

Impact of landslides in Tourism of Himalayas: A case study of Mussoorie

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Abstract: Mussoorie, an A-grade classified hill station of Uttarakhand is one of the Most Significant tourism spots of Uttarakhand. Every Year a significant amount of revenue is generated through tourism & related activities in Mussoorie. Tourism is also an only source of livelihood to many residents of mussoorie. Lying in Lower Himalayan Region, Mussoorie is also highly susceptible to Landslides due to its location, movement of tectonic plates, Monsoon season and amount of rainfall it receives over the Year. Construction of infrastructure to develop this tourism destination has further triggered the landslides in the area due to various reasons. This research paper attempts to correlate the relation between landslides and its direct or indirect impact on tourism and its Stakeholders. This Paper aims to highlight the major issues faced by tourism stakeholders due to landslides.

Keywords: Deforestation, Hill station, Landslide, Mussoorie.

1. INTRODUCTION

Mussoorie, also known as Queen of hills is a famous hill station situated in lower Himalayas at a distance of 35 kilometers from Dehradun in Uttarakhand. The town is situated between 1,820 and 2,100 meters above sea level and the annual rainfall in the area is greater than 2000mm, most of which is confined to the monsoon season.

In 1881 the population of Mussoorie was just 3,106 (Atkinson, 1882) which soared to 30118 as per 2011 census. Reasons for this increase have been because of increased employment & entrepreneurship opportunities. The other group which adds up to the current population is tourists, students and pilgrims. To promote tourism, hills slopes have been cut down for erecting new commercial establishments such as hotels & restaurants. Moreover, expansion of existing parking spaces to cope up with the never ending increase in vehicular traffic, construction of recreational facilities & road cutting and widening, have been causing the problems of slope instability and bank erosion in the nearby villages.

Natural disasters have been common in Uttarakhand but their frequency and impact in the recent past has turned out to be a cause of concern for all stakeholders. A lot of destruction has been caused by natural disasters in areas of Uttarkashi, Pauri and more recently in Kedarnath.

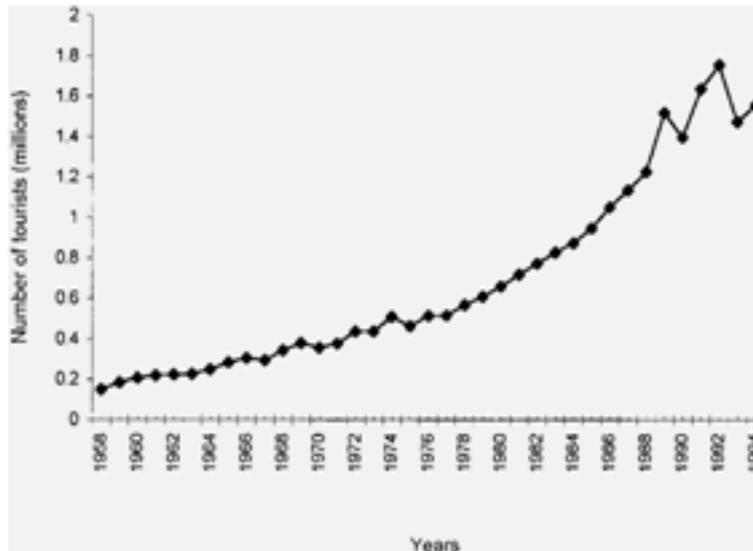
This research paper focuses on the reasons & causes of landslides in mussoorie and its impact on the tourism activity. Natural degradation of land cover due to deforestation and monsoon has an adverse effect on the land.

Tourism in Mussoorie

Tourism in Uttarakhand is an age-old phenomenon. Earlier, it was done for 'pilgrimage' and did not impact the environment as it involved the local populace. It did not have many adverse effects on the environment for two reasons:

- The numbers of people undertaking tourism activity for pilgrimage were less due to hectic travel schedule and inadequate transport facilities.
- amount of exploitation of natural and local resources was very limited

- The paradigm shifts of tourism of mussoorie from pilgrimage to leisure and furthermore adventure led to the construction of various super structural facilities such as fine roads, comfortable transport systems, good hotels & sightseeing & adventure points. Unlike Pilgrimage, modern tourism is a round the year activity. Burden is placed on the environment and heritage and the natural resources are fully exploited. The graphic representation below shows a dramatic increase in the tourist trends for Mussoorie from 1958 to 1994. (Tourist Ź Bureau, 1995).



(Madan 2000)

Fig 1: increase in the tourist trends for Mussoorie from 1958 to 1994

Tourism in Mussoorie is divided into summer and winter seasons. In summers tourists from Uttar Pradesh, Haryana, Bihar, Punjab, Rajasthan and South India visit the place to get relief from hot weather in their states and also to observe the scenic beauty of the place. The popular tourist attractions during this period are Kempty Fall, Bhatta Fall, Jharipani Falls, George Everest, gun hill and Company Garden.

In the winters the tourists visit this place to witness snowfall and also to celebrate new year's & Christmas eve. The local body hosts winter line carnival at the end of December to attract tourists and promote regional tourism. The popular tourist attractions during this period are sister market, lal tibba, gunhill, camel's back road and Mall road. Lal Tibba is famous for its sightseeing and one can witness snowcapped Himalayan Range from this place.

The most popular food outlets in Mussoorie are Kalsang fast food, lovely omelet, green vegetarian restaurant, Urban Turban and Tavern bar & restaurant. One can also find peddlers and Hawkers selling Corn-on-cobs, popcorn & candy floss along the mall road.

Accommodation units in mussoorie over 204 hotels with total capacity of 2387 rooms and 5700 beds. These include Five star hotels such as JW Marriott, Jaypee Manor House, Savoy hotel, Ramada, Brentwood by Fern and many more. Apart from these other sections of accommodation units include Homestays, lodges and a few ashrams.

Landslides: an unmitigated disaster

Landslides are the movement of soil or rocks in downward direction due to gravity. This happens when force of gravity surpasses the strength of the soil & other variables that hold the slope including rocks & plants. The various natural causes identified for Landslides are low plant cover, heavy rainfall, earthquakes, movement of tectonic plates. Man-made causes include Deforestation, construction of buildings & improper disposal of non recyclable waste.

Though it is a natural phenomenon, it is very destructive when it comes to economic/financial loss, loss of biodiversity, loss of habitat and destruction of Road transport. Rainfall is a main cause of landslides in Himalayan region in areas where soil is unable to withstand sturdiness due to constant erosion. The other identified reasons are large scale construction and deforestation in some cases.

Uttarakhand has been prone to this disaster since times immemorial. Every year a lot of fatal accidents occur due to this disaster. In 2021 alone the states of Himachal Pradesh & Uttarakhand have witnessed 170+ landslides up till now. The number of lives lost in it are around 47. Uttarakhand has witnessed 2900 percent increase in the amount of landslides since 2015.

As per the reports of Uttarakhand State Disaster Management Department the number of landslides was 972 last year taking 25 lives. 132 incidents have been recorded so far, claiming 12 lives. Dams build in various places in Uttarakhand have been considered prime reason for landslides, the Char Dham Pariyojana and the Rishikesh-Karnprayag Railway Line project have entailed deep cutting into the hill slopes and cutting down trees for these activities have further triggered the disasters.

Experts share that geological & geographical studies for this particular area and these projects have witnessed inefficiency in expertise and knowledge leading to core unscientific approach while developing these projects. According to the Supreme Court High Power Committee- locations Identified for these projects have been highly prone to Landslides witnessing regular collapses. The final report submitted points out the lack of efforts taken by the government to avoid deforestation. Over 700 hectares of forests covering 47000 trees have been cleared for char Dham project alone. No proper measures have been taken to work on deforestation to avoid the risk of Landslides.

2. REVIEW OF LITERATURE

A geomorphic evaluation of the landslides around Dehradun and Mussoorie, Uttar Pradesh, India (Sambhu V. Panikkar, V. Subramanyan 1996) concludes in their paper about various reasons for landslides in regions of mussoorie. Road cuts and improper embankments have been considered to cause minor landslides however causes of major or large landslides are monsoon, rainfall and seismic activities around the area. Preventive measures suggested were rapid afforestation programs, toe- walls need to be constructed.

Landslide susceptibility mapping using bivariate statistical method for the hilly township of Mussoorie and its surrounding areas, Uttarakhand Himalaya PRATAP RAM 2020 shares in the data of areas prone to landslides in mussoorie. The paper suggests that regions of Mussoorie including Bhattafall, George Everest, and kempty fall are high hazard zones. These areas are also one of the most scenic places to visit in mussoorie. They together provide livelihood to small hawkers, peddlers and roadside shopkeepers as setting a permanent catering or commercial establishment is a tricky job in these areas. Local residents of these places, especially Bhatta Gaon & George Everest, walk down to these areas to earn their bread and butter. For them Landslides come as a loss of livelihood in these areas.

Kemphy Fall area witnesses' maximum landslides due to rise in water levels in the Fall. This Rise in water level seeps and loosens the soil integrity causing landslides. These landslides come as a challenge to over 50 small commercial establishments who have a single source of income.

Sapna Madan 2000 in her paper **The impacts of tourism on the environment of Mussoorie, Garhwal Himalaya, India** shares an insightful data of the tourism trends in mussoorie. The paper advocates that 80% of tourists visit mussoorie for recreational purposes, other forms of tourism are also undertaken in smaller fractions such as education (8%) and religion (14%). The paper further shares the frequency of tourists to Mussoorie which is 68% for first timers, 24% for second timers and 8% for third timers. Most of the Tourist influx is in May-June in summers and December- January in winters. This data clearly shows the scope of business at small, medium and large scale for catering as well as accommodation stakeholders.

3. RESEARCH METHODOLOGY

The research methodology used for this particular topic is divided into two major sources:

- a. **Primary Source:** Likert Method was used to conduct the research in which around 50 people of Mussoorie region participated and provided insightful data which helped to strengthen the foundation of the research work conducted.
- b. **secondary sources:** various numerical data was collected from past research work on similar topics to correlate between landslides and tourism. A report by the Uttarakhand Tourism Development Board, named Collection of Tourism Statistics for the State of Uttaranchal was referred to understand the trends of tourism in Mussoorie throughout the year. Meaningful data was compiled from the website and journals of Uttarakhand State Disaster Management Authority.

OBJECTIVE OF RESEARCH

This research is conducted with the purpose of understanding the causes of landslides and its impact on tourism stakeholders of Mussoorie. This research paper will also help to analyse and evaluate the causes of landslides and suggest measures to minimize them. This research paper will help researchers undertaking similar research in future.

OBSERVATIONS & INTERPRETATIONS

A field survey was undertaken in the area of Mussoorie in which around 50 people volunteered to answer a set of questions related to the research. The sample population was between the age group of 25-35 years of age. 76% of the respondents have been living in Mussoorie for more than 15 years and have families and occupations based in Mussoorie. 10% of the respondents have been living in Mussoorie for the past 10 years and have come mainly for educational purposes. 8% of the respondents have been associated with Mussoorie between 5-10 years. 6% of the respondents are tourists visiting Mussoorie for excursions and short visits.

There are few major routes taken by tourists to visit Mussoorie & other tourist destinations after Mussoorie such as Dhanaulti and Tehri Lake. They are:

1. **Dehradun-rajpur/Mussoorie Bypass-Mussoorie** is a main motorable route easily accessible by bus or personal conveyance. This route covers a distance of around 35 km. This route is most feasible for tourists visiting from New Delhi & other states falling south of New Delhi. This route witnesses most Rush during Peak seasons of Mussoorie to the extent that at times there are very long traffic jams in this Route.
2. **Dehradun-kimadi village-mussoorie** is a 45 km long semi-metallic road generally used by local residents of Kimadi village and residents of areas around Library. This route is generally used as an alternative route during monsoons in case of landslides or road blockages in Dehradun-MussoorieBypass-Mussoorie route. This route connects the most popular tourist attractions in Mussoorie such as Lambidhar mines & George Everest. Even though this route connects rural areas of kimadi to dehradun & Mussoorie, this is the most neglected and overlooked route.
3. **vikasnagar-yamunabridge-kemty-mussoorie** is a 68 km long route starting from Vikasnagar. This route is generally preferred by tourists visiting from areas of Haryana, Chandigarh, Punjab and other north western places. This route provides a beautiful scenic beauty while travelling.
4. **rishikesh-chamba-dhanaulti-mussoorie** is the longest motorable route to reach Mussoorie amongst these routes. It covers a distance of 131 kilometers and is also a part of All-weather road/char dham yojana till Chamba. This route has Two major shakti peethas on the way. One is the Kunjapuri Devi Temple near Narendranagar & other is the Surkanda devi Temple in Kaddukhal near Dhanaulti. Other Tourist attractions include Hotel Ananda which was the Mahal of one of the most significant kings of uttarakhand history Shri narendra Shah Maharaj. This route is very well developed under Char Dham Pariyojana. However at certain places one may find that the quality of roads is very bad due to poor construction & monsoon conditions. Similar to above routes this route is connecting many rural areas and the quality of roads reflects on their livelihood.

All the above mentioned routes are accessible by vehicles throughout the year. However monsoons pose a major challenge in the effectiveness of these routes. This in turn hampers the tourism activity of Mussoorie.

Mussoorie is largely dependent on Tourism as an economic activity. Many small and medium enterprises have been running for decades relying on tourism products. The accommodation units in mussoorie include 3 Govt. Hotels, 149 starred and non starred hotels, (including big brands like JW Marriott, Savoy by ITC, Ramada, Jaypee Manor House), 45 paying Guest houses & Homestays and 8 Dharamshalas catering to every segment of tourist visiting Mussoorie. The amount of accommodation units in a limited area has weakened the rock strata which have led to landslides. Excessive Rains in the past few years have further broken down the integrity of Soil. Various construction activities of infrastructure facilities & superstructure facilities around Mussoorie have required cutting down of slope resulting in the change in slope geometry thus destabilising the slopes. However it is important to discuss that the cutting of slopes is more frequent in parts of Mussoorie like Lakshmanpuri and Bataghat areas.

The areas of kemty fall towards the library witness landslides due to very different reasons unlike Bataghat & Lakshmanpuri area. The main reasons include monsoons and heavy rains.

After the field survey three major reasons identified for the blockage of these routes include:

1. Landslides: covering a major percentage (93%) of the total causes of hampering the tourism activity in the Area.
2. Road Blockages: 6% of the total respondents believe that road blockages also hamper the ease of conveyance to & fro Mussoorie both for tourists & residents alike.
3. Monsoon has also been considered one of the most important factors which hampers ease of conveyance as the seasonal water bodies bring debris stones & soil in large amounts during monsoons and scatter it on roads which in itself is very risky for those driving vehicles. such sights can be seen above the toll tax in kolhukhet, chunakhala, and places in kempty fall route.

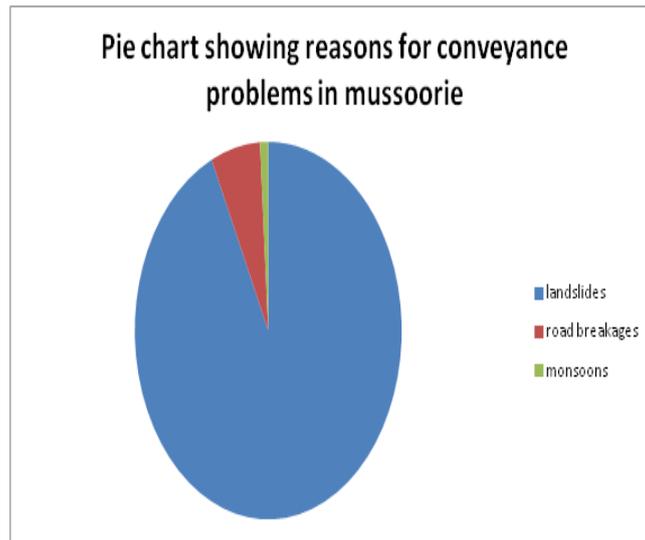


Fig 2: pie chart showing reasons for conveyance problems in mussoorie

The major landslides witnessed by the respondents are in the Dehradun-rajpur/Mussoorie Bypass-Mussoorie route since it is the most commonly used route connecting Mussoorie and the travel time is also less as compared to other routes mentioned above. It is the most common route used by Tourists and residents alike. This route connects and caters to the maximum number of shopkeepers, Restaurant operators and Hotels amongst all the three routes. The landslide prone zones include Chunakhala, Glogi power station and areas around Kolhukhet. These areas witness landslides every year due to monsoons and seasonal water bodies which impacts the soil integrity. It also brings gravel and mud on the road causing accidents of vehicles.

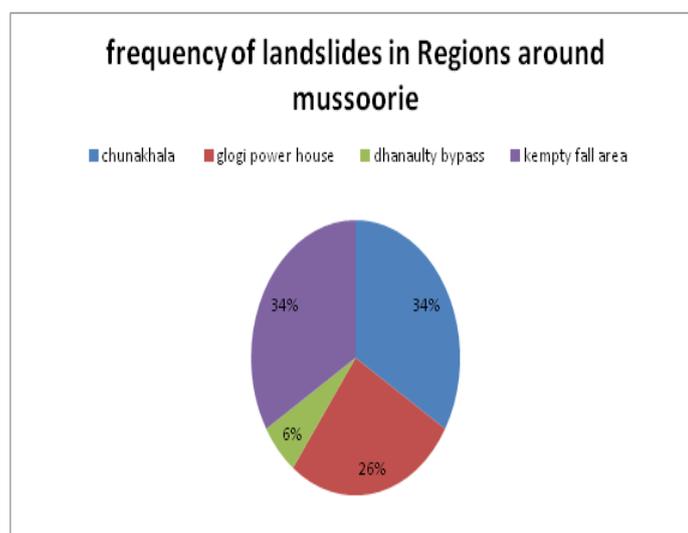


Fig 3: pie chart showing areas around mussoorie Prone to landslide

From the data collected from respondents shows 34% of total landslides occur in area of Chunakhala, bhatagaon and nearby areas. similar figure can be seen for the gologi power house area in the same route. the main reasons of these landslides have been attributed to monsoon. however improper construction of roads and vertical embankments to hold landslides are also some significant reasons for these landslides. landslides in this route have caused major business losses to tourism units and small scale businesses as tourists tend to change their destination due to these reasons. The delay in availability of raw materials in case of street vendors also affects the livelihood of these people.

Another area affected by landslides is Kempty-mussoorie route (26%) nearby kempty fall and yamuna bridge witnessing landslides due to monsoons. Moreover the Route is very narrow and semi metallic which is another cause of worry in the monsoon season as the travel becomes hectic partially due to weather and partially due to bad condition of road network. During monsoons, small street vendors, shop owners and restaurant owners have witnessed fall in their business due to these issues. Many locals opt for a secondary income during the monsoon season as the business immediately dips after the summer vacations (may-July). Months of August- November witness a consistent fall in the number of Tourists visiting various parts of Mussoorie primary reason being safe accessibility to the hill station.

Dhanaulti Bypass route connecting Mussoorie to Dhanaulti is also a home of major landslides witnessed in mussoorie. The areas from Lakshmanpuri to Bataghaat are very highly prone to landslides blocking the Roads connecting to Dhanaulti. The main reasons for these landslides are not monsoon but constant construction in the name of development. Main sewer line and garbage disposal is done in this area. The route is very narrow which in itself is difficult to drive on, above that frequent landslides have degraded the quality of roads in those areas. Landslides in these areas have always been a reason for concern for the local people living around those areas as it cuts their connectivity to Mussoorie Market. Lots of Hotels have outsourced their laundry to locals of these areas. Poor road connectivity hampers the operations of hotels.



Pic 1: Danaulty bypass Route (courtesy: TribuneIndia)

Pie charts below show the reasons behind landslides and the businesses most affected by these landslides in the areas of Mussoorie. This data has been gathered based on the responses received from the sample population.

Over 50% of respondents believe that landslides are caused by construction activities undertaken in the area with the development motive. King craigs area in Mussoorie has been witnessing poor road structures and small seasonal landslides due to construction of Ongoing Parking in the area. The soil is unable to bear the weight of these structures and no effective measures are being taken to create vertical walls to avoid such landslides.



Pic 2: Laxmanpuri landslide (courtesy:TribuneIndia)

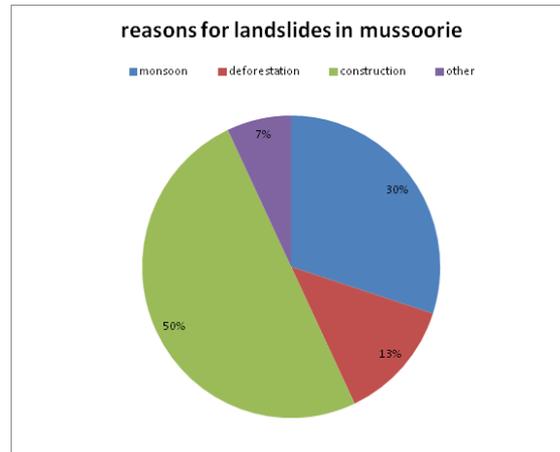


Fig 4: pie chart showing reasons for landslides in mussoorie

30% of Respondents shared that landslides are caused by rain falls during monsoon and winter season weakening the integrity of soil. Such landslides cause more damage to livelihood and property. These landslides generally decrease slope area of hills. Such landslides cause loss of property and life. In 2020 similar landslide occurred below nagar palika Mussoorie destroying few vehicles which were parked nearby

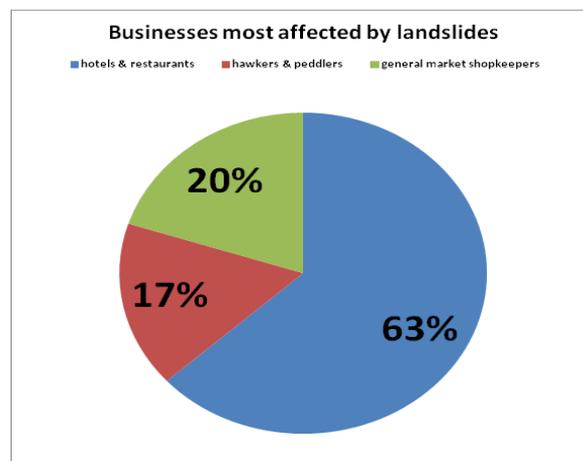


Fig 5: pie chart showing tourism business affected by landslides



Pic 3: ongoing construction for multi-level parking in King-Craigs Area Mussoorie.(courtesy: Times of India)

No matter what the reasons for these landslides may be, they have affected the locals and tourists alike. 63% of the respondents say that restaurant owners and accommodation units are highly affected due to this phenomenon because landslides hinder or cut the connectivity system to Mussoorie moreover it compromises the safety of tourists. Accommodation units have witnessed decline in the number of tourists from the months of August- November. Small scale Hawkers & peddlers have to find a secondary source of income during monsoons and beginning of winters due to such decline of tourists and are generally opting two occupations at a time to meet their needs. New generations have migrated from the regions in search of stable livelihood and better opportunities.



Pic 4: landslide occurred in 2020 near nagar palika mussoorie causing loss of vehicles parked near the area. (courtesy: Times of India)

17 % of total respondents believe that decline in tourism affects peddlers and Hawkers the most. Moreover, the landslides impact the movement of raw materials required by these people for selling. The Mall Road stretching till Library is the area where these businesses are most common. Jhula Ghar area witnesses maximum peddlers & Hawkers selling small products and gaming products for recreation of tourists. The Tibbati market along Mall Road witnesses a great hit due to landslides as they are mainly dependent on Dehradun-rajpur/Mussoorie Bypass-Mussoorie route. Any disruption on this route directly impacts their business in terms of delivery of their products in desired time frame and decline in the number of tourists not arriving in Mussoorie due to landslides on specific routes.

4. SUGGESTIONS & CONCLUSION

Mussoorie not only provides Revenue in terms of tourism but also provides livelihood to the residents of the region. Some remedial and improvement measures must be taken to ensure that the number of landslides in the area is:

- Construction of buildings and heavy structures alongside main routes connecting mussoorie region should be stopped completely as it has triggered landslides in Dhanaulty Bypass around Bataghat and Lakshmanpuri Areas.
- Construction of vertical walls besides routes where soil integrity is low and frequent landslides occur due to monsoons in Mussoorie Dehradun Route.
- Identify areas where the soil integrity is loose or there is a chance of landslides and undertake controlled bombing to trigger voluntary landslides. So that Accidents can be avoided.
- Planning of tourism activities for monsoon should be done well in advance which includes mending of roads, construction of vertical walls, and construction of road boundary.
- Plantation and maintenance activities need to be undertaken alongside the roads to hold the soil and mitigate landslide related risks.
- Locals and residents should share information about high landslide risk areas around their residences so that timely action can be taken to avoid accidents through landslides by the competent authorities.
- There is a huge dip in number of tourists visiting mussoorie during monsoons. Measures must be taken to avoid such circumstances so that the tourists can experience the nature of Mussoorie.

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