INTRODUCTION
STATEMENT OF PURPOSE

This thesis purports to study the emergence of a diverse culture on the basis of a unique and diverse environment in the context of Brahmaputra valley during the pre-Ahom period. The term culture may be defined as a 'pattern of life' (Thapar 2003) There are several indicators for the emergence of a diverse culture such as settlements, crafts and occupations, architecture, food habits, and crops such as rice and a distinct textile tradition. This region has been isolated in ways more than one; both in geographic and academic terms. A modest attempt has been made to address this existing lacuna in the study of ancient Indian history and to look at the region as having pan-Asian links both eastward (Southeast Asia) and westward (South Asia). The environment is not looked at in isolation but emphasis is laid on the role of communities who have forged a symbiotic relationship with the environment through time.

The environment providing a variety of resources is significant as it forms the basis of subsistence for the communities. These resources are assigned several meanings by the communities based on their multiple uses. The dependence on the environment is part of the cultural tradition of the communities who form a multi-cropping agricultural system as opposed to mono-cropping, and a range of communities co-exist performing a variety of activities such as foraging, shifting and settled cultivation, terracing, fishing and pastoralism. The data pertaining to the Neolithic period and the data available from the 5th to the 9th century is inadequate to provide a comprehensive picture, since inscriptions are primarily records of donations
made to religious centres. Similarly, Neolithic data is also incomplete as archaeologists have been unable to determine the beginning and the end of the Neolithic period. Within these constraints, the present study attempts to highlight how various communities interact with the environment and form a distinct culture evolving their own subsistence strategies.

The Brahmaputra valley and its adjoining hilly tracts are situated between 89°49' and 97°4' E and between latitude 22°0' and 29°18' N. The region is well defined by the towering Himalayan ranges on the North, and by the forest clad and highly dissected ranges of the Indo-Burmese border on the east and south. To the west, it opens up through the Brahmaputra Valley into the vast plains of the Bengal delta. It is exactly at the tri-junction of the Indo-Chinese, Indo-Malaysian and Indian sub region. It was the part of the northward migrating 'Deccan Peninsula' that first touched the Asian landmass after the break up of Gondwanaland in the early Tertiary Period. It is in this lowland-highland transition zone that the highest diversity of biomes or ecological communities has been found with a high diversity of species. It is identified as the confluence of South and South East Asia in both environmental and cultural terms. The diversity of landmass, flora and fauna and communities make this region unique and display the potential for the emergence of diverse settlements and a complex agricultural system through time.

The word environment is related to the natural conditions in which people, animals and plants live. It is related to the physical surroundings and conditions, especially those affecting people's lives (Oxford Dictionary
1995:267). This work attempts to address issues pertaining to the interface between environment and history. The environment comprises within its fold, both the field and forest. The environment of the Brahmaputra valley encompasses a mosaic of agricultural tracts, forests, marshland and hilly tracts fit for terrace farming. The nature of the environment, its diversity and uniqueness has led to the diversity in settlements and culture through time in this region (Cooper 1997:6).

The settlement pattern and the emergence of an agricultural system depend on several geographical parameters. A multiplicity of factors such as proximity to the river, availability of water, abundance of plants and fish food, modes of communication etc., influence the settlements along the river valley. In an attempt to bring to light the man-environment relationship, an attempt has been made to highlight the environmental diversity and abundance in the Brahmaputra valley and on the basis of this diversity three environmental micro-regions have been identified namely, the eastern, central and western zone, which are demarcated by the tributaries and form the basis of socio-cultural-political identity from the 7th century onwards.

A survey of the inscriptions reveals interesting finds for the region of study. The presence of the earliest pre-Ahom inscription dated to the early part of the 5th century AD in the easternmost part of the valley is significant as it indicates a shift in agrarian expansion in agrarian expansion from the upland to the central Brahmaputra valley area, where it witnesses a proliferation. An outcome of this shift results in the eastern part of the valley was getting marginalised as there are a small number of grants found in the post 7th
centuries. This pattern also highlights local political developments in the eastern part of the valley and their subsequent expansion into other parts of the region. It is also significant that this pattern does not support the generally accepted view of historians that acculturation of the northeast resulted from an eastward expansion of Sanskritic culture from the Ganga valley.

Scholars have predominantly viewed the region in terms of the expansion of civilisation from the Ganga valley to the ‘uncivilized’ and ‘barbaric region’, but a reworking of the available sources, by drawing not only from epigraphs, but archaeological and ethnographic data and the environmental factors, reveal that the region has its own identity and significance and is inhabited by several communities like the Bodos, Mishings, Karbis and Nagas who follow a diverse farming and cultural pattern during the present times. These distinctive groups that exist have cultural tradition, but it is difficult to integrate these into a study of ancient history without extensive fieldwork.

Settlements began in the Brahmaputra valley during pre-historic period (See chapter 2). The environmental setting of the river Brahmaputra provided a conducive setting for the emergence of a mosaic of settlements in the Neolithic period. The river has influenced the nature of settlements, flora and fauna, geographical features, climatic conditions as most settlements have a riverine character. Juxtaposing the archaeological data, the environmental diversity, and the availability of wild varieties of crops including rice, the presence of outcrop of rocks, a vast number of water bodies, wetness, and
the availability of fish, it has been observed that a pull factor worked for the communities to settle along the river Brahmaputra during pre-historic times.

Archaeological sources reveal that various types of agricultural activities, occupations and crafts, such as plant gathering and cultivation, tool making, pottery making, etc., were being practiced among the prehistoric dwellers. It is clear that pottery has been found at various sites in areas along and beyond the Brahmaputra valley such as the Kamakhya hills, Sarutaru, Marakdola and Daojali Hading (KAS: 1984).

Rice plays a significant role in the life of the communities within the diverse agricultural system. There are several wild varieties of rice that are harvested by the inhabitants and play a crucial role in rituals and festivals. There is diversity in the manner in which rice is harvested and cultivated among the various communities. This work will attempt to understand the significance of rice in a socio-cultural context.

There have been few attempts to construct the history of the region on the basis of the environmental diversity that sustains various communities since the pre-historic period to the present times. Scholars have focussed on riparian civilisations, if viewed in descending order from Hwang Ho, Mekong, Irrawadi and in ascending order from Tigris-Euphrates, Indus and Ganga. These rivers have witnessed the emergence of settlement and cultivation since prehistoric times. This study focuses on how the river Brahmaputra had played a significant role for the emergence of diverse settlements and a complex agricultural system leading to a diverse culture with a distinctive identity in the later years of history.
This study also looks at the various factors or parameters for the emergence of several crafts, occupations and rituals in the context of environmental abundance. It also examines the social, religious and economic significance of the cultivation or harvesting of various plants and animals in the Brahmaputra valley.

All societies adapt themselves to the environment and this adaptation includes food, habitation, protection and production. The environmental diversity influenced culture, exchange, crafts and behaviour of the communities inhabiting this region. In an account by John Elliot on the Garo hills, dating back to 1788 (28-29):

In times of scarcity many of the hill people subsist on the kebul which in growth is said to be like the Palmira and the interior part of the trunk, when pounded and steeped in water, is an article of food, in so much as to be the common means of sustenance during a scarcity of grain, when boiled it is a gelatinous substance and tastes when fresh like a sugar cane: those who can afford it, mix rice with it. They also subsist on the kutchu, a sort of yam, found in great plenty about the hills. I saw three sorts, though I could not learn they had any separate name. One has a number of buds on it, is said to be a cooling medicine and is eaten boiled or baked. ........This plant was cultivated by the 'Garrows', nearly in the same manner as we do potatoes in England; a bud being broken off to be sowed for a plant. The 'Garrows' say it yields, after it is dug out of the ground and laid by for the ensuring season of cultivation (commencing immediately on the breaking up of the rains) from 3 to 10 buds. Another sort of kutchu grows at the tops of the hills, and is found by its sprout, which twists itself round the trunk and branches of trees. I have seen the sprout 10 to 20 feet high. The leaves have three segments like a vine - leaf, but more pointed: of deep green colour, and very small. The root is found from a foot to 2 feet and a half below the ground, in shape tapering of a reddish colour and in length from 5 inches to a foot and half, it is eaten roasted.

The above quote is significant as it highlights the ability to adapt by the communities and also their dependence on the environment, as they utilise root crops, use plants for medicinal purpose and also engage in the processing of plants.
Agricultural products---bamboo, cereals, herbs, fruits and betel-nut---which form an important part of any society are valued not only for their food value but are assigned several meanings according to the needs of that society. It also addresses the different forms of agriculture, such as terracing, foraging, fishing, settled and shifting cultivation as a part of an agricultural system as a mono-cropping pattern is not followed in the region.

The Brahmaputra valley is the core region of this study and the study begins with the prehistoric period and limits itself till the 13th century, as the Ahom invasion marks a different phase in this region.

This work will not only see different communities such as cultivators and other non-agricultural communities as coexisting at the same time, but also the interdependence of the various activities such as farming, fishing, art and craft, and exchange with each other. These activities are influenced by the localised needs of the communities and a range of environmental factors. The environment to a large extent determines the intensity and the nature of these activities, which is reflected in the belief systems and rituals of these communities related to the environmental products.

ENVIRONMENTAL BACKGROUND OF THE BRAHMAPUTRA VALLEY

O.H.K. Spate (1965:600) remarks that the present state of Assam possesses individuality and it is in a sense transitional towards High Asia and Indo-China and even to China itself. Further, this region has earned the unique distinction of being the world's wettest place under the influence of the southwest monsoon characterised by wet summer and dry winter. The
uniqueness of the region is highlighted as this region is the meeting place of three distinct vegetation zones as highlighted in the following quote.

The tropical rain-forests which cover northeast India, Bangladesh and Southeast Asia are areas in which complex ecosystems have their greatest manifestations. These areas, being the meeting place of three distinct vegetation zones, have a wide range of edible plants. Further, the alternate wet and dry periods, caused by seasonal monsoons, set in motion a set of adaptive processes for plants to develop large food storage, such as underground tubers which are present in the region in a large variety; and this is a great source of food for the indigenous population of this area (Harris 1972:180-193).

River Brahmaputra and its Tributaries

The river itself defines the extent of the region; it is not defined by any political, linguistic or racial boundaries as settlements emerged in the region along the river Brahmaputra and its tributaries from the prehistoric past and have continued till the present times. It has not only moulded its surrounding environment, but also its people and their culture. The Miris are fond of river bank settlements for fishing purposes and prefer to establish settlements there. Fishing is indispensable to their life for consumption and as a pastime activity. (Singh 2003:539). The Brahmaputra is a majestic and powerful waterway, influencing the lives and livelihoods of millions of people in the three countries\(^1\) through which it flows. Historically and geographically it is known that the river Brahmaputra was formed before the formation of the Great Himalayas.

Several communities settled along the river, which provided them with means of livelihood such as vegetation on fertile soil, a source of protein food (fish),

\(^1\) It rises in the Chema Yung Dung and Kubi glaciers of Western Tibet, near Mount Kailash and Mansarovar Lake, and flows through Tibet, Northeast India and Bangladesh before falling into the Bay of Bengal. It has a total length of 2,900 kilometers of which 720 kilometers flow through the Assam Valley and some distance in Arunachal Pradesh.
connectivity and lucrative trade. The communities living along the Brahmaputra are involved in a number of occupations such as agriculture, fishing, hunting and craft manufacturing. The communities depend more on natural water resources than on other sources (Singh 2003: xxviii). The river is also the best medium for movement and trade and helped to import other non-locally available materials. It is evident that the prehistoric settlements and even the present day towns are situated along the river and bound by hills in three directions which aided the control of floods.

Occupying as it does one tenth of the valley and fed by so many tributaries, the Brahmaputra River system is a dominating factor influencing the environment of its surroundings. A soil rendered perennially fertile by it and its tributaries, aided by a prolonged season of heavy rainfall, has ensured that the valley and the surrounding hills have an amazing array of flora and fauna. The variety of vegetation due to sub tropical climatic zone with yearly 250–300 cm of rainfall is an evidence of natural abundance.

Wet Land

The marshy, low land area close to the Brahmaputra and some of its tributaries in the plains has a typical wetland ecosystem of savanna or grassland². Savanna areas are also located at comparatively higher alluvial terrace of the coarser deposit of tributaries of the Brahmaputra. There is also an abundance of fishing activity in the region. Fishing has been continuing in the various beels and marshy lands in local areas apart from the main course

² These grass land consist of an admixture primarily of Saccharum Elephantinus (Barotakhar), Erianthus Revange (Ikoira), Imperata Cylindrica (Ulnkher), Pollinia Ciliata (Harkher), Pragmites Karka (karka khagori), Arundo Doax (Nal) etc.
of the river. Availability of several varieties of aquatic variety of plants has provided subsistence to the communities.

The freshwater wetlands (beels) in the Brahmaputra valley cover an area of 101,232 ha and covered by 3,513 wetlands (beels). This is close to 4% of the total floodplain area and 1.3% of the total area of the valley. The lakes/ponds occupy an area of 15,494 ha and number 690. There are 861 oxbow lakes/cut-off meanders covering 15,461 ha. The waterlogged areas number 1,126 and occupy 23,436 ha (dry season satellite data). The swamps and marshes cover an area of 43,434 and number 712. The resources of these wetlands are important for human nutrition, as well as for the ecosystems as they provide a habitat for a number of aquatic flora and fauna, including migratory and indigenous birds, fishing is the main economic activity in the beels.

Forest Cover

This region has a unique ecology that is marked by dense forests, which are a source of various fruits, medicines and herbs. The dense jungles and grasslands possess a range of medicinal and herbal plants and flowers, including numerous varieties of orchids. The grassland and forest also have a wide range of bamboo, plantain, coconut etc. On the foot hills and hills are tropical and sub tropical forest to a height of around 2000 meters, consisting of big and small trees³, and thick undergrowth of ferns, creepers and climbers. The

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³ Among the trees most common are Acacia Odoratissma (jotikorai), Acacia Marginata (korui), Alstonia Antidisenterica (Dulkhuria), Andracyna Trifoliata (Uriam), Bignonia Colais
dense jungles and grass lands posses a huge range of medicinal and herbal plants and flowers, including numerous varieties of orchids. In the higher Siang basin are deciduous and mixed deciduous forest of walnut, oak, chestnut, pine, spruce and rhododendron, and conifers and alpine meadows at optimum heights.

Though the flora of this region exhibits an Indo-Malayan affinity, the floral elements of other parts of India, and of neighbouring and far off countries, have also contributed to its richness and diversity. It is of interest to note that about one third of the flora of Brahmaputra valley is endemic to this region.

The total forest covers in the Brahmaputra valley is 4598.7 sq. km. The forest covers of the Brahmaputra valley have divided into several types. The upper reaches of the Brahmaputra valley comprises the only single rain forest of the country covering around 2000 sq. km (Ramakantha 2003: 24).

Evergreen types of forest occupy the major parts of the eastern Brahmaputra valley. It also occupies the south east portion of central Brahmaputra valley.

Deciduous type’s forest comprises the entire Sal tree belt as well as the major part of the scrub in the all three zones of the Brahmaputra valley.

Swamps type of forest includes un-drained depressions generally known as Beel. Grass land is two types in the Brahmaputra valley. The riparian tract of

(parijat), Butea Frondosa (polash), Careya (komba), Cassia Fistula (Sonaru), Gemlina Arborea (Gamhari), Nuuclea Cadamba (Kadam), Soondieas Amara (Amra), Terminalia Hilka (Hilikha) etc.

the valley and other is a belt of low rainfall. Nearly the whole of the former is under water during the rains and permanent water level.

**Plant Diversity**

There is a wide diversity of plants available in the region due to favourable climatic conditions which are useful to man. In the wet plains rice typifies agriculture, natural forest is dense and large domestic animals are scarce. Rice also forms the staple food crop (Barthakhur 1968: 45). There are various types of cereals, legumes, tuberous and rhizomatous plants (sweet potato and yam), vegetables, fruits and other commercially viable plants associated with this region even during the present times. There are several references to the innumerable varieties of rice in ancient Indian literature. About 5,000 modern varieties of plants have been identified in this region (ICAR 1964:59). There are thousands of varieties of flora and fauna; around 430 species of orchids are available, which are out of a total 1000 orchid species in the world. There are 456 varieties of high altitude medicinal plants. These medicinal plants have formed a rich resource in the region and have been used by the communities for treating minor and major ailments. There are more than 35 species of good quality bamboo which are observed in the region. The discussion on the impact on the historical development of plant diversity and its significance for the communities since prehistoric times is taken up in chapter 2.

The evergreen forests contain plants belonging to a number of species, chiefly of the following families: *Dilleniaceae, Anonaceae, Magnoliaceae, Guttiferae, Leguminosae, Myrtaceae, Styraceae, Ebenaceae, Myristicaceae,*
Lauraceae, Euphorbiaceae, Fagaceae, Palmae, and Graminae and in the
hills conifers, Vacciniaceae, Ericaceae, and Temstroemiaceae.

The evergreen rainforest forest generally present a three layered forest of
which the top layer is very often constituted by one or two deciduous species
of enormous size such as Dipterocarpus pilosus, Artocarpus Chaplasha,
tetrameles nudiflora. The middle layer is formed either by a gregarious
species such as Mesua Ferrea or by a large number of mixed species. These
layers determine the economic value of the forest where Mesua ferrea grows
it is considered the principal species, but also Terminalia myriocarpa,
Amoora wallichii, Duabanga sonneratioides are well known timber trees of
this type of forest. The third or lowest layer consists of small trees and
shrubs. This type is characterised by a very large number of climbers notably
the climbing Acacias and Bauhinias, several species of Vites unona, Uravia,
Mezoneurum, Calamus, Tapiria hirsuta, Entada scandens, Delhousiea
bracteata, Gnetum Gnemon and many others (kanjila 1939: ix).

Sal occurs in the deciduous forest with local variations such as
Lagerstraemia parviflora, Kydia calycina, Schima Wallichii and Careya
arborea being perhaps more dominantly available variety of the Sal tree.
Gmelina arborea, Cassia fistula, Albizzia lucida and odoratissima, Millusa
velutina, Stereospermum chelonoides occur in some environmental zones of
the region (kanjila 1939: x). Grasses of the following genera characterize the
riparian areas, Saccharum, Anthhisteria, Erianthus, Arundo, Phragmites, etc.,
they cover extensive tracts along the large rivers especially where the banks
are low. The following grasses are characterized of the dry tracts. Imperata
arundinacea, Aptuda varia, Andropogon Iwaracusa, Nardus contortus and Squarrosus, Pollinia ciliata, Erianthus elephantinus, Panicum assamicum, Anthistiria gigantia and Strigosa; Setaria glauca, Rottboellia protensa, Isachne australis Saccharum narenga, Neyraudua madagascariensis, Paspalum scrobiculatum, Ishcemum ciliare, etc. (Kanjila 1939:xii)

Climate of the Brahmaputra System

All facts of agricultural activity, whether it is the choice of crop rotations and cultural practices, seedbed preparation, harvest and post harvest operations, introduction of new crops into new areas, or planning of plant protection measures, are greatly influenced by climate. Rainfall is the major climatic element that affects crop growth and development, particularly where rain fed farming is widely practiced. The rainfall in the Asian monsoonal region more often than not is characterised by high spatial and temporal variability. The onset of monsoon determines the planting time and the subsequent distribution of rainfall greatly influences the growth and development of that crop. The filling of reservoirs, natural or man made, which are the source of supplemental irrigation after the rains cease, depend entirely on the monsoon.

The climate of the Brahmaputra Valley is controlled by several factors such as the sub-tropical locational and positional significance with its mountain and plateau girdle and an opening to the west. While the lofty ranges in the north protect the valley from the cold air mass of the Tibetan region in the winter. The climatic conditions in the Brahmaputra Valley exhibit a major
deviation, especially in the distribution of rainfall. It is under the influence of
the southwest monsoon characterised by wet summer and dry winter.

This region has earned the unique distinction of being the world's wettest
place under the influence of the southwest monsoon characterised by wet
summer and dry winter. The Bay of Bengal in the southern direction and
Patkai Hills in the eastern direction makes the region unique. The 2900 km
long river Brahmaputra and its vast tributaries system, various natural
waterfalls and lakes, marshy land and wetland combine to make it the wettest
region. Due to this wet climate and fertile soil, various edible items in their
wild form are growing in the region. Since there is an abundance of water in
this region, uses of irrigation facilities is not a key concern as in other arid
regions of the sub-continent.

The Valley

The valley is formed by the alluvial deposits\(^5\) of the Brahmaputra system. It is
flat, though surrounded by high mountains which help in controlling floods on
both banks of the river. Another geo-morphological feature of the valley is the
presence of a number of isolated hillocks or monadnocks on both banks of
the river, right from Tezpur and Mikir hills to as far as west of Dhubri,
detached from the Meghalaya plateau by the degradational work of the river.

\(^5\)There are traces of deposits of different ages, the most recent alluvial being within the
present day level. Undulating plains are formed towards the head and side of the valley, an
example of which is provided by one present near Doombooma. Some important tributary
traces were formed near Dihang valley (One of the main tributaries of Brahmaputra system
in the upper reaches of the Arunachal Pradesh) near Margherita, but best example is
provided by the Daffla valley, where three terraces of 250,160 and 140 feet (76, 49, 43
meters) in height, respectively are formed. The depth of the alluvial on the plain is more than
several thousand feet. At the head of the Brahmaputra river system, there are a few hills,
such as the Tipam hills of Jaipur and Digboi, which are the outlying portions of the Naga Hills
and they consist mostly of sandstone bed.
There is a marked difference between the physiography of the north and south banks of the river. In the north, the innumerable tributaries running down from Arunachal Pradesh and Bhutan Himalayas debouch abruptly to the main valley and form a series of alluvial fans which join and obstruct the course of the tributaries near the foot hills. As a result, the tributaries branch out in different channels till they form permanent courses farther downstream in almost a southerly direction. But before finding their way into the Brahmaputra they run almost in a parallel course to the main stream. Consequently, the tributaries have conspicuous meandering courses leading to the formation of bills and ox bow lakes and huge marshy tracts. It may be noted here that the alluvial debris in the northern fringes of the valley have given rise to Tarai or semi-Tarai conditions where water trickles down resulting in wet soil and dense forest cover.

The southern part of the valley is less wide and uneven and the tributaries in the south east are considerably larger. The western section of this part of the valley is very narrow with small tributaries which run in less meandering courses. Meandering in the eastern part of the southern section of the valley is conspicuous and there are a number of bills and ox bow lakes which are essential for checking soil erosion, fishing and provide raw material for wood craft.

The Brahmaputra river system has a crucial impact on the environment due to the formation of several of its tributaries. These tributaries are independent to each other but linked through the main river the Brahmaputra and spread

6The Dhansiri and the Kopili have by their head ward erosion almost isolated the Mikir and Rengma hills from the main mass of the Meghalaya plateau.
across the valley. The criss-cross character of these tributaries leads to the variation in vegetation and soil forming a diverse natural resource base. This leads to the formation of a distinct pattern of food gathering and production (hunting/cultivation etc.). Thus the various communities manufacture their own instruments for food production, practice customs and rituals related to food production and vary from each other in their food habits and the manner in which they relate to the environment. Thus, we see that plant resources have a significant role in the life of the communities living in this region, but more significantly the communities have carved out distinct cultural niches for themselves.

**Geological Formation**

The geological formation of the Brahmaputra Valley can be traced back to the Cretaceous Period. Although the recent geological composition is the alluvium river gravel, during the Pleistocene era it consisted of the older alluvium gravel. Archaean gneiss forms the basis of the Sonitpur and the Darrang districts, and the lower hills near the Brahmaputra are an extension of the Pre-Cambrian shield of Karbi Anglong district. The plain is made of alluvium consisting of clay and in varying proportion, ranging from pure sand near the Brahmaputra to pure clay.

In Nagaon district, only three periods of the geological history are represented in the outcropping surface, namely the Quarternary, the Tertiary and the Pre-Cambrian. The Quarternary is represented by the recent

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7 The alluvium is believed to be underlain by younger tertiary rocks belonging to the Oligocene-Pliocene period over the gneissic basement. Structurally the Brahmaputra valley is known as a ramp valley. The basement starts to sink from about here eastward till it reaches a depth of 6,400 meters.
alluvium of the Brahmaputra, its many tributaries and its branch, the river Kalong. The plain is covered by alluvial soil which is mostly loamy, and consists of a mixture of clay and sand in varying proportions ranging from pure sand on the bank of the Brahmaputra.

Rocks belonging to the Tertiaries are exposed near Lumding. These belong to the Jaintia, Barail and the Surma series. The Archaean gneissic complex is the oldest group of rocks occupying mainly occupying the Karbi Anglong and the north-west fringe of the North Cachar Hills. The Jaintia series overlies the earlier formation at different places. It fringes the archaean on the southern and south-eastern side in a semi-circular outcrop. The Barail\(^8\) series overlies the Jaintia series occupying a larger area north of Haflong-Disang-Thrust. It fringes the Jaintia series to the north-west and occupies a vast area.

A large part of the Brahmaputra valley is covered by alluvial deposit in a varied character, pebbles, sand, and clay and very commonly a mixture of sand and clay, often with much decomposed vegetables materials. The tertiary beds includes a similar varied assemblage of rocks-hard sandstone, soft loose sands, hard conglomerates, soft loose pebble beds, coal seams, shales clays; clayey and shale sandstone and sandy shales and sandy clays are very common.

The more porous sands contain oil in several areas of the valley. The lowest tertiary bed of some parts of Assam includes thick limestone. A classification

\(^8\) This wide belt extends from the Barail foothills up to the Dhansiri reserved forest, and finally disappears in the Dhansiri Basin.
of the Brahmaputra valley has been worked out by the Burmah oil company's geologist F.R. Mallet, of the Geological Survey of India classified as: i) Dihang series, ii) Tipam series, iii) Surma series, iv) Barail series, v) Jaintia series, vi) Dishang series. These are places in order of age (the Dishang series being the youngest) accepting the Dishang series thought to be partly equivalent to the Jaintia series. The cretaceous beds are mainly sandstone and conglomerates but include some shales and thin coal seams. The Gondwana beds include quartzite and shales also with thin coal seams (Kanjila 1939: iv).

Igneous rocks other than those forming part of a metamorphic complex, are not very abundant, basalt being the most important rock. Serpentine is found in association with slightly metamorphosed shales and amongst the older metamorphic rocks are gneisses, schist's and quartzite, granite, periodotite and dolerite are found intruding into the metamorphic rocks.

It is not possible to reconstruct with any certainty the conditions under which the older rocks were formed, but it is clear that during the Tertiary times almost whole of the south eastern part of the region was under water, which could be in the form of open sea, coastal lagoon, or river estuary. It is likely that during much of this period there existed land to the North West part of the Shillong plateau.

The geological formation also shows variedness and is an essential factor leading to the variation in soil types and land categories leading to environmental diversity in the region.
Variation in Land

Ethnographic accounts of the agricultural system of the various communities in the Brahmaputra Valley tend to categorise land based on the purpose to which it is finally put to. Land can be broadly categorised into three types. These are the *jhum* (called shifting cultivation in north east India) land, wetland and dry land. The *jhum* lands are those where slash and burn methods of cultivation are practised. Usually after clearing the jungles and bushes the trees and shrubs are let to dry and burnt. The ashes of these are used as manure in the *jhum* fields. The dry lands are those, which are used for the cultivation of dry crops such as mustard seeds. The dry lands are usually situated in the plains whereas the shifting cultivation takes place in the hilly areas. At times, there is no provision for irrigation water on the dry lands. Ordinarily, the high riverbanks were used as dry fields. The wetlands are used for the cultivation of paddy, as there is not much requirement for irrigation techniques in the plains. The plains are suitable for this purpose as rice transplantation can be done easily and the requirement for water logging is fulfilled in the plains. The uncultivated land of the valley is usually forested area or is covered with tall grasses and reeds. The availability of a variety of soils in the Brahmaputra Valley provides suitability for the cultivation of a variety of crops. The broad categories under which the soil types can be divided are based on its pattern of usage.

Eight agro-climatic regions have been identified in India, out of which the Brahmaputra valley belongs to the humid Bengal-Assam Basin, incorporating the present day states of Bengal and Assam. The major soil groups found in
this region are the riverine alluvium, tarai soils, laterite soils, red-yellow soils, red-sandy soils or gravely soils (Murthy 1978:3). Rice is an important crop in the valley and is also found in its wild forms. The soils on which rice grows are varied and there is hardly a type of soil, including alkali soils, on which it cannot be grown with some degree of success.

Wide ranging soil and climatic conditions are suitable for rice in the humid Bengal-Assam Basin, eastern Himalayan region, and in the Bay islands. The altitude has not been found to be of much significance for rice as it ranges from a few metres in the Sunderbans in West Bengal to about 1,600 metres in north-eastern Himalayas in Mizoram state. Rice is adaptable to the wide ranging characteristics of soil, hence it is not possible to categorise any particular soil group as a rice soil or to assess its productivity. (Murthy 1978:10) The ability of rice to adapt to various kinds of soils reinforces the fact that rice harvesting and cultivation in the valley has a longer antiquity dating to the pre-5th century as agriculture was carried on involving different methods such as swidden cultivation as we will see in chapter 2 and the harvesting of several kinds of wild varieties of rice continued in the various eco-niches. Soils in the Brahmaputra valley are acidic, especially those developed on old alluvium, whereas the soils on new alluvium are slightly acidic to neutral and in some cases slightly neutral. The soils in the upland areas are rich in minerals, but low in ground water.

Variations in the character of the soil arise due to location and proximity from the river, forested areas, hilly tracts and natural phenomena such as floods. The nature of soil varies in Upper and Lower Brahmaputra valley. The arable
soils in the Upper Brahmaputra valley are generally broadly grouped into the old alluvial soil, new alluvial soil of riparian tracts and the hilly soils. The major portions of the arable soils are alluvial. The Upper Brahmaputra valley can be further subdivided into the Upper Brahmaputra Valley (North) and the Upper Brahmaputra valley (south). The North Upper Brahmaputra valley is a region of fertile soils which with adequate rainfall renders a high agricultural productivity in terms of potentiality to it. However, the agricultural rhythm is constantly disrupted through floods and the shifting course of the innumerable streams.

The lower Brahmaputra valley can be further subdivided into the Lower Brahmaputra Valley North and the Lower Brahmaputra Valley South. In the Lower Brahmaputra valley north, the foothills are suitable for evergreen vegetation, the higher belt of silt, which can be termed as the rice land. The Brahmaputra khadar is a zone of frequent siltation and meant for purely agricultural purpose. Thus the valley has been divided into several sub-regions by scholars, which formed the basis of settlements in distinct ecological conditions.

The Himalayan Mountain System

The Himalayan mountain chain forms a gigantic arch stretching from the Nanga Parbat peak in the North West to the Namcha Barwa massif in the east. The Himalaya extends for a length of about 2400 kms from the west to the east and varies in width from 150 to 300 kms. The Himalayas are amongst the youngest mountain systems of the world and were formed in different layers, dividing them into distinct physiographic regions such as the
Outer Himalayas or Siwalik Hills, Lower or lesser Himalayas, Main or Great or Central Himalayas and the Trans or Tethyan or Tibetan Himalayas. (Negi 1990:30)

The eastern Himalayas cover the Darjeeling Hills, Sikkim, Bhutan and Arunachal Pradesh and the Brahmaputra basin in the northern direction. In this region the Himalayan range covers an area of 1, 22,802 sq. kms. The eastern Himalayan range is bound by Nepal in the west, north Bengal and Assam valley in the south and Tibet in the north. The eastern Himalayas have been divided into three physiographic units which are the Outer Himalayas\(^9\) or Siwalik Hills, Lower or lesser Himalayas\(^10\), Main or great Himalayas\(^11\) (Negi 1990:30).

\(^9\)The outer Himalaya is made up of the Siwalik type hills and rise up to an elevation of about 450 mts. in a series of knife-like ridges from the Brahmaputra basin plains. The hills are about 10-15 kms wide. The south facing slopes are steeper than their northern counter parts. The mountain rises sharply and abruptly from the narrow strip and is cut into deep gorges by rivers liable to sudden floods. The narrow strips of passes are locally known as Duars which are about eighteen in number and run through the Himalayan foot hills to the High Mountains. The Siwalik Hills are well developed almost all along the southern tract of the eastern Himalayas. These hills extend into greater part of southern Arunachal Pradesh till the mountains curve around the Brahmaputra valley east of which Siwalik Hills lose their identity to be replaced by a series of low hills with greater slopes. Further towards east, these low hills merge with the lesser or lower Himalayas. North of the Siwalik Hills lay a series of longitudinal valley this extends to the base of lower or lesser Himalayas. These longitudinal valleys are fills with freshly laid down alluvial that has been brought by rivers and streams draining both the Siwalik Hills in the south and the lesser or lower Himalaya to the north. The longitudinal valleys are not very well developed in the southern part of Arunachal Pradesh, where the Siwalik hills tend to quickly merge with the lower Himalayan ranges to the north. In certain tracts, the lower Himalayas rise abruptly above the low outer Himalayan hills with no clear cut demarcation between the two physiographic units.

\(^10\)The lower or lesser Himalayan belt occupies the central part of this region. It is made up of a number of ridges, many of which are almost north south trending. Some of the prominent ridges of the lower or lesser Himalayas are the Darjeeling ridge, Kalimpong ridge, Singaila and Donkhyia ranges, Gangtok ridge and Thimphu ridge have average altitudes varying from 3000 to 3500 mts. These mountain ranges support diverse forms of vegetation that range from pine and scrub forest at lower elevation to sub alpine forest in higher tracts.

\(^11\)The main or great Himalayas separate the eastern Himalaya from Tibet. It extends from the kanchengungga massif in the west to the Namcha Barwa peak in the east. The width of this zone is about 60 kms. There are a number of fertile valleys in its southern tract which produces food grain during monsoon months. A number of mountain passes occur in this mountain wall. These include the Thag La, Tulung La, Dom La, Andra la and Kaya La.
The eastern Himalaya is drained by a number of rivers in the Brahmaputra system (Negi 1990:48). The climatic conditions tend to change rapidly within short distances primarily due to sharp changes in topography, and altitude. The variation in climate in the eastern Himalayan region is caused by a complexity of the relief features as well as differential effects of the weather systems in the different regions. However, a certain unity results from the monsoonal effects common to the whole region. The wind pattern in the Himalayas is extremely complicated. The varying climatic and topographic conditions have reflected on the natural vegetation of the eastern Himalayas (Sahni 1995:35).

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12 The river Teesta rises from the Zemu glacier in Sikkim. It drains a major part of Sikkim and the Darjeeling hills. Its main tributaries are the Lhonak, Kachung and Rangit. The river Torsa drains south western Bhutan. It is also known as the Amo Chhu. The Raidak river drains western Bhutan. Its main tributaries are the Thi Chhu, Paru Chhu and Ha Chhu. The river Sankosh rises in the snows of the main Himalaya range as the Mo Chhu. It drains parts of central Bhutan. The Manas River drains parts of central and eastern Bhutan. Its main tributaries are the Mangde chhu, Chamke and Kurd. The Kameg River drains a part of Arunachal Pradesh. Its main tributaries are the Bichom and Tenga. The Subansiri River drains a large part of Arunachal Pradesh. Its main tributaries are the Yuma chhu and Chavaki Chhu. The Lohit River also drains a part of Arunachal Pradesh.

13 The foot hills experience a hot and humid, sub tropical climate. Cool temperate conditions prevail in the lower Himalayan zone while the main or great Himalayan ranges experience alpine (arctic) conditions. Bulk of the precipitation is received from the monsoon which brings rain to the eastern Himalaya as early as possible in May. Snowfall is experienced in the tract above an elevation of about 2500 mts. The average maximum temperature rises to about 40°C. Sub zero temperatures are experienced in winter in the northern tract.

14 The eastern Himalaya has a prolonged monsoon season from June to October with very little rain from the western disturbances in winter. In the eastern Himalayas the precipitation is also heavy increasing from March to May with the advancing hot season. The transition is gradual and restricted mainly to an increase in cloud and fog and rain and with little change in humidity and temperature (Lal 1981: 9).

15 General direction of the wind flow over the mountains in winter is from north east to North West over the mountainous terrain the actual wind may show considerable deviations due to local influences. At higher levels, the winds are westerly of about 120 km per hour reaching 160 km per hour, or more. At low level, they are about 50-60 km per hour.

16 The forest types range from tropical evergreen in the foot hills to temperate evergreen in the middle mountains and coniferous at higher elevation. Sub alpine and alpine forests are found near the snow line. It is characterized by one of the richest flora in the world and abounds in tree ferns, orchids, primula and blue poppies and the tallest trees in India. According to Champion and Seth (1968) the altitudinal pattern covers a very wide spectrum.
Grasslands as a biotic climax appear at a height of 1050 m where both subtropical evergreen forest and grassland vegetation are found to coexist. The grasslands\textsuperscript{17} owe their origin to the practice of shifting cultivation. The principal components of the grassland are bamboos viz. \textit{Chimonobambusa callosa}, \textit{cephalostachyum latifolium}, \textit{Dendrocalamus hookeri} and \textit{D. Sikkimensis}. The valuable broom grass \textit{Thysanolaena maxima} occurs in commercial quantities on hill sides at 900m. The Subtropical forests are dominated by a \textit{Ficus–Castanopsis–Callicarpa} association in the lower reaches and by \textit{Schima–Castanopsis–Engelhardtia–Saurauria} association in the higher reaches.

We can conclude from the above discussion that the Brahmaputra Valley has rich alluvial deposits brought by the Brahmaputra and its tributaries, humid monsoonal climate, the influence of the Eastern Himalayan range, rich soils with an extensive forest and grassland cover provides an extensive area for settlement and agricultural land use. The rainfall in the region is quite high all the year round and major irrigation works may not to be an essential requisite for agriculture. The inhabitants of the Brahmaputra Valley and its adjoining hill areas have access to diverse natural resources, due to the variations in the type of land and elevation from the sea. By looking at the range of soil categories found in the Brahmaputra Valley and its adjoining area it is clear that rice grows in a variety of conditions and there is no fixed type of soil

\textsuperscript{17} The usual grasses to be seen are \textit{Arundinella bengalensis}, \textit{Saccharum spontaneum}, \textit{Setaria palmifolia} etc.
suitable for rice to grow in. Archaeo-botanists substantiate the adaptable nature of rice which will be taken up in greater detail in chapter 3.

The various ecological zones have been formed in the Brahmaputra valley arising due to the various environmental factors. This environmental diversity has in turn led to the formation of several eco-systems. On the basis of the environmental factors the Brahmaputra Valley into three different ecological zones; the Eastern Brahmaputra Valley, the Central Brahmaputra Valley and the Western Brahmaputra Valley and look at the variation in their, climate and rainfall, soil, relief, water and forest resources and how these factors influenced the communities and their culture involving Pattern of food gathering and production (hunting/cultivation etc.), instruments for food production, customs and rituals related to the food production, food habits and religious systems based around food production. An ecological distinction may be suggested between the tributaries of the northern and southern bank of the Brahmaputra Valley which led to the formation of the ecological diversity in the three zones of the Brahmaputra valley. These zones are divided by the tributaries of the river Brahmaputra and have define as Upper Brahmaputra valley between Dihang-Dibang-Lohit-Subansiri in Northern bank of the Brahmaputra and Dikow–Dhansiri of the southern bank of the Brahmaputra. The lower Brahmaputra valley is define between Pagladiya-Sankosh-Tista river of the northern bank of the river Brahmaputra and Kopili-Dudhnai river in the southern Brahmaputra zone. In between the upper and lower Brahmaputra valley the central Brahmaputra valley exists.
SOURCES:

The issues discussed above can be addressed by drawing upon a diverse source base for the region. There is a diversity of available sources in the Brahmaputra valley, among which some of these can be worked upon.

**Epigraphy:** The inscriptions (5th – 13th century AD) about 32 in number and engraved both on copper-plates and stone, constitute an important source for reconstructing the region's historical past prior to the thirteenth century. Most of these inscriptions have been found on locations near the Brahmaputra, Pushpabhadra, Kalang, and the Surma rivers. These inscriptions mention a variety of crops and plants available in the region and a diverse environment where a complex agricultural system emerged. Several of these plants and trees are still found in the region and continue to be used by the present day communities for multiple purposes. The epigraphs tell us the diverse nature of settlements, farming patterns, occupations, crafts and professions that emerged in the region.

**Literary data:** The texts that have been incorporated for the study of the region are the *Arthasastra*, *Periplus Maris Erythrae* (dated to the first century AD), and the Account of Huen Tsiang (dated to the AD 629). These texts talk about the variety of products that were available in the region and also the usage of these products. The description of the diverse environment is also reflected in the epigraphs. These text are significant as they provide information about the early period of the Brahmaputra valley.
**Archaeo-botany:** There are no direct archaeobotanical finds available for the region of study as no archaeobotanical surveys have yet been made in the region. The archaeobotanical data is available for studies that have been conducted for other parts of Southeast Asia and China that have been incorporated in the analysis of rice production. Also data has been collected from Institute of Archaeology, London and the Archaeological Survey of India for the studies conducted in South and Southeast Asia.

**Ethnographic studies:** Anthropological data for reconstructing the history of the communities in the region has been helpful. These sources are available in the Cambridge anthropological museum, Cambridge, Journal of Anthropology, Gauhati university, Guwahati; Department of Folklore, Tezpur University; various diaries of colonial ethnographers (such as Mills and Hutton's etc.) and photographs in the photo archives available at the Cambridge Museum of Anthropology, Cambridge and data available at the Pitt Rivers Museum, Oxford. The records, diaries, reports, paintings and photographs by various colonial administrators and researchers and also by anthropologists working on the region contributed immensely in the construction of a historical relational analogy with the region.

**Archaeological Data:** The archaeological data regarding various excavated sites in the region that are available in the Reports of Kamrup Anusandhan Samiti, Reports of Archaeological Survey of India, Reports in the Journal of Gauhati University, diaries and display of artefacts at the Pitt Rivers museum and the Cambridge University Museum of archaeology and anthropology would be helpful to get information on the region.
As discussed earlier the available sources for the region have certain gaps in them chronologically and also archaeologically this region has a paucity of data. The problem related to the dating of the Neolithic and also the paucity of descriptive inscriptions up to the 7th century AD. The profusion of epigraphic and ethnographic data can lead to some interesting results for the region of our study.

**CHRONOLOGY**

Based on the available archaeological data the chronology of the Neolithic period in the Brahmaputra valley lacks absolute dating. However, scholars have placed the Neolithic to a time frame of 2000-1500 BC (Sarma 1985:16). Due to the lacuna in the archaeological data there is no date for the end of the Neolithic period in the region that may have continued till a later date. The epigraphs are dated from the 5th to the 13th century AD and portray the diversity in the region in terms of settlements and resources.

**OVERVIEW OF CHAPTERISATION**

**Chapter 1: Historiography: Problems and Issues**

There are two issues that have been addressed in this chapter; firstly, the broader issue of the lacuna that exists in the study of diverse eco-systems as opposed to mono-cropping and secondly, the problem that exists with the already existing works which have not given this region its truly deserving identity as an environmentally rich and diverse zone with its proximity to both south and southeast Asia.
Chapter 2: Environmental Diversity and Settlements

This chapter discusses the formation of three diverse environmental zones and the emergence of diverse settlements within these three zones. It also looks at the implications of environmental diversity, as scholars tend to look at only one agrarian zone for the emergence of agriculture in the study of ancient Indian history. It will also look at the complex nature of settlements and the bearing that the environment had on the settlements.

Chapter 3: Emergence of Agricultural System

This chapter attempts to study the emergence of an agricultural system in the Brahmaputra Valley. Scholars have portrayed this region as an area of 'relative isolation' or 'peripheral area' yet the environmental abundance and diversity of this region is reflected in the three environmental zones since prehistoric times. This chapter discusses the emergence of a diverse agricultural system comprising of foraging, shifting cultivation, pastoralism, fishing and settled rice cultivation within the three diverse environmental zones. Fishing emerges as a profitable proposition due to the presence of a large number of water bodies in the region. Rice, in both its wild as well as domesticated form is an important segment of the agricultural system. This chapter not only looks at the emergence of rice with the aid of archaeobotanical data, but also looks at its diverse uses and places it in a socio-cultural context. It also addresses the issue of the interaction of the communities within these zones as their role is significant in the utilisation of resources from the environment as the communities in the past have intervened in the environment of this region.
Chapter 4: Inhabited Areas and Introduction of New Elements

The giving of land grants to the Brahmins in the 4th-5th ushered in a process of intensification of the agricultural system in the Brahmaputra Valley and not the beginning of a civilisation as viewed by scholars. The environmental diversity in the three micro-regions resulted in the emergence of diverse crafts and occupations in the region. These crafts are significant in the region as they largely rely on individual initiative and also involved the usage of several resources from the environment. There are also a number of other art forms and occupations that emerge in the region such as painters, architects, physicians etc. These crafts undergo a certain level of complexity as it can be gathered not only from the epigraphic data but the ethnographic accounts too talk about the living traditions of the communities as seen during the colonial and present times.

Chapter 5: Crop, Culture and Control

The land-grants document not only the emergence of a political structure but also the emergence of a complex administrative structure. There is archaeological data which documents the emergence of diverse temples in the region that may have played a role in the agricultural system. The final issue that has been discussed is the issue of language as there is a diversity of dialects spoken by the communities inhabiting this region.
LOCATION OF BRAHMAPUTRA VALLEY IN ASIA