

# Eastern HIMALAYAS CULTURAL DIVERSITY

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# Eastern Himalayas: Cultural Diversity

First Volume

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## Climatic Change and its Impact on Subsistence Farming and Changing Pattern of Socio-economic Life of Indigenous People

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### Abstract

The foothills of the Himalayas and the Northern region belong to the humid sub-tropical climate and were known as a comfortable climatic zone long ago. The ancient inhabitants at this region were mainly involved in subsistence farming but at present, there is a huge change in the weather and climate of this region along with the entire world, which is having a great impact on agriculture as a result the small farmers of this region are constantly facing various problems and adversities in their farming and livelihood. Current climatic extremes such as atmospheric warming, irregularity of rains, sometimes results in loss of crops and sometimes for prolonged rains and crops are damaged. In addition, insect infestation and various diseases in the crops have made the life of the farmers miserable. As well as continuous population growth and urbanization have further led to the lowering of ground water levels, which requires money for frequent irrigation of agricultural land, and this had a profound impact on the aquifer environment. As a result, the region is currently witnessing massive changes in agriculture and crop types. The socio-economic life of the indigenous people of this region is being affected in various ways largely due to unfavorable climatic conditions.

**Keywords:** Subsistence farming, Indigenous people, Global warming, Decreasing water level, Climatic change.

### I. Introduction

India is a subcontinent belonging to subtropical climate and depends on agriculture. India is primarily an agricultural country which is largely depends on nature for agriculture. According to 1991 Census three – Fourth of India's Population (74.03 %) lives in village. Agriculture plays a vital role in Indian's economy. 54.60 % of the total work force engaged in agricultural and allied sector activities (Census 2011) and account for 17.80 % of the country's Gross Value Added (GVA) for the year 2019-2020 (at current prices). 23.00 % of India's Gross National Product (GNP) representing agriculture sector alone.

which place a major role in country's development and shall continue to hold an important place in the national economy (Khan et al., 2009).

The People living in the foothills of the Himalayas spend their lives and livelihood through traditional and intensive agricultural activities. The climate of this region is basically cool and humid subtropical kind and pleasant. The inhabitants of this place depend on various factor of climate like rainfall, temperature etc. for agricultural activities. Over the past few decades there have been many changes in world's climate and they are affecting various aspects of human life in different ways. All the factors that affect climate are latitude, altitude, air pressure, rainfall, distance from sea, oceans currents etc.

In recent years, due to global warming, the glaciers in the Himalayan Mountain range are continuously melting, which threatens the people here in the near future. Uneven rainfall pattern, increased temperature, elevated CO<sub>2</sub> content in the atmosphere is important climatic parameters which affects the crop production and quality. Research studies indicate that weathering parameters influence strongly (67 %) compared to other factors like soil and nutrient management (33 %) during the cropping season. The Intergovernmental Panel on Climatic Change (IPCC) projected that the global mean surface temperature will likely rise and may result into uneven climatic change. It has reported over 20<sup>th</sup> century that rising temperature places an important role towards global warming as compared to precipitation. Research has confirmed that crop yield falls by 3 % to 5 % for every 1 % increase in the temperature. Further, it is predicted that the global mean surface temperature will likely be in the range of 0.3 – 0.7 ° C for the period 2016 – 2035 (IPCC, 2014). This impact may put agricultural activities at significant risk. India could experience a 40 % decline in agricultural productivity by the 2080s. Rise in temperature will affect wheat growing regions placing hundreds of millions of people at the brink of chronic hunger (IPCC, 2007).

Livelihood is a continuous process as a result of which every individual has to adopt some means of in order to service. Therefore, managing secure and reliable livelihood for all is the main goal of sustainable development. However, global climate change has become a particular concern for sustainable and descent livelihoods. Rising global temperature is pushing countless people into poverty through continued livelihood insecurity. Poor rural peoples in India are facing various problems due to loss of livelihood as a result of climatic change.

In agriculture, infrastructure such as irrigation, communication, market etc. is very important. India is a traditional agricultural country rich in natural resources. The climate of North Bengal, belonging to the Himalayan hill region and its foothills, is quite conducive to agricultural activities. Due to its location

  
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this part of West Bengal receives maximum rainfall which is favorable for agricultural activities of the inhabitants of this region. The inhabitants of this region mainly cultivate rice, jute, potato, sugarcane, mustard, tobacco and various fruits and vegetables. On the other hand, the inhabitants of the hilly areas mainly cultivate crops such as paddy, maize, wheat, oilseeds, ginger and cardamom etc. However, the inhabitants of this region are mainly small farmers and face various infrastructural problems in agriculture. Climate – related changes in agriculture particularly affect farmer’s income and livelihoods. Weather extremes such as high rainfall, temperature etc. reduce crop production and ensure food security. Therefore, sustainable development in the agricultural sector will not be possible if appropriate measures are not taken in the agricultural sector along with climatic change. Changes in temperature can particularly affect farmer’s crop selection.

The following table shows the gross cropped areas, net sown area, and cropping intensity in the districts of North Bengal are given below:

*Gross Cropped Area, Net Sown Area and Cropping Intensity in the Districts of North Bengal*  
(Area in '000 Hectares)

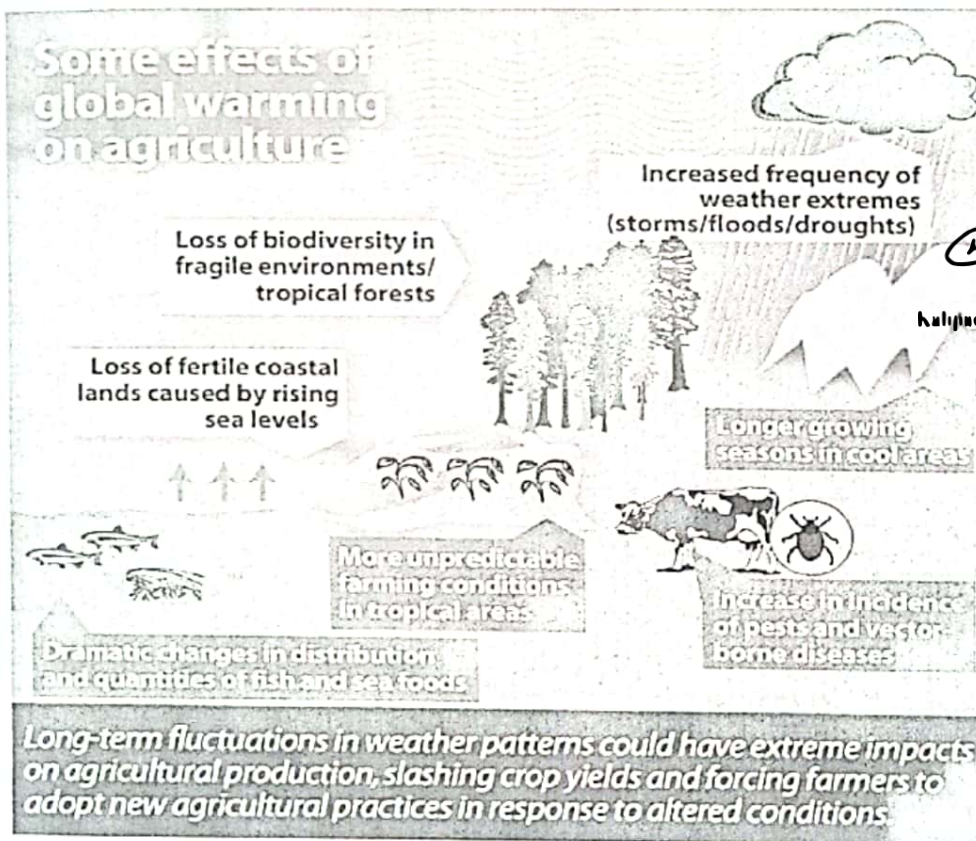
Districts	Cultivable Area *	Gross Cropped Area	Net Sown Area	Cropping Intensity (%)
Darjeeling	157	194	132	147
Malpaiguri	353	546	336	163
Coochbehar	258	521	251	207
Uttar Dinajpur	279	488	276	177
Dakshin Dinajpur	188	308	186	166
Malda	282	443	216	205
West Bengal	5682	9530	5256	181

Sources: Department of Agriculture, Government of West Bengal.

## II. Weather Impact on Agriculture

The relationship between climate and agriculture in India is very close. Crops are impacted by rainfall variability and heat stress. Climatic change causes surface soil erosion due to increased rainfall. Continued melting of glaciers due to temperature causes sea level rise, flooding of coastal areas and groundwater

Stalinization, which is detrimental to agriculture. Increases in average seasonal temperatures may shorten the duration of many crops, which may reduce yields. Climate change has a direct impact on crop evapotranspiration. Global warming and erratic rainfall effect the nutritional value of crops. Erratic rainfall, evaporation, soil moisture disturbance and water scarcity caused by climatic change can have considerable negative impact on agriculture. High temperatures reduce crop yields and support the proliferation of weeds and pests. Rising temperatures continue to affect staple crops like paddy, wheat, maize etc. in India. This rising temperature, if not controlled, will not only endanger food security, but also make India dependent on food imports.



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Source: <https://www.agrivi.com/wp-content/uploads/2015/10/sl4.gif>

### III. Objectives of the Study

The main objectives of this present paper are:

- To find out the climatic changes in the Northern Himalayan Foothills and its effect on agriculture of the inhabitants of this region.
- To verify what changes have occurred in the quality, types and variety of crops produced with climate change.
- To understand the socio-economic condition of the inhabitants with the change in the crop produced.

#### IV. Methodology

This research study is based on conceptual knowledge. Facts have been taken from Secondary sources of data such as Ethnological monograph, district gazetteers, census reports, newspapers, journals, subject books and internet.

#### V. Main Findings

Indian rural people are basically agriculturist. The villagers earn their income from agriculture. We all know that agriculture is largely nature dependent. Different factors of nature affect agriculture in different ways. Farmers in India still do agriculture using primitive methods. They use various tools like ox, plough, sickle, spade etc. to perform agricultural work. India is a vast country and the climate varies from region to region. Agriculture in India is mainly dependent on rainfall produced by the monsoon climate. This rainfall has created water resources in agriculture which is helpful for agricultural work during cultivation. Different crops are cultivated in India according to seasons. The villagers which have a river and stream to construct small and major dams provide a new way of life to the inhabitants. It is found tanks and canal irrigation tends to prosper in agriculture income. In our country, the villages inhabited within the network of canal irrigation facilities have got most of the modern life (S. L. Doshi and P. C. Jain, 2007, p - 105)

West Bengal is primarily an agricultural state. North Bengal under it is mainly an agricultural region and its area is spread over an area of approximately 21,855 square kilometers. More than 8% of India's food production comes from West Bengal that has just 2.7% of the total land area, but accommodates 7.6% of the population. The state is divided into six agro – climatic zone, which are located in three major agro – climatic regions, viz., the Eastern Himalayan Region, the Lower Gangetic plain Region and the Eastern Plateau & Hill Region. (Paria. B, Mishra. P and Behera. B, 2022)

Most of the people in districts of North Bengal, Darjeeling, Cooch Behar, Jalpaiguri, Alipurduar, North Dinajpur etc. belonging to the eastern Himalayan hill region its foothills are associated with agriculture. The inhabitants of this area still live by traditional and intensive agriculture. Soils of this region are acidic and sandy loam with low water holding capacity limiting productivity of quality of crops. Crops production is not high due to low soil fertility in this region. The maximum rainfall in this region of North Bengal is 200 to 400 cm. yet, irrigation facilities in this region are inadequate due to lack of proper infrastructure. Also due to high rainfall this place is prone to soil erosion, which is not conducive for agricultural activities. The indigenous people of this region cultivate both Kharif and Rabi crops. Darjeeling and its hilly areas are mainly



cultivated with tea, maize, millet, potato, soybean, cardamom etc. Tobacco is an important cash crop of Cooch Behar. In the remaining districts like Alipurduar, Jalpaiguri, and Uttar Dinajpur various crops and vegetables such as rice, wheat, potato, jute, mustard etc. cultivated. However, at present crop diversification, irrigation, fertilizer use, pesticide, use, road connectivity, market and storage facilities are increasing risk towards non-food grain production in this region as the main divers of agricultural change. Initiation of economic reforms in 1991 opened up the domestic agriculture produce to the globe market and created new opportunities for agricultural exports leading to greater diversification in cropping patterns towards non – food crops. In Darjeeling districts, it has shown a significant increase in non – food crop cultivated area from 18.03% in 2004 – 2005 to 42.53% in 2013 – 2014. (Paria. B, Mishra. P and Behera. B, 2022)

Over the past few years, climatic change occurred in North Bengal, which is located in the foothills of the Himalayas. Here the temperature continues to rise and excessive rains cause flood and soil erosion which adversely affects agriculture. North Bengal is full of rivers which can be used as main source of water for agriculture. Teesta, Torsa, Mahananda, Raidak, Jaldhaka, Balason, Kalchini, Mechi, Murthy etc. are some important rivers flowing through this region of North Bengal. However, due to lack of proper infrastructure, the vast water resources of this region are not being utilized properly for agricultural purposes. People here are using underground water through shallow tube – wells for irrigation which is costly and does not bode well for future generations. Over the years the warming of sea surface has resulted in the emergence of various cyclones which are causing huge damage to the agriculture sector of this region. The Green Revolution brought about increased production through the use of high – yielding crops and modern agricultural technologies such as chemical fertilizers, pesticides, tractors, controlled irrigation, mechanical threshers etc. Although the Green Revolution has boosted crops production in various Indian states such as Punja, Haryana, Maharashtra and Gujrat through the cultivation of high yielding varieties and use of chemical fertilizers, but it has not had a significant impact on West Bengal. Farmers in this region are mainly marginal and small farmers. As the inhabitants of this region could not use the factors useful in the Green Revolution and their crop production could not increase significantly. Farmers of this region also have to depend only on wholesale traders instead of retail demand to ensure remunerative price of their crops which is affecting their financial situation.

## VI. Conclusion

In the view of the above discussion, it can be seen that the inhabitants of this region are particularly dependent on subsistence farming. As a result of climatic changes effects in many ways on agricultural activities is noticed. They are not

  
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able to take appropriate measures in agriculture in response to climatic change. Also, due to the lack of proper implementation of appropriate measures taken by the government in the field of agriculture, the inhabitants of this region are being deprived of its benefit. Following the onset of India's Green Revolution, government policies such as the use of high yielding seeds, use of chemical fertilizers and irrigation had a profound impact on the agricultural economy in this region due to their limited applications.

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