

**PROJECT REPORT ON EFFECT
OF
NEPAL EARTHQUAKE ON
HUMAN BEINGS
IN NEPAL AND ITS ADJACENT
AREAS
B.A 3RD SEMESTER**



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Preface

Field study is essential to a student of geography as it helps to developed a geographical scene for the interpretation and identification of the complex inter relationship between physical and socio cultural Set up of the area visited for geographical excursion. Such a field work, in fact it, provides training on natural background on the course BA 3rd semester Honours student in geography of Mekliganj college have taken an attend to explore the effect of earthquake induced of the causes of earthquake and effect of the earthquake at Nepal, a big city of Kathmandu.

In this report i have their to focus on the physical condition as well as Social economic condition of Kathmandu city for propose have made a search of to explore the present Situation of the idea.Each an every chapter is writing with 11 tables map. Diagram feature more, after if any part of the report becomes helpful for any readers. I will feel my self fortune and successful to a certain extent.

Acknowledgement

I would like to express my heartfelt gratitude to Mr. Jaki Ahamed Siddique. Head of the department of geography Mekliganj college who offered perennial help and guidance to me at every stage by this Untiring and ever stimulating supervision, critical assessment and valuable comments, I am also very much thankful to Mr. Mahandra Nath roy and Mr Prashanta Biswas of geography department of Mekliganj college who accompanied me throughout the study.

I also extend my gratitude to the library staff of Mekhliganj College who helped me for collecting various information about my field of interest from different books journal etc.

Last but not least, I was also supported by my few classmate's and co-workers of department geography of Mekhliganj College

B.A 3rd Semester

**Department of Geography
Mekliganj College**

CHAPTER-1

1.1 Introduction

Earthquake is a violent tremor in the earth crust, sending out a series of shock and aftershock waves (L waves) in all direction from its focus. Earthquakes constitute one of the most terrible natural hazards which often turn into disaster causing extensive devastation and loss of human lives and their properties. A deadly earthquake shook Nepal and sent tremors through Indian subcontinent. On 25 April and 12 May 2015, Nepal and its surrounding area were hit by earthquakes which are considered to be the most devastating in the living memory of the inhabitants of these affected areas. The 7.9 magnitude quake was the strongest to hit Nepal for 81 years. It was the most horrible natural disaster to hit Nepal since the 1934 Nepal-Bihar border earthquake. The quake measuring 7.9 on the Richter scale, which was followed by 97 aftershocks of magnitudes 3.0-6.9 on Richter scale, caused heavy casualties in Kathmandu and injured thousand others. The earthquakes had its epicentre at Lamjung, around 80 km north-west of Kathmandu. It had its impact in several areas in Nepal and India. It was also felt in northern and north-eastern part of India, China, Tibet, Bangladesh and as far as Pakistan. Continued aftershocks occurred throughout Nepal and its adjacent area at 15-20 minutes intervals, with one shock reaching a magnitude of 6.9 on 26 April at 12:42 IST. It was a major earthquake similar in intensity to the 1934 Munghy and the 2001 Gujarat Earthquakes.

A second major earthquake occurred on 12 May 2015 at 12:35 IST with a magnitude of 7.3 on Richter scale. The epicentre was near the China border between Kathmandu and Mt. Everest, at Kodari around 113 kms east of Kathmandu. It struck at the depth of 18.5 km. This earthquake occurred along the same fault as the original earthquake of 25 April 2015. As such, it is considered to be an aftershock of the 25 April quake. Tremors were also felt in Bihar, Uttar Pradesh, West Bengal and other North-east Indian States.

1.2 Objectives

The following objectives to be taken of the consideration

- i) To know the geographical condition of the study area
- ii) To discuss the cyclone in the study area
- iii) To know the responsible causes of cyclone in the study area
- iv) To investigate the effect of cyclone
- v) To suggest appropriate approach or possible measures to overcome the problem of the study area

1.3 Methodology

Methodology is the of the common criteria for any research in geographical field. In such way present study is based on secondary sources of data for this purpose many maps senses report, various books articles and report about the cyclone have been consulted information regarding physical and cultural environmental of the study area were collected from various sources the data collected from secondary sources are then summarised and tabulated. After that data are analysed with suitable statistical diagram and cartographic techniques and shown in map. The project report has been prepared by using various software's like Microsoft ms excel (2007), ms word e.t.c.

The following project report has been prepared for systematic approach to show the relationship between physical and cultural environment as well as the effect of cyclone in the area.

CHAPTER-2

General Background of The Study Area

2.1 Introduction

The name "Nepal" is first recorded in texts from the Vedic period of the Indian subcontinent, the era in ancient Nepal when Hinduism was founded, the predominant religion of the country. In the middle of the first millennium BC, Gautama Buddha, the founder of Buddhism, was born in Lumbini in southern Nepal. Parts of northern Nepal were intertwined with the culture of Tibet. The centrally located Kathmandu Valley is intertwined with the culture of Indo-Aryans, and was the seat of the prosperous Newar confederacy known as Nepal Mandala. The Himalayan branch of the ancient Silk Road was dominated by the valley's traders. The cosmopolitan region developed distinct traditional art and architecture. By the 18th century, the Gorkha Kingdom achieved the unification of Nepal. The Shah dynasty established the Kingdom of Nepal and later formed an alliance with the British Empire, under its Rana dynasty of premiers. The country was never colonised but served as a buffer state between Imperial China and British India. Parliamentary democracy was introduced in 1951 but was twice suspended by Nepalese monarchs, in 1960 and 2005. The Nepalese Civil War in the 1990s and early 2000s resulted in the establishment of a secular republic in 2008, ending the world's last Hindu monarchy.



The Constitution of Nepal, adopted in 2015, affirms the country as a secular federal parliamentary republic divided into seven provinces. Nepal was admitted to the United Nations in 1955, and friendship treaties were signed with India in 1950 and China in 1960. Nepal hosts the permanent secretariat of the South Asian Association for Regional Cooperation (SAARC), of which it

is a founding member. Nepal is also a member of the Non-Aligned Movement and the Bay of Bengal Initiative. The Nepalese Armed Forces are the fifth-largest in South Asia; and are notable for their Gurkha history, particularly during the world wars, and has been a significant contributor to United Nations peacekeeping operations.

Geology

Landform regions

For a country of its size, Nepal has tremendous geographic diversity. It rises from as low as 59 metres (194 ft) elevation in the tropical Terai—the northern rim of the Gangetic Plain, through beyond the perpetual snow line to 90 peaks over 7,000 metres (22,966 ft) including Earth's highest (8,848-metre (29,029 ft) Mount Everest or Sagarmatha). In addition to the continuum from tropical warmth to cold comparable to polar regions, average annual precipitation varies from as little as 160 millimetres (6.3 in) in its narrow proportion of the rainshadow north of the Himalayas to as much as 5,500 millimetres (216.5 in) on windward slopes, the maximum mainly resting on the magnitude of the South Asian monsoon.[2]

Forming south-to-north transects, Nepal can be divided into three belts: Terai, Pahad and Himal. In the other direction, it is divided into three major river systems, east to west: Koshi, Gandaki/Narayani and Karnali (including the Mahakali along the western border), all tributaries of the Ganges river. The Ganges-Yarlung Zangbo/Brahmaputra watershed largely coincides with the Nepal-Tibet border, save for certain tributaries rising beyond it.

Himal

Perspective view of the Himalayas and Mount Everest as seen from space looking south-south-east from over the Tibetan Plateau. (annotated version)
Himal Region is a mountainous region containing snow. The Mountain Region begins where high ridges (Nepali: लेक; lekh) begin substantially rising above 3,000 metres (10,000 ft) into the subalpine and alpine zone which are mainly used for seasonal pasturage. By geographical view, it covers 15% of the total area of Nepal. A few tens kilometers further north the high Himalaya abruptly rise along the Main Central Thrust fault zone above the snow line at 5,000 to 5,500 metres (16,400 to 18,000 ft). Some 90 of Nepal's peaks exceed 7,000 metres (23,000 ft) and eight exceed 8,000 metres (26,247 ft) including Mount Everest at 8,848 metres (29,029 ft) and Kanchenjunga at 8,598 metres (28,209 ft).

Hilly

Middle Hills

Hilly Region is a mountain region which does not generally contain snow. It is situated to the south of the Himal Region (the snowy mountain region). This region begins at the Lower Himalayan Range, where a fault system called the Main Boundary Thrust creates an escarpment 1,000 to 1,500 metres (3,000 to 5,000 ft) high, to a crest between 1,500 and 2,700 metres (5,000 and 9,000 ft). It covers 68% of the total area of Nepal.

These steep southern slopes are nearly uninhabited, thus an effective buffer between languages and culture in the Terai and Hilly. Paharis mainly populate river and stream bottoms that enable rice cultivation and are warm enough for winter/spring crops of wheat and potato. The increasingly urbanized Kathmandu and Pokhara valleys fall within the Hill region. Newars are an indigenous ethnic group with their own Tibeto-Burman language. The Newar were originally indigenous to the Kathmandu valley but have spread into Pokhara and other towns alongside urbanized Pahari.

Other indigenous Janajati ethnic groups – natively speaking highly localized Tibeto-Burman languages and dialects – populate hillsides up to about 2,500 metres (8,000 ft). This group includes Magar and Kham Magar west of Pokhara, Gurung south of the Annapurnas, Tamang around the periphery of Kathmandu Valley and Rai, Koinch Sunuwar and Limbu further east. Temperate and subtropical fruits are grown as cash crops. Marijuana was grown and processed into Charas (hashish) until international pressure persuaded the government to outlaw it in 1976. There is increasing reliance on animal husbandry with elevation, using land above 2,000 metres (7,000 ft) for summer grazing and moving herds to lower elevations in winter. Grain production has not kept pace with population growth at elevations above 1,000 metres (3,300 ft) where colder temperatures inhibit double cropping. Food deficits drive emigration out of the Pahad in search of employment.

Terai

Main articles: Terai and Inner Terai Valleys of Nepal

Terai is a low land region containing some hill ranges. Looking out for its coverage, it covers 17% of the total area of Nepal. The Terai (also spelt Tarai) region begins at the Indian border and includes the southernmost part of the flat, intensively farmed Gangetic Plain called the Outer Terai. By the 19th century, timber and other resources were being exported to India. Industrialization based on agricultural products such as jute began in the 1930s and infrastructure such as roadways, railways and electricity were extended across the border before it reached Nepal's Pahad region.

The Outer Terai is culturally more similar to adjacent parts of India's Bihar and Uttar Pradesh than to the Pahad of Nepal. Nepali is taught in schools and often spoken in government offices, however, the local population mostly uses Maithali, Bhojpuri and Tharu languages.

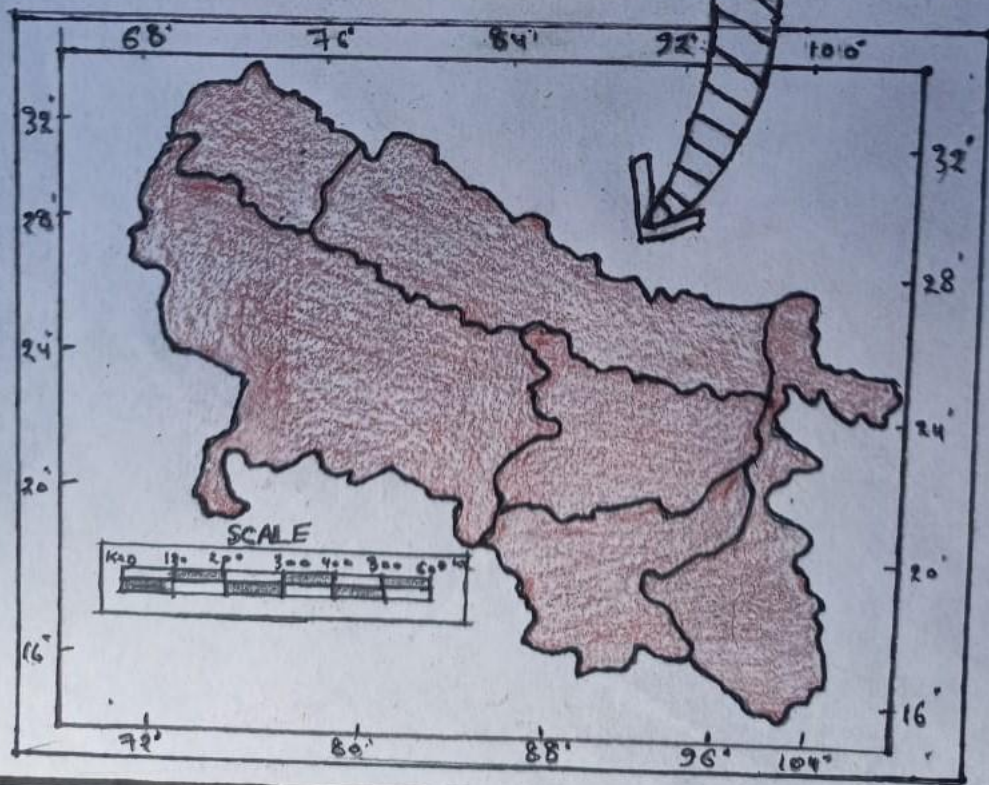
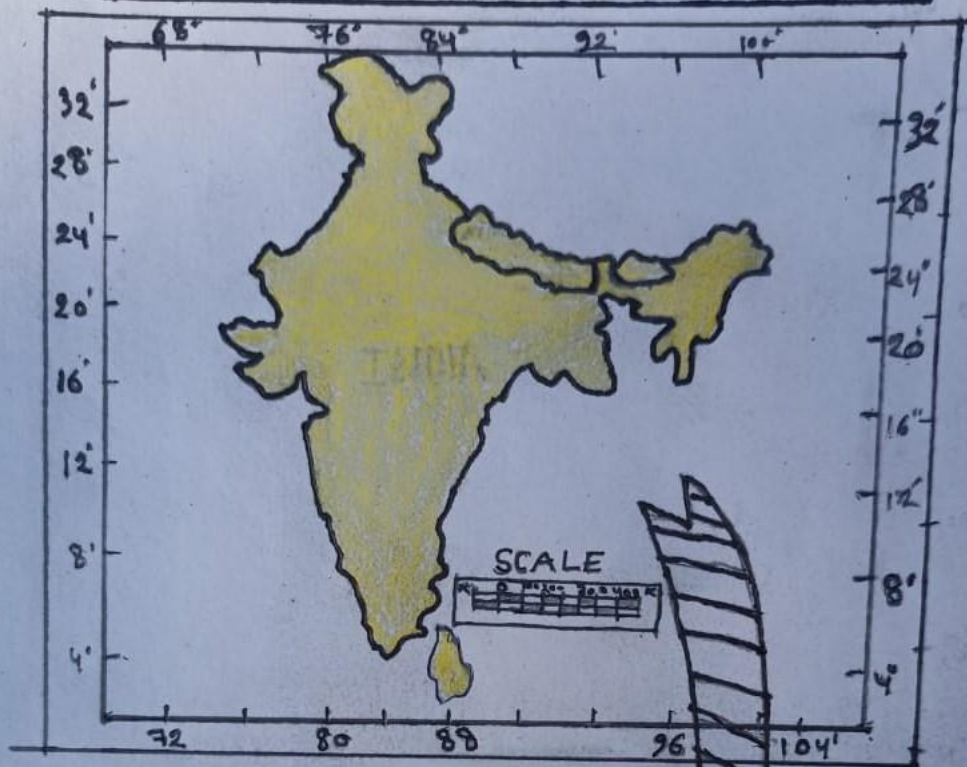
The Outer Terai ends at the base of the first range of foothills called the Siwaliks or Churia. This range has a densely forested skirt of coarse alluvium called the Bhabhar. Below the Bhabhar, finer, less permeable sediments force groundwater to the surface in a zone of springs and marshes. In Persian, terai refers to wet or marshy ground. Before the use of DDT this was dangerously malarial. Nepal's rulers used this for a defensive frontier called the char kose jhadi (four kos forest, one kos equaling about three kilometers or two miles

2.2 Location Of The Study Area

The Nepal and some districts of north India along the India-Nepal border have been selected for this

study. The study area is bounded by 21°33'07.04" N to 30°21'02.53 N Latitudes and 77°06'33.77" E to 95°56'31.16" E Longitude in Nepal and the states of India, namely West Bengal, Bihar, Uttar Pradesh, Assam and Sikkim (Figure 1). This area represents a zone of transition between the Kunlun range of China and the peninsular plateau of India, and displays the typical characteristics of the Himalayan range and its foothills. It is covering an area of 6, 56,558 sq. km.

LOCATION MAP



2.3 Geography

Nepal has three categories of rivers. The largest systems – from east to west the Koshi, Gandaki/Narayani, Karnali/Goghra and Mahakali—originate in multiple tributaries rising in or beyond the high Himalaya that maintain substantial flows from snowmelt through the hot, drought-stricken spring before the summer monsoon. These tributaries cross the highest mountains in deep gorges, flow south through the Middle Hills, then join in candelabra-like configuration before crossing the Lower Himalayan Range and emerging onto the plains where they have deposited megafans exceeding 10,000 km² (4,000 sq mi) in area.

The Koshi is also called Sapta Koshi for its seven Himalayan tributaries in eastern Nepal: Indrawati, Sun Koshi, Tama Koshi, Dudh Koshi, Liku, Arun, and Tamor. The Arun rises in Tibet some 150 kilometers (100 mi) beyond Nepal's northern border. A tributary of the Sun Koshi, Bhote Koshi also rises in Tibet and is followed by the Arniko Highway connecting Kathmandu and Lhasa.

The Gandaki/Narayani has seven Himalayan tributaries in the center of the country: Daraundi, Seti Gandaki, Madi, Kali, Marsyandi, Budhi, and Trisuli also called Sapta Gandaki. The Kali Gandaki rises on the edge of the Tibetan Plateau and flows through the semi-independent Kingdom of Mustang, then between the 8,000 meter Dhaulagiri and Annapurna ranges in the world's deepest valley. The Trisuli rises north of the international border inside Tibet. After the seven upper tributaries join, the river becomes the Narayani inside Nepal and is joined by the East Rapti from Chitwan Valley. Crossing into India, its name changes to Gandak.

Second category rivers rise in the Middle Hills and Lower Himalayan Range, from east to west the Mechi, Kankai and Kamala south of the Kosi; the Bagmati that drains Kathmandu Valley between the Kosi and Gandaki systems, then the West Rapti and the Babai between the Gandaki and Karnali systems. Without glacial sources, annual flow regimes in these rivers are more variable although limited flow persists through the dry season.

Third category rivers rise in the outermost Siwalik foothills and are mostly seasonal.

None of these river systems supports significant commercial navigation. Instead, deep gorges create obstacles to establishing transport and communication networks and de-fragmenting the economy. Foot-trails are still the primary transportation routes in many hill districts.

Nepal's towns, villages, rivers and peaks

River management

Rivers in all three categories are capable of causing serious floods. Koshi River in the first category caused a major flood in August 2008 in Bihar state, India after breaking through a poorly maintained embankment just inside Nepal. The West Rapti in the second category is called "Gorakhpur's Sorrow" for its history of urban flooding. Third category Terai rivers are associated with flash floods.[7]

Since uplift and erosion are more or less in equilibrium in the Himalaya, at least where the climate is humid,[8] rapid uplift must be balanced out by annual increments of millions tonnes of sediments washing down from the mountains; then on the plains settling out of suspension on vast alluvial fans over which rivers meander and change course at least every few decades, causing some experts to question whether manmade embankments can contain the problem of flooding.[9] Traditional Mithila culture along the lower Koshi in Nepal and Bihar celebrated the river as the giver of life for its fertile alluvial soil, yet also the taker of life through its catastrophic floods.[10]

Large reservoirs in the Middle Hills may be able to capture peak flows and mitigate downstream flooding, to store surplus monsoon flows for dry season irrigation and to generate electricity. Water for irrigation is especially compelling because the Indian Terai is suspected to have entered a food bubble where dry season crops are dependent on water from tube wells that in the aggregate are unsustainably "mining" groundwater. [11]

2.4 Drainage

Nepal has three categories of rivers. The largest systems – from east to west the Koshi, Gandaki/Narayani, Karnali/Goghra and Mahakali—originate in multiple tributaries rising in or beyond the high Himalaya that maintain substantial flows from snowmelt through the hot, drought-stricken spring before the summer monsoon. These tributaries cross the highest mountains in deep gorges, flow south through the Middle Hills, then join in candelabra-like configuration before crossing the Lower Himalayan Range and emerging onto the plains where they have deposited megafans exceeding 10,000 km² (4,000 sq mi) in area.

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Nepal's towns, villages, rivers and peaks

River management

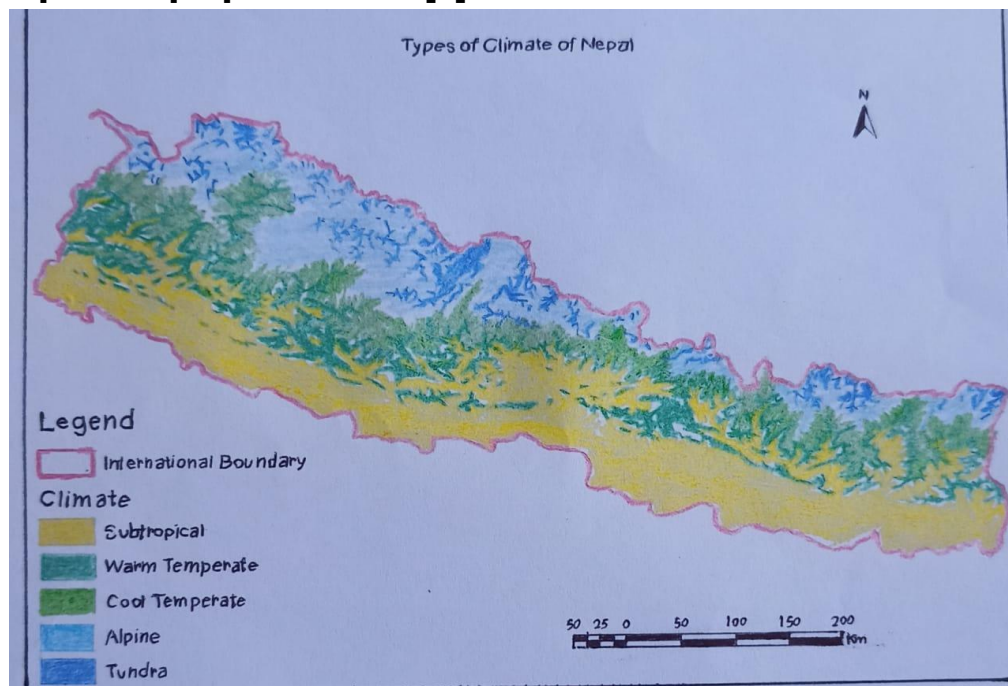
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Climate

Nepal's latitude is about the same as that of the United States state of Florida, however with elevations ranging from less than 100 meters (300 ft) to over 8,000 meters (26,000 ft) and precipitation from 160 millimeters (6 in) to over 5,000 millimeters (16 ft) the country has eight climate zones from tropical to perpetual snow.[5]



The tropical zone below 1,000 meters (3,300 ft) experiences frost less than once per decade. It can be subdivided into lower tropical (below 300 meters or 1,000 ft.) with 18% of the nation's land area) and upper (18% of land area) tropical zones. The best mangoes and well as papaya and banana are largely confined to the lower zone. Other fruit such as litchee, jackfruit, citrus and mangoes of lower quality grow in the upper tropical

zone as well. Winter crops include grains and vegetables typically grown in temperate climates. The Outer Terai is virtually all in the lower tropical zone. Inner Terai valleys span both tropical zones. The Sivalik Hills are mostly upper tropical. Tropical climate zones extend far upriver valleys across the Middle Hills and even into the Mountain regions.

The subtropical climate zone from 1,000 to 2,000 meters (3,300 to 6,600 ft) occupies 22% of Nepal's land area and is the most prevalent climate of the Middle Hills above river valleys. It experiences frost up to 53 days per year, however, this varies greatly with elevation, proximity to high mountains and terrain either draining or ponding cold air drainage. Crops include rice, maize, millet, wheat, potato, stone fruits and citrus.

The great majority of Nepal's population occupies the tropical and subtropical climate zones. In the Middle Hills, "upper-caste" Hindus are concentrated in tropical valleys which are well suited for rice cultivation while Janajati ethnic groups mostly live above in the subtropical zone and grow other grains more than rice.

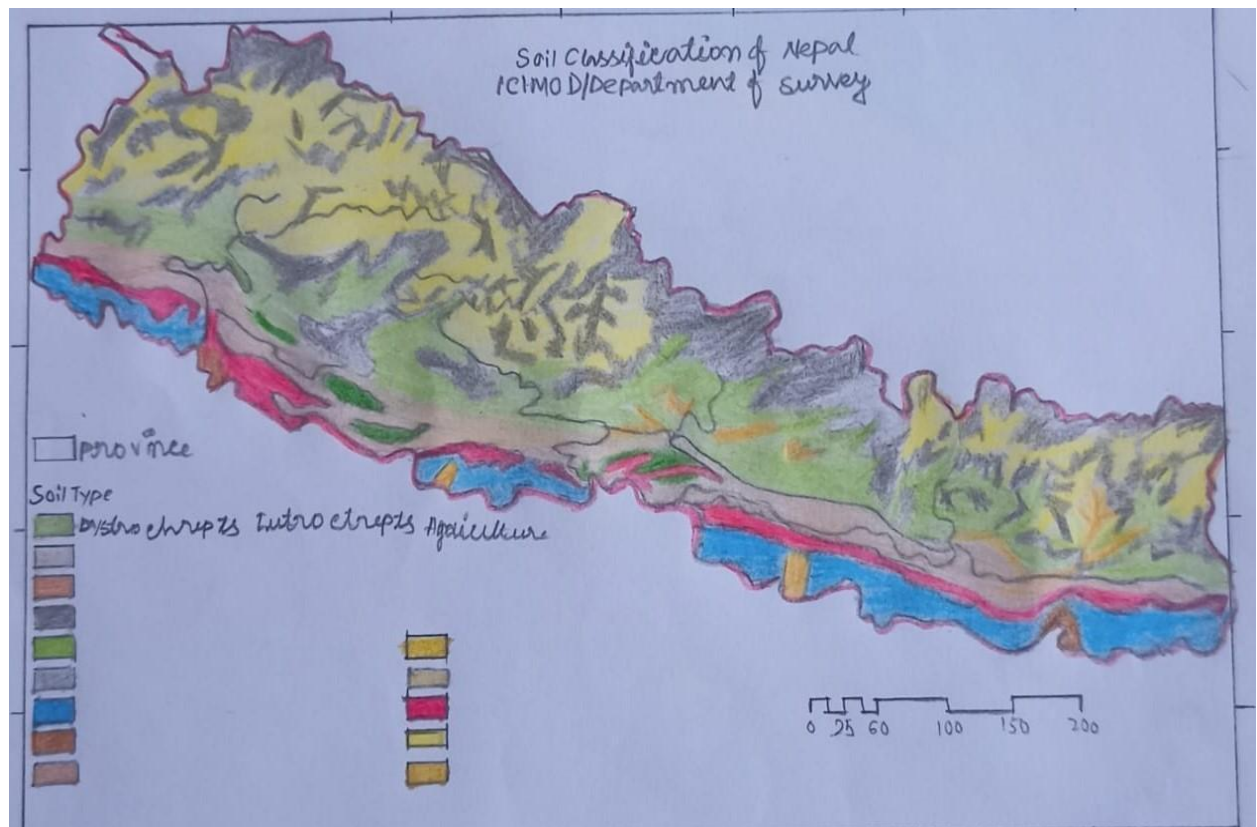
The Temperate climate zone from 2,000 to 3,000 meters (6,600 to 9,800 ft) occupies 12% of Nepal's land area and has up to 153 annual days of frost. It is encountered in higher parts of the Middle Hills and throughout much of the Mountain region. Crops include cold-tolerant rice, maize, wheat, barley, potato, apple, walnut, peach, various cole, amaranthus and buckwheat.

2.6 Soil

- **Introduction**

"Soil matters for humans and ecosystems" (Vienna Soil Declaration, 2015).

Soil is an important natural recourse for living things of the world, which connect the chain of ecosystem. Its types are variably



distributes all over the earth surface which are familiar by the characteristics and various soil types are mapping units; and exist as bodies of similar soil material which eventually merge laterally with other soil types, bedrock, or unaltered sediment. It consists of a natural body of minerals and organic matter occurring on the surface of the earth. It is an important part of the natural environment which is made up of a multitude of physical, chemical and biological entities with many interactions occurring among them for plant growth and having ever-changing properties in response to many chemical and bio-physical processes. There are different types of soil in Nepal. Various factors such as geology, physiographic, climate and vegetation types have resulted in variations in soil properties. There is very limited research about soils in Nepal (Shah, 1995 and Chalise, Kumar & Kristainsen (2019). Knowledge of the distribution of soil with its types is critical to humanity's struggle for survival and well-being. This supports to identify the basic characteristics of soils as well as agricultural significance. Cropping system can be planned depending upon the types and distribution of soil. It also helps in promoting soil conservation policy. So the present paper studies visualized soil distribution and assess the soil erosion status of Nepal with large and small watershed using geographic information system and remote sensing techniques.

Material and Methods

The present research is based on published documents such as the books, reports and articles available on soil types, its classification and soil erosion of Nepal which developing the ideas regarding the soil types and soil erosion of Nepal. Similarly, most of the information related to soil types of Nepal was retrieved from websites. The study discussed soil types of Nepal prepared by Land Resource Mapping Project (LRMP) based on world reference base developed by Food and Agriculture Organization of the United States, FAO (LRMP, 1986) and Soil and Terrain (SOTER) soil type of Nepal by ISRIC-World soil Information based on universal soil classification system developed by United State Department of Agriculture, USDA (Dijkshoorn and Huting, 2009). The map scale of LRMP is 1:125000 and map scalr of SOTER soil type is 1:1000000. The soil types and its controlling factors like physiography and climate type are analyzed using Geographic information system (GIS).

Study Area

Nepal is located mostly on the Southern slope of central Himalayan in the continent of ASIA. Geographically, Nepal is elongated east to west (Mechi to Mahakali) with the length of 885 km. The North-South width varies from 145 to 241 km with the mean of 193 km. The shape of Nepal resembles roughly a narrow rectangle with an area off 147,181 sq. Km. Nepal lies within the 26o 12' to 30o27' North latitudes and 80o4' to 88o12' East longitudes. It is bounded by China in the north and India in all three directions east, west and south (Buffer State). Being bounded by land on all sides Nepal is also known as Land-locked country. The physiography of Nepal has been mainly divided on the basis of river relief, structure, altitude and geographical distribution. Boaroadly, Nepal is divided into Hills and Mountain regions and Tarai and Inner Tarai regions which occupy 77 and 23 percent respectively. The can be divided into Tibetan Mrginal Range, Inner Himalayas, Great Himalaya, Midland Valley, Mahabhart Lekh and Chre Range. Similarly, Tarai and Inner Tarai regions also can be divided into Inner Terai, Bhabar zone and Main Terai (see Fig. 1).

2.8 Natural vegetation

The vegetation types range from sub-tropical forests at the lower altitudes to temperate grasslands intermixed with oak and coniferous forests on the Khaptad Plateau. Common species are chir pine, spruce, fir, maple, birch, alder, rhododendron and bamboo.

Vegetation Zones in Nepal
As you explore Nepal, you will notice that there are different vegetation zones in Nepal. These changes are in the surrounding trees, plants and

shrubs as you gain altitude. The vegetation in the Himalayas can be broken up into the six categories below.

Tropical(<1000m)

Below 1000m, forests are dominated by sal trees. Other signature plants that you will find in the tropical zone include tall elephant grasses and acacia. Also, rosewood trees and silky cotton trees, which produce bright red flowers every spring.

**Paddy ricefields by Sharada P.Subtropical
(1000m to 2000m)**

As you start to gain altitude, the sal forests give way to the more cold-tolerant species. Including the distinctive chir pine. Deciduous trees include autumn-blooming chestnuts and the spring-blooming schima, a fruiting tree species distantly related to the tea bush.

Lower Temperate(1700m to 2700m)

As you climb above 1700m, evergreen oaks start to appear. Where there is sufficient water, you may also spot horse chestnut, maple, walnut, alder and birch trees. The deciduous forests are broken up by swathes of blue pines, which flourish on south-facing

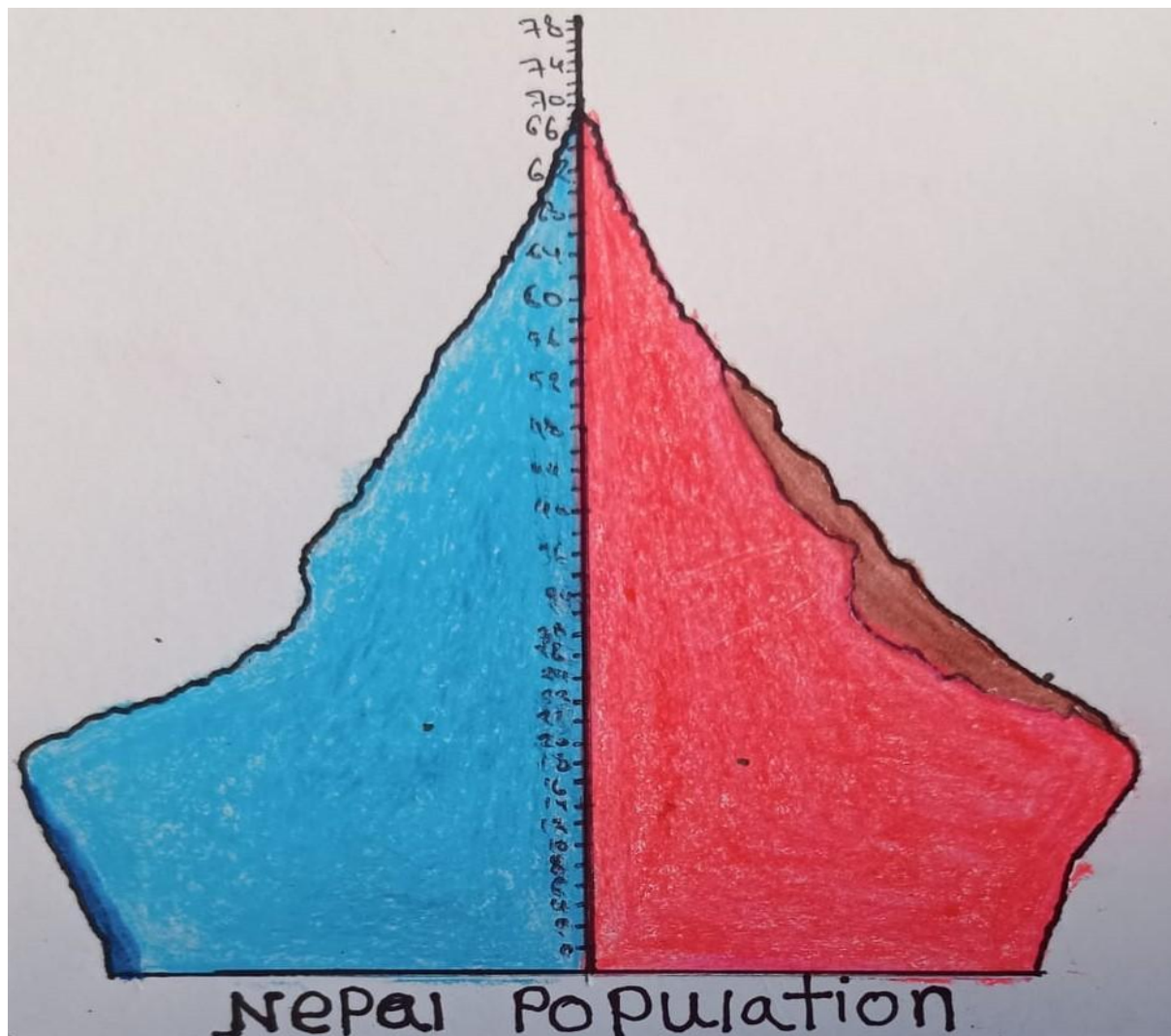
Alpine

(4000m to snowline)

There are almost no trees at all above 4000m, though a few species of ground-hugging rhododendrons persist almost as far as the snowline. In the alpine meadows that define this elevation, you will see distinctive alpine flowers like edelweiss, gentians, anemones and stellara, which can survive up to 5500m.

2.8 Demography

In the 2011 census, Nepal's population was approximately 26 million people with a population growth rate of 1.35% and a median age of 21.6 years.[2]



In 2016, the female median age was approximately 25 years old and the male median age was approximately 22 years old.[3] Only 4.4% of the population is estimated to be more than 65 years old, comprising 681,252 females and 597,628 males. 61% of the population is between 15 and 64 years old, and 34.6% is younger than 14 years.

In 2011, the birth rate is estimated to be 22.17 births per 1,000 people with an infant mortality rate of 46 deaths per 1,000 live births. Compared to the infant mortality rate in 2006 of 48 deaths per 1000 live births, the 2011 IMR is a slight decrease within that 5-year period. Infant mortality rate in Nepal is higher in rural regions at 44 deaths per 1000 live births, whereas in urban regions the IMR is lower at 40 deaths per 1000 live

births. This difference is due to a lack of delivery assistance services in rural communities compared to their urban counterparts who have better access to hospitals and neonatal clinics.[4]

Life expectancy at birth is estimated to be 67.44 years for females and 64.94 years for males. The mortality rate is estimated to be 681 deaths per 100,000 people.

Net migration rate is estimated to be 61 migrants per 100,000 people. According to the 2011 census, 65.9% of the total population is literate.[5]The population of Nepal has been steadily rising in recent decades. In the June 2001 census, there was a population of about 23 million in Nepal.[6] The population increased by 5 million from the preceding 1991 census; the growth rate is 2.3%.[6] The current population is roughly 30 million which contributes to an increase of about 3 million people every 5 years.

Sixty caste and linguistic subgroups have formed throughout time with the waves of migration from Tibet and India.[7] There was a moderate amount of immigration early in Nepal's history, then the population essentially remained the same without any significant fluctuations for over one hundred years.[7] Natural disasters and the following government resettlement programs in the 1950s led to a spike in internal migration from the hills to the Terai region.[7] In the 1980s the Western Chitwan Valley became a major transportation hub for all of Nepal. Along with this major change came a dramatic increase in government services, business expansion, and growing employment, especially in the agricultural industry. The valley's population grew rapidly through both in-migration and natural increase.[7]

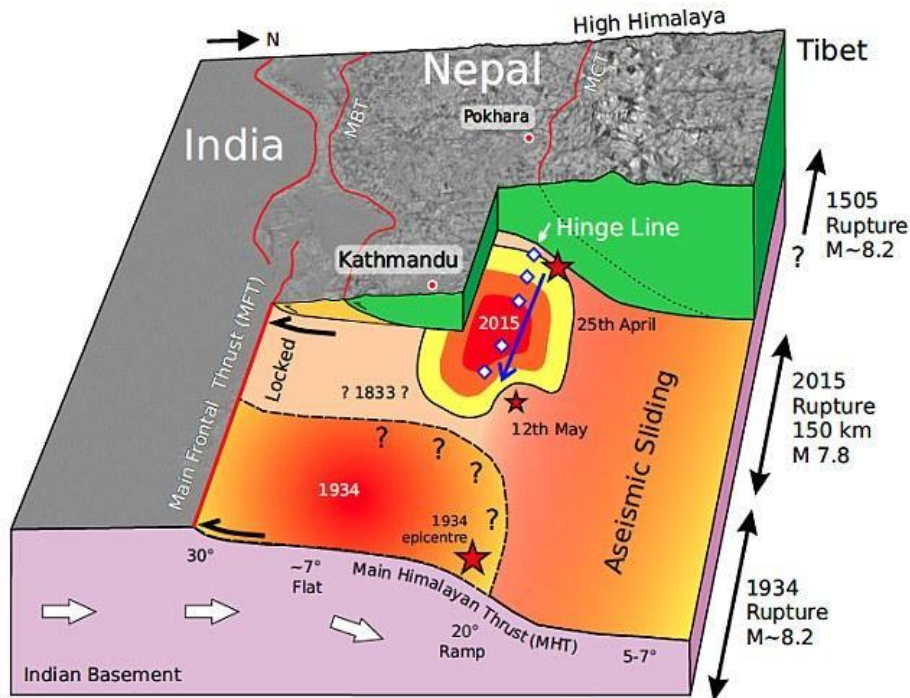
Chapter :- 3

Result and Discussion

CAUSES OF EARTHQUAKE

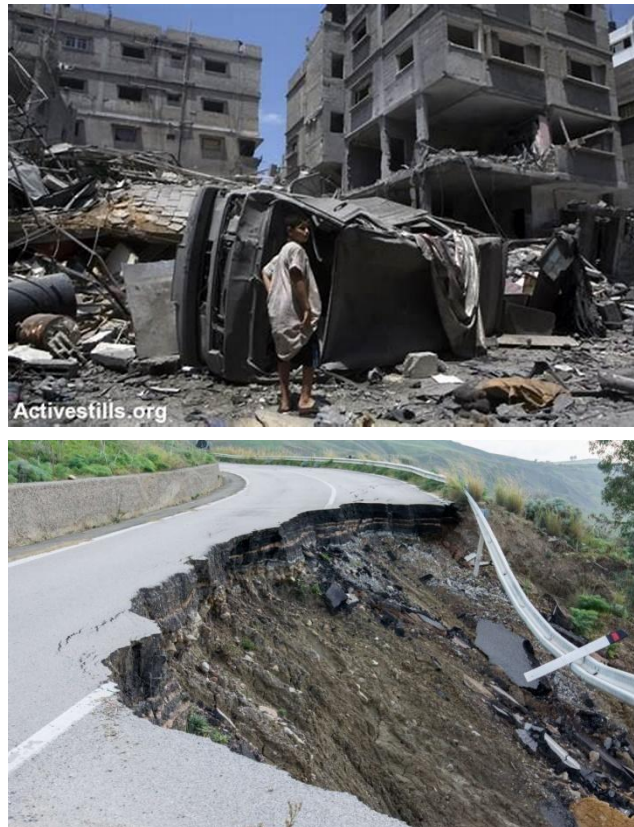
Earthquake Nepal and India along the Himalayan belt were caused mainly due to collision of Indian plate and Eurasian plate. Deep focus and high magnitudes of earthquakes are caused along the convergent plate boundaries because of collision of two convergent plates, namely Eurasian and Indian convergent plates. The subduction of Indian plate below Eurasian plate caused Nepal earthquake at the belt of Himalaya. April 25 and May 12, 2015 earthquakes had occurred on the northern boundary of the Indian plate which is under thrusting the Eurasian plate. The main cause of Nepal earthquakes is attributed to the northward movement of Indian plate. The Indian plate is moving toward north-northeast ward direction at an average rate of about 4.5-5 cm per annum, which causes a stress. On 25th April 2015, the stress built up as the Indian and Eurasian plates slide under one other

causing earthquake. The epicentre of these two earthquakes has lay on the boundary of these two plates. The earth quake was caused at the depth of 10 kilometres. The 188 aftershocks measuring around 3.0-6.9 magnitudes in Richter scale were at the depths of 10-50 kilometres. After the major earthquake, the earth's plates lost their equilibrium. The aftershocks are basically nature's way to help earth get back its equilibrium.



Effect of earthquake

The hazardous effect of Nepal earthquakes depends not only on several buildings, most of them old, collapsed in the densely populated Kathmandu valley. Kathmandu's Darbar square, a UNESCO world heritage site, was totally damaged in the quake. Harsh damage took place to the parts of the palace complex in Vasanthapura Square. The site of palaces and temples of the city were warren of narrow lanes and historic structure. Kathmandu residents ran onto the streets and other open spaces, throwing up clouds of dust and wide cracks opened on paved streets and the building's walls. Earthquakes are often followed by landslides and rock



avalanches and glacier avalanches in Himalayan Hilly areas. The quake caused avalanches on Mount Everest, making the climbers running for cover and killing at least 18 people at the start of the main climbing season. At least 1000 climbers had been at the base camp of the Everest when the earthquake struck. The base camp had been severely damaged and the teams were trapped. their magnitude of Richter scale or intensity alone, but also on so many factors, such as geology of the earth crust (lithology, elasticity, soil condition, permissible stress, rock structure, etc.), design of buildings, quality of construction, population pressure, etc. Several villages, towns, human constructions and their properties, lives were completely damaged. The urban area of Kathmandu, the capital of Nepal, was completely destroyed by April earthquake which hit Nepal. Several buildings collapsed like a pack of cards as if they were mud huts.

Chapter:- 4

Recommendation and conclusion

4.1 Recommendation

1. During earthquake, you should run towards safe place like an open area away from buildings, electricity wires, flammable inputs, etc.

2. If you are in a moving car during earthquake, you should stop the car as quickly as possible.

3. If you are staying indoors, you should take shelter under a heavy and hard furniture namely desk, table, bench, etc.

4. You should not run through or near the buildings; always stay in open space until the tremor stop. 5. You should construct seismically engineered (earthquake resistant design) buildings or light weight buildings with lighter roofs in highly earthquake prone areas. X. Findings.

4.2 Conclusion

An earthquake cannot be prevented or accurately predicted, but there are some forewarning sign of a coming tremor, and there are various system being developed and in use to reduce the damage from this disaster. However, no perfect techniques have been developed to predict the tremor till date. Making exact prediction about the occurrence of a tremor in an area and time is still a tricky proposition. The seismologists are more and more concentrating on the aspect of earthquake forecasting. When we would be able to predict of earthquakes accurately on the basis of animal behavior or other unusual phenomena, it would save many lives and property damages.

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Some Picture :-





