Vol 7 Issue 5 June 2017

ISSN No : 2230-7850

International Multidisciplinary Research Journal

Indian Streams Research Journal

Welcome to ISRJ

RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.org

ISSN: 2230-7850 IMPACT FACTOR : 5.1651(UIF)

INDIAN STREAMS RESEARCH JOURNAL

VOLUME - 7 | ISSUE - 5 | JUNE - 2017

MALIN VILLAGE LANDSLIDE: A GEOLOGICAL HAZARD

Mr. Arjun Doke
Assistant Professor, Shankarrao Bhelke College, Nasrapur, Tal. Bhor,Dist. Pune.

ABSTRACT

This article deals with the main aspects of geological hazard assessment by presenting review of GIS-based methodology for identification and analyses of hazard. In the India every year more than hundred disaster accrues. Whole Maharashtra effectuated form different disasters are cyclones, tsunamis, earthquake and volcanic eruption etc. Present article study the different type of hazard and disaster main focuses of article is different type of geological hazard. Landslide is a one of the common threats in many part of the word. India subcontinent has also the same situation the northern part of India, Himalaya region landslide prone area. In Sahyadri Mountains, landslides are very common. Pune district in Maharashtra state is one of the landslide hazard affected areas. Landslide is a geological hazard accord in village Malin on 30th July 2014. Village Malin is located in the lower reaches of their respective potentially threatening mountain slope, dance forest and hilly area, the settlement of villagescatted but along the road on hill slope. Malin, rehabilitation village because Formation of reservoir (Dimbhereservoir). In that avalanche 134 people killed which include 50 men, 64women and 20 childrenand more than that injured. The present paper deals with debris length and which at the toe, angle of debris material, volume of debris was calculated. Result of that present article Human violence against ecological fragile slope, Ecological Imbalance due to deforestation, intensity of rainfall 108mm (10.8cm) on 29th July 2014,changing agricultural practices- villagers had recently shifted fromcultivation of rice and finger millet to wheat, which required leveling of steep areas, which contributed to instability of the hills. The quarrying activity is seen on hilltopof Malin village.The total volume of Malin landslide estimated 52800.00m3(Values are field based on measurement and calculations). The landslide appears to be a mudslide in deeply weathered soils (there is no evidence of involvement of large amount of bedrock). One of the reasons of Malin landslide is steep slope.

KEYWORDS:*Hazard, Disaster, Geological Hazard, Anthropogenic, Sahyadri Mountains, Landslide, Geographical Information System, Geological risk factors.*

INTRODUCTION :

Hazard may be defined as “a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.” The word ‘hazard’ owes its origin to the word ‘hasard’ in old French and ‘az-zahr’ in Arabic meaning ‘chance’ or ‘luck’. Hazards can be grouped into two broad categories namely natural and manmade. Natural hazards are hazards which are caused because of natural phenomena (hazards with meteorological, geological or even biological origin). Examples of natural hazards are cyclones, tsunamis, earthquake and volcanic eruption which are exclusively of natural origin. Landslides, floods, drought,

fires are socio-natural hazards since their causes are both natural and man made. For example flooding may be caused because of heavy rains, landslide or blocking of drains with human waste.

Disaster is "Those elements of the physical environment, harmful to man and caused by forces extraneous to him" (Burton et al 1978)."disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area; (The Disaster Management act, 2005)

India is vulnerable, in varying degrees, to a large number of natural as well as man-made disasters. 58.6 per cent of the landmass is prone to earthquakes of moderate to very high intensity; over 40 million hectares (12 per cent of land) is prone to floods and river erosion; of the 7,516 km long Coastline, close to 5,700 km is prone to cyclones and tsunamis; 68 per cent of the cultivable area is vulnerable to drought and hilly areas are at risk from landslides and avalanches. Vulnerability to disasters/emergencies of Chemical, Biological, Radiological and Nuclear (CBRN) origin also exists. Heightened vulnerabilities to disaster risks can be related to expanding population, urbanization and industrialisation, development within high-risk zones, environmental degradation and climate Change (National Policy on Disaster Management 2009)

Landslide is an important geological hazard that causes damage to natural and social environment. The concept of landslide is dealt by many authors differently. Varnes and IAEG (1984) defined landslides as 'almost all varieties of mass movements on slope including some such as rock falls, topples and debris flow that involve little or no true sliding'. Brusden (1984) considered landslides as a unique form of mass transport and a process which do not require a transportation medium such as water, air or ice. Crozier (1986) defined landslides as 'the outward and downward gravitational movement of the earth material without the aid of running water as a transporting agent'. According to Hutchinson (1988), 'A landslide in its strict sense is a relatively rapid mass wasting process that causes the down slope movement of mass of rock, debris or earth triggered by variety of external stimulus'. A recent definition by Courture R (2011) simply states that 'landslide is a movement of mass of soil (earth or debris) or rock down a slope'. This concept of landslide is more broaden with respect to the type of material that moves down slope. Landslide causes loss of around 1000 lives and property worth $4 billion annually (EM-DAT 2007). According to the database created by the Centre for Re- search on Epidemiology of Disasters, landslides and related processes have killed over 61,000 people world over in the period between A.D. 1900 and A.D. 2009 (EMDAT 2010). According to Brabb (1993), at least 90% of landslide losses can be avoided if the problem is recognized before the landslide event.

Landslide susceptibility is generally seen as expressing the likelihood that a landslide will occur in an area as a function of local terrain conditions (Soeters and Van Westen, 1996). A simple empirical method which is used in many papers, although it cannot delineate a travel path (Dai et al., 2002), is the angle of reach (AOR) approach. The AOR, which was first introduced by Heim (1932) as the Fahrboschung, is defined as the angle connecting the crown of a landslide with the distal margin of the runout material. Since introduced by Heim, correlations between AOR and changes in landslide volume, type and runout path have been investigated by many authors (e.g. Scheidegger, 1973; Hsu, 1975; Corominas, 1996; Dai and Lee, 2002; Corominas et al., 2003). However, an aspect of the approach not yet examined is the change in AOR as a consequence of a stepwise landscape seen as geological benches in the runout path. Susceptibility assessments on a 1:1000 scale using the infinite slope model (Ward, 1976; Selby, 1993). The result was highly affected by the large local variations of soil depth and cohesion (Dahl, 2007). The large local variation in soil parameters is a major obstacle for potentially assessing regional landslide susceptibility in the Faroe Islands using a mechanistic approach. In Maharashtra, western ghat region is affected by landslide a study of landslide and its effect on human environment in thane district carried by pardeshi and others. (Pardeshi2009). Calculation, volume of landslide cruden and varnes formula is use,(Cruden and Varnes, 1996)

Malin, rehabilitation village because Formation of reservoir (Dimbhe reservoir). In that avalanche 134 people killed which include 50 men, 64women and 20 children and more than that injured. Some statements are present hair of senior most person SatishThigale said that the root cause of landslide at Malin appears to be

leveling of land on the hill sor cultivation, SamairaAbdulali(Environmentalist) said that part of the Himalayas are rocky and have nothing to hold the soil. These are creating the condition by cutting trees. A. K. Saha(DeputyDirectorGeneral, Geological Survey of India) said that preliminary reports indicated the landslide occurred due to two days of non-stop rain.

Hence, there is a detail study of village Malin landslide as well as need for landslide hazard assessment at various spatial scales.

Aim

The basic aim and objectives of the study is to utilize Remote, GIS Technology for Disaster management. Remote sensing technology will be applied for the generation of spatial data, analyze temporal and spatial changes in land use/ land cover in the study area and its use for analyzing the disaster.

Scope of the Study

The study is landslide analysis, its impact on human being as well as environment.Its Analyzing the site suitability for settlement (rehabilitation village).

Limitation

The study is made in limited time constraint and field study along with available data.

Challenge

The area of study is not cover highly vulnerable to landslide as per the classification by the Geological Survey of India as well as the Western Ghats do not fall either under 'very high' hazard zone or 'high' hazard zone.

OBJECTIVES

This research paper mainly focuses on the different type of geological Hazard, Landslide as a Hazard and finding the cause of village Malin landslide.

1. To study the different type of geological Hazard.
2. To estimate the landslide volume and causes.

STUDY AREA

Village Malin is lactated in AmbegaonTahsil154km away from Pune City in a North-westerly direction. The place of landslideis 19^0 9' 4" N &73^0 41' 18" E. This typical mountain terrain (Village Malin and adjoining area) has an average altitude of 850 m (minimum 750 m and maximum 1,190 m), with an average gradient of 24° (maximum 70°). The average temperature is 20–28 °C and the average annual precipitation is 1133.73 mm (most of which falls in July and August). Area of VillageMalin has an irregular shape, having an area of 736sq/m bordered by villageSukalwedhe on east, villagePimparwadi on north east, village Adhare on south east village Tirpde on west, villageAsane on south west, village Don on north westand village Hatvij and Ambe on north.Maharashtra is covered by Deccan basalts of Cretaceous-Eocene age which is arranged in several strata. The lowermost megacryst lava flow horizon (M1) of 60 meters thickness is observed about 400 meters above sea level. The climate is moist but healthy. As per the 2011 census figures, village had a 165 house hold and Population 704, out of that 365 Male and 340 Female, 666 belong to Scheduled Tribes and 34 to Scheduled Castes. The vegetation is mainly of dry deciduous type and scrub type. It is due to moderate and irregular rainfall. 29th July 2014 rainfall of that place recorded near Dimbhe reservoirraingasing station 108mm (10.8cm), (Bhandari2014).

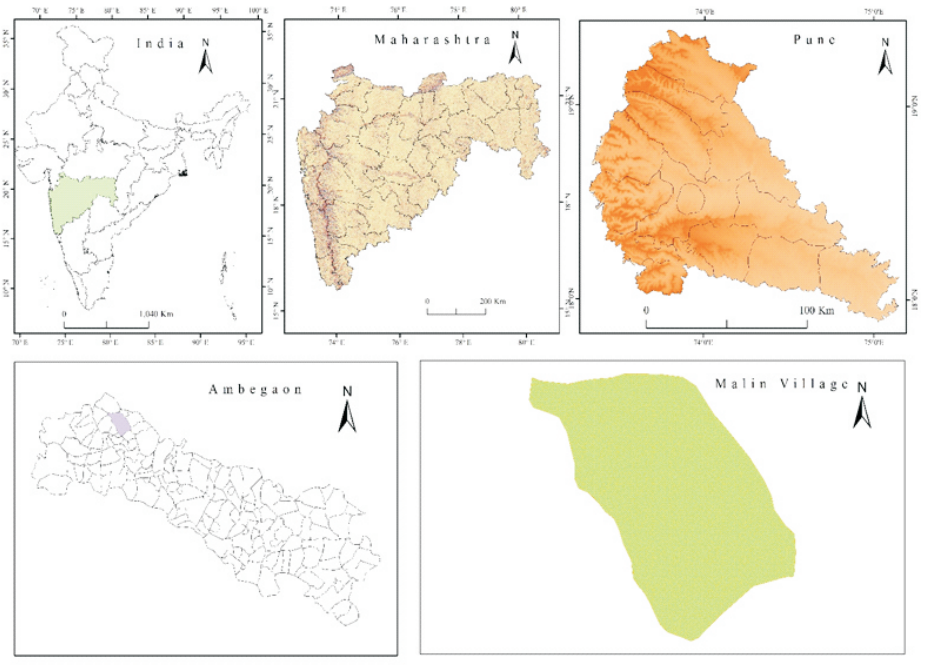

Fig.1 Location Map of Study Area.

DATABASE AND METHODOLOGY

The primary and secondary data have been used for the research paper. The cartographic technique has been also used to represent the data.

A) Primary Data

Field observation:-

Field observation has been another important instrument for collecting qualitative data, especially for geological and geomorphological setup of region.

B) Secondary data

The main secondary sources of data that were inter alia examined were:

- 2011 Village Record of landuse from Tahsil place Ambgaon.
- 2011 Census data.
- 47E/12, SOI (Survey of India) topographical maps of the study area at the scale 1:50,000. (Finding the Location of Landslide only)
- Official websites of the respective state governments and Government of India

Methodology

The whole research is divided into three stages:

1. Pre-field work:-

- Study of available literature of the study area.
- Preparation of interpretation key and disaster classification system.
- Collection of information from different government department.

2. Field Work:-

Reconnaissance visit to field to get familiar with the study area.

- To check all the doubtful cases on the ground.
- To check the accuracy of the pre-field interpretation data.
- To carry out detail survey to record actual condition of sites.

• Finalization of interpretation key.
• Data collection from secondary data sources.

3. Post-Field Work:-

• Research Paper writing.

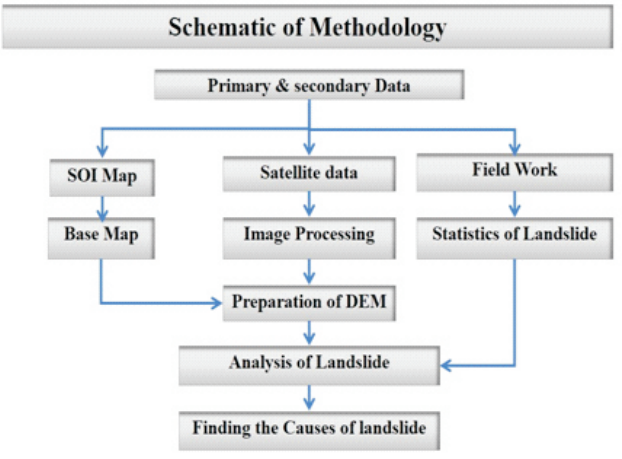

Fig. 2. Schematic of Methodology

TYPE OF HAZARDS

There are many different ways of classifying hazards. One is toconsider the extent to which hazards are natural.

1.Natural hazards such as earthquakes or floods arise frompurely natural processes in the environment.

2.Quasi-natural hazards such as smog or desertification arise through the interaction of natural processes and human activities.

3.Technological (or man-made) hazards such as the toxicity of pesticides to fauna, accidental release of chemicals or radiation from a nuclear plant. These arise directly as a result of human activities.

Hewitt and Burton (1971) itemized a variety of factors relating to damaging geophysical events, which were not process-specific, includingAerial extent of damage zone, Intensity of impact at a point, Duration of impact at a point, Rate of onset of the event, Predictability of the event.

A typology based on Hewitt and Burton (1971) would appear as follows.

1.Atmospheric (Single element): Excess rainfall, Freezing rain (glaze), Hail, Heavy snowfalls, High wind speeds, Extreme temperatures.

2.Atmospheric (Combined elements/events): Hurricanes'Glaze' storms, Thunderstorms,Blizzards, TornadoesHeat/cold stress.

3.Hydrologic: Floods – river and coastal, Wave action Drought, Rapid glacier advance.

4.Geologic: Mass-movement, Landslides, Mudslides, Avalanches, Earthquake, Volcanic eruption, Rapid sediment movement.

5.Biologic: Epidemic in humans, Epidemic in plants, Epidemic in animals, Locusts.

6.Technologic: Transport accidents, Industrial explosions and fires, Accidental release of toxic Chemicals, Nuclear accidents, Collapse of public buildings.

The volume of the landslide depends upon its shape. The shape of the landslide with its maximum width coinciding with its lower boundary (or toe), resembles either a quarter ellipsoid-shaped mass or a block wedge. For a half ellipsoid-shaped landslide, the volume can be estimated by the formula (Cruden and Varnes, 1996).The

village is location in high potentially dangerous (fig.1).The calculation of landslide volume

$VOLIs = (1/6)\pi D_r W_r L_r$

Where Dr is the maximum depth of surface rupture, Wr is the maximum width between the flanks of the landslide, and Lr is the minimum distance from toe of surface of rupture to crown.

The total volume of Malin landslide estimated 52800.00m3(Values are field based on measurement and calculations). The landslide appears to be a mudslide in deeply weathered soils (there is no evidence of involvement of large amount of bedrock).

Causes finding Malin landslide is given bellow

1.Slope- The main cause of village Malin landslide is steep slope.

2.Rainfall-In 2014, monsoon delay, Villagers of Malin spend extra time for preparation pre monsoon agriculture activity last week of July rain accord very heavy impact of that inflation and peculation rate of water is increase, 29th July 2014 rainfall of that place recorded near Dimbhe reservoirraingasing station 108mm (10.8cm), (Bhandari2014).

3.Human activity − List few years the villagers shift their agriculture pattern, on hill top as well as on hill slope formation of new paddy field seen. The Malin villagers cut tree for formation of new agriculture field. The formation of new field upper part of soil is removing, impact of that inflation and peculation rate of water is increase due to heavy rainfall of last two days mass of top soil is increase and they flow on gravitation force.

CONCLUSION

The Malin landslide is a challenge of human being for management of disaster. Pune district is not a free for landslide. A part of western ghat in punedistrict is prone for landslide. In that avalanche 134 people killed which include 50 men, 64women and 20 children and more than that injured. The present paper deals with debris length and which at the toe, angle of debris material, volume of debris was calculated. Result of that present article Human violence against ecological fragile slope, Ecological Imbalance due to deforestation, intensity of rainfall 108mm (10.8cm) on 29th July 2014, changing agricultural practices- villagers had recently shifted from cultivation of rice and finger millet to wheat, which required leveling of steep areas, which contributed to instability of the hills. The quarrying activity is seen on hilltopof Malin village.The total volume of Malin landslide estimated 52800.00m3(Values are field based on measurement and calculations). The landslide appears to be a mudslide in deeply weathered soils (there is no evidence of involvement of large amount of bedrock). One of the reasons of Malin landslide is steep slope. We can understand landslide only by systematic geotechnical, geomorphologic, hydrological and seismic characterization of slopes and study of environmental impact of urbanization. A study is use full for the geomorphologies, Geologies and planners.

REFERENCE

1. Bhandari, R.K. (2014): The Malin mud avalanche tragedy of 30 July 2014-time to ask the right questions,Current Science,Vol. 107, No. 4, pp 560-561.

2. Brabb, E. (1993): Proposal for worldwide landslide hazard maps, Proceedings of 7th International Conference and field workshop on landslide in Czech and Slovak Republics., pp 15-27

3. Brusden, D. (1984): Mudslides. In:Brusden D, Prior D (eds) Slope Instability. Wiley, Chichester, pp 363-418.

4. Burton, I., Kates, R.W., and White, G.F. (1978): The Environment as Hazard New York: Oxford University Press. pp.12.

5. Burton, I. And Kates, R.W. (1964): The perception of natural hazards in resource management, Natural Resources Journal 3, pp.412-41.

6. Corominas, J.(1996): The angle of reach as a mobility index for small and large landslides, Can. Geotech. J., 33, pp.260-271.

7. Corominas, J., Copons, R., Vilaplana, J. M., Altimir, J., and Amigo, J. (2003): Integrated Landslide Susceptibility

Analysis and Hazard Assessment in the Principality of Andorra, Nat. Hazards, 30, pp.421-435.
8. Courture, R. (2011): Landslide Terminology - National Technical Guidelines and Best Practices on Landslides. Geological Survey of Canada., p 12, Open File 6824
9. Crozier, M. (1986): Landslides-causes, consequences and environment. Croom Helm Ltd, London and Sydney, pp 0.7097-0.7099.
10. Cruden, D.M., and Varnes, D.J., 1996, Landslide types and processes, Chapter 3 inLandslides: Investigations and Mitigation, Turner, A.K., and Schuster, R.L. eds., Transportation Research Board, Special Report 247, p. 36-75.
11. Dai, F. C. and Lee, C. F.(2002): Landslide characteristics and slope instability modeling using GIS, Lantau Island, Hong Kong, Geomorphology, 42, 2002, pp.213-228.
12. Dai, F. C., Lee, C. F., and Ngai, Y. Y. (2002): Landslide risk assessment and management: an overview, Eng. Geol., 64, pp.65-87.
13. Dahl, M. P. J.(2007): Landslides in the Faroe Islands – An Analysis of Triggering Parameters, M.Sc. Thesis, Roskilde University, Denmark, (in Danish with English Abstr.).
14. EM-DAT (2007): Emergency Disasters Data Base, Volume 2007: Brussels, Belgium, Centre for Research on the Epidemiology of Disasters. Ecole de SantePublique, UniversiteCatholique de Louvain.
15. EMDAT (2010): Emergency Disasters Data Base, Volume 2010: Brussels, Belgium, Centre for Research on the Epidemiology of Disasters. Ecole de Sante, Publique University Catholique de Louvain
16. Heim, A. (Ed.): Bergsturz and Menschenleben, Fretz&WasmuthVerlag A.G., Zurich, 1932.
17. Hewitt, K. and Burton, I. (1971): The Hazardousness of a Place: A Regional Ecology of Damage Events, University of Toronto.
18. Hsu, K. J.(1975): Catastrophic Debris Streams (Sturzstroms) Generated by Rockfalls, Geol. Soc. Am. Bull., 86, pp.129-140.
19. Hutchinson, J. (1988): Mass movement. In: Fairbridge R (ed) The Encyclopedia of Geomorphology. Reinold., pp 688-695
20. Pardeshi S.,Pardeshi S.,Nagare V.(2009): A study of effect of landslide on human environment in thand district, Maharashtra state. The Deccan Geographer, Vol.47,No.01, June 2009, pp.45-56.
21. Scheidegger, A. E. (1973): On the Prediction of the Reach and Velocity of Catastrophic Landslides, Rock Mech., 5, pp.231-236.
22. Selby, M. J. (Ed.),(1993): Hillslope Materials and Processes, 2nd ed., Oxford University Press, Oxford, UK.
23. Soeters, R. and Van Westen, C. J.1996: Slope instability recognition, analysis, and zonation, in: Landslides investigation and mitigation, edited by: Turner, A. K. and Shuster, R. L., Transportation Research Board, Special Report 247, National Academy Press, Washington D.C., USA, pp.129-177.
24. Varnes D, IAEG (1984): Landslide hazard zonation: a review of principles and practice. United Nations Scientific and Cultural Organization, Paris, pp.1-6
25. Ward, T. J. (1976): Factor of Safety approach to landslide potential delineation, in partial fulfillment of the requirements for the Degree of Doctor of Philosophy, Colorado State University, Fort Collins, Colorado, USA.

Mr. Arjun Doke
Assistant Professor, ShankarraoBhelke College, Nasrapur, Tal. Bhor,Dist. Pune.

Publish Research Article
International Level Multidisciplinary Research Journal
For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper,Summary of Research Project,Theses,Books and Book Review for publication,you will be pleased to know that our journals are

Associated and Indexed,India

- International Scientific Journal Consortium
- OPEN J-GATE

Associated and Indexed,USA

- Google Scholar
- EBSCO
- DOAJ
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Databse
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database
- Directory Of Research Journal Indexing

Indian Streams Research Journal
258/34 Raviwar Peth Solapur-413005,Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.isrj.org