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Anthropogenic Activities vs Mass Wasting in Shimla City

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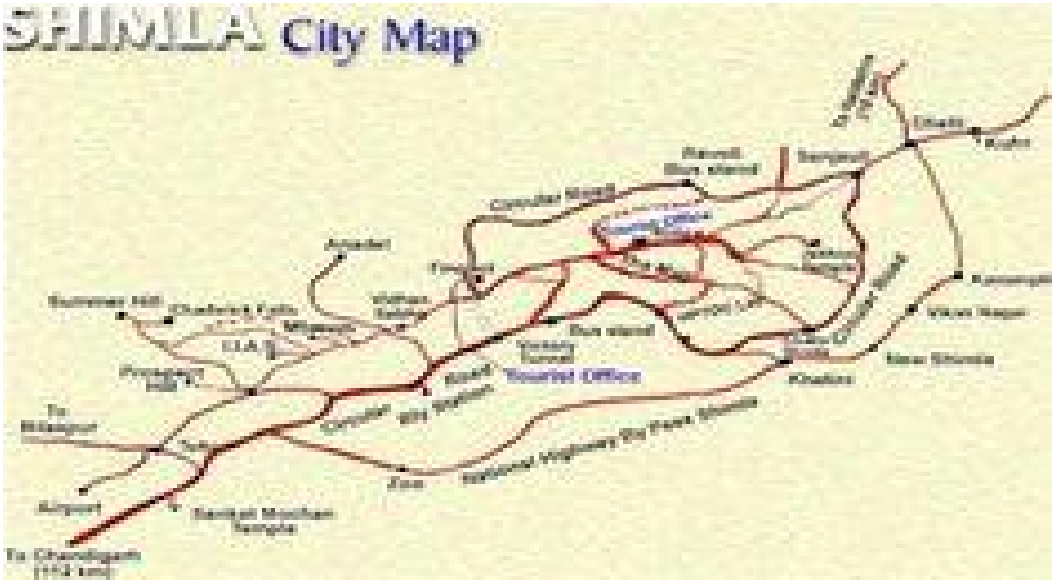
Abstract: *Encircled by verdant stretches and snow-capped peaks is the highland town of Shimla. Himachal Pradesh's capital, Shimla, is a place of unspoiled natural beauty. It is among the most well-liked travel spots in India. It has several restaurants and motels because it is a popular tourist destination. In addition to the numerous government and private guest houses, there are about 500 hotels in and around Shimla. A population of 25,000 was taken into account when the city was first planned. Not only in Himachal Pradesh but even in Shimla City, the city's climate is being negatively impacted by the sudden increase in human activity due to population growth, which has led to a rising tendency of landslides. . The present paper deals with anthropogenic activities versus mass wasting in Shimla City. The paper is based on secondary data and primary data published in various newspapers namely Amar Ujala , the Times of India and various online publications. The population data is obtained from government organisations of Shimla.*

Keywords: anthropogenic activities, mass wasting

I. INTRODUCTION

Currently the capital of Himachal Pradesh, Shimla was once the summer capital of the British Empire in India. Shimla is endowed with every natural boon one could ask for. Nestled amidst verdant, snow-capped peaks, it occupies a stunning location. Other hills cannot compare to the ambiance created by the stunning chilly hills and structures dating back to the colonial era. Despite its unprecedented growth, Shimla maintains a nostalgic ambiance and pays homage to its imperial heritage.



Source:
https://www.researchgate.net/publication/285628607_Integrated_water_management_plan_for_Shimla_City_in_India_using_geospatial_techniques

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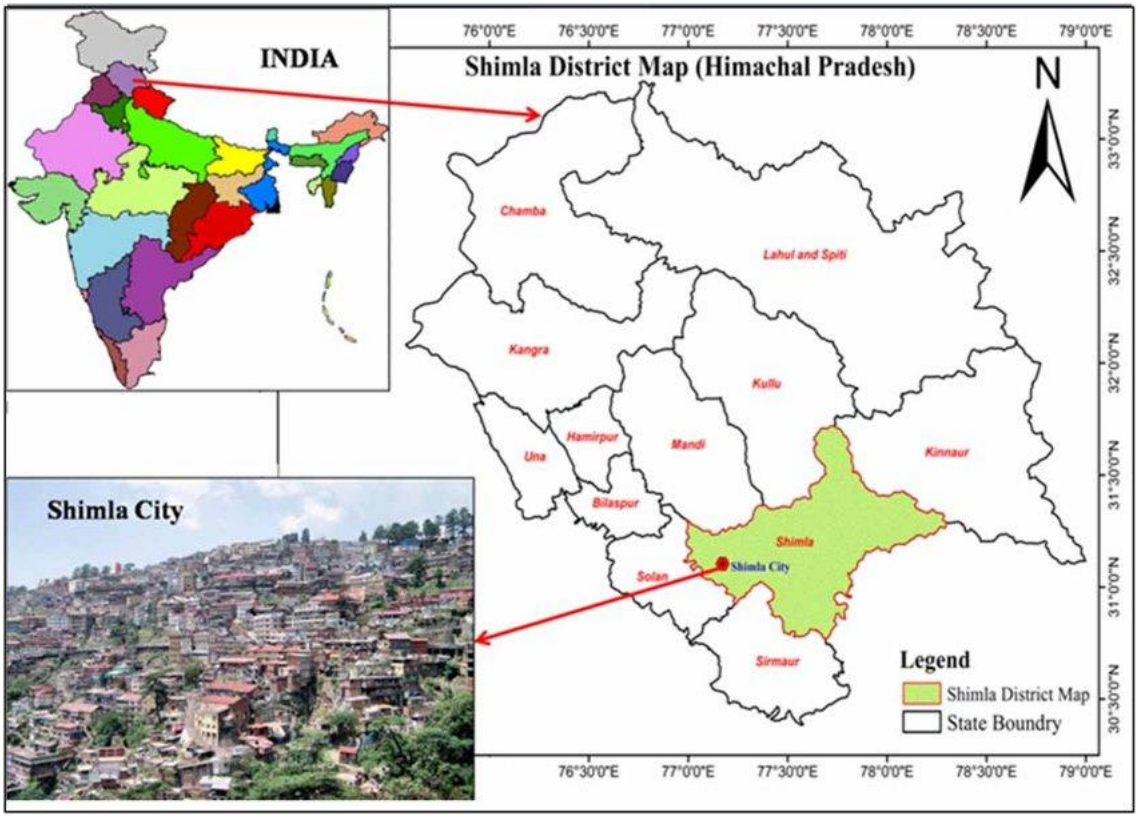
Location:

Shimla has developed over several hills and connecting ridges. **Its location is** 31° 6' 12" North Latitude77° 10' 20" East Longitude.It covers an area of 25 km2 **.Its** height Above Sea Level is 2,205 m



Site:

Blessed with the finest of nature, Shimla is situated in a beautiful region. The city is in the southwest Himalayan hills. Of the seven spurs that form the ridge on which it is located, noteworthy hills are Jakhu (8050 feet), Prospect Hill (7140 feet), Observatory Hill (7050 feet), Elysium Hill (7400 feet), and Summer Hill (6900 feet). The Shivalik Mountain ranges are situated to the south. The Dhauladhar and Pir Panjal ranges pass across it. The Himalayan Mountain ranges are located northeast of the city. The city's geography is among the most complex and diversified because it is located adjacent to both higher Himalayan and subtropical regions. Most the city's geographical areas have steep, vertical topography.

Climate of Shimla:

Because Shimla is surrounded by the Himalayan Mountains, it has a cold temperature. It's weather is lovely and warm. April through June are the summer months in Shimla. The range of temperatures is from 15 degrees Celsius at low tide to 28 degrees Celsius at high tide. The winter season in Shimla lasts from November to February. The temperature ranges for the maximum and minimum are 0°C or lower to 15°C and minus 0°C, respectively. The winter months are quite chilly because of the strong winds coming from the Himalayas. July has the highest annual average temperature of 13.7 °C and the highest precipitation. June has the greatest annual average temperature (20.6 °C). January has the lowest annual average temperature. Wintertime precipitation is lower than summertime precipitation totals. The city receives 157 centimetres of rain on an average in a year. Extreme cold and snowfall throughout the winter months create difficult conditions for a typical winter's existence, which has an impact on both the tourist's inflow and Shimla's local population.

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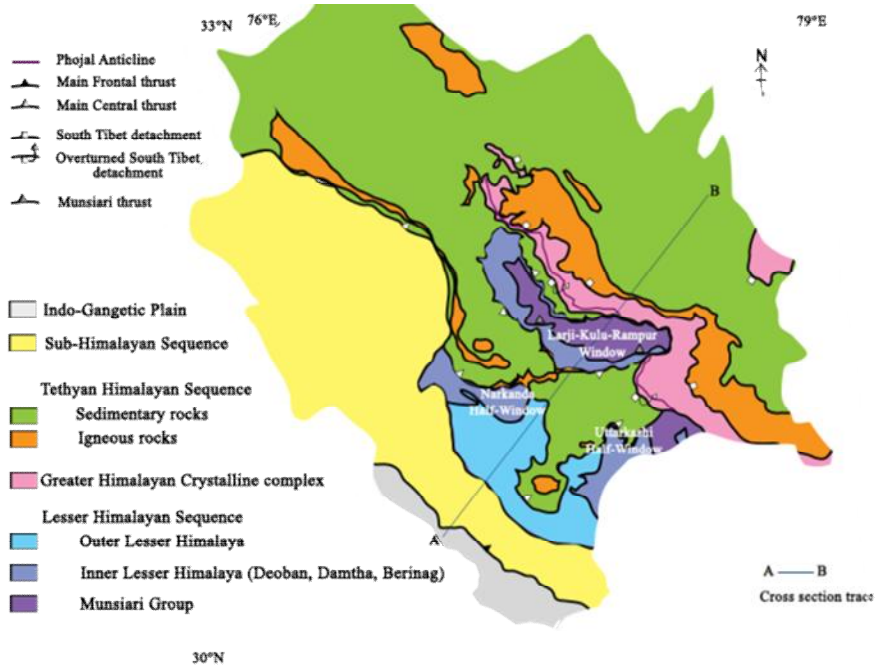
SHIMLA AND IT'S GEOLOGY :



The **major rocks** comprising the Shimla district are given in the table below:

Age	*Group*	*Formation*	*Lithology*
Middle Proterozoic	*Kullu Group*	*Khokhan Formation*	*Quartzite quartz chlorite and quartz biotite schists ,slates,green phyllites and schists,garnetiferous schists*
		Garh Formation	*Streaky mylonite gneiss,banded and augen gneisses with few band of quartzite*
		Khamrada Formation	*Carbonaceous to graphite schists and phyllite locally garnetiferous,lenticular greyish blue and cream coloured platy limestone and calc schist*
	Rampur Group		*Phyllite,schist,quartzite,dolomite and basic flows.*
	Jutogh Group		*Shale, Phyllite, schist, Staurolite quartzite, dolomite, limestone and amphibolite*

The city is classified as a Zone IV (High Damage Risk Zone) according to India's earthquake hazard zoning. The already earthquake-prone region faces a major threat from shoddy building practises and rising population.About 25%of the old town is in the sinking zone .The reasons of sinking of land include unregulated dumping of debris on slopes,resulting in loose soils;increasing pressure of people and building on slopes;poor drainage and sewerage systems.

Problem:

The environmental deterioration brought on by a yearly rise in visitors without the infrastructure to support, Shimla's popularity as an ecotourism destination has increased. A rising problem in the area is landslides, which usually happen after torrential rains.

II. RESEARCH METHODOLOGY

Following paper is based on secondary data received from the online platform. Data related to newspaper has been taken from Amar Ujala,PTI newspaper. Data related to population has been taken from Municipal Corporation.

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Objectives:

- Causes of mass wasting in Shimla
- Anthropogeneric activities and mass wasting
- Climate change and mass wasting

Demography of Shimla :

The planning of all resources that have an effect on a region's socioeconomic status is based on its demography. According to the 2011 census, there were 1,69,578 people living in Shimla City, including 93,152 men and 76,426 women. Inflow.n addition, March, April, May, and June are the months with the most events on the Himachal Pradesh tourism calendar. This is also the period of year when Shimla sees the greatest inflow of visitors.Being a popular destination, 33,18,829 domestic visitors and 1,62,168 overseas visitors made up the 34,80, 997 total number of tourists that visited Shimla in 2011.The inflow of tourists has been steadily rising. Almost one lakh people visit the town each day, and its population is close to two lakh.In a study published in the Indian Express, the NDMA noted that Shimla was designed to accommodate 25,000 people, but currently has a population of approximately 3,00,000. The paper was titled National Landslide Risk Management Strategy.

Shimla and Masswasting:

The entire state has been designated as a "natural calamity affected area" by the Himachal Pradesh government. The Mandi district of Himachal Pradesh ranked 16th out of 147 districts in 17 states in the socio-economic parameter risk exposure map for landslide exposure. Hamirpur came in at number 25, Bilaspur at number 30, Chamba (32), Solan (37), Kullu (46), Shimla (61), Kangra (62), Una (70), Sirmaur (88), and Lahaul and Spiti (126) were next in line.

Shimla of Himachal Pradesh alone has 17,120 landslide-prone locations .As per the government data, 675 of these are situated in close proximity to significant infrastructure and populous areas, as reported by PTI.PTI research indicates that the biggest number of these priority landslide-prone places is found in Chamba (133), followed by Mandi (110), Kangra (102), Lahaul and Spiti (91), Una (63), Kullu (55), Shimla (50), Solan (44), Bilaspur (37), Sirmaur (21) and Kinnaur (15)."Ten such sites have been identified in Shimla district: Krishna Nagar, Halog, Bangla colony, Totu,

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Baldiyan, Mehali-Malyana road, Nerva Rest House, Patti Dhank, Niyani, Dharali, Kool Khad, Browni khad and Ladanala, Kotighat and Jiskon, Rohru-Chirgaon-Kotdwar road," reported PTI.

Interestingly, Shimla has turned out to be the Himachal district most affected by the destruction since the August catastrophe. Of the 74 people killed, 21 perished in three landslide accidents caused by intense rain in Shimla, the capital of Himachal Pradesh. The root of the issue is a combination of hill city population pressure, poor planning, and lack in enforcement of rules. There have been three landslides and twenty-one fatalities.

Since the start of the monsoon in 2023, 113 landslides have occurred in Himachal Pradesh in just 55 days. According to PTI, which cited data from the Himachal emergency operation centre, there were only 117 big landslides recorded in 2022, compared to just 16 in 2020. This is around six times more than there was the previous year. These have given rise to

- Landslides at 160 places
- 379 People deaths in two months
- 38 people missing
- 2457 houses demolished in Himachal,
- 10,000crore loss of property since the beginning of monsoon this year. Landslides have contributed to more than a third of these losses.
- The two departments that is the National Highway Authority of India(NHAI) and the Public Works Department (PWD) has suffered a loss ofabout 1,000 crore and Rs 2,491 crore respectively as per PTI .

III. CONCLUSION

BR Thakur, Chairman of the Department of Geography, Himachal Pradesh University, Shimla, says that man himself is responsible for the disaster in the state, it is a completely man-made disaster, while the rains have added fuel to the fire. Himachal Pradesh in the monsoon season which lies between June to September receives nearly 730 mm of annual average rainfall which it has received till the month of August in the current year as per the Metrological department the state . The recent landslide that caused extensive property damage, along with other connected risks like cloudburst and flash floods, have demonstrated that the majority of construction designs are poorly thought out and deviate from accepted standards. Even government departments usually do not adhere to the design rules. This has led to a disturbing scenario where a significant number of hazardous constructions are added annually to the enormous number of unsafe buildings that are already standing in unsafe settings, geologically active unstable hilly terrain, and unfriendly climates, according to the NDMA research.

There are several man-made causes of landslides in Himachal Pradesh, including ill-considered building projects in the environmentally delicate Himalayas, dwindling forest cover, and structures that obstruct streams' water movement. Prof. Virender Singh Dhar, a geological specialist, told PTI that the primary causes of the rise in landslides include the massive clearing of hill slopes for road construction and widening, blasting for tunnels, and hydro projects. He added that Himachal Pradesh had seen the vertical chopping of mountains for the sake of building roads, with retaining walls as short as five to ten feet.

According to experts, the cutting of rocks in the foothills, coupled with an inadequate drainage system and intense rainfall, has made the slopes of Himachal extremely susceptible to landslides.

Following the ongoing devastation, CM Sukhu has also acknowledged the structural flaws in buildings and drainage systems in the hills and has said that the state government is going to approach these issues once the situation is contained.

Climate scientist Suresh Attre told PTI that intensity of rain hasincreased. The rising temperaturesalong with heavy pours hasled to landslides due to loosening of the bed rock inareas which have undergone cutting downstream on the foothills.The reason had been Western disturbance which have been already active since May. A few days after the arrival of monsoon on June 24, clouds started raining with such intensity that many parts of the tourist citywere destroyed. The destruction continued in August too due to the population burden faced by the city.

- This disaster has also raised questions on the existing development model.
- Poor urban planning in the hills and lack of enforcement of existing norms.

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- The unscientific construction in the ecologically-fragile Himalayas, the depleting forest cover, and the indiscriminate cutting of the hills as the reasons for increased landslides.
- Without realizing the potential of the fragile mountains; tunnels were dug by damming the mountains for power projects.
- Four lanes, unplanned road construction, mining etc. have shaken the earth.
- Unscientific construction by blocking the routes of rivers and streams forced them to change their routes

- Cloud burst and torrential rains completed the task.
- In Shimla, nature created such a havoc that 20 people were buried in the temple while worshiping in the morning. In Krishnanagar, the permanent buildings built between the kutcha gates were uprooted.
- Since the arrival of monsoon, 379 people had lost their lives, which is the highest figure of loss of life in the past years.
- Property worth Rs 10 thousand crores had been destroyed. The disaster has broken the back of tourism, horticulture, and pharma industries.
- 792 roads were closed. This had happened after a long time, when hotels in big tourist places like Manali and Shimla are lying vacant.
- The World Heritage Kalka-Shimla Railway Track had been under debris at many places.
- Four-lane highways connecting Himachal to Chandigarh, Punjab and Delhi have also caved in at hundreds of places. Due to the disaster, thousands of people have become homeless and are forced to live like refugees.
- Cutting of trees is also a major cause of disaster. Deforestation for construction of roads and buildings has also brought destruction. The trees washed away in the rivers are giving evidence of this.
- Debris is being thrown into rivers. Due to lack of mining in Vyas, the river bed is spreading. In other places, illegal mining is taking place in ravines and drains more than the prescribed standards. This is changing the course of the rivers.
- The mountains are shaking due to excessive blasting for the tunnel
- There is no drainage system related to the present Shimla. Drainage systems were made but were not developed. During heavy rains, the flow of water from where it got to became faster and even the drains on the side of the houses are not cleaned before the rains.

Suggestions:

Very well said by the father of our nation," MAHATAMAGANDHI', there is enough for everyone's need but not for everyone's greed.

- The need of the hour is sustainable development.
- Alternative development methods need to be practiced.
- New infrastructure of the city needs to be planned keeping in mind the current permanent (residents of Shimla) and temporary population (tourists) of Shimla.
- Proper planning related to sustainable development and its implementation should be done.

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- Drainage system should be upgraded to improve runoff in the monsoon season further reducing the risk of sinking.
- Strict legal proceedings and their implementation need to be practiced.

All residents and segments of the society should take this incident as a lesson to plan, process and implement in a sensible manner keeping in mind our generations to come. Nature has filled the face of beautiful Shimla city with cruel scratches. Some got buried in landslides and some went into rivers and streams. Concrete buildings started tocollapse like a deck of cards. There has never been such a rain in Shimla city. Monsoon alone is not responsible for this, it is a side effect ofwe, thehumans tampering with ecology which is also a warning that the danger will become bigger in future if timely proper planning and its implementation is not done.

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