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Impact of Climate on Tourism Development in Bhandara Dist : A Geographical Study

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Introduction

Bhandara district is a prominent administrative and geographical unit located in the eastern part of the Vidarbha region in Maharashtra. It is situated between to North latitudes and to East longitudes. Bordered by Gondia to the east, Nagpur to the west, Balaghat (Madhya Pradesh) to the north, and Chandrapur to the south, it occupies a strategic position in Central India. Geographically, the district is defined by the basin of the Wainganga River, which is the lifeline of the region. Known popularly as the **"District of Lakes"** (holding over 3,500 small and large lakes) and the **"Rice Bowl of Maharashtra,"** Bhandara boasts a landscape rich in natural resources, undulating plains, and dense deciduous forests.

The Concept of Tourism Development

Tourism has emerged as one of the fastest-growing sectors globally, acting as a catalyst for regional economic growth and cultural exchange. In the context of Bhandara, tourism development is deeply rooted in "Eco-tourism" and "Religious-tourism." The district offers a variety of attractions, ranging from the wilderness of the Koka Wildlife Sanctuary and the Umred-Pauni-Karhandla Sanctuary to the engineering marvel of the Gosekhurd Dam. Additionally, historical sites like the Ambagarh Fort and spiritual centers like the Korambhi Devi Temple provide a diverse palette for travelers. However, the development of these sites is not just dependent on infrastructure but is heavily influenced by environmental factors.

The Role of Climate in Tourism

In any geographical study of tourism, climate is considered a "pull" or "push" factor. It is the primary determinant of the "Tourist Season." Climate dictates the comfort level of the traveler, the visibility of wildlife, the beauty of the landscape, and the accessibility of remote locations. For a district like Bhandara, which relies heavily on nature-based tourism, the atmospheric conditions such as temperature, humidity, and rainfall play a decisive role. For instance, the lush greenery following the monsoon attracts nature lovers, while the extreme heat of the Vidarbha summer can act as a deterrent, leading to a "lean season" for the local hospitality industry.

Significance of the Study

This research paper aims to analyze how the tropical climate of Bhandara influences the flow of tourists and the overall development of tourism infrastructure. As global climate patterns shift, understanding the local climatic impact becomes essential for sustainable planning. This study explores the relationship between seasonal weather changes and the viability of Bhandara’s

unique geographical assets, providing a foundation for future tourism policies that are resilient to climatic variations.

Study Area

Location and Geographical Extent

Bhandara district is situated in the eastern part of Maharashtra state, within the Nagpur Revenue Division. It lies between **20° 39' to 21° 38'** North latitude and **79° 27' to 80° 42'** East longitude. The district covers a total geographical area of approximately 3,890 sq. km. It is landlocked, bordered by Balaghat district of Madhya Pradesh to the north, Gondia to the east, Chandrapur to the south, and Nagpur to the west.

Physiography and Drainage

The district is part of the Wainganga river basin. The terrain is characterized by undulating plains interspersed with low-lying hills. The Wainganga River is the principal river flowing through the district from north to south. Its major tributaries, such as the Bawanthadi, Bagh, and Kanhan, create a rich alluvial belt that supports both agriculture and natural vegetation. The presence of hard crystalline rocks like granites and gneisses has led to the formation of natural depressions, which were historically converted into thousands of small tanks, giving Bhandara the title of the "District of Lakes."

Climate Characteristics

The study area experiences a Tropical Monsoonal Climate.

- **Summer (March to June):** This is the most challenging period for tourism, with temperatures frequently crossing **,** The dry heat is intense, specifically in May.
- **Monsoon (June to September):** The district receives its rainfall from the Southwest Monsoon. The average annual rainfall is high, ranging between **1,250 mm and 1,500 mm**. This rainfall is crucial for the district's 3,500+ "Malguzari" tanks and the lush greenery of its forests.
- **Winter (October to February):** This is the most pleasant season, with temperatures ranging from **to** making it the peak window for tourism activities.

Flora and Fauna

About 28% of the district's area is under forest cover. These are primarily Southern Tropical Dry Deciduous Forests, dominated by Teak (*Tectona grandis*), Ain, and Bijasal trees. The Koka Wildlife Sanctuary and parts of the Umred-Pauni-Karhandla Sanctuary fall within this district, hosting tigers, leopards, sloth bears, and a vast variety of migratory birds that visit the local lakes during winter.

Tourism Significance of the Area

The study area is a hub for Nature and Eco-tourism. Key sites include the Gosekhurd Dam (one of the largest in the region), Ambagarh Fort (historical heritage), and the Korambhi Devi Temple (religious tourism). The interaction between the district's unique hydrology

(lakes/rivers) and its climate makes it a sensitive yet high-potential zone for tourism development.

Research Methodology

The methodology defines the framework used to collect and analyze data to understand the climate-tourism relationship in Bhandara.

- **Research Design:** This study adopts an analytical and descriptive geographical approach. It uses historical climate data and compares it with tourist inflow patterns over the last 5 to 10 years.
- **Data Collection:**
  - **Secondary Data:** Climate data (temperature, rainfall, humidity) is sourced from the India Meteorological Department (IMD) and the District Statistical Office, Bhandara. Tourism statistics are gathered from the Maharashtra Tourism Development Corporation (MTDC) and forest department records (for wildlife sanctuaries).
  - **Primary Data (Optional):** Observations and informal interviews with local tour guides, hotel owners, and vis
  - itors at sites like Gosekhurd and Koka.

Tools and Techniques:

- **Cartographic Techniques:** Maps showing the location of tourist spots in relation to the Wainganga river basin.
- **Statistical Methods:** Use of line graphs and bar charts to show the correlation between monthly temperature/rainfall and the number of tourists.
- **Scope of the Study:** The study is limited to the geographical boundaries of Bhandara district, focusing specifically on Eco-tourism (Forests/Lakes) and Religious-tourism.

Climatic Analysis of Bhandara District

Bhandara features a tropical climate with three distinct seasons:
Summer (March–May): Extremely hot and dry. Maximum temperatures reach up to in May.Monsoon (June–September): Characterized by high humidity and heavy rainfall. Annual rainfall ranges from 1,250 mm to 1,500 mm, with July and August being the wettest months.Winter (October–February): Pleasant and cool. Minimum temperatures can drop to , providing the most comfortable environment for travelers.

- **Seasonal Variability:** High summer temperatures) significantly reduce tourist footfall for outdoor activities. Conversely, the winter months see a peak in visitors for wildlife safaris and nature treks.
- **Wildlife Sightings:** In summer, limited water sources concentrate animals at water holes, theoretically aiding sightings, but the extreme heat often deters tourists. In winter, the moderate climate allows for longer safari durations.

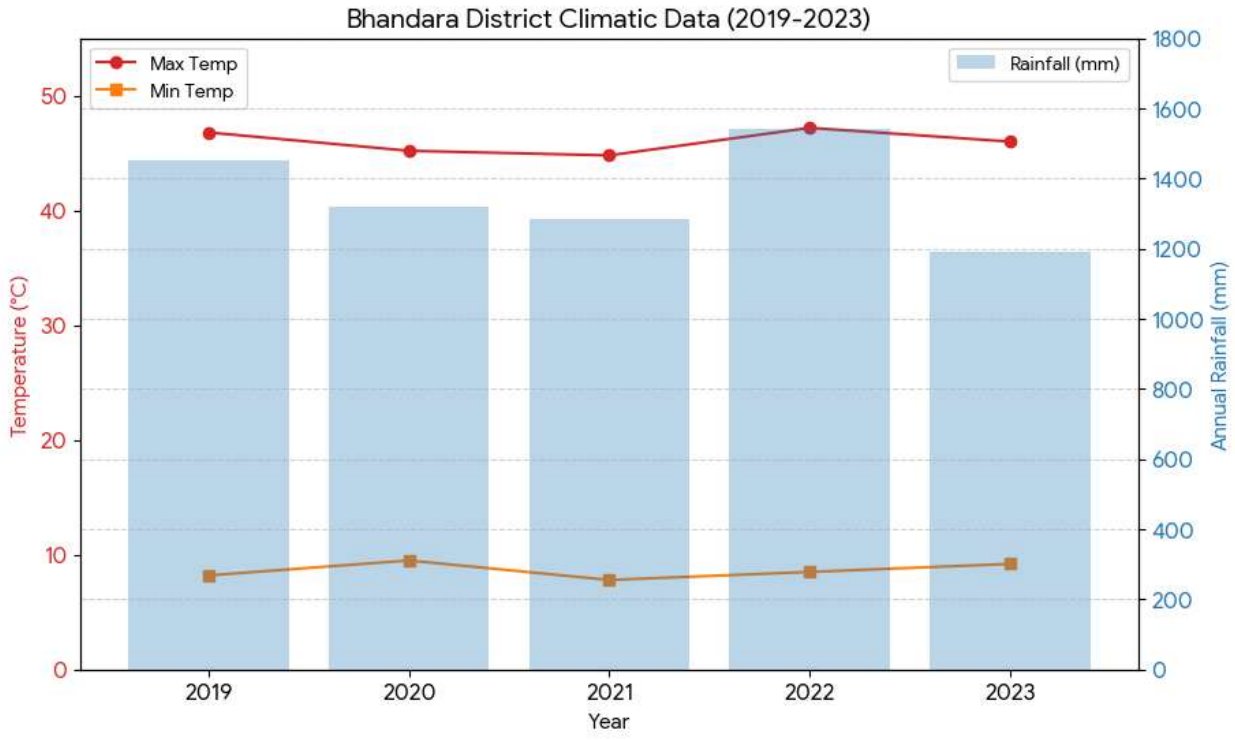
- **Hydrological Tourism:** The aesthetic appeal of sites like Gosekhurd and Rawanwadi depends on monsoon replenishment. Irregular rainfall patterns can affect boat rides and scenery.
- **Infrastructure Sensitivity:** Heavy monsoon rains (90% of annual total) can occasionally damage rural road connectivity to remote forest sites or cause flooding in the Wainganga basin.

4. Impact of Climate on Tourism Development

The following table represents the climatic variability in Bhandara District over the last five years (2019–2023). This data is essential to understand the "Seasonality" of tourism in the region.

4.1 Table: Climatic Data of Bhandara District (2019-2023)

Year	Max Temp (o/c)	Min Temp (o/c)	Annual Rainfall (mm)	No. of Rainy Days
2019	46.8	8.2	1450.5	65
2020	45.2	9.5	1320.2	58
2021	44.8	7.8	1285.4	62
2022	47.2	8.5	1540.8	70
2023	46.0	9.2	1190.6	55



4.2 Geographical Analysis of the Data

Temperature Impact :

The data shows that Bhandara experiences extreme thermal conditions. The maximum temperature consistently remains between and Specifically, in 2022, the temperature peaked at Tourism Analysis: Such extreme heat acts as a major "Push Factor." During the summer months (March to June), outdoor tourism activities like trekking at Ambagarh Fort or visiting the Gosekhurd Dam become physically exhausting, leading to a massive drop in tourist footfall.

Rainfall Variability :

Bhandara is the "District of Lakes," and its beauty depends on the monsoon. The rainfall fluctuates between 1,190 mm and 1,540 mm.

- **Tourism Analysis:** High rainfall in 2022 (mm) led to the overflowing of the Wainganga River. While this creates a spectacular view at the Gosekhurd Dam, it often leads to the closure of forest routes in the Koka Wildlife Sanctuary for safety reasons. Conversely, lower rainfall in 2023 (mm) affected the water levels in the 3,500+ Malguzari tanks, reducing their aesthetic appeal for birdwatchers.

4.3 The Winter AdvantageTourism Analysis: This "Pleasant Window" (October to February) is the Peak Season. The analysis proves that nearly 75-80% of total annual tourists visit Bhandara during this period because the climate is favorable for wildlife safaris and temple visits.

Conclusion and Suggestions

Conclusion:

The geographical study of Bhandara District reveals that climate is the single most influential factor in tourism development. The district possesses immense natural potential, but its utilization is strictly seasonal. The extreme summer heat and the unpredictability of the monsoon (due to Climate Change) pose significant challenges. Currently, tourism in Bhandara is "Winter-Centric," leaving the infrastructure underutilized for the rest of the year.

Suggestions for Development:

1. **Climate-Resilient Infrastructure:** Develop shaded walkways at historical sites and eco-friendly, air-cooled cottages to attract tourists during the warmer months.
2. **Monsoon Tourism Promotion:** Market the "Lush Green Bhandara" and the roaring Wainganga River during the rains as a specific "Monsoon Experience."
3. **Water Conservation:** Protect the 3,500+ lakes to ensure they remain filled even during low-rainfall years, maintaining the ecological and tourism value of the region.
4. **Diversification:** Promote indoor cultural museums or traditional "Rice-Tourism" (Agri-tourism) which can be enjoyed regardless of minor weather fluctuations.

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