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A Review Landslide Area Mapping by GIS and Remote Sensing and its Mitigation Methods in Parts of Western Ghat

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ABSTRACT - In mountainous terrain, landslides are one of the most dangerous natural hazards. Landslides surround the research location in Maharashtra's Western Ghat. Baseline data on slope, relative relief, drainage density, geology and lithology, and land use and land cover are calculated using satellite pictures from Landsat, Google Earth, and Google Maps, as well as topographical sheets from the Survey of India (SOI). The purpose of this research is to provide an overview of the necessity of mapping geological ligaments and terrain components such as streams, slopes, and facets in determining how geological ligaments and terrain parameters work. Rain is one of the most common causes of landslides. One or both of the aforementioned requirements must be included in any corrective solution.

KEY WORDS: Landslide, ,GIS, Remote sensing,

I. INTRODUCTION

1.1 Landslide

A landslide, also known as a mudslide or landslip, is a type of mass wasting that encompasses a variety of ground motions such as rock falls, deep slope collapse, and shallow debris flows. Landslides are a severe concern in practically every corner of the world, since they result in economic and social damages to private and public property. Natural catastrophes have highlighted the devastation that unexpected mass movements such as landslides can wreak, with landslides claiming lives and causing significant property and infrastructure damage on an annual basis. Remote sensing (RS) and Geographic Information Systems (GIS) are essential for effective disaster mitigation and management, as well as the occupational foundation for disaster monitoring assessment, identifying gaps and offering effective disaster management techniques based on these technologies. RS and GIS have become useful tools in geology for predicting and estimating natural hazards. The applications range from better catastrophe monitoring to utilising GIS to construct hazard analysis models that can save lives and property. Although natural hazards have grown in scale and frequency over the last few decades, there has also been a significant growth in technology capacity to mitigate them. As a result, the economic damage caused by natural disasters is growing with time. Human settlements, new urbanisation, and engineering contractions all take a portion of the natural budget. To identify any explored region with hazards, a hazard assessment is required. The Patan region is marked by its dry environment, sparse population, natural vegetation, low soil quality, complex geomorphology, and severe slope gradient. Landslides, paucity of water supplies, flash floods, and groundwater contamination are all difficulties that any sustainable development plan in the Patan Taluka (western ghat) region faces. Furthermore, harmful habits brought on by increasing urbanisation may pose an irreversible threat to the region's natural and cultural assets. Patan and its environs have been selected as a pilot study on district natural hazards and planning for the entire western Ghat region. Landslides are a serious threat to human life.property and infrastructure, and becomes a major constraint on the development of the area.

II. LITERATURE REVIEW

Wei zuoan. [1] This study's topic, according to Wei zuoan [1,] was "A dynamic comprehensive approach for landslide management." A slope failure

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arises as a result of growing external pressures and deterioration of slope geo materials, leading in a gradual and dynamic development and occurrence of landslides. Because the geological properties of the site, as well as other active variables like as hydrodynamic stress and human activities, are complex and frequently unknown, the dynamic evolution and occurrence of landslides can only be understood via the gathering of landslide information. For such a progressive process, this research proposes a dynamic comprehensive control technique for landslide management. This management method emphasises the use of effective landslide control methods at the right time and in different groups, and it takes full use of

Ancut, a rotaru [2] Understanding the causes of slope development, particularly the onset of movement, involves knowledge of a number of characteristics, the majority of which are related to groundwater and can be difficult to determine. Landslides are commonly caused by heavy rain, rapid snowmelt, a wet winter and spring, particularly if previous years were also wet, the removal of material from the base, loads of material at the top, earthquakes, erosion, poor forest management, the addition of water to a slope from irrigation, roof downspouts, poor drainage, septic-tank effluent, canal leakage, or broken water. In Romania, the majority of landslides are caused by a combination of poor forest management and severe rain. Structural geology has been used in recent years to investigate the genesis and evolution of potential solutions.that produced the movement is critical to comprehending the avalanche mechanisms. This study examines the movement of landslides from the perspective of many stages of landslide activity, including pre-failure, failure, post-failure, and reactivation.

Ulrich Kamp [3]. Several thousand landslides were produced in the Himalayas of northern Pakistan and India by the Mw7.6 Kashmir Earthquake on October 8, 2005. To establish the relevance of event regulating characteristics in triggering the landslide, a multi-criterion analysis was used. Lithology, faults, slope gradient, slope aspect, elevation, land cover, and river sand pathways were among the factors. The findings revealed four different types of landslide vulnerability. Furthermore, they found that lithology had the greatest impact on landslides, especially in highly fractured rocks including shale, slate, clastic deposits, and limestone and dolomite. Furthermore, the closeness of the landslides to faults, rivers, and highways aided in the initiation of the collapses.

Lucio Olivares [4] Lucio Olivares The physics of rainfall-induced flowslides in pyroclastic soils are still being worked out. The use of a well-equipped small-scale flume is required because to the complexity of the phenomena (rainfall-induced collapse in initially unsaturated granular deposits, post-failure transition to flow-like landslide). Flume experiments were carried out at the Second University of Naples to investigate the fundamental elements of such occurrences. A new experiment is underway to evaluate the performance of a time domain reflectometry device and optical fibres as signs of approaching failure. The instrumented Flume and the methodologies used to monitor the primary characteristics of slope behaviour are described in this study. In this regard, our initial experimental results are highly encouraging.

Ghosh and Bhattacharya, [5] Landslides are an evolutionary and lethal force, making them a major source of worry for human life and property.Land use changes in mountainous areas for various socioeconomic activities (e.g., urban growth, road construction, deforestation, etc.) intensify the risk of landslides and have negative consequences (Aleotti and Choudhury 1999). The huge quantity of data and factors that must be examined in order to reach a conclusion regarding landslide susceptibility for a specific region demands the development of an automated system capable of assessing the severity of potential landslides in that area.

Saro Lee [6] The research area's landslide spots were determined by interpreting aerial pictures and conducting field surveys. GIS and image processing technologies were used to acquire and process topographical and geological data as well as satellite photos. For landslide hazard analysis, eight landslide-inducing factors are taken into account. The link between each landslide and its causal elements was used to create landslide susceptibility maps. A probabilistic strategy to estimating landslide-prone regions using GIS and remote sensing is provided in this paper.

Iswar Das [7] Landslide investigations are frequently guided by ground awareness and field measurements of rock strength and slope failure criteria. Landslide susceptibility studies gain from the inclusion of data gathered from multiple sources and methodologies at various scales as GIS-based statistical approaches grow more refined. This research shows how to map landslide susceptibility using logistic regression and compares the results to the geotechnical-based slope stability probability classification (SSPC) methodology. Geotechnical methods such as SSPC perform better when used to a hill-cut road segment for landslide susceptibility mapping.

Miau-Bin Su [8]Time domain reflectometry (TDR) is used in conjunction with the global positioning system (GPS) to track ground deformation of high altitude landslides in Li-shan as a complement to the monitoring methods for subsurface deformation in the slope. Assessing the location of the sliding

surface and the distribution of displacements are the most important aspects of a landslide monitoring system. For large-scale landslides or landslides in high-altitude mountain settings, traditional monitoring technology is not always adequate..

Pradhan [9] This research presents the findings of cross-validation of a frequency ratio model for landslide susceptibility analysis utilising remote sensing data and GIS. Landslide placements in the research regions were estimated using aerial images and satellite photos, which were supplemented by field assessments. For verification, the test findings were matched to field-verified landslide areas. Landslides are caused by tropical rains and flash floods in Malaysia, which induce rock surface collapse along fracture, joint, and cleavage planes. Although the geology of the nation is reasonably stable, continuing population and urbanisation result in deforestation and deterioration of the soil layers that cover the slopes, posing major hazards to the slopes. Designers and engineers will find landslide susceptibility maps extremely useful in locating acceptable construction locations.

III. CONCLUSIONS

After studying this the and remote sensing are found to be one of the best and advanced methods for the analysis of landslide. The landslide is major problem found in various parts of the world so that by using the advanced techniques like GIS and REMOTE SENSING we can found landslide hotspots earlier so that there should mitigation planning can be done.

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