the forest land. In consequence, the tribal’s has started
facing crisis to their traditional practice associated with the forest. The people
accustomed with forest environment and ecological ethics have started losing their
habitats, food, cultural practices based on available physical environment and mode of
co-existence with nature. Ruthless deforestation coupled with the frequent inter-state
border conflict pushed the tribes from the forest areas. Absence of timely intervention
and reduction of population size has opened the door for reckless exploitation of
forest wealth and creates a congenial ground for the extremist out fits in the forest belt
areas (Goswami, 2012: 16-17). Under such a scenario, it has become very important to analyze on the varied aspect of deforestation and its impact on the people and also to look into the sensitive issue of political ecology.

1.2: Environmental history of India: An overview

Deforestation has also been a priority concern for historians dealing with the environmental history of the country as it deals with land, forest, the people and culture, and economic base associated. Such environmental historical research is relatively new for historians, and literature on environment history in general and Naga Hills in particular is scanty. Many researches had already been done on various subjects related to the colonial phase of the British rule. The impact of the British forest policy in the Indian context has been studied in various regional perspectives and research continues to be carried on by scholars. T.J. Campbell’s *A brief History of the Forest Department of Assam* (1898) and H.P. Smith and C. Purkayastha’s *A short history of the Assam Forest Service 1850-1945* (1946) are early works dealing on regional prospects. Another work is that of Ramachandra Guha’s *The unquiet woods: Ecological changes and Peasant resistance in the Himalayas* (1989) which is an agenda on environmental works set as a critique of colonial policies. Madhav Gadgil and R. Guha’s work *This Fissured Land: The Ecological History of India* (1992) gives an immense theoretical importance and other information; it also contains few references on Assam. P.M Mohapatra and P.C Mohapatra’s *Forest management in tribal area: Forest policy and People’s Participation* (1997) is a pioneering work outlining the steady deteriorating of the forest along with the condition of the people, mainly the tribal people, living in and around the forests and depending on the forests for their living. Rajib Handique’s *British Forest Policy in Assam* (2004) examines the socio-economic and environmental impact of the British policy but even this work contains limited information of the Naga Hills District which was previously a part of colonial Assam. Gupta, Thapliyal, Pal and Joshi *Impact of Deforestation on Indian Monsoon- A GCM Sensitivity Study* (2005) published in *Journal of Indian Geophysical Union* is an addressee on the impact of deforestation over Africa, North-East India and Burma region on Indian summer monsoon circulation and rainfall. Kapesa lokho, Raju and Azmi work on *Paleoenvironmental and Biostratigraphic Significance of Uvigerinids and other Foraminifera from the Bhuban Formation, Assam-Arakan Basin, Mizoram* (2011)
published in Journal Geological Society of India is a good documentation on biochronology and interpretation of the depositional environment. Nautiyal and Chauhan (2009) work on Late Holocene vegetation and climate change in Loktak Lake region, Manipur, based on pollen and chemical evidence published in The Palaeobotanist provides insights into the changing vegetation and climatic scenario in the Loktak region during the Late Holocene. Jhimli’s Changing Equation between Man and Environment in India’s North East: A Sociological Analysis (2013) published in International Research Journal of Social Sciences tries to look at the disruption of man- environment relationship in north eastern part of India through Marxist approach. It attempted to understand the region under British Empire which gradually led to the degradation of its ecological set up and the perpetuation of same policy in post-independence period by the independent government of India which has led to the further deterioration of the situation. Jay Anand’s Emerging institutional perspectives: A case study on managing bamboo resources for charcoal production in Nagaland, India in Boiling Point (2013) is a good article that examines the use of plant genetic resources, especially bamboo, in Nagaland (North-East India), and how institutions have optimised its use through promoting the use of sub quality (flowering) bamboo for charcoal making helping to sustain local livelihoods by generating income from this otherwise wasted resources and they thus reduce carbon emissions by using the bamboo charcoal at both household and industrial level. The volume Climate Change in Northeast India: Recent Facts and Events – Worry for Agricultural Management (2009) by Das, Ghosh, Choudhury, Patel, Munda, Ngachan and Chowdhury gives an input of Northeastern Region of India relating to highly prone consequences to climate change because of its geo-ecological fragility, strategic location vis-à-vis the eastern Himalayan landscape and international borders, its trans-boundary river basins and its inherent socio-economic instabilities. Sajal Nag (1999) Bamboos, Rats and Famines: Famine Relief and Perceptions of the British Paternalism in the Mizo Hills (India), is a remarkable work on ecological phenomenon witnessed by the British when they entered the Mizo Hills followed by severe famine apparently caused by rats due to bamboo flowering. However, all these works does not mention anything in particular on the Naga Hills.

In the context of Nagaland, works on environmental studies have been of a minimal nature if not non-existent. Alemchiba Ao, A Brief Historical Account of Nagaland (1970) is a descriptive account of Nagaland; so also is Tajenyuba Ao’s
British occupation of Naga country (1993) which is a work on the British occupation on the different tribes of the Nagas yet fails to mention anything on the history of environment in the Naga Hills. Atola L Changkiri’s work on Angami Naga and the British 1832-1947 (1999) reflects on the relationship of the Angami Naga with the British but does not deal with the environmental policies of the British. Piketo Sema’s British policy and Administration in Nagaland 1881-1947 (1991) is a good work on British policy but greatly lacks in discussion on the colonial forest policy and related issues. Pushpanjoli Deori’s work on Environmental History of the Naga Hills 1881-1947 (2005) concentrates on the nature, risk and the control of natural resources along with the indigenous responses to the changing patterns of environment control under colonialism; understanding of the relationship of forest and the Nagas; steps undertaken by the colonial state for conservation and forest regulations. NEPED’S project, Adding value to Shifting Cultivation in Nagaland and Building upon Traditional Agriculture in Nagaland (2006) is an overview of Agricultural systems in Nagaland. S. K. Bera, S. K. Basumatary et al. (2011) work on the Late Holocene Climate and Vegetation Change in the Dzüko Valley, North East India published in Current Science is a profile of the Dzüko valley that revealed the short term vegetation and climatic alterations in the region for the last 1600 years. All these works does not clearly mention on the nature of forestry and de-forestation and its impact on the Naga Hills and people in particular. Moreover, scientific validation is not incorporated which is very important to give a clear description on the changing scenario of the time.

1.3: Objectives of Study
The study focus on the authentic presentation of the Nagas both in the use of environment and its impact. The study covers such issues beginning from the colonial period to modern times. The unique traditional ownership of land and forest has been a crucial focus of the study as these has to a large degree controlled the state to implement any firm legislation. The study also makes an intensive survey on the extent of deforestation and addresses some major causes of deforestation. It also examines the reasons of the failure of Forest Acts from colonial to post-colonial in containing deforestation. Finally, an important impact on the study is to analyze the management and changing status of forestry within the assigned temporal framework,
its varied impacts, and suggest a strong recommendation for future initiative by the government and other organizations on deforestation and forest management.

1.4: Methodology and Sources

This study involves the following strategies for the collection of data:

Historical sources both archival and secondary-periodicals, reports of different Government officials, Gazetteers etc. are consulted and analyzed.

Ethno-historical accounts on the traditional practices of cultivation, fallow period, forest management, sacred groves and present agricultural practices were documented. Observations were also made on Government schemes, projects etc., introduced in the villages across Nagaland alongside its impact on deforestation both from secondary sources and field study.

Satellite imageries have greatly expanded opportunities for data integration, analysis, modeling, and map production for environmental monitoring and assessment. As populations grow, as countries boost their economies, as landscapes change, governments have increasingly relied on up-to-date satellite imagery and other geospatial data for applications on environmental planning, land registration, disaster response, public health, agriculture, biodiversity, conservation and forestry. Therefore, satellite imageries are also taken to highlight the extent of forest cover and land-use change in the State. To delineate and identify potential sites for investigation, digital analysis has been carried out and the sites marked with the help of GPS aided technologies.

Nagaland, one of the seventh states in North-East India by virtue of its geographical position, climate conditions and altitudinal variations, is a biodiversity rich region. The people of Nagaland depend directly on land and forest for their livelihood. About 70% of the total population of Nagaland practice agriculture—Jhum cultivation and the rest are engaged in tertiary activities and principally, services of different types. The social structure of different Naga tribes may be analogous in certain respects, but they exhibit significant economic difference on account of various ecological factors of their terrain. The Naga history is deeply rooted with the land they live. The land is the soul of the Nagas. The area where the Nagas live is characterized by the hilly and forested environment. This style of livelihood has led
them to develop a symbiotic relationship with their environment. The environment has significantly contributed for the evolution of culture, customs, social and varied traditional practices. The Nagas occupation and their way of life are also essentially linked with the forest. However, the system has and is experiencing substantial changes with times with exogenous influences and other intervention. Prior to the British colonization of the Naga Hills, the Nagas were prudent users of nature. Forest management and absolute ownership lies with the individual and the community. There has been no forest management applied to any area. But with the coming of the British and setting up of British India Administration at Samaguting in 1866, marked a historic step in Nagaland’s modern history (Chasie, 2005: 253-264). The management of the forest thereafter was done according to the Assam Forest Regulation of 1891. In course of time, the coverage of the area was extended to the whole of Nagaland which formed one Forest Division of Assam up to 1957 called the Diphu Forest Division.

The State is no longer immune to change in large scale land-use which over the years has been accelerated by anthropogenic and technological demands. The people grip on forest and forest based resources is deteriorating the natural environment. The study of late Holocene climate and vegetation in the Dzúko valley indicates that the climatic condition deteriorated and resulted in deforestation as evidenced by the loss of dwarf bamboos (dry brown patch) and burnt stumps of Rhododendron. During the recent past, the natural forest of the area is being destroyed extensively by forest fire because of human intervention. All these have resulted in the rapid depletion of the rich flora of area (Bera et al., 2011: 143-148). The wanton destruction or use of land for cultivation especially jhum cultivation, burning of jungles-a traditional practice, creation of new village, mining, logging, population growth, etc., are contributing to forest lost in Nagaland. The age-old forest based traditional practices along with the livelihood of the people has also dwindled. According to the Forest Survey Report, 2012, out of the total land area of 16,57,583 hectares, forest occupy an area of approximately 8,62,930 hectares. Within this, 88.3% of the forest belongs to communities and individuals, and only 11.7% of the total recorded forest constitutes government forest. Henceforth, the private owners play a key role in the matters of forest and land.
Against such a back drop, it has become imperative to conduct studies on history of environment and ecology in the region under investigation covering the Districts of Mokokchung, Mon, Peren, Tuensang, Wokha and Zunheboto. This will also lead other disciplines to take into account the fast changing and growing environmental concerns while conducting any kind of research in the region. To many it may seem as a surprise that there have been concerns for environmental and ecological issues throughout human history. This is because our studies of history have focused too often on war, politics, and dynasties rather than environment, culture and development. Just as individuals are lost without their memories, civilization needs its collective memory in the form called history. Studies of the history of environment and ecology give us greater understanding of the active changes in the nature of landscapes. They provide a historical reference for examining modern patterns and process of environmental and ecological changes. By comparing histories from multiple locations, one can evaluate the cultural and natural causes of differences of changes in the characteristics of ecosystems. The modern global environmental and ecological crisis requires an understanding of history that is only recently becoming available.
End Notes


2. Ibid.


13. Ibid.