

Introduction

The present study intends to explain, from historical perspective, the occurrence of natural calamities such as – earthquakes, cyclones, floods, droughts and famines which took place in the northern part of the colonial Bengal between second half of the nineteenth century and first half of the twentieth century. The northern part of Bengal during the nineteenth and twentieth centuries was comprised of the princely State of Cooch Behar; and the districts of Jalpaiguri, Darjeeling, Rajshahi, Rangpur, Dinajpur, Malda, Pabna, and Bogra which collectively formed the Rajshahi Division. The study tends to focus on the causes and impact of the natural calamities that had occurred in this part of Bengal and their subsequent influences on ecology, population and economy. Northern Bengal produces an exclusive variety of topographical configurations which were constructed by the Himalayan hills in the extreme north of the districts of Darjeeling, the Terai (foot-hill) region of Darjeeling and Jalpaiguri with rich forest tracts and tea gardens, and widespread agricultural lands in the plains of the northern Bengal. The environmental condition and social relations of production prevailed in northern Bengal had been manifested critically during the time of natural hazards. On the other hand, the distinctiveness of northern Bengal in terms of climatic disorder, river-influence and rainfall, endemic inequalities in food-consumption, the proportion of mortality along with the over-all demographic pattern influenced and shaped by these natural calamities - invokes the priority of analyzing these crucial issues, yet to attain any serious historical interventions on the part of the professional historians. The areas which had been ravaged by the calamities had shown certain distinctiveness in terms of loss and recovery that varied from region to region, and the proposed study intends to explore this varied nature of the after-effects that were markedly different for the districts of northern Bengal in comparison with the other parts of Bengal and India as well. Moreover, the present research intends to critically examine the Governmental measures and policies adopted in order to rescue the people from the disasters and salvage the plight of the victims.

The geo-morphological evolutions through the centuries had not only shaped the sub-Himalayan tract of which districts of northern Bengal form a major part but made significant contributions towards the formation of natural topographical atlas of Bengal as a whole. Being contiguous to the sub-Himalayan region which is very prone to the zone of seismic activity, districts of northern Bengal, more or less, in general had to witness a series of earthquakes that ravaged its different parts during the colonial rule. Though Geology as a scientific discipline was a product of colonial initiative to acquire knowledge about mineral resources of India but it had little contribution in mitigating the earthquake occurrences and its effects. The earthquake of 1897 is officially known as Assam Earthquake and the earthquake of 1934 has been termed as Bihar-Nepal earthquake. Several historical and scientific researches on 1897 and 1934 earthquakes have been carried out by the historians and social scientists that delve into the aftermath of the disaster in the northern and north-eastern parts of India but little importance has been given to the affected areas of north Bengal. Available documents and information on these two earthquakes for northern districts of Bengal are not only scarce but could only be obtained in a more scattered manner. Perhaps for this reason hardly any attempt has been made by the social scientists to find out the extent of destruction and suffering or recuperating of the society of north Bengal during and after the earthquakes. The study will focus on two major earthquakes, occurred in 1897 and 1934 which produced considerable changes in the existed state of land, water-bodies and drainage pattern, public and private masonry buildings, the railways and also in the overall communication system of northern Bengal. Earthquakes in northern Bengal had frequently been accompanied with destructive landslides in the hilly region of northern Bengal which aggravated the sufferings of the people in terms of increased number of deaths and damage of natural resources and human properties.

Storms and cyclones made time to time visit to the different districts of this region accompanied by heavy rainfall and wind of great force. From the month of November to May upper winds over the Himalayan region are predominantly westerly. Nonetheless, Cyclones did not restrict to these months but appeared in a more violent form in many times of the year. The districts of northern Bengal frequently fell under violent gale between 1864 and 1899 (with other parts of Bengal or sometime exclusively). The cyclones under the period of study whether came from the Bay of Bengal or having regional origin did not confine themselves to their origin, in fact, northern part of the Bengal as well as other parts of Bengal

were also hit by these cyclones. Cyclones had very often accompanied with heavy rains which had contributed to rising water level in the rivers that endanger the possibilities of floods. Official reports of several government departments regarding cyclones of this period had not only contradicted with each other but produced ambiguous information from which any uniform deduction could hardly be drawn. Despite of their origin in the Bay of Bengal the cyclones had several times produced death and destruction in the northern part of Bengal, which was located far from the sea or coastal area. Any historical attempt on the part of the historians to decipher cyclonic impact upon human lives, settlement and society in this part of Bengal is still awaited. The sufferings caused by the cyclonic disasters, and destructions it brought about need to be spell out separately and distinctively for the northern districts so far the varied nature of meteorological information about the cyclones for different areas and subsequent government reliefs are concerned.

Floods produced serious destruction of lives and agricultural crops in northern Bengal. Bengal, as a whole, became wealthy in agricultural production and trade by the outstanding contributions of its rivers which nature has given to her. But the valuable offerings of rivers sometime got disturbed with the considerable increase in water level in the river-bed. The rivers of northern Bengal had their origin in the Himalayan hills which provided an undaunted supply of water throughout the year. But floods in this region caused both by the heavy or unseasonable rainfall in the plains and hills and unprecedented increase of water-level swept away the lands and people rested on its bank. Moreover, the intensity, duration and geographical distribution of rainfall throughout the region produced floods of varied in nature and severity. Duration of floods and their severity were determined by the quantity of inflow of waters caused by the cyclonic and general excess of local rainfall and outflow of waters depended on the subsequent evaporation, sloppy nature of the land or the drainage pattern (natural and constructed). Riverine morphology had a considerable impact towards the formation of topographical and agricultural settlement in the northern districts of Bengal. Tista, the largest river of northern Bengal had many times brought about large quantity of water due to the melting of glacier or heavy rainfall in the hills which inundated a large tract of land spread across northern Bengal. Other rivers of northern Bengal like – Karatoya, Lish, Ghish, Torsa, Jaldhaka, Kaljani, Mahananda, Atrai etc. also flooded the region frequently. Ganges, rolling down to the southern part of northern Bengal mainly through the district of Murshidabad caused severe floods. Loosening of lands or rocks due to the heavy and sudden

rains sometimes caused devastating landslides in the hilly part of northern Bengal which called for additional damage of human property and lives. Embankments which supposed to be a major concern for reducing the danger of flood occurrence sometimes even heightened the tensions among the flood victims because the colonial hydrology had yet to tap new tools or solutions for diminishing the hazardous effects of inundation in the northern part of Bengal. The large scale destruction of crops and commodities had resulted to widespread increase of prices and aggravated enduring poverty of the people. Thus the natural events had contributed to the spawning of complex relationship between environment, social ecology and subsistence.

On the other hand, unprecedented or continuous shortage of rainfall lasted for couple of seasons had created the condition for drought. Persistence of drought for long time of a year caused serious scarcities of food grain which were intensified into a famine by its further extension. The reason of famines was twofold – first was the natural factor i.e. severe drought which caused to the large scale destruction of crops and the second was human-factor that acted as the main catalyst to transform a famine-warning region into a famine-point region. Northern districts of Bengal sometime exclusively had to witness a series of scarcities and famines as a result of both the natural and human factors and on certain occasions became a part of a widespread famine which had affected Bengal as a whole. There had been ten wide-spread famines in India during the forty years, from 1860 to 1900; and in spite of relief operations carried out by the British Government there was a great number of life which were lost during these years. In the second half of the nineteenth century Bengal had witnessed serious famines in 1866 (as a part of Bengal-Orissa famine), in 1873-74 (Bihar-Bengal famine) and in 1892 and 1896-97 (along with other provinces of India). Until the Great Bengal famine of 1943, though there was no occurrence of famine in Bengal but there were some issues of serious scarcities in the early part of the twentieth century. The agricultural production and market of Bengal could not remain far from the adverse impact of the Great Depression during the 1920s and 30s. All these precedents were outnumbered by the famine of 1943 in comparison to the death and destruction, it called for. The whole of Bengal was ravaged to such an extent during the famine of 1943 which caused massive rupture in the economy and society of Bengal that recovery from this amounted to a considerable time.

In a land like Bengal where agriculture, the backbone of Bengal's economy, heavily depends on the regularities and quantity of rainfall, then how can one completely ignore or eschew a

comprehensive survey of rainfall pattern in Bengal. Even the Government did not have much felt to alter the rainfall dependency of the people through sufficient irrigation or canal networks or even the scarce introduction of irrigation or canal system did not provide any assistance or relief to the poor during the time of shortage of rainfall. Famine literature regarding Bengal or India has already made rich by the valuable writings and researches by the academicians from different fields. The present study does not intend to indulge into any present-day dominant theoretical presuppositions or their exertions, rather to interrogate the dynamics of social ecology influenced by the shortage of rainfall and the successive crop-failure, through the examination of meteorological or rainfall data and its co-relation with the crop production and trading of commodities, whether intensified and aggravated to the famine condition by the activities of human agency. Persisting research works on several Bengal famines, so far, mostly have confined to the narratives of the economic and political factors and their impact on society, thereby ignore the climatological aspect; but an ecological and meteorological investigation could possibly add a new dimension to the existing famine-literature, yet to incorporate the issues of politics and control of water. Moreover, the existing writings on Bengal famine though have focused on Bengal as a single 'region', hardly involve any detail survey of specific district/s or region separately despite of the fact that famine condition and its development and successive relief measures had widely varied from district to district and region to region. The present study will thus try to explore the distinctive situation of the famine affected districts of northern Bengal even along with their minor sub-divisions and *thanas* in a comparative manner so that additional or new information and interpretations could emerge. Since there is no attempt to make any district-wise study of famines so far, the proposed study, therefore, is also intended to situate the condition of life, property, production and society of northern Bengal during the famines occurred under the period of study.

The advent of colonialism, as a global phenomenon, had acted as a watershed in transforming the existed biosphere in India that evolved through the changing trajectories in the sphere of political ecology. The imperial ideology of controlling the forests and increasing pressure of land revenue transmuted the Indian society more vulnerable to the climatic disasters. Politics of water and food intensified during the floods, droughts and famines have not only unfolded the complexities of ecological variability but have revealed the unexplored historicity of the natural disasters. The temporary or permanent dislocation of ecological dependency within

the society in terms of livelihood, entitlement, recovery, rights and control had confronted between the ideologies and initiatives of relief, charity and hegemony on the part of the Governmental and non-governmental agencies. The complex demographic behaviour of northern Bengal comprised of several types of tribes, castes, indigenous and European population had responded differently during different natural calamities. The frontiers of northern Bengal developed social relations of production and distribution so markedly different from both western and eastern Bengal that the broad outlines of demographic mobility need to be sketched separately for this region, especially during the calamitous days.

Expansion of railways in different parts of northern Bengal from the second half of the nineteenth century enabled the colonial government to get access to the rich natural resources of this region and to impose its domination over the natural world that had to accommodate considerably with growing colonial demands. The mutual contradiction between the prompt expansion of commodity production for a capitalist world market and the continuity of non-capitalist agrarian social structures can probably be best viewed in terms of the situation when the normal rate of production, trade and consumption or appropriation was shattered by the occurrence of calamities. Commodity frontiers appeared to have been transformed during and after the calamities that contributed to the shifting of culture of food-consumption from paddy, rice etc. to other makeshifts or more coarse quality of food grain and the cattle were also suffered from want of fodders during these times. The successive changes introduced in land-revenue, agriculture and trading pattern during the calamitous days had become more critical for the subsistence and survival of the people of this region. Vulnerability of disasters was further aggravated due to the appearance of diseases (malaria, cholera, influenza, and small-pox etc.) or epidemics which were more intensified during the period of climatic disorders and inflicted additional sufferings for the victims of the disasters. Thus the governmental policy of relief had to co-exist with the concerns for public health and its restoration.

Over the past few decades researches on environmental history of India have unearthed many uncharted terrain of historical ecology and eco-political aspects of environment and climate but little importance has been given to the natural disasters. Disaster which as a subject or discipline belongs to the safe hands of the geographers, geo-scientists or meteorologists could equally be interesting and important for a historian since a historical study of disasters may produce additional information and knowledge thereby exploring an alternative dimension of

socio-economic and political history. Thus the present study intends to explore the social history of climatic disorders and natural disasters that affected the northern Bengal and brought out changes in ecology, economy and society of northern Bengal.

Natural history or environmental history has long been viewed as ‘non-historical’ subject which has neither human connections nor any social implications. Reconstructions of human history have not been substantiated by the influences of natural events in the professional arena of historical writings although Fernand Braudel in *The Mediterranean and the Mediterranean World in the Age of Philip II* (1949) vehemently protested against the historians who treated the environment simply as a silent and passive backdrop to their historical narratives and provided a major ‘break’-through in the prevailing distinction between the natural and human history. Environmental history, as one of the latest scholarly endeavours which emerged in the late twentieth century, has made an attempt to explore the human-nature relationship from the historical standpoint. The major practical issues of environmental history, J. Donald Hughes¹ remarks; are: the impact of environmental actions in human societies, the fluctuations in the natural environment resulted from the human actions and the influences of those changes in turn on history, and the history of human perception about the world of nature and its mechanisms. In today’s context of global warming and climate change Dipesh Chakrabarty’s ‘The Climate of History’ (2009) attempts to explain the causes of these problems in the advent of the Age of Anthropocene as a new geological epoch when “humans exist as geological force” that “severely qualifies humanist histories of modernity/globalization.”² Natural disasters such as floods and droughts had serious human influences upon themselves because the environment was more critically transformed by the human power, control, and direction for the sake of human interests which was deliberately detrimental for the maintenance of natural or environmental balance. In fact, the shortage or excessiveness of rainfall had been politically categorized and diverted to a abnormally transforming character of human response and solidarity which was more market driven, socially hierarchical and politically controlled by the State or agencies.

The brutal and dramatic encounter between human existence and natural disasters exhibited the saga of continuity of human civilization since the dawn of the appearance of human being in this earth; contrary to this, at the same time, progress of civilizations had also been accelerated by utilizing the natural resources and forces in a more favourable way. Side by side, there were substantial indigenous strategies for environmental management on a small

scale, according to Richard H. Grove (1995), which often involved ³ a considerable understanding of environmental processes, had existed in many parts of the world since time immemorial. This fundamental relation between the nature and human being had hardly changed over the centuries and still today, despite of use of latest scientific developments, man could scarcely have the fortune in taming nature. Environmental or natural factors determine the economic, social livelihood of geographical inhabitants which are subject to transformation with the pace of changing nature of natural or climatological occurrence, be it temporary or enduring. The historical dimensions of the natural disasters or calamities (such as – flood, earthquake, cyclone, drought, landslide, etc.) form one of the important segments of historical reconstruction of human past and these issues are also increasingly coming to be recognized, with their regional and local variations. Regional environmental history seems to be a vital inclusion in interpreting the natural or ecological issues of a particular region with an in-depth and thorough research since, as has been argued by Hughes (2006), ‘a region, more aptly than a nation, can be defined in ecological terms’. Similarly, though the impact of the natural hazards or disasters may be shown most instructively, as argued by Hughes (2012) in more limited case studies, ‘but no case study, however small, may be considered in isolation.’⁴ In the days of increasing fashioning of academic researches by interdisciplinary approach the history of technology, agricultural history or economic history as a whole, forest history and ecological history etc. might be regarded as integral parts of the environmental investigations since they explore human interactions with the natural environment. Thus in recent years when environmental or natural history has come out as a subject of ‘mainstream’ history, these environmental actions have been enabled the historians to interpret the ‘potentialities’ of these natural activities in order to highlight the changing features of ecological, economic and social environment with an interdisciplinary method.

Colonialism marked a watershed in environmental history of the globe. After the fifteenth century the evolving global structure of trade and travel provided the backgrounds for a process by which indigenous European ideas about nature were gradually transformed and developed through the exhaustive inclusion of ‘information, impressions and inspiration from the wider world’. In this way the commercial and utilitarian purposes of European expansion generated a situation, as argued by Grove (1995), in which the tropical environment was increasingly utilized as the symbolic location for the idealized landscapes and aspirations of the western imagination.⁵ Similarly, for India, as the world ecology has been profoundly

changed during the eighteenth and nineteenth centuries by the growth of western capitalism, according to Madhav Gadgil, and Ramchandra Guha (1992), first through trade and later by colonialism, in view of this alteration the ecological transformations in India during the colonial period deserve special interest in regard to the intimate connection that recent research has made between British imperialism and environmental degradation in the colonized countries.⁶

There occurs a remarkable shift in the perspective and interpretation of the impact of natural disasters viz. earthquake upon the human society. According to Stallings (1997) the shift has been marked from ‘the oldest and most prevalent typification’ of the effect as ‘life-loss’ to the 1970s invention of the impact as ‘psychological harm’.⁷ But on the other hand, it is said to believe that, ‘memory of natural disasters is, in contrast to the memory of war, markedly short-lived’ which induced to, according to Christof Mauch (2009), ‘eclipse destructive natural phenomena that occurred in the past.’⁸ Psychological trauma produced by the disaster and subsequent recovery from that trauma needs a careful and cautious analysis of emotional underpinnings which appears as an important element in the disaster-discourse because, as Simmons (2008) believes, ‘most humans and their institutions live in a world of feelings and moods’ where ‘feelings are also constructed cognitively.’⁹ Thus “the ecology of emotion”¹⁰ has also guided the behavioural aspect of the assessment of loss, time and material need for recuperation and finally the restoration of the pre-disaster order. The cultural ecology of land use, water management etc. have become the dominant elements in the process of recovery which further deepens the question about the concern for transforming character of those aspects. The transforming character of land, agriculture and consumption during the colonial period had a serious bearing on the question of ‘ecology of culture’ which was constructed and shaped by the State and its administration on the one hand, and long-established tradition of belief, and mutual cooperation of poverty and livelihood on the other hand. Although in general cases the ‘cultural factors operate at various levels through the policies of sovereign states (and the world bodies to which they belong), the public and private agencies that serve those policies, and the public officials who are directly responsible for how the policies are carried out’¹¹ but the colonial administration in India faced great difficulties in acquiring necessary information about the disaster and conducting subsequent relief operations. Information and resource collection for the recovery had also appeared as important elements for the victims of the disaster who were placed in a critical condition and brought down to a

status of wretched. However, the process of recovery and restoration of pre-calamity order includes in it, as Ben Wisner and others (2003) have argued, ‘the manner in which assets, income and access to other resources, such as knowledge and information, are distributed between different social groups, and various forms of discrimination that occur in the allocation of welfare and social protection (including relief and resources for recovery).’¹²

Academic researches on disasters have tended to focus on the process of disaster mitigation and the impact of the disaster because, as argued by Greg Bankoff (2003), these aspects ‘are inseparably linked to questions of environmental conservation, resource depletion and migration patterns in an increasingly globalised world.’¹³ In the 1990s there was increasing emphasis on natural disaster information and mitigation and the decade was celebrated as the International Decade for Natural Disasters Reduction (IDNDR). The information was technical and initiated the basis for major enterprises in building structures designed for seismic safety, slope stability, severe storm warning systems, and global monitoring and reporting.¹⁴ On the other hand, the historical dimension of natural disasters is no less important in exploring the history and legacies of vulnerability and coping of the societies lived under the colonial domination and in doing so, Tirthankar Roy (2014) argues, ‘a deeper understanding of the impact of natural disasters upon society needs a graded sense of time’.¹⁵ Roy’s book provides useful insights to the analysis and understanding of the historicity of natural disasters, and has enriched the existing historiography by raising new arguments and questions on the method of historical reconstruction of natural disasters in colonial India. Although the book has ‘introduced’ disasters as historical subject, but lacks any detail analysis of the occurrences and impact of the disasters which widely varied from one place to another. K. Hewitt argues (1983) that the western inference on disasters like, abnormal natural events or vulnerable population, rests on the postulation of ‘a socio-cultural construct reflecting a distinct, institution-centred and ethnocentric view of man and nature’¹⁶ and these characteristics has been frequently demonstrated by the commonly assigned designation of ‘topicality’.¹⁷ Along with the geographical heterogeneity there were differences in demographic structures affected by the unequal terms of international trade which made the populations of less developed countries ‘more likely to die from hazard’ in comparison with the more developed countries.¹⁸ Asian Disaster Reduction Centre has compiled the statistics on disaster mortality in the recent past which revealed, as argued by Tirthankar Roy, the

probability that death caused by natural disasters in South Asia was double than the rest of the world (excluding China).¹⁹

Until the advent of the knowledge of ‘vulnerability’ to illustrate disasters, there was a collection of predominant interpretations which rarely delved into the problem of a particular society that produces the experiences through which people encounter dangers. One approach was blatantly naturalist (often termed as physicalist), where the entire circumstances has been attributed to ‘the fierce forces of nature’ or ‘nature on the rampage’, on the other hand, further observations of ‘man and nature’ confrontation intricate a more delicate environmental determinism, in which the perimeters of human rationality and resultant confusion of nature stretched to catastrophic errors in our interfaces with it.²⁰ But the notion of a society’s vulnerability to natural hazard can be attributed more than to a region’s geographic or climatic tendency to hazard though very often the major historical and social dimensions of natural hazards or disasters were overlooked in emphasizing disaster prevention through the improving scientific applications, engineering remedies and the administrative management of hazard. At the same time a group of populations as well as the governments were categorized as liable of lacking of adequate knowledge and awareness, which could initiate measures towards reducing of risk but failed to do so.²¹ Vulnerability can be devoted to the errors in planning, location, strategy, and construction of a community’s erections and organization. R. Chambers (1989) has argued that vulnerability can be denoted by historical developments which dispossess people from the resources of surviving from hazard without suffering losses that make them physically weak, economically penurious, socially dependent and degraded and psychologically impaired.²² Recent researches on disasters especially which are of ‘geographical study’ have argued on the “disasterscape” of a region which ‘epitomizes the collective condition of disasters.’²³ Anu Kapur (2010), who has coined the term, has described ‘disasterscape’ in the following words:

“...it denotes an area that manifests the hallmark of a disaster. Characterized by features of destruction, devastation, and state of upheaval,... A disasterscape is a place where human life is lost or damaged, relationships ripped and livelihoods disrupted... The disasterscape is also a commodity, which can not only be sold but also politicized and corrupted. For it can sharpen our ecological and political sensitivities and human sensibilities....”²⁴

Northern Bengal, both as a geographical region and political-administrative unit had witnessed a series of natural disasters which were further intensified by the human

interferences, and hence it can be said that the natural disasters which occurred in northern Bengal had truly formed the “disasterscape”.

Greg Bankoff (2001) has further argued that the western assumption ‘to depict large parts of the world as dangerous places for *us* and *ours*’²⁵ provided a major justification for their ‘civilizing mission’ and the process of adaptation for themselves in the ‘temperate climate’ was coupled with ‘cultural constraints’ and criticism of the oriental society and environment. Moreover, colonial rule became the major stricture in measuring the extent and complexities of the reasons of vulnerabilities and efficiency in conducting relief operations. Recovery from the natural disasters could not only be a matter of accumulation of resource or execution of relief but it was more based on the society’s knowledge and understanding of cultural distinctiveness for themselves and the space provided by the colonial state to recover the colonized from the given ‘marginality’ of their material and spiritual conditions. Tirthankar Roy elsewhere (2008) argues that ‘the process of economic recovery depends largely on the success of managed retrieval and reconstruction of assets’ which usually involves a greater degree of ‘money, information, infrastructure and coordination.’²⁶ As the rich and poor both suffer loss during the natural disasters, so Roy has designated the natural disasters as ‘class neutral’ in contrast to the ‘man-made war or civil strife’,²⁷ but the fact is that neither the degree of loss did match with each other nor the process and duration of recovery was identical for the both, rather disasters has intensified the vulnerability and dependency of the later upon the former.

The existed literature mentioned above has no doubt contributed to the understanding of the problems of natural disasters and its impact on society and economy in a broader scale. Although during the recent decades problems relating to ecology, especially under the influence of the debate on climate change, has attained considerable attention by the historians and sociologists, but any historical work on a particular or smaller region where the elements of calamity, ecology, and vulnerability could be intersected more categorically, is yet to attain any proper historical interpretation by the historians. Northern Bengal, in this respect, deserves special attention by the historians who were earlier more inclined to focus on the overall environmental transformation in terms of colonial policies on forest, land pattern, and agricultural changes of any region, but to explore the complexities and dynamism of disaster occurrences, sufferings and displacement, and rehabilitation and relief operations of any particular region. It is in this recent wider background that the present

historical study seeks to draw the changing relationships between the natural calamities such as – earthquakes, landslides, cyclones, floods, and droughts occurred during the second half of the nineteenth century and the first half of the twentieth century and their impact on the society, economy and ecology of the northern districts of colonial Bengal. The study also intends to underscore the far-reaching impact of environmental and ecological transformations occurred in this region caused by the natural calamities.

An interdisciplinary method has been followed in writing this dissertation. The study connects itself with the wider academic networks of geography, economics, ecological and environmental history along with their basic element i.e. human society. The collection of sources for the whole research work is divided into two parts. The first part is the collection of data. For this purpose both the primary sources and secondary sources have been utilized. For the primary sources several unpublished documents like – archival sources viz. annual reports, Government proceedings and official correspondences stored in several archives; and among the published documents – published travelogues and memoirs of the British officials, newspaper reports, survey and settlement reports of several districts, Census reports of the relevant volumes, famine commission report, district gazetteers of several northern districts of Bengal have been consulted. For the collection of secondary sources, contemporary and recent books, monographs, journals, periodicals, unpublished Ph. D dissertations, digital sources have been taken into account. The second part of the method comprises of the analysis and interpretation of the collected data and information in order to offer some logical suggestions for the understanding of the problem.

The present work has been divided into five main chapters excluding the Introduction and Conclusion. The first chapter entitled ‘Historical Geography and Demography of Northern Bengal’ seeks to historicize the geographical transformations and ecological vulnerabilities during the colonial periods in northern Bengal. The chapter also intends to explain the demographic transformations of northern Bengal shaped by the environmental factors and natural disasters occurred during the period of the study. Apart from the geographical and demographical changes the chapter will also focus on the political construction of the northern Bengal districts which had gone through several territorial and administrative adjustments and transfers of lands among each other even in the first half of the twentieth century. In order to analyse the geographical characteristics, the river system, change of river course and formation of new lands seemed to be the most decisive factor for the geographical

construction of the region. Northern Bengal had a great variety of topographical structures which extended from the Darjeeling Himalayan ranges to the riverine inundated agricultural tracts. The second chapter entitled 'Cyclone, Society and Economy: Disaster and Damage in Northern Bengal (1864-1899),' focuses on the occurrences, spread and effects of the cyclones from 1864 to 1899, on society and economy of northern Bengal and side by side examines the genesis and dissemination of meteorological knowledge during the second half of the nineteenth century. The cyclones under the period of study had originated in the Bay of Bengal and travelled to the northern districts of Bengal, and few were caused by local depressions. The third chapter entitled 'Earthquake, Vulnerability and State: Northern Bengal in 1897 and 1934' describes the impact of the Earthquake of 1897 and 1934 in the society and economy of northern Bengal. The chapter also examines the growth of geological knowledge as part of disaster mitigation process in colonial India.

The fourth chapter 'Rivers, Floods and Contagion: A Historical Survey on Rainfall, Embankments and Disease in Nineteenth and Twentieth Century North Bengal' is broadly divided into four parts. The first part deals with the famine of 1787 caused by the devastating flood which was instrumental to the change of course of the river Tista. The second part has described the causes and occurrences of floods took place in north Bengal from 1850s to the 1920s and the state of society, economy and market amidst the destructions of life and property. The third part of the chapter highlights the constructions and role of embankments, drainage and irrigation in connection with the occurrences of floods and examines the colonial ideology of construction and maintenance of these means to eradicate the severity of floods. Finally, the last part is related with the diseases and epidemics caused by water-logging, embankments and contagion which had aggravated the sufferings and impoverishment for the people. Thus the chapter provides a detail analysis of floods and other collateral damages it brought about in form of destruction of lives, production and property in colonial north Bengal.

The fifth or the last chapter titled 'Drought, Scarcities and Famines: Ecology, Subsistence and Economy in Northern Bengal (1866-1909)' intends to draw the impact of drought or shortage of rainfall in the economy, ecology and society of northern Bengal. The present chapter has been divided into three major parts viz. the first part explores the hitherto uncharted history of 1873-74 Bengal-Bihar famine in northern Bengal; the second part seeks to unearth the specific and distinctive aspects of the famine of 1896-97 along with a

comparison of other parts of Bengal; and the third part deals with the scarcity of 1908-09 which was limited to some particular areas of northern Bengal. However, the main objective of the chapter is to critically examine the ecological and environmental changes which took place in northern Bengal in terms of variations in rainfall, short and long lasting drought and their impact on the human-nature relations in form of agricultural production and subsistence, which in turn had influenced the complex social-ecology of survival and livelihood, depended on State's and private charity and relief. Famines had brought into all these elements together in a single fold which was characterized by a consistent tension existed between market, State and society.

Notes and references:

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- ⁴ J. Donald Hughes, 'What Does Environmental History Teach?' in Angela Mendonca, Ana Cunha, Ranjan Chakrabarty (eds.), *Natural Resources, Sustainability and Humanity: A Comprehensive View*, Springer, Netherland, 2012, p. 11.
- ⁵ Richard Grove, *op. cit.*, p. 3.
- ⁶ Madhav Gadgil, and Ramchandra Guha, *This Fissured Land: An Ecological History of India*, Oxford University Press, New Delhi, 1992, p. 116.
- ⁷ Robert A. Stallings, *Sociological Theories and Disaster Studies*, Preliminary Paper (249), Disaster Research Centre, University of Delaware, 1997, p. 9.
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- ⁹ I. G. Simmons, *Global Environmental History, 10,000 BC to Ad 2000*, Edinburgh University Press, Edinburgh, 2008, p. 224.
- ¹⁰ For details see *Ibid.*, pp. 223-226.
- ¹¹ Joan Iverson Nassauer (ed.), *Placing Nature: Culture and Landscape Ecology*, Island Press, Washington, D.C, 1997, p. 26.
- ¹² Ben Wisner, Piers Blaikie, Terry Cannon, and Ian Devis, *At Risk: Natural Hazards, People's Vulnerability, and Disasters*, Second edition, 2003, p. 5.
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