



**Where Expertise
Meets Technology**

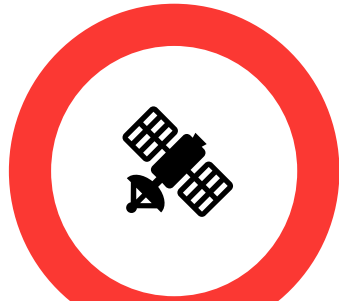
Matrix Geo Solutions

*We See the Earth Differently
– With Precision, Passion, and Purpose*

Transforming Planning, Monitoring, and Management
with Advanced Remote Sensing & Geospatial Technology Solutions

Quick Contact: Amit Sharma | Email – ais@matrix-geo.com
| +91-9891508001 | www.matrix-geo.com

Matrix Geo Solutions Limited



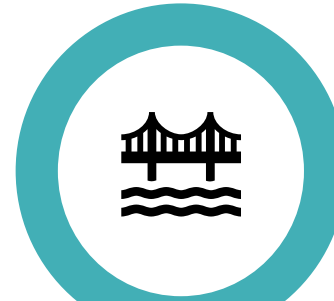
Modern Survey Technology

Smarter Data Collection from Space, Aerial, Drone, Surface, Underground, Underwater



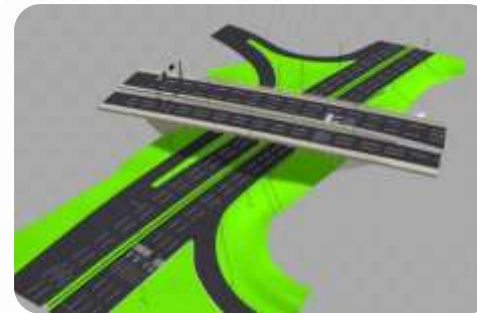
Geospatial Consultancy

GIS Data Preparation, Geospatial Analysis, Training, GIS Based Decision Support



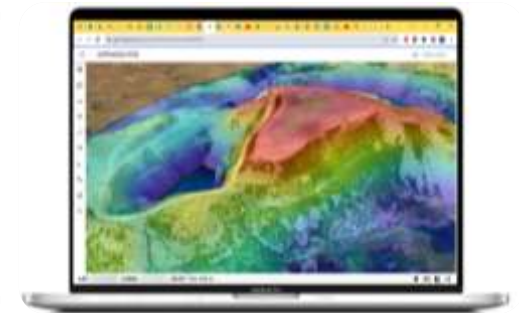
Engineering Consultancy

Road, Railways, Irrigation, Water PFR/FR/DPR/FLS



Software Solutions

Application for Data Visualization and Smarter Decision-Making Using AI/ML



India's Disaster Vulnerability



- **Natural Disasters (Hydro-Meteorological, Geological & Biological)**
 - Flood, Cloudburst, Landslides, Earthquake, Cyclone, Droughts, Heat/Cold wave
- **Anthropogenic (Man-Made) Disasters**
 - War, Industrial accidents, Forest fire etc.



Challenge: Vast geography, dense population, difficult terrain

Reasons



1. High Population Density



2. Informal & Unplanned Settlements



3. Limited Early Warning Reach



4. Slow & Fragmented Initial Response



5. Inadequate Preparedness & Awareness



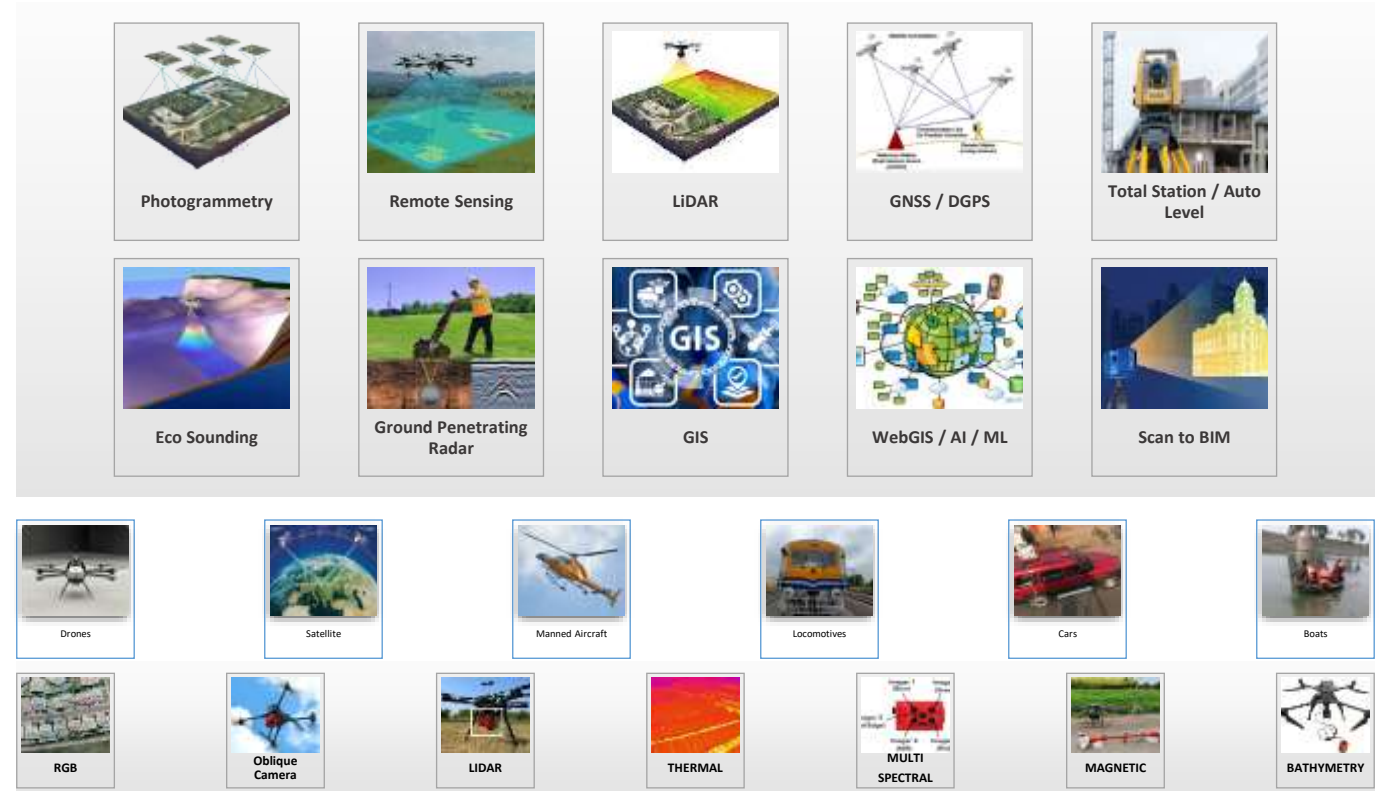
6. Climate Change Amplifies Risks

What We Need

Map

Monitor

Manage



Drones & Geospatial Tech can help in 3M

How Drones & Geospatial Tech Help

Pre-Disaster

Risk Assessment and Mapping

Monitoring

Training

During Disaster

Real-Time Situational Awareness

Search and Rescue

Post-Disaster

Damage Assessment

Monitoring Recovery

Documentation
Comprehensive reporting

Pre - Disaster Management



Risk Assessment and Mapping: High-resolution aerial surveys to map vulnerable areas

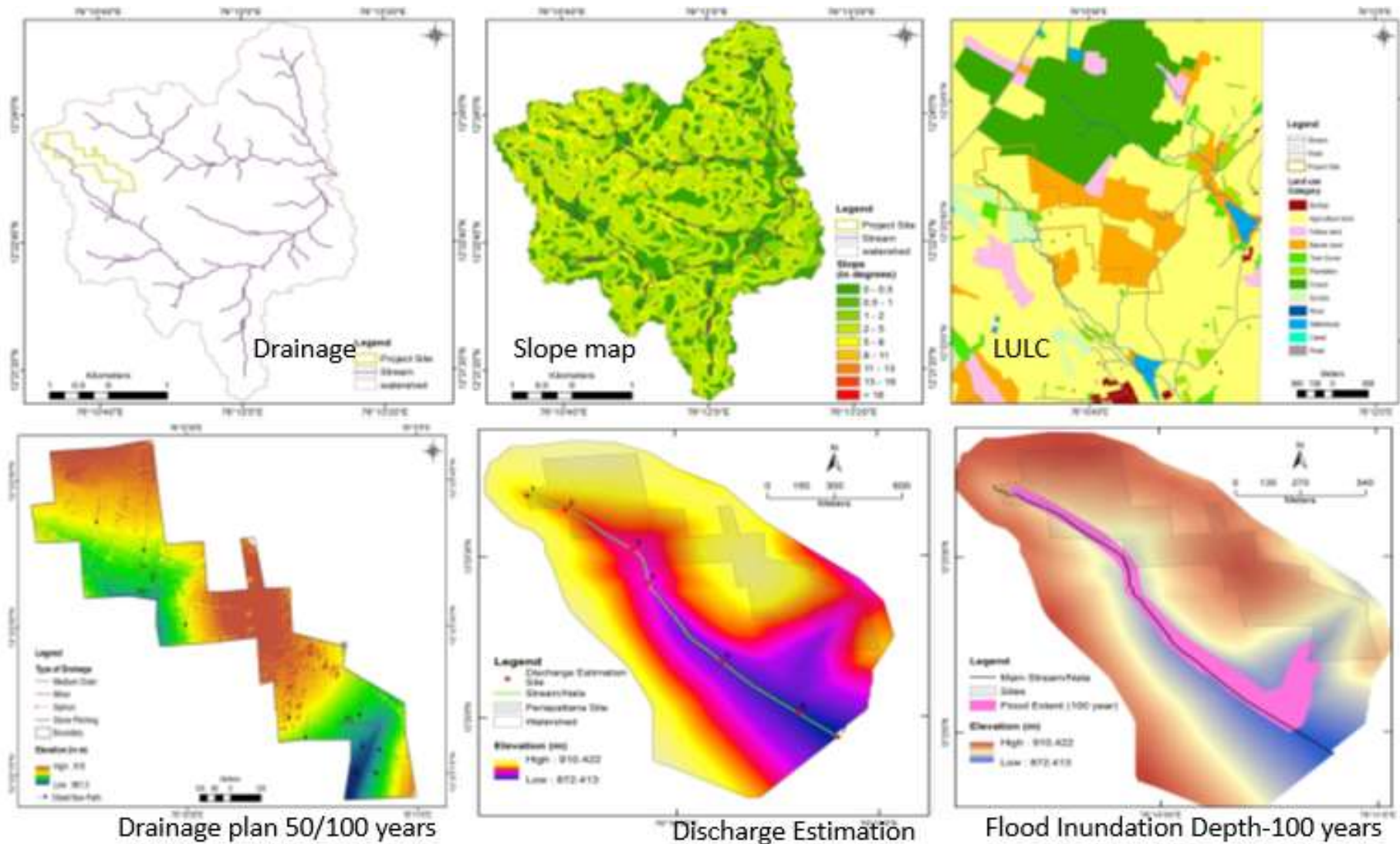


Monitoring: Real-time monitoring of critical infrastructure for early warning systems.



Training: Regular training for officials using drones.

Pre - Disaster Management



Pre - Disaster Management



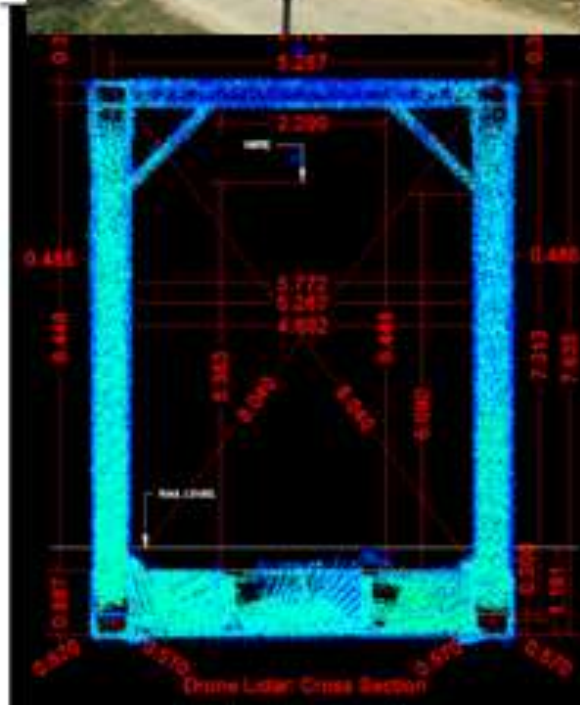
Pre - Disaster Management – Critical Structure Monitoring / Inspections



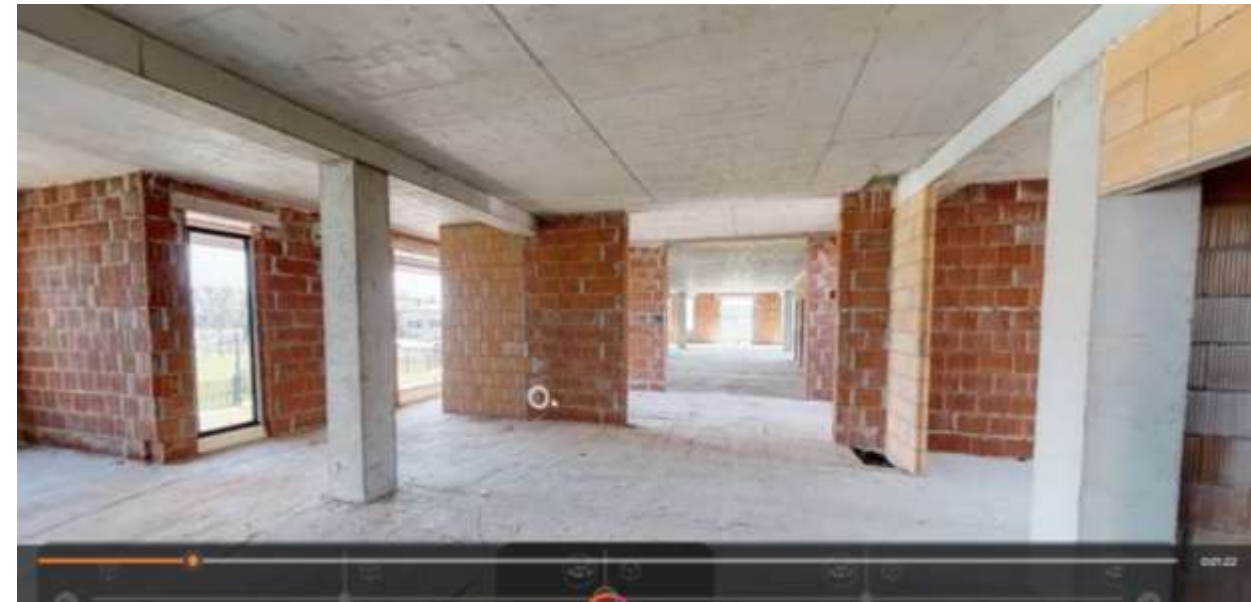
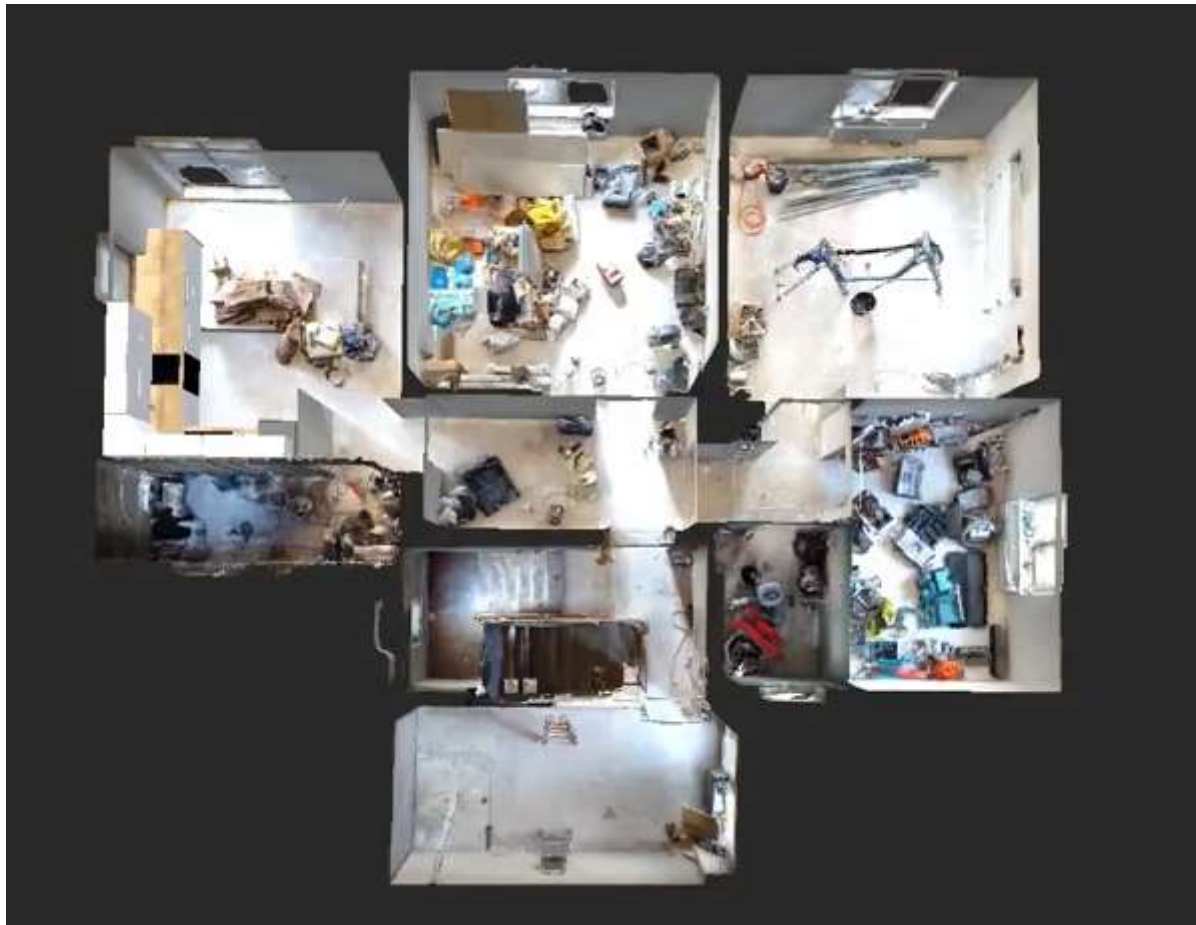
CAMBER RESULT:
Left Side Elevation

Left Side Elevation

Joint	As Per Design	Field Measurement Manual	Terrestrial LIDAR MM
L0	0	0	0
L1	13.1	10	11
L2	21	20	23
L3	26.3	24	25
L4	21	18	20
L5	13.1	12	11
L6	0	0	0



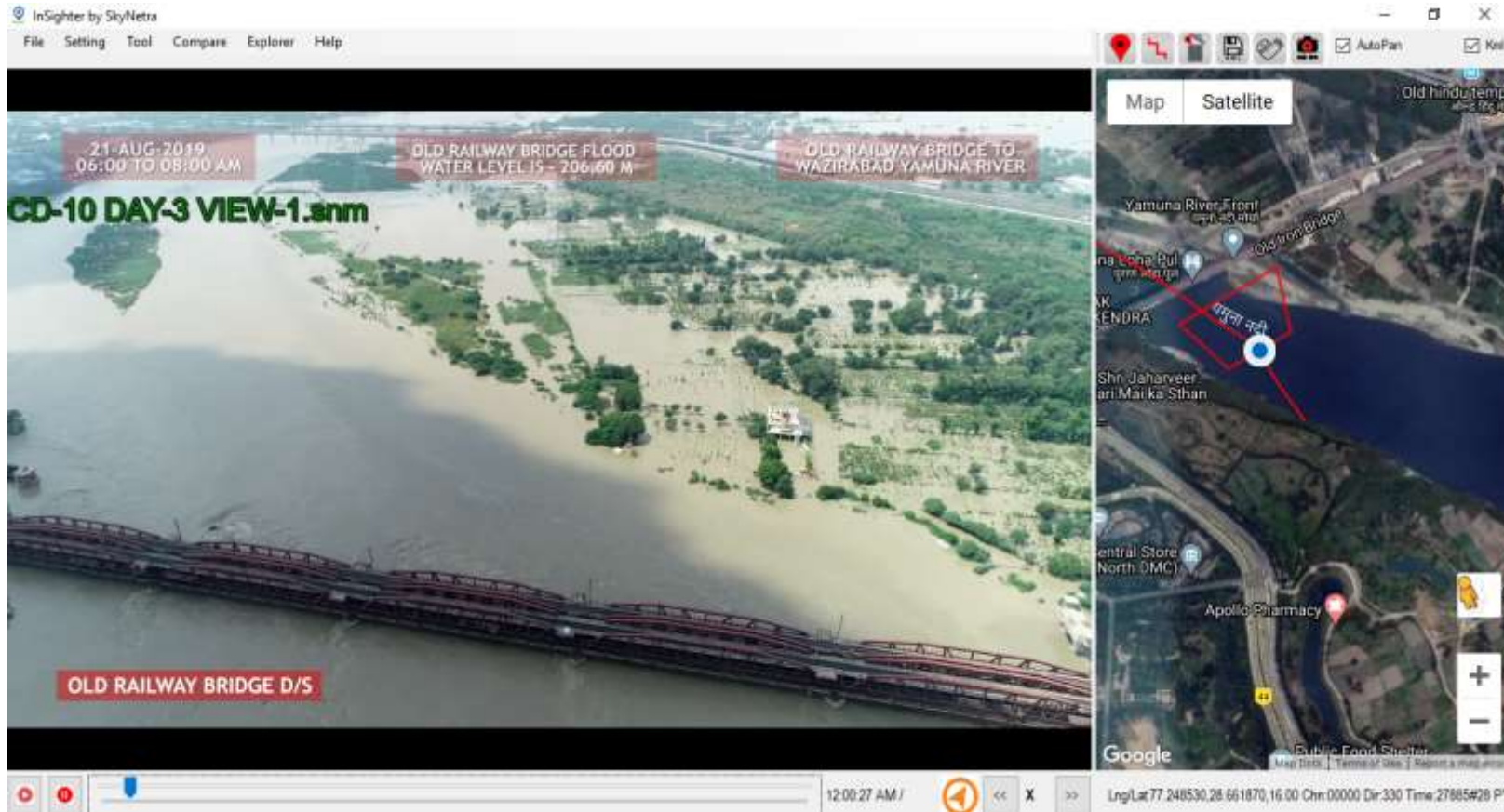
Pre - Disaster Management – Indoor Monitoring / Documentation



Land Slides Prone Areas Geological assessment



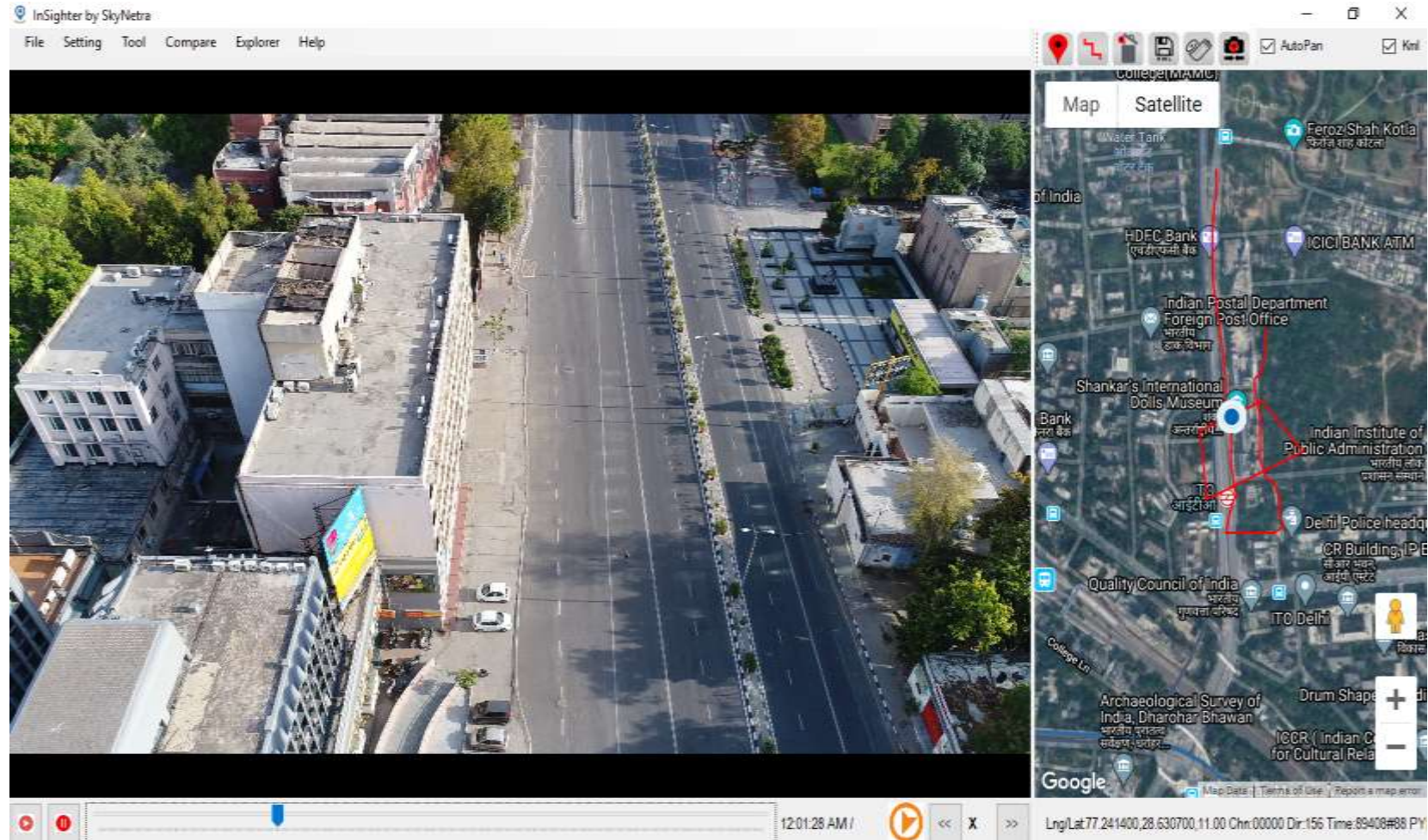
Disaster Monitoring



The screenshot displays two windows from the InSight by SkyNetra software. The left window shows a satellite view of a flooded area with the following text overlays: "21-AUG-2019 06:00 TO 08:00 AM", "CD-10 DAY-3 VIEW-1.snm", "OLD RAILWAY BRIDGE FLOOD WATER LEVEL IS - 206.60 M", "OLD RAILWAY BRIDGE TO WAZIRABAD YAMUNA RIVER", and "OLD RAILWAY BRIDGE D/S". The right window shows a Google Maps satellite view of the same area, with a red rectangle highlighting the flooded region. The Google Maps interface includes a search bar, a map control panel with zoom in (+) and zoom out (-) buttons, and a status bar at the bottom showing coordinates: "Lng/Lat 77.248530, 28.661870, 16.00 Chn 00000 Dir 330 Time: 27885#29 PY".



During - Disaster Incident

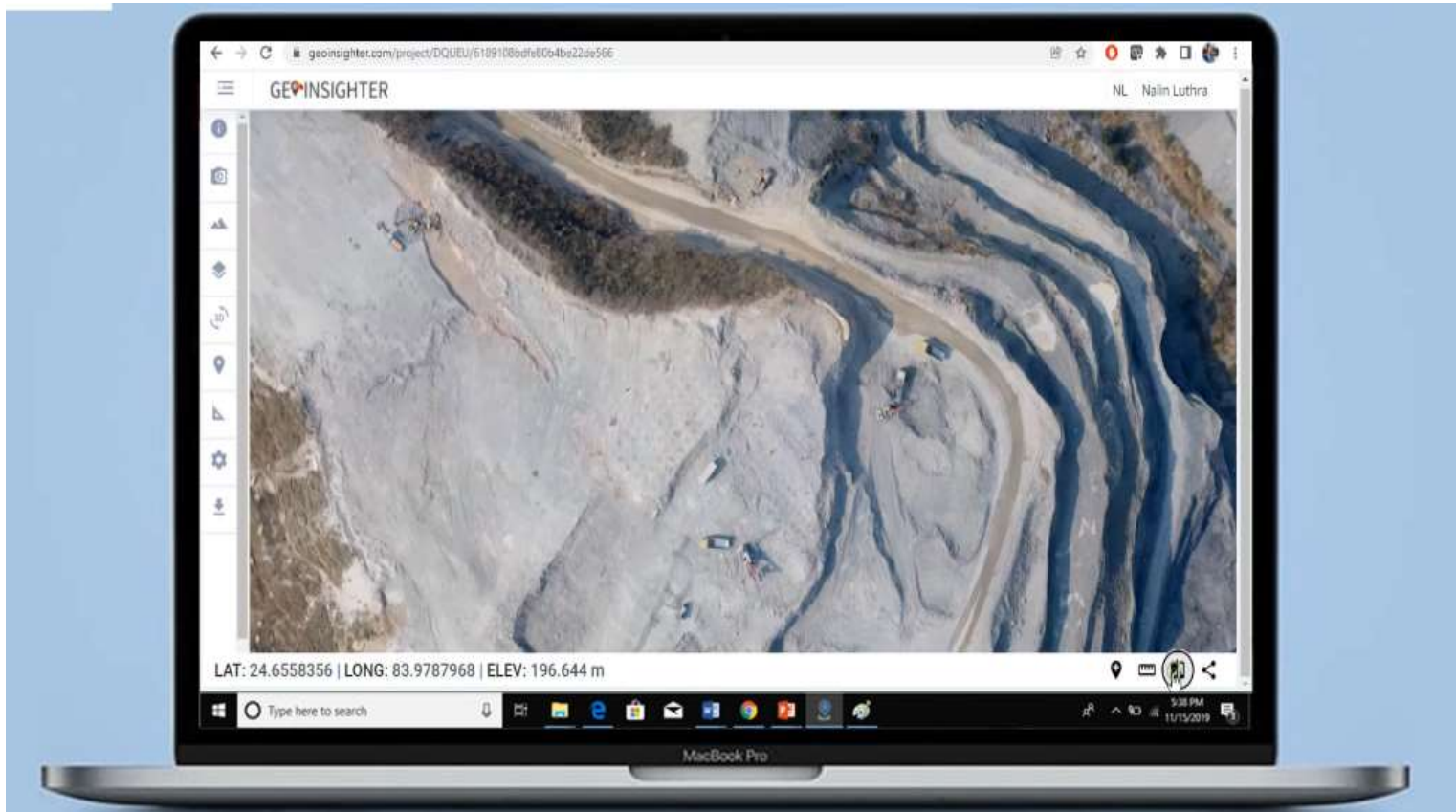


Helping Police to Monitor Densely Populated Area During Lockdown

During - Disaster Incident

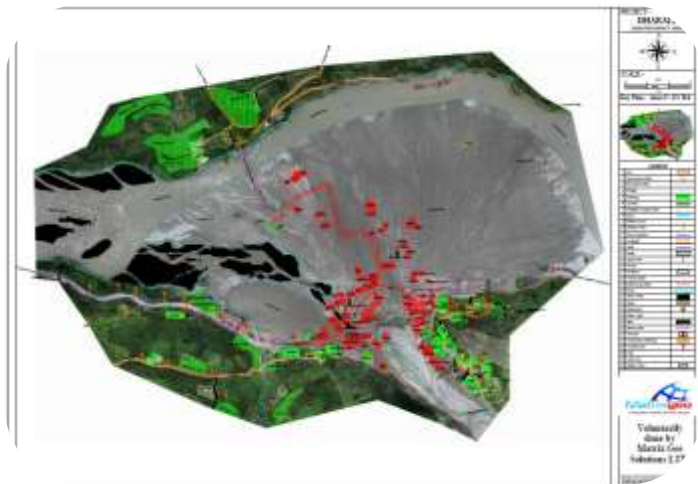


During - Disaster Incident – Single Source of truth

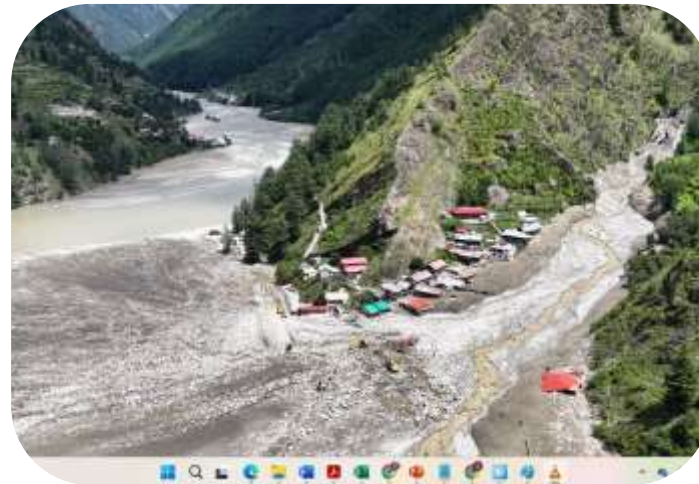


- **Storing Centrally**
- **Accessibility Anytime Anywhere**
- **Analysis & Decision Support**
- **Sharing with stakeholder**
- **Collaboration**

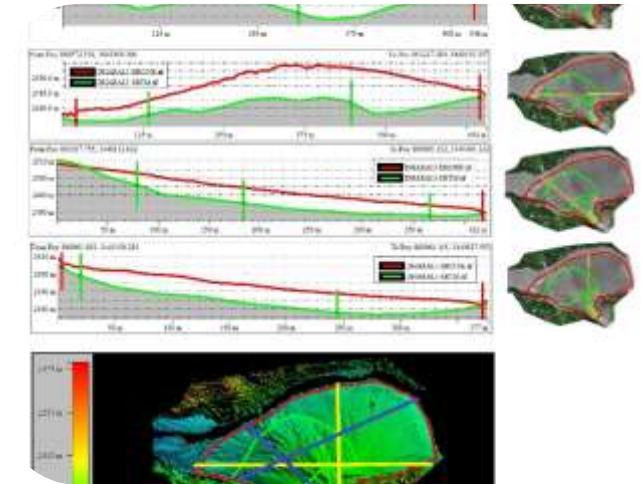
Post - Disaster Incident



Damage Assessment: Detailed surveys for accurate damage assessment and reconstruction planning.



Monitoring Recovery: Track recovery efforts to ensure efficient resource use.



Documentation: Comprehensive reporting for insurance claims and future planning.

Post - Disaster Incident - Dharali



Post - Disaster Incident - Dharali

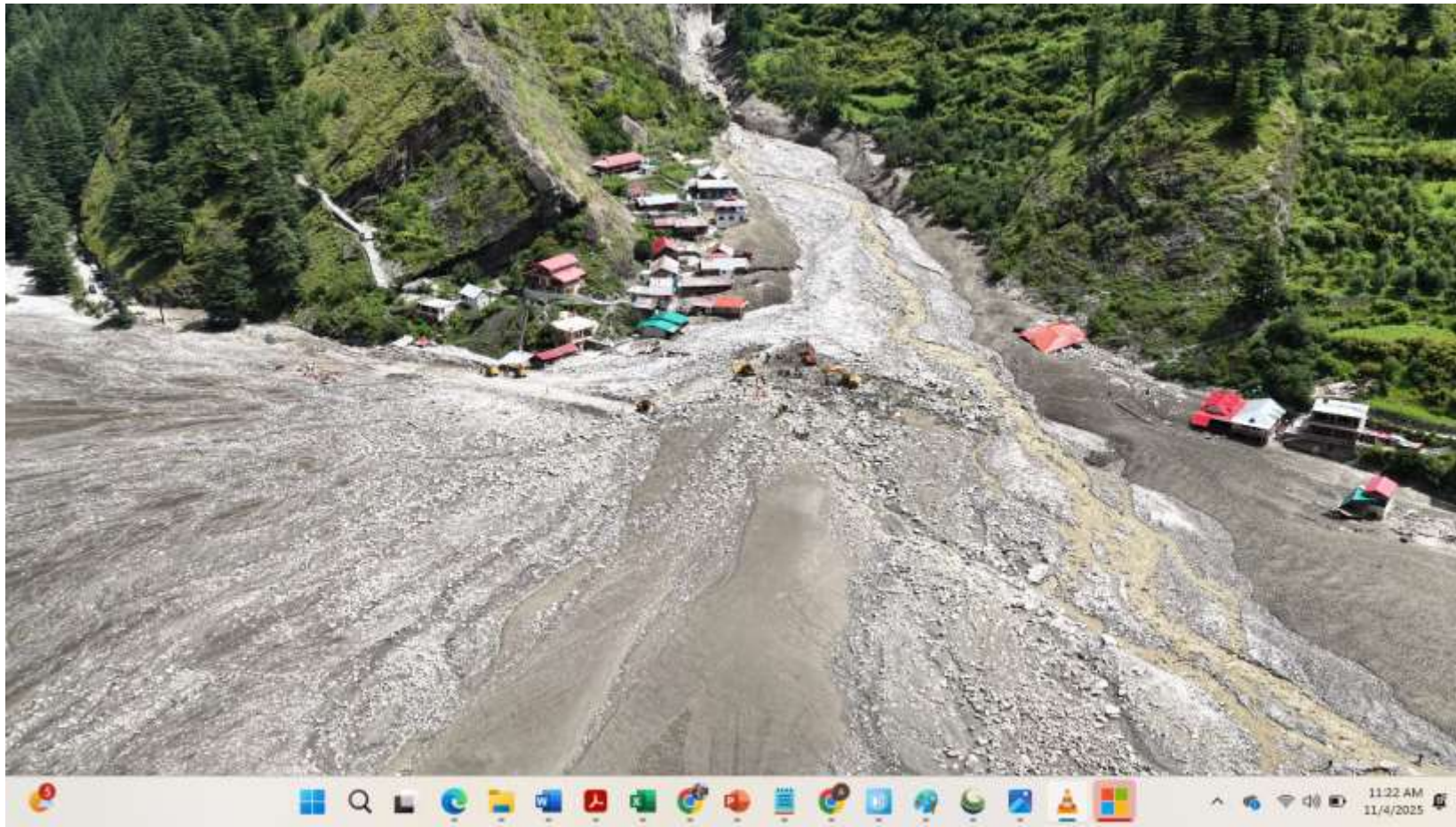


Post - Disaster Incident - Dharali



Upstream
Monitoring

Post - Disaster Incident - Dharali



Search &
Rescue

Post - Disaster Incident - Dharali

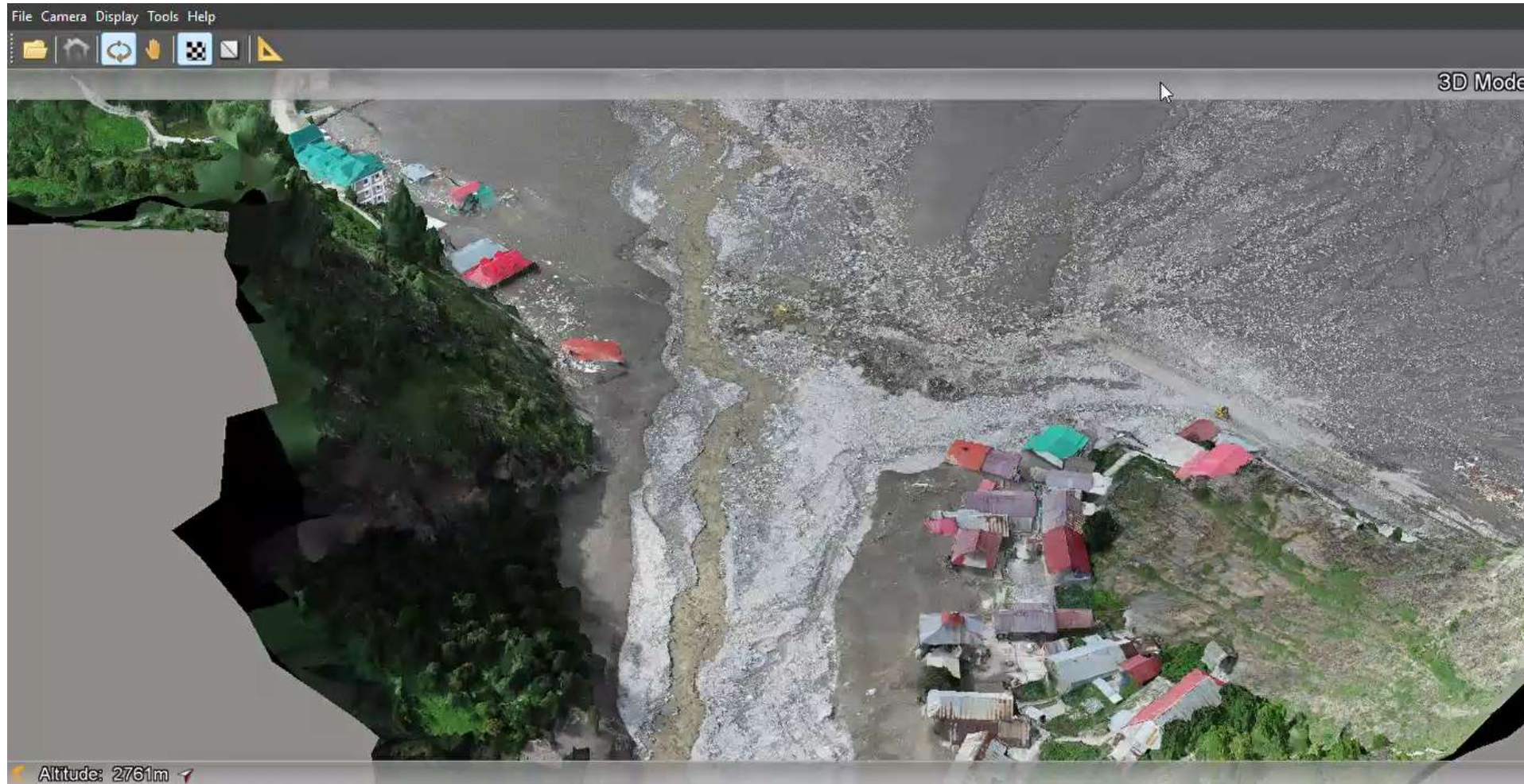


Drone Image – 1- 5 CM per Pixel

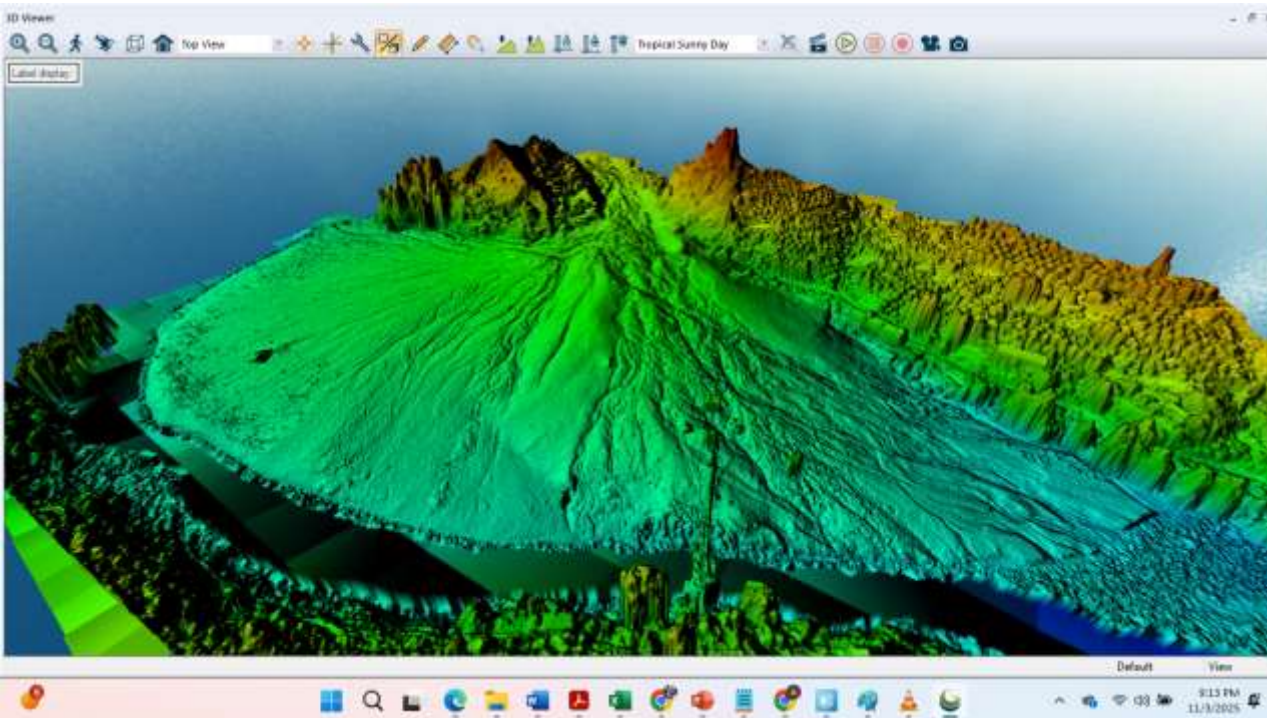


Satellite Image – 50 CM per Pixel

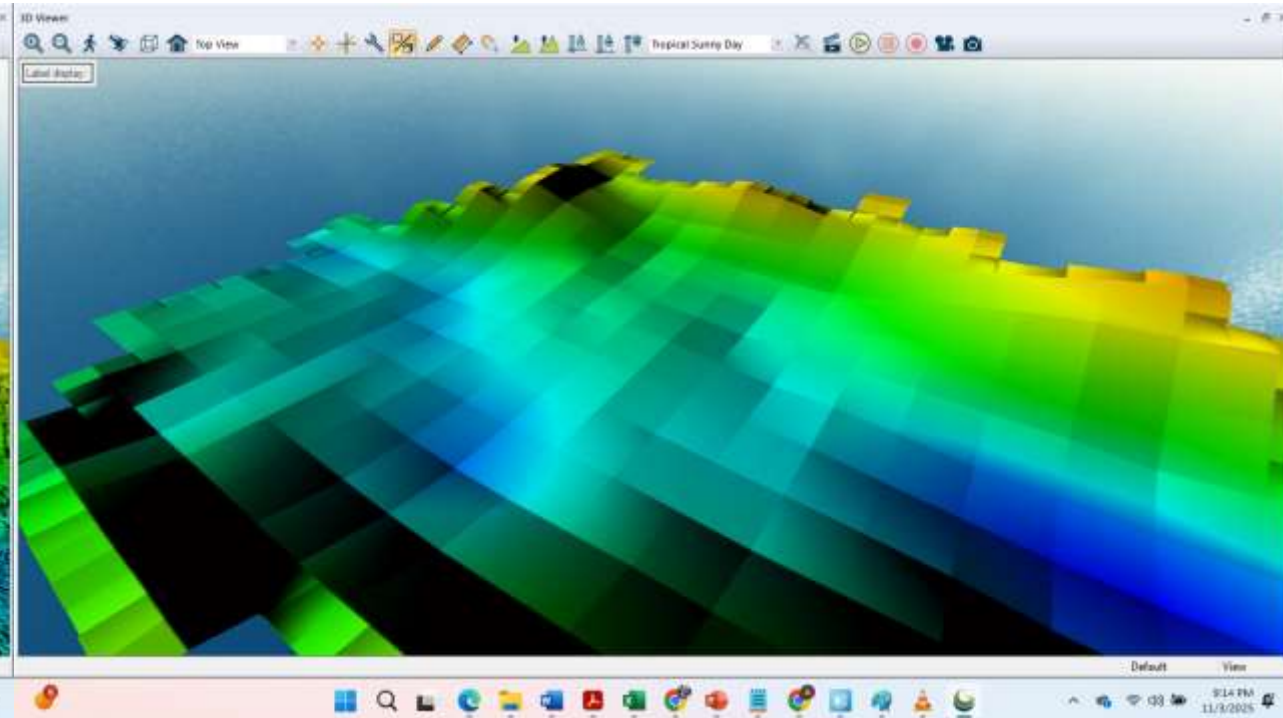
Post - Disaster Incident - Dharali



Post - Disaster Incident - Dharali

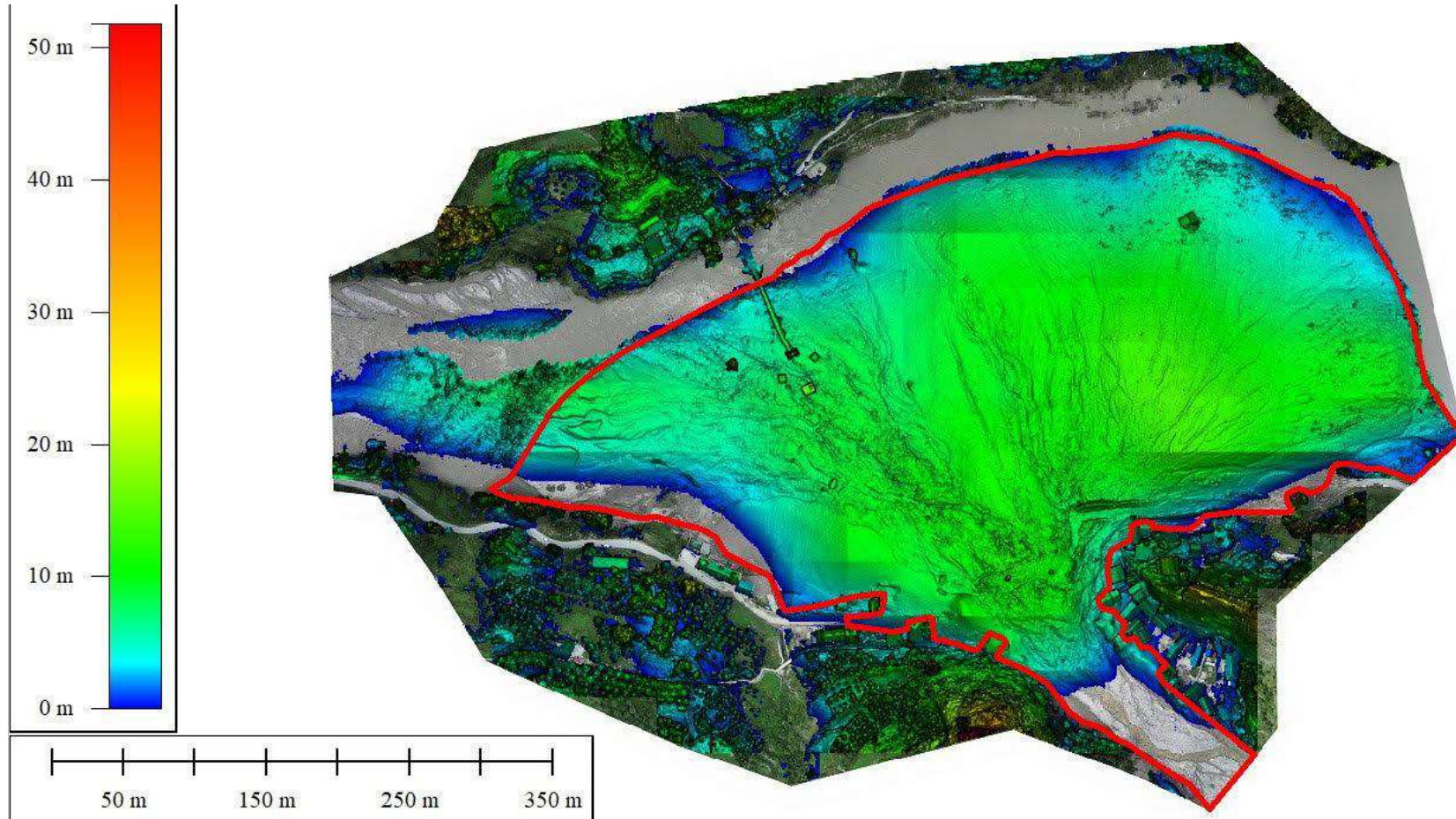


Drone LiDAR Elevation



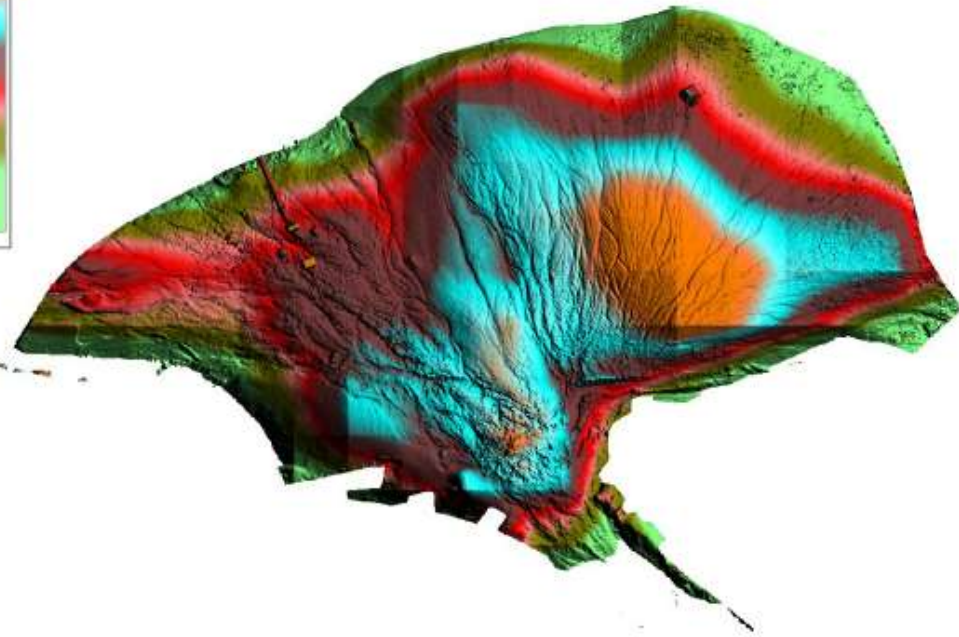
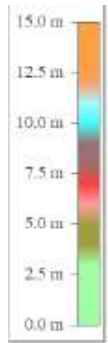
Satellite Based Elevation

Post - Disaster Incident - Dharali



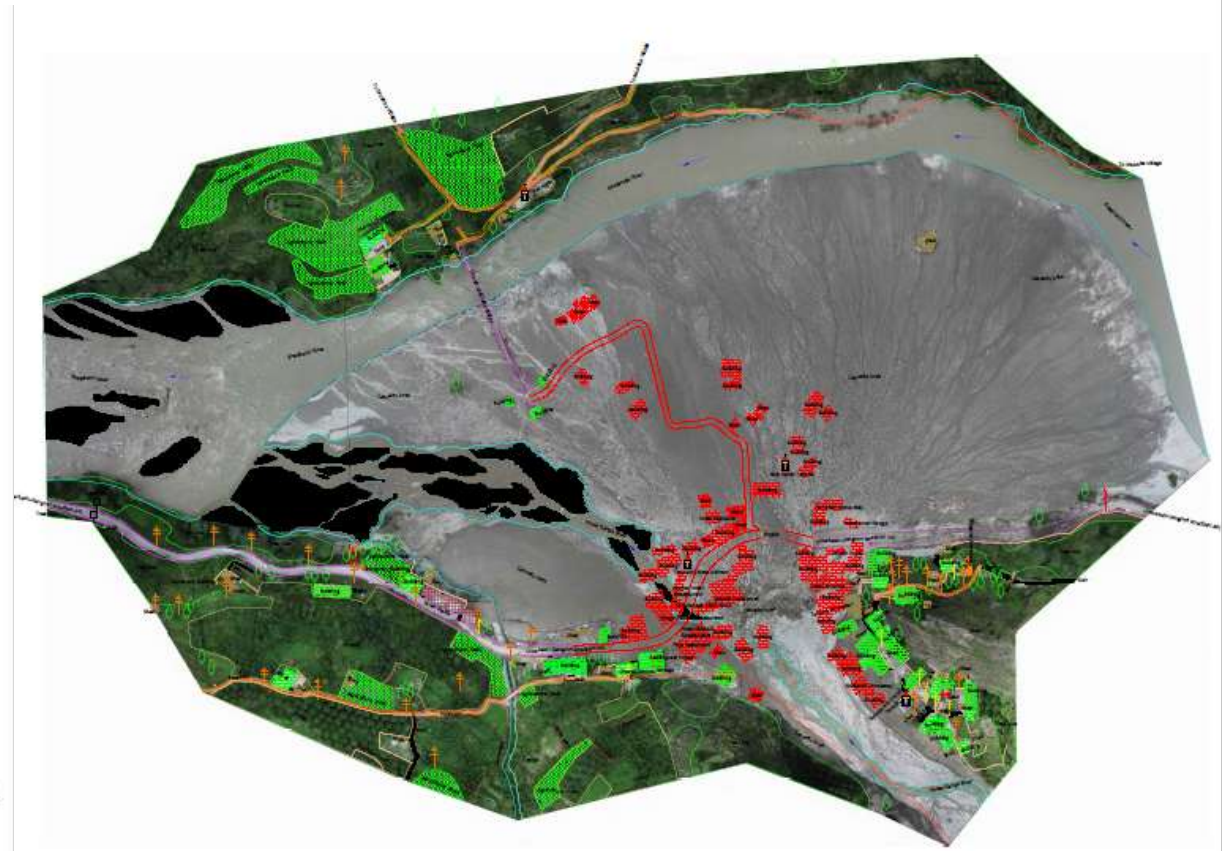
LiDAR derived DEM of the Dharali fan expanded by the deluge of 5 August 2025.

Post - Disaster Incident - Dharali



Volume of Debris Accumulated : 710429 cubic metres

Voluntarily Done By Matrix Geo Solutions LTD.



DHARALI
(DISASTER IMPACT AREA)

SCALE -

Key Plan - Area-31.191 HA

LEGEND

1	Ash	[Red Box]
2	Agriculture Field	[Green Box]
3	Boundary Wall	[Black Line]
4	Bridge	[Orange Line]
5	Building	[Red Box]
6	Culvert	[Blue Line]
7	Disaster Impact Area	[Grey Area]
8	Drain	[Blue Line]
9	Electric Line	[Yellow Line]
10	Electric Pole	[Yellow Circle]
11	Flow Direction	[Blue Arrow]
12	Highway	[Orange Line]
13	Gate	[Black Line]
14	Gate	[Black Line]
15	Light Pole	[Yellow Circle]
16	Canal	[Blue Line]
17	Canal	[Blue Line]
18	Canal	[Blue Line]
19	Canal	[Blue Line]
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21	Canal	[Blue Line]
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49	Canal	[Blue Line]
50	Canal	[Blue Line]

Matrixgeo
A Geospatial Technology & Service Company

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Dharali – Climate Change Indications

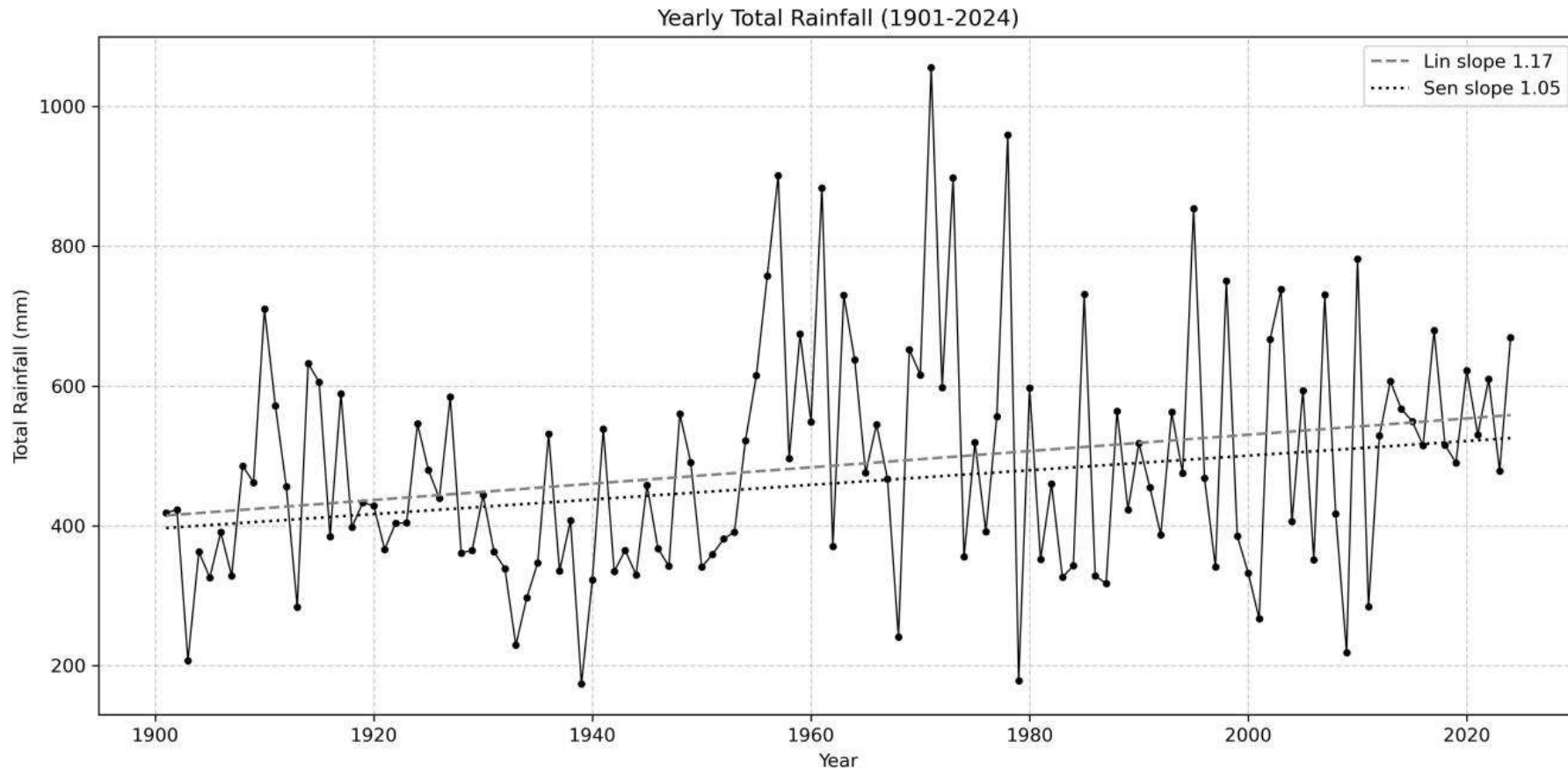
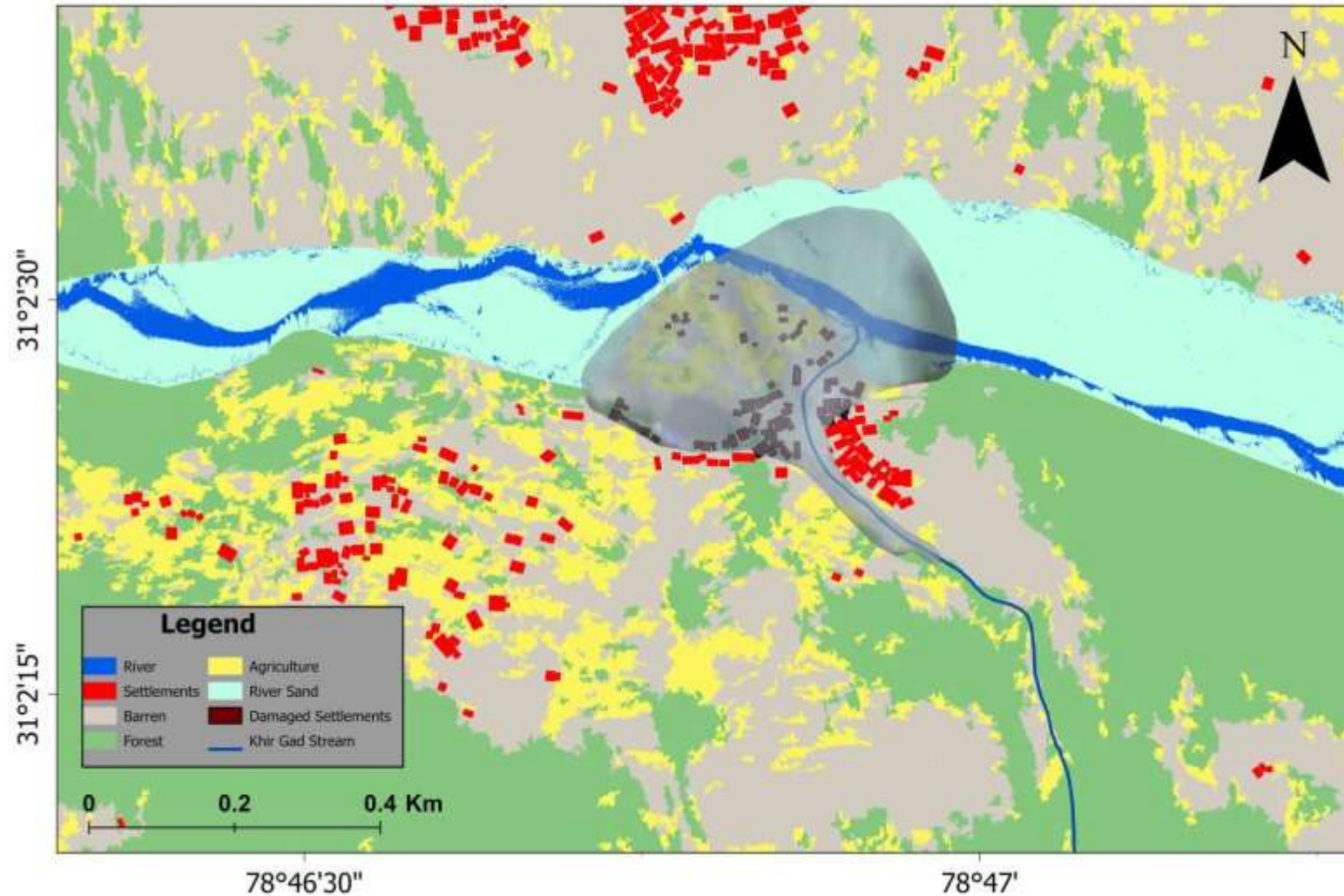


Figure: Rainfall data of 124 years presenting high intensity extremes increasing in this region

Dharali – Geospatial mapping



Dharali

- Khera Gad (Dharali), Tel Gad (Harshil), Bhela-Awana Gad (Sukki)
- Climate induced, hydro-meteorological phenomenon
- Induced with high intensity rainfall causing land slide and cascading on the way
- Scouring in the valley
- Pooling of water upstream of Harshil is caused by the material brought down by debris flow



Way Forward - Suggestions



- Preparation
 - Training
 - Map Venerable areas
- Technology Adoption
 - On Service >> Technology transfer mode
- Real time and Near Realtime Decision support system with Drone and GIS data
- Unmapped Venerable area
 - (old available maps are in 1:50K /1:25K)
 - Gaps in land use planning
 - Sparse Continuous observation
 - Gaps in understanding complex cascading process
 - Gaps in data sharing



MAKING **GEOSPATIAL TECHNOLOGY** WORK FOR **PEOPLE**



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