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REVIEW ARTICLE

A STUDY ON THE ECOLOGY AND TRENDS IN THE BRAHMAPUTRA VALLEY DURING THE ANCIENT PERIOD

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A Study on the Ecology and Trends in the Brahmaputra Valley during the Ancient Period

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INTRODUCTION

The agricultural landscape in the Brahmaputra valley witnessed a change with the onset of land grants made from the 5th to the 13th centuries. The agricultural production may have been closely tied to the temples. Ludden opines that a transactional nexus lay behind these land grants involving Brahmans who were Vedic scholars, ritualists and temple administrators with the agricultural communities who were farmers, herders, artisans, and merchants. The Brahmans emerge as the main beneficiaries. The earlier inscriptions upto the 9th century record grants being made to temples either in the form of a bell or a cave.

Agricultural landscapes represent significantly new forms of environments, both natural and artifactual, which are a result of the non-cultural elements of the landscape and a consequence of human action. Morrison describes the agricultural landscape and its changing structure and contents in the region surrounding the large pre-colonial city of Vijayanagara in Southern India. She studies the various categories of agricultural production and agricultural facility.

Many up-land groups and plain forest-dwellers entirely or partially through a combination of gathering and hunting activities produce not only subsistence goods, but, commodities for exchange. The emergence of such specialized foraging and exchange is dependent on several factors such as the local environmental contexts and processes. Gathering and hunting in the Holocene are seen as doable, enduring and pervasive strategies. These strategies have continued historically and have battled against sedentarisation or peasantisiation and more efficient and comfortable modes of subsistence.

Among the variety of food plants available, rice vies with wheat as a human food. Among the cereals, rice has the unique ability of tolerating continuous flooding and is often a sole crop for subsistence farmers in low-lying monsoonal regions. It is because the structure of the plant is semi-aquatic and hence transports air from the shoot to the root zone, enabling the micro organisms associated with the rhizosphere to

biologically fix nitrogen. As a result subsistence farmers are able to reap some harvest without fertilisation. It has been seen by Geographers and Botanists that rice was one of the earliest plants to be cultivated or domesticated by food gatherers in both tropical and warm temperate regions, where standing water or intermittent flooding occurs during the growing season.

The region can be categorised into diverse zones on the basis of the land use pattern, climatic conditions and the availability of natural resources. The epigraphic data dated to the post century period also refer to several environmental zones such as thickly forested areas, tributaries, wet lands and drier hill areas. The environmental diversity in the Brahmaputra Valley led to the formation of diverse eco-zones that resulted in the emergence of a variety of ecological agrarian zones and diverse communities resulting in the dependence of environment-community relationship on a diverse resource base. The focus of scholars such as R.S. Sharma (2010) and Romila Thapar (2010) has been on the study of one core agrarian zone but the Brahmaputra Valley displays the emergence of several environmental zones leading to the emergence of a unique agricultural system with variety of pattern of agricultural practices and culture. This study has attempted to understand the diversity in the environment leading to the emergence of such diverse zones.

Owing to its vast catchment area the Brahmaputra River waters a vast expanse of land. The River Brahmaputra and its extensive network of tributaries and the Himalayan mountain system bestow this region with its wet monsoonal climate, dense forests that lead to its rich fertile soil and a prolific growth of wild varieties of plants. This environmental diversity has in turn led to the formation of several ecosystems. It is possible to divide 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 environmental features and the diverse resources available.

REVIEW OF LITERATURE

Mehra and Arora (2011) on the domestication of plants in India focus on the tribal people as efficient exploiters of the economic potentialities of plants, and the information on the present day use of plant species could be analysed to understand the processes involved in the sequence from food gathering to cultivation and domestication and in the diffusion of economic plants to other groups. By and large, physiographic and climatic variations and ethnic diversity have created pockets of concentration of plant species of economic value and the tribal people contributed substantially to the pattern by identifying and utilizing the flora.

Vishnu-Mittre (2011) observes that the uses of wild plants in the Indian subcontinent show several stages of man-plant relationship, ranging from mere acquaintance with a wild plant to its subsequent selection and cultivation. It is interesting to note that certain wild plant species have the same uses in China, Africa and Southeast Asia as in the Indian subcontinent.

Guha(2012) in his work on the Garhwal and Kumaun region describes the character of the village settlements and their access to a wide range of resources. The location of settlements gives them an advantage of the diverse environments such as grass-rich areas of the forest for grazing animals; oak forests provided both fodder and fertilizer. The broad-leaved trees provided the villagers with fuel and agricultural implements. The forests were central for agriculture and animal husbandry and were also a source of medicinal herbs and food in times of need in the form of fruits, vegetables and roots.

Mehra (2012) in his work, looked at a diverse subsistence base in the prehistoric past in the Indian subcontinent. He makes inferences about possible means of subsistence in Pre-Neolithic times which can be drawn from the present-day uses of biodiversity, especially by communities living in the tribal belts of India where agricultural practices are only part of people's subsistence practices, and people continue to depend on forest products. He argues that crop diversification was an obvious subsistence strategy of the chalcolithic period. Crops suited to dry lands and wetlands were available for cultivation in both seasons, leading to better land use.

Norman (2010) views that root crops play a primary nutritional role in the topical regions as a source of carbohydrates for subsistence and local sale. In regions where there is an abundance of root as well as cereal crops, as in the case of Eastern Java, Rice seems to be the preferred item of diet. Rice is consumed by the root crops by the poor people. The epigraphs in the Brahmaputra valley give a list of

several plants in the region such as jam and wood apple, Banyan trees, bamboo, mango, fig, betel nut, jackfruit, black-berry, silk-cotton, sweet root, plum and areca nut trees.

The environment of the Brahmaputra valley is influenced by the high mountain walls on all sides excepting the narrow gap on the west, through which the Brahmaputra flows, and the dense forest, marshes, hilly terrain and river tracts.

NOTIONS ON AGRICULTURAL SYSTEMS

Within its broad umbrella it comprises of smaller segments of shifting cultivation, hunting-gathering or foraging, wet rice cultivation etc. In the Brahmaputra valley wet rice cultivation plays a significant role in the valley region as agricultural activities are confined to the wet season while shifting cultivation plays a significant role in the hills. There are several present day communities who live in dense forests and upland areas and pursue shifting cultivation such as the Lalungs of Assam.

Jahnabi Gogoi Nath's (2011) work throws light on the Agrarian system of Medieval Assam. Her work mainly relying on written records such as the Ahom chronicles or *Buranjis*, land grant epigraphs, biographical and genealogical works of the medieval period of Assam (both published and unpublished), contemporary foreign accounts and the Persian chronicles. The work although primarily focuses on the administrative aspects of agriculture, yet it attempts to study agriculture in its entirety as a system incorporating swidden farming, wet rice cultivation etc.

The soil type in the western valley is similar to the soil found in the Eastern valley, as it is mainly made up of the new alluvium and the adjoining areas are made up of the old alluvium. The western part of the valley apart from the rice growing fields has access to small pockets of rough grazing land for animals. As far as the composition of nutrients is concerned, the western Brahmaputra valley has a high level of Nitrogen, low level of phosphorous and medium level of Potassium. The land in the valley has been defined as 'good land', but its surroundings have been defined as 'land with severe limitations, suitable for forestry and grazing.

The western Brahmaputra valley has large tracts of arable land with pockets of scrub and grass along with a few belts of 'reserved forests. This zone too has access to tropical semi-evergreen and tropical wet evergreen forests. In terms of the economic value of the forest products the revenue from forests have been assessed as 21-40 rupees per hectare of forest land. The western Brahmaputra valley is marked by hot, humid monsoon climate.

RESEARCH STUDY

The different forms of food production practised in many different combinations of methods, on differing

soils, in differing environmental zones, using different crops and animals, and at differing levels of intensity present a bewildering array of complexity. It is important to study agriculture in the backdrop of its ecology in the three micro-regions as the inhabitants have to cope with several factors such as the utilisation of considerable variety of riverine, savannah and forest food resources. Along with this they had to cope with the flooding of the Brahmaputra and its effect on the availability of roots, tubers and other plants. All these factors add to the diversity in the agricultural system.

The study of ancient Indian history has largely focused on wet rice cultivation as the chief form of agriculture in a kind of mixed baggage of rice cultivation along with population growth, based on the assumption that rice supports large populations, granting of land in order to encourage a large number of people to settle and also the notion of the expansion of agriculture. Wet rice cultivation also involves several complex procedures such as soil preparation, the saplings are grown separately and then the process of transplantation, weeding, and greater requirement of water and large tracts of plain land as compared to cultivation carried out in the sub-montane tracts in the region of study, which is free from the risk of flood and artificial irrigation. The latter form seems to be simpler and prone to lesser risks as compared to wet rice cultivation.

Foragers have largely been viewed in isolation, and often in a linear manner. In the past, whenever colonial ethnographers encountered non-cultivators, non-sedentary and those engaged in hunting and gathering, such groups were put into a 'classificatory' and 'Victorian evolutionary schema', which placed them at the bottom of a hierarchy, with pastoralism and cultivation above it. Any deviations from the existing stereotypes were viewed as residual or byproducts of recent acculturation. There is also a tendency of generalising all Palaeolithic cultures as hunter-gatherers.

However, a shift in paradigm is evident in recent writings, where an "interactive trade" between foragers and agriculturists has been proposed in Indian prehistory. Studies reveal that the highlanders have been engaged in different kinds of production for the lowlanders in the Rajmahal hills. There is a longstanding history in South Asia of relations of exchange and interdependence between agriculturists and peoples involved in the hunting of wild animal and the gathering of wild plants.

These relationships were marked by a high degree of variability and flexibility with specific groups of people altering their strategies in relation to ecological, demographic and political imperatives. It is important to look at the foragers, fishermen and pastoralists, as historians cannot merely limit themselves to the study

of cereal production alone and environmental resources play an important role in the form of medicines, fuel, fibre, hides meat and milk provided by these communities. Foraging, pastoralism, animal husbandry and fishing are a part of the agricultural system as societies subsist on a range of environmental resources and draw upon the same.

However, these subsistence strategies co-existed and did not evolve from one stage to the other. Foraging, fishing and pastoralism are significant activities practised by the inhabitants for procuring resources from forests and water bodies. Rice in both its form, cultivated and wild is an important crop in the region not only as a food crop but also has a social context. The final issue is the interaction of the communities within the three zones as this interaction is significant in the utilisation of resources from the environment.

The presence of diverse settlements tells us that the Brahmaputra valley has been home for a number of communities practising a variety of crafts and occupations. These communities relied on several of the environmental resources available in the three zones. A variety of diverse groups in the region have been performing diverse functions besides farming, such as exchange activities, textile weaving, cane and bamboo weaving, boat building, construction work and the use of herbs and medicinal items. These diverse activities are dependent on the environment and these diverse groups were engaged in the utilisation of these resources for their daily requirements. Inferences about possible means of subsistence in the past can be drawn from the present-day uses of biodiversity, especially by people living in environmentally diverse belts where agricultural practices are only part of people's subsistence practices, and people continue to depend on a variety of environmental products.

Craft production is significant as it involves the search for appropriate raw materials, visualising the requirements and also the end-product, and skilled persons and the knowledge of requisite technique for manufacturing. Scholars who have looked at craft production in the region as part of economic history have not looked at its links with the environmental resources as largely craft production is dependent on the availability of resources available in the environment. Their focus has primarily been restricted to identifying crafts and their technologies and linking their manufacture to royal patronage. Sinopoli argues that craft and craft products can be seen as having a broader meaning, incorporating conventional crafts such as textiles, ornaments, pottery, etc. and also other kinds of producers whose products were in words, sound or movement such as poets, bards, musicians etc. Craftsmen play an active role in society and also shape the productive system. Craft production also has wider effects and implications such as the emergence of exchange

networks, modes of communication-roads, boats etc. and trading centres. She also raises the issue of consumers of crafts which is difficult to discuss in the context of the Brahmaputra valley as the consumers do not occur in the epigraphs.

In the Brahmaputra valley there are several other perceptions that appear in the writings of scholars such as the perception that the socio-economic setup in the region was 'static' and 'unchanging'. However, the study of the region does not reveal such a pattern as there were diverse crafts that were emerging, the proliferation in boat-making and also the thriving of riverine routes. The region displays a number of crafts both 'conventional' and 'non-conventional' in society. There are two issues that can be raised pertaining to crafts in the region of study. Firstly, to examine whether the state played a role in the production of crafts which is referred to as 'attached production' or whether it was absent which is termed as 'independent production'. The second issue is to examine the complex nature of the diversity of craft manufacture, its implicit socio-cultural significance and also look at it in a broader context incorporating 'conventional' and 'unconventional' crafts.

The present study argues that there were diverse ways in which the communities interacted with the environment within the three environmental zones which led to the development of a diversity of occupations and craft production. The presence of diverse environmental resources available in the region would have ensured that the raw materials and their products would have led to the movement of resources within each zone and at times outside the three zones.

The agricultural system in the Brahmaputra valley witnessed a series of regimentation with the emergence of land grants. There were certain changes that came about in the agricultural system as an outcome of these land-grants. The present study would attempt to look at three key issues. Firstly, it will look at the political structure that emerged in the various zones. There are three kinds of spaces that emerge in the region which comprises of the political space where the royal dynasties issued the grants, urban space where the craft production and exchange activities took place and sacred spaces-that witnessed temple construction. There were changes that were taking place in the agricultural system such as the political structure and the new administrative set-up to cope with the changing environment.

In the Brahmaputra valley, there were several levels of officials who were assigned to perform administrative and military tasks. These officials were involved in the process of decision-making. The inscriptions mention several officials who helped the king in his court and the royal palace. The ruling-elite appointed officials who were in charge of the decision-making process in the agrarian tracts as well.

CONCLUSION

The Brahmaputra valley emerges as a unique zone with three micro regions, namely the Western, Central and Eastern zone. The Brahmaputra valley is an environmentally rich zone due to its location on the trijunction of three other regions such as the Himalayan ranges on the North; forest clad and highly dissected ranges of the Indo-Burmese border on the east and south, and vast plains of the Bengal delta to the west which lead to environmental abundance and diversity in these three micro-regions. This diversity is manifested in the variations in soil type, forest products, climate etc. The three zones are not just diverse environmentally but it also results in diversity in these three zones such as diversity in the nature of settlements, agricultural pattern, craft activities, architectural patterns and administrative system.

The historiography of the Brahmaputra valley presents a lacuna in the study of ancient Indian History. It either considers it to be outside the folds of 'Indian' history or just brushes it aside as 'mythological' or 'tribal' history. This study based on the diverse dimensions of the region environmentally resulting in the emergence of complex settlement patterns and agricultural system is opposed to the study of one particular zone in a 'diffusion perspective' from where settled cultivation dispersed to other parts of the subcontinent. It reflects both continuity and diversity in patterns since prehistoric times.

The diverse nature of settlements can be seen as they were located in diverse environmental zones since prehistoric times and the kinds of resources that are utilised by the communities in the three zones also varied. The communities were influenced by the environment and also in turn influenced the environment as a symbiotic relationship emerged between the two as seen from the archaeological data since pre-historic times. The eastern zone inhibits the proliferation of settlements due to certain geographical reasons such as the constant recurrence of floods in the eastern tributaries and also the frequent change in the course of the settlements. The nature of settlements varied as there are references to *pura* (city) and *grama* (village settlements) in the epigraphs.

The number and nature of temples also vary in the three zones as the central zone temple remains reveal complex and elaborate temple structures. The temples emerge as dominant and empowering structures in the central zone as compared to the eastern and western zone.

The agricultural pattern that emerges in the three zones is an interesting one as it negates all existing theories of not only the expansion of agriculture (predominantly wet rice cultivation) eastwards but also the notion that giving away of land grants led to the emergence of surplus production and the transfer of revenue to the state. Shifting cultivation was practiced which also continued in the post century period. The

region also witnesses a range in the kinds of activities that were performed from boat building, exchange activities, management of stables, etc. A survey of the terms referring to agricultural revenue are lesser in comparison to the officials who were engaged in revenue collection of boats, protected houses, stables and ports. There was shifting cultivation in the Neolithic period which continued in post 5th century AD period. Thus, it is obvious that the imposition of settled cultivation, which is generalized by historians, does not take place in the Brahmaputra valley.

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