



***Excel Geomatics***

*Delivering Solutions to the World*

# SaaS Platform for Mining Surveillance & Monitoring Illegal Settlements within Mining Lease



*Mr. Vineet Lohani  
India*

# Agenda

- 01 About Excel Geomatics**
- 02 SaaS Platform for Mining Surveillance**
- 03 SaaS Platform for Monitoring Illegal Settlements**



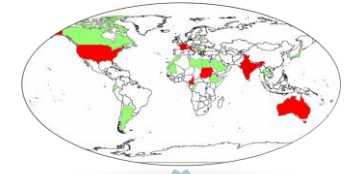
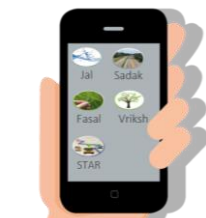
# About Excel Geomatics



**Web GIS Developed**

- *Excel Geomatics is a Geospatial Data Creation, Data Modelling and Web Based GIS & IT Solution Provider, based out of India*
- *We are ISO 9001:2015 (QMS) ; ISO 27001:2013 (ISMS) and CMMi-L3 (SI and ITE Services) certified company*
- *In last 12 years we have been able to win >400 projects*
- *More than 80% of our business is repeat business*

**Mobile Apps Developed**



**Global Coverage**



**In-House Drone**



**IoT**



**Training & Capacity Building**



- Remote Sensing Services
- GIS Services & Geo-Development database
- Drone /Aerial Mapping
- Mobile App Develop. & Location Based Services
- Surveying
- LIDAR & Photogrammetry Services
- Web GIS Development
- R&D Cell & Training Centre
- AI Module Development /Deep Learning
- Big Data Analytics, Cloud GIS & IoT Based Services
- Strategic Planner & Risk Analysis & Mapping

# Excel Geomatics in Different Sectors and Opportunities Beyond Boundaries

## Service Domains



## Client and Partner Countries



## Reseller of Satellite Images



# Problem Statement

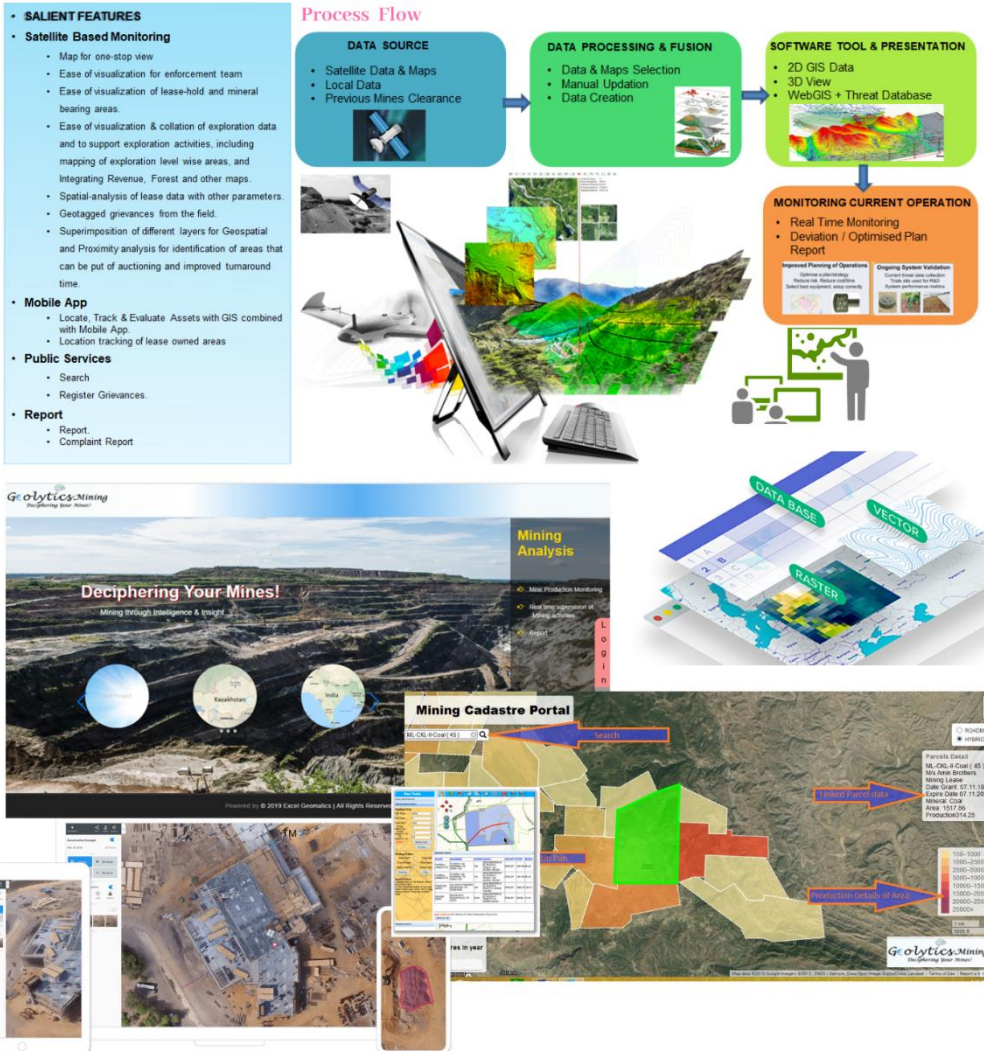
- Mining is a major source of revenue for the Government
- However, the government loses lots of revenue due to illegal mining
- Due to scarcity of staffs, security threat and also due to remote location of mines in most of the cases, it is not possible for the Mining department to do regular monitoring of illegal mines in the state
- Sometimes, illegal miners mine within the forest area, away from the eyes of the administration
- There are some cases, where miners start mining beyond their leased boundary. But due to lack of any physical marking on the ground, it is not possible to realize that the mining has been extended beyond the leased boundary
- Some miners go on excavating for minerals, well beyond their prescribed depth or go below the allowable mining depth





# Proposed Solution

## WEB BASED PLATFORM FOR MINING

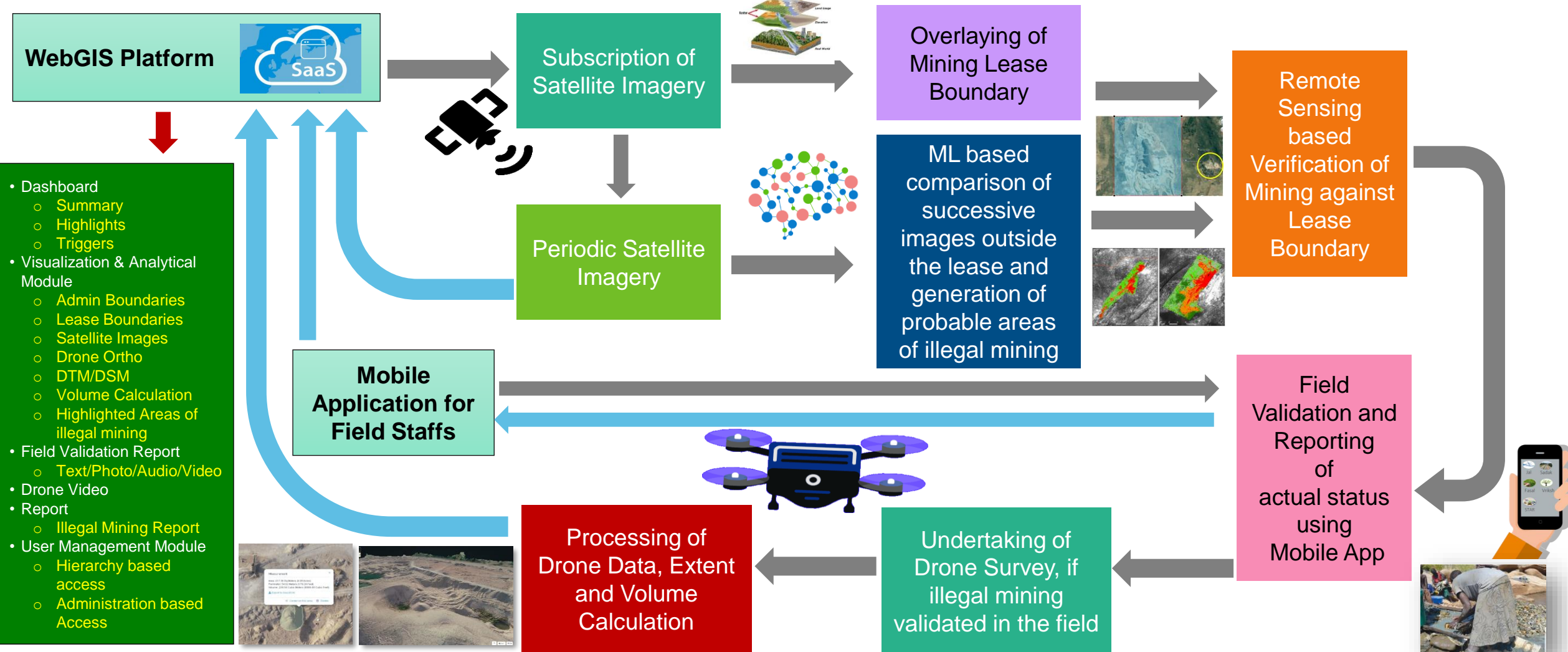


# Satellite, Mobile App and Drone Integrated Platform for Mining



# Process Flow

In order to curb and report illegal **Settlements, structures & mining** and also to optimize the processing time and cost, the following process flow has been envisaged:



### MINING THROUGH INTELLIGENCE AND INSIGHT

#### Mining Database Management Module

- Leased Boundary Upload
- Spatial and non-spatial data Upload
- Database Query

#### Data Visualization Module

- 2D Visualization Module
  - Drone Flying Path
  - Drone Ortho-photo
  - Digital Surface Model of the Mining Site
  - Digital Terrain Model of the Mining Site
  - Other Raster Layers
  - Other Vector Layers
- 3D Visualization Module
  - DSM and DTM Visualization in 3D
  - Vector Layer Visualization in 3D
  - Draping of Drone Ortho-photo on DSM or DTM for 3D visualization

#### Field Survey Integration Module

- Mobile App for Field Photograph & Data Collection

#### Periodic Monitoring

- Satellite Based Periodic Monitoring
- Monitoring of Illegal Settlements, structure & Mines
- Monitoring of Environmental Compliances
- Monitoring of Rehabilitation

#### Operation & Management Module (Optional)

- Haul Road Planning
- Water and Sediment Flow Planning
- Assessment before and after Drilling or Blasting
- Hazard Identification and Mitigation

#### Map Print Module

- Module for Printing of Various Maps

#### Reporting Module

- Module for Generating Various Reports



# SaaS Platform for Mining Surveillance

(cloud-based software delivery mode)



## MINING SURVEILLANCE SYSTEM

Login

[Home](#) [Contact Us](#) [Citizen Dashboard](#)



### GEOLOGY AND MINING DEPARTMENT

The Department Of Geology And Mining J&K Stands Established In 1960 With The Objective To Explore The Mineral Wealth And Groundwater Resources A Hidden Treasure Of The State, By Geological Explorations.

Since Then It Has Been Able To Identify And Establish Various Important Mineral Deposits Like Limestone, Gypsum, Bauxite, Magnesite, Dolomite, Quartzite, Borax, Fuel Minerals Like Coal, Lignite, Decorative/building Stones Like Granite, Marble, Slate, Bauxite, China Clay, Bentonite And Gemstone Like Sapphire, Garnet, Tourmaline Etc.

Geo-hydrological Survey And Groundwater Inventory Is Being Carried Out To Explore Groundwater Potential And Its Subsequent Development On Requisition Basis As Well As Departmental Exploration Programme.

Geotechnical Studies Of Engineering Assignments/ Projects Besides, Administration Of Minerals Under M&M (D & R) Act 1957 And The Rules Made There-under Are Also Its Domain. The Department Of Geology And Mining Has Played A Significant Role In Overall Economical Development Of The State By Proving Various Mineral Deposits, Which Enabled The State Government In Granting Of Many Mining Leases/Prospecting Licenses For The Establishment Of Mineral Based Industries And Generation Of Employment In J&K State.



## LOGIN

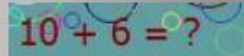
**Username \***

At least 3 character

**Password \***

Use upper and lowercase letters as well

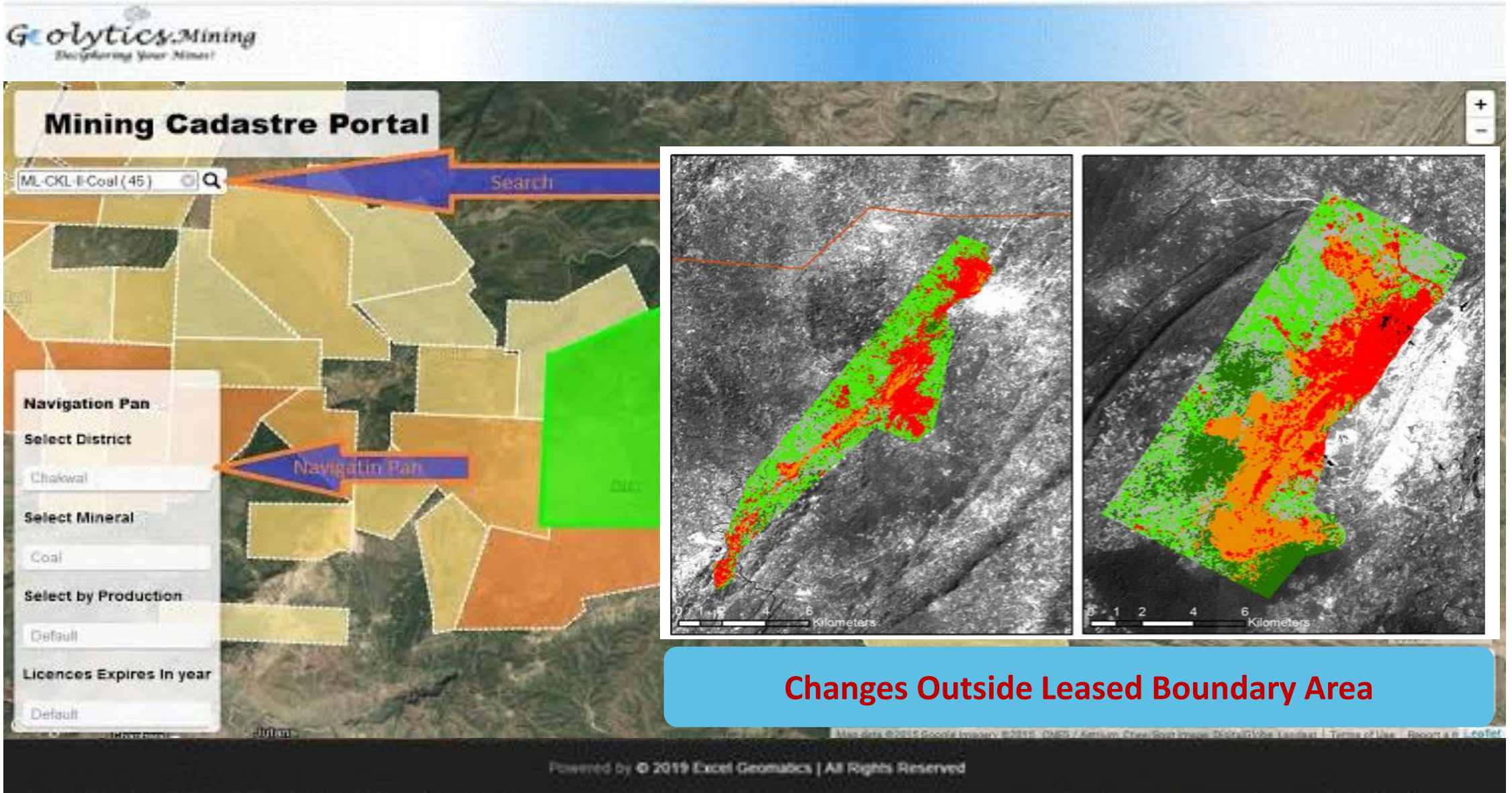
How much is the sum



$10 + 6 = ?$

Login





**Geolytics Mining**  
Empowering Your Mines!

## Mining Cadastre Portal

ML-CKL-E-Coal (45) Search

**Navigation Pan**

Select District  
Chakwal

Select Mineral  
Coal

Select by Production  
Default

Licences Expires In year  
Default

Changes Outside Leased Boundary Area

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## MINING SURVEILLANCE SYSTEM

DIRECTOR

- Dashboard
- Monitoring
- Mining Lease Data
- Weather Monitoring
- User Management
- Report
- Change Detection

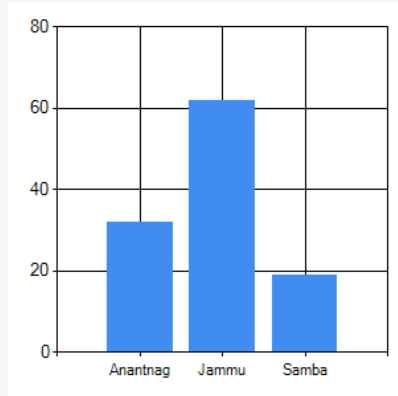
**Leased Mines**  
Total Count: 341  
Mining Area,  
Jammu & Kashmir

**Trigger Information**  
No of Triggers: 296  
No of field Verified trigger: 28

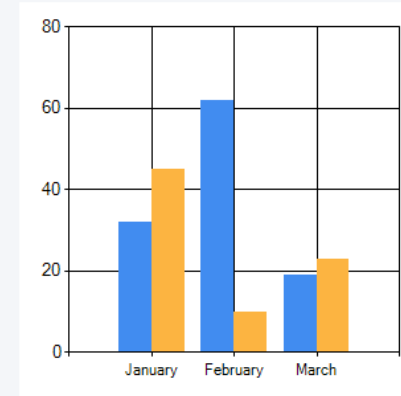
**Field Verification**  
No. of Unauthorized Mining Cases: 38  
No. of Minor Mineral Mining Cases: 15  
No. of 'Any Other' Cases: 38  
No. of Other Than Mining Activity Cases: 15

**Citizen Complaints**  
No. of Complaints : 100  
No. of Complaints forwarded to District : 30  
No. of Complaints Verified by District: 20

**LEASED MINES (2020-2021)**

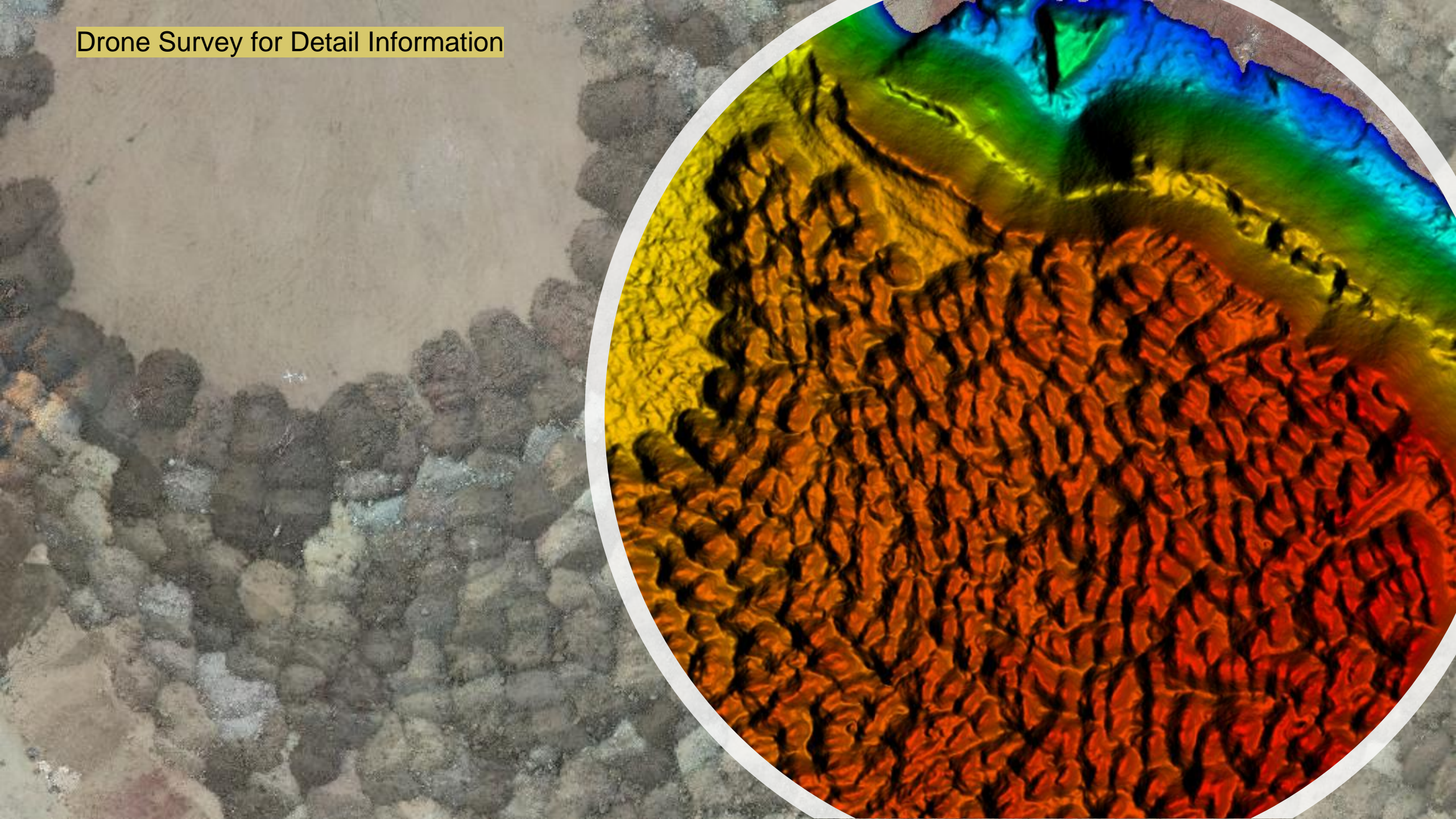


**TRIGGER INFORMATION (2020-2021)**



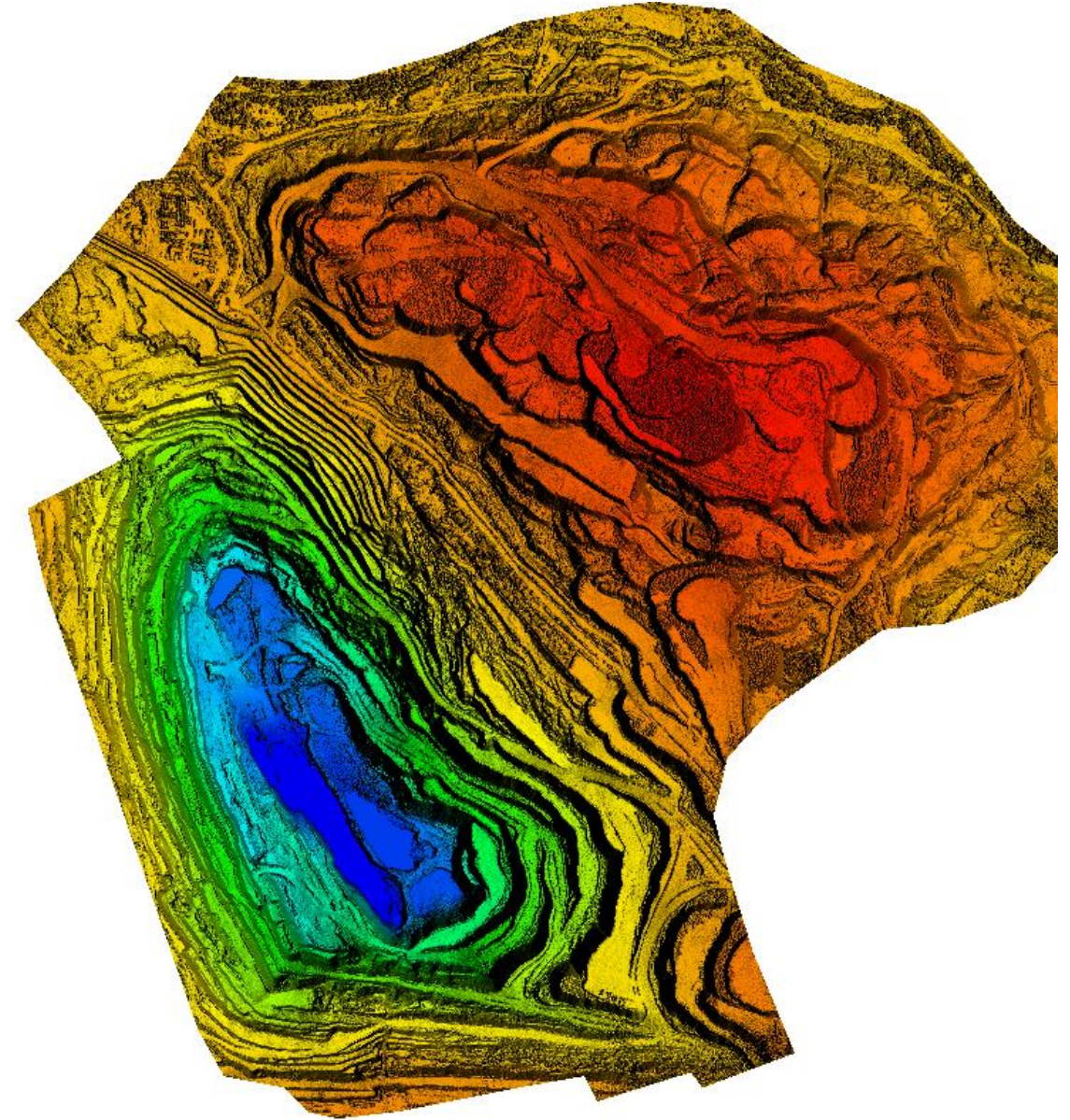
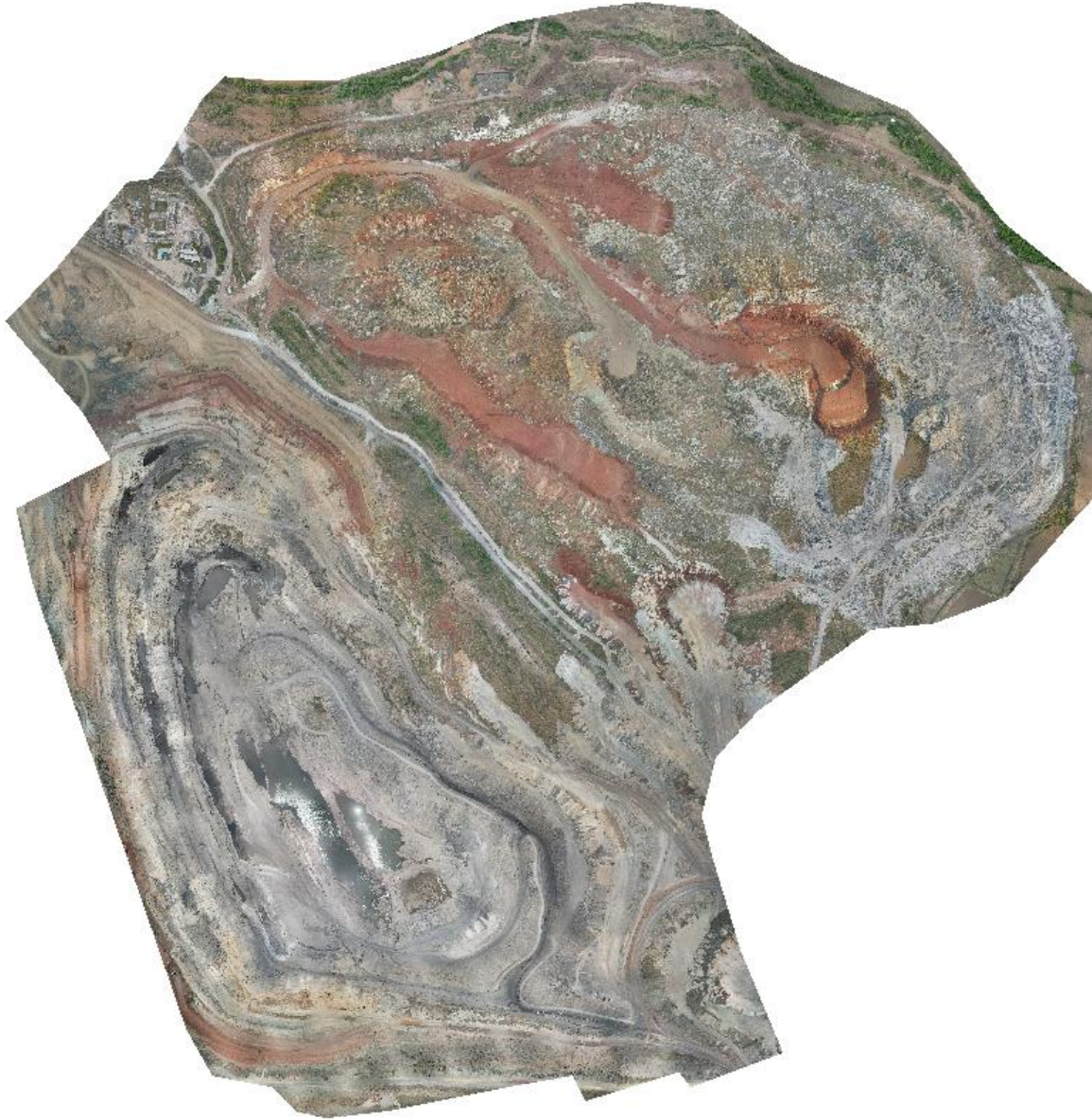


Drone Survey for Detail Information





# Volumetric Analysis





# Problem Statement

- **Within the Lease Boundary.**
- **Beyond the Lease Boundary.**



# SaaS Platform for Monitoring Illegal Settlements

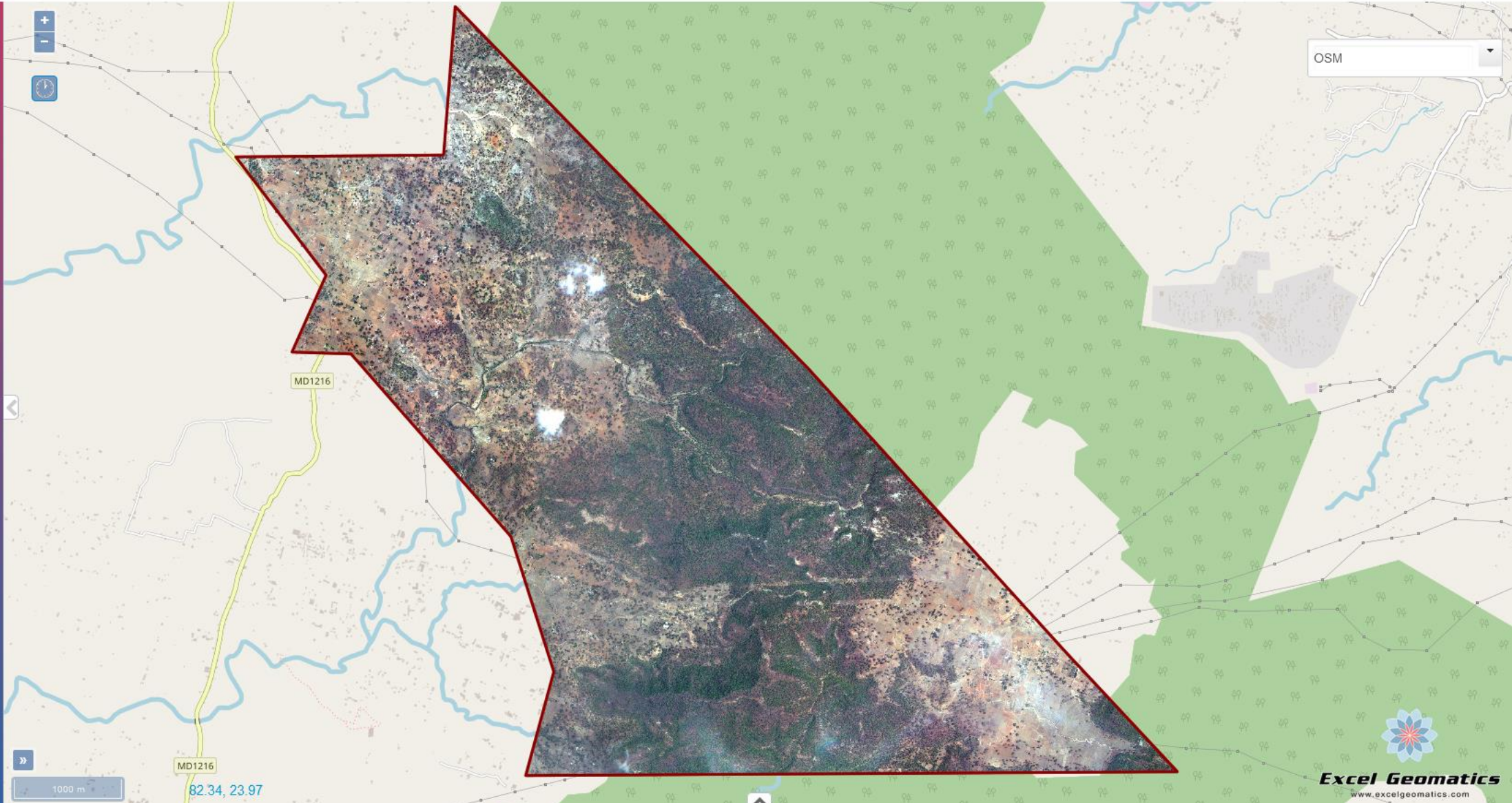
(cloud-based software delivery mode)



# Change Detection Stage

## WebGIS Solution For Change Monitoring

- ▶ Baseline
- ▼ Change
  - Oct 2021
  - Nov 2021
  - Dec 2021
  - Jan 2022
  - Feb 2022
  - Mar 2022
  - Apr 2022
  - May 2022
  - Jun 2022
  - Jul 2022
- ▼ Satellite Image
  - Satellite Image
- ▶ Bookmarks
- ▶ Measurement
- ▶ Swipe
- ▶ Print



OSM



## WebGIS Solution For Change Monitoring

▼ Baseline

- Locations
- Apr 2021
- GRID
- AOI
- Village

▼ Change

- Oct 2021
- Nov 2021
- Dec 2021
- Jan 2022
- Feb 2022
- Mar 2022
- Apr 2022
- May 2022





## WebGIS Solution For Change Monitoring

▼ Baseline

- Locations
- Apr 2021
- GRID
- AOI
- Village

▼ Change

- Oct 2021
- Nov 2021
- Dec 2021
- Jan 2022
- Feb 2022
- Mar 2022
- Apr 2022
- May 2022





## WebGIS Solution For Change Monitoring

**Baseline**

- Locations
- Apr 2021
- GRID
- AOI
- Village

**Change**

- Oct 2021
- Nov 2021
- Dec 2021
- Jan 2022
- Feb 2022
- Mar 2022
- Apr 2022
- May 2022





## WebGIS Solution For Change Monitoring

**Baseline**

- Locations
- Apr 2021
- GRID
- AOI
- Village

**Change**

- Oct 2021
- Nov 2021
- Dec 2021
- Jan 2022
- Feb 2022
- Mar 2022
- Apr 2022
- May 2022





# Change Detection Stage

## WebGIS Solution For Change Monitoring

- Jul 2022
- Aug 2022
  - New Building
  - Demolish Building
- Nov 2022
- Dec 2022
- Feb 2023
- Mar 2023
- Apr 2023
- May 2023
- Jun 2023
- Jul 2023
  - New Building
  - Demolish Building
- Aug 2023
  - New Building
  - Demolish Building







## WebGIS Solution For Change Monitoring

- Locations
  - Apr 2021
  - Dhirauli Grid
  - Dhirauli AOI
  - Dhirauli Village
- Change
- Satellite Image
- Bookmarks
- Measurement
- Swipe
  - First Date:
  - Second Date:
  - Swipe Reset
- Print

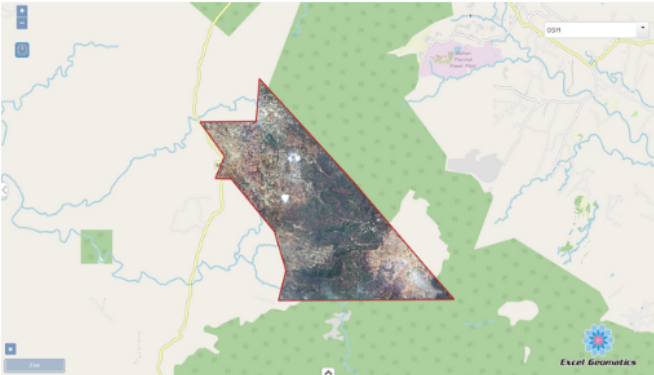


## WebGIS Solution For Change Monitoring



- Dashboard
- Map
- Report
- Manage User
- Upload Report

Select Month Jul-22



**Base Line Summary**

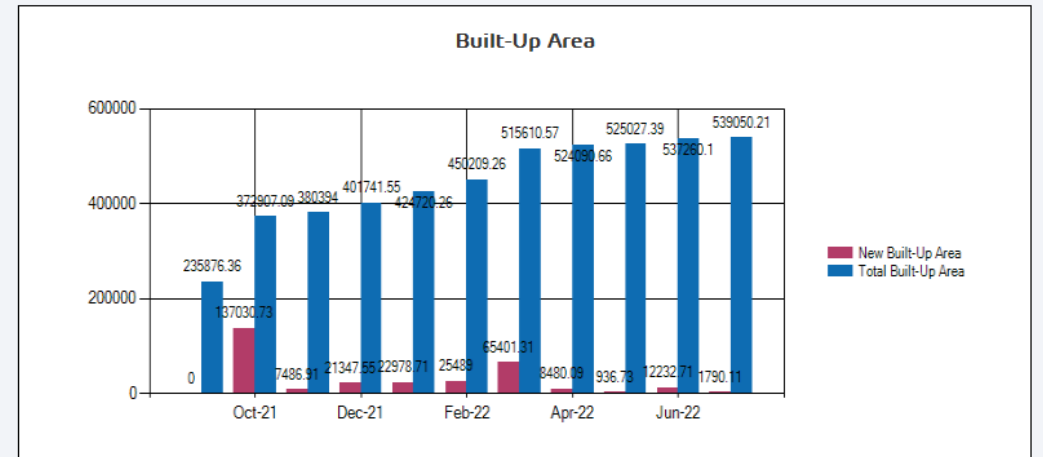
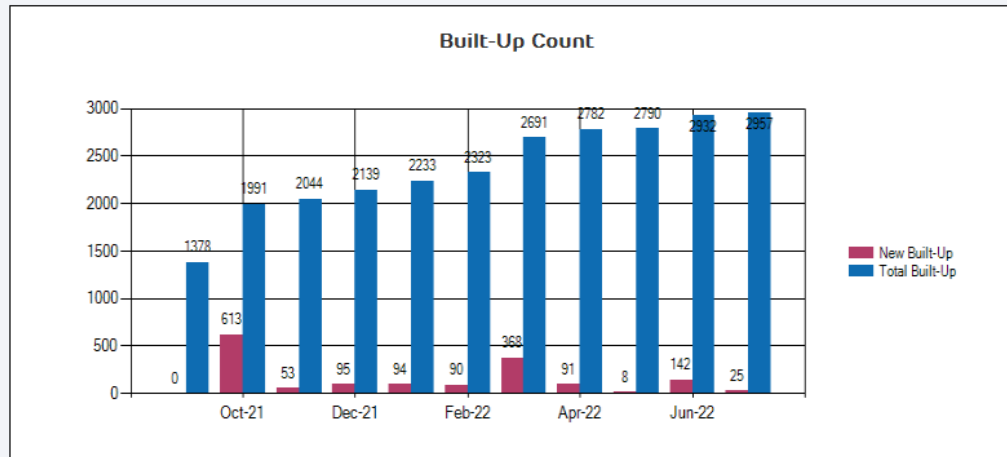
(Apr-21)

New Built-Up	0
Total Built-Up	1378
New Built-Up Area Sqm (Approx.)	0
Total Built-Up Area Sqm (Approx.)	235876.36

**Monthly Summary**

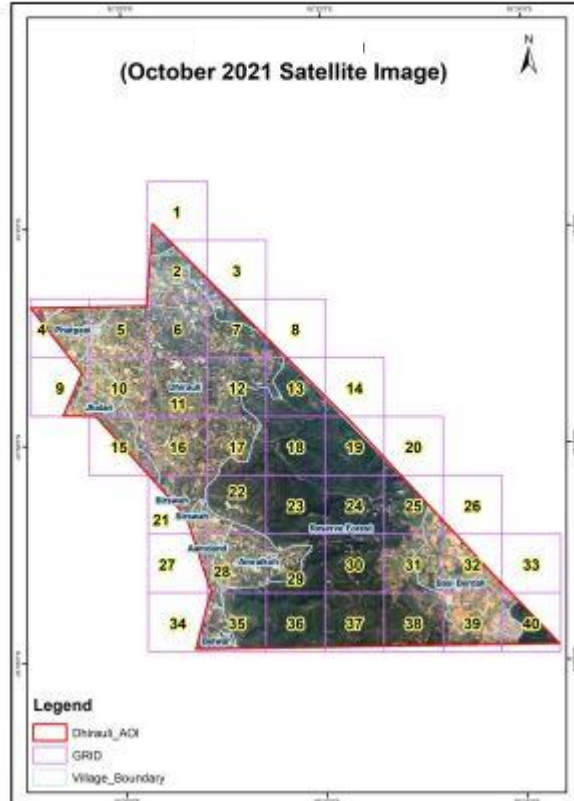
(Jul-22)

New Built-Up	25
Total Built-Up	2957
New Built-Up Area Sqm (Approx.)	1790.11
Total Built-Up Area Sqm (Approx.)	539050.21





## Index Map for Baseline Report



## Statistical Report: Baseline Survey -

- Summary of Built-Up Count:

Built-Up Status (Count)-October 2021								
SN	Session	Previous Built-Up	New Built-Up	Demolished Built-Up	Total Built-Up	Previous Built-Up Area Sqm (Approx)	New Built-Up Area Sqm (Approx)	Total Built-Up Area Sqm (Approx)
1	October 2021	1378	613	NA	1991	235876.36	137030.73	372907.09

- Village Wise details (Built-up Count)

Village Wise Built-Up Status: October 2021								
S N	Village	Previous Built-Up	New Built-Up	Demolished Built-Up	Total Built-Up	Previous Built-Up Area Sqm	New Built-Up Area Sqm	Total Built-Up Area Sqm
1	Basi Berdah	131	145	NA	276	29218.85	31659.14	60877.99
2	Belwar	36	45	NA	81	10659.39	11004.24	21663.63
3	Dhruvi	690	196	NA	886	107644.2	44661.56	152305.76
4	Jhalari	71	5	NA	76	14547.35	669.12	15216.47
5	Phatpani	132	50	NA	182	18542.01	11892.79	30434.8
6	Sirsawah	3	4	NA	7	381.02	1032.16	1413.18
7	Reserve Forest	76	13	NA	89	7165.21	1879.09	9044.3
9	Amraikoh	183	137	NA	320	38141.54	30230.94	68372.48
8	Aamdand	56	18	NA	74	9576.79	4001.69	13578.48
<b>Total</b>		<b>1378</b>	<b>613</b>		<b>1991</b>	<b>235876.36</b>	<b>137030.73</b>	<b>372907.09</b>

- Grid Wise details (Built-up Count)

Grid Wise Built-Up Status: October 2021							
GRID ID	Previous Built-Up	New Built-Up	Demolished Built-Up	Total Built-Up	Previous Built-Up Area Sqm	New Built-Up Area Sqm	Total Built-Up Area Sqm
1	1	1	NA	2	47.27	567.27	614.54
2	68	9	NA	77	6867.59	1726.25	8593.84

### Grid Wise Built-Up Status: October 2021

GRID ID	Previous Built-Up	New Built-Up	Demolished Built-Up	Total Built-Up	Previous Built-Up Area Sqm	New Built-Up Area Sqm	Total Built-Up Area Sqm
3	0	0	NA	0	0	0	0
4	106	46	NA	152	15479.27	11157.49	26636.76
5	148	20	NA	168	25319.37	9264.14	34583.51
6	91	20	NA	111	15422.25	6163.64	21585.89
7	41	5	NA	46	4755.81	1814.67	6570.48
8	0	0	NA	0	0	0	0
9	24	1	NA	25	3826.05	201.22	4027.27
10	151	27	NA	178	23443.17	5920.79	29363.96
11	61	44	NA	105	14298.31	9515.37	23813.68
12	56	18	NA	74	8692.48	3005.11	11697.59
13	0	1	NA	1	0	198.54	198.54
14	0	0	NA	0	0	0	0
15	14	1	NA	15	3887.42	14.43	3901.85
16	75	32	NA	107	10891.84	4067.83	14959.67
17	60	31	NA	91	8041.52	4481.55	12523.07
18	0	0	NA	0	0	0	0
19	0	0	NA	0	0	0	0
20	0	0	NA	0	0	0	0
21	20	7	NA	27	2941.37	1274.32	4215.69
22	8	3	NA	11	911.55	987.03	1898.58
23	0	0	NA	0	0	0	0
24	0	0	NA	0	0	0	0
25	7	0	NA	7	514.21	0	514.21
26	10	0	NA	10	724.44	0	724.44
27	11	2	NA	13	2485.62	743.22	3228.84
28	161	107	NA	268	29467.42	21919.98	51387.4
29	43	42	NA	85	12408.8	10475.89	22884.69
30	3	0	NA	3	809.8	0	809.8
31	65	7	NA	72	7163.68	1518.18	8681.86
32	66	73	NA	139	14839.49	15070.66	29910.15
33	7	0	NA	7	1436.03	0	1436.03
34	2	2	NA	4	153.09	689.21	842.3
35	40	46	NA	86	11148.7	11072.56	22221.26
36	0	0	NA	0	0	0	0
37	0	0	NA	0	0	0	0
38	5	0	NA	5	227.71	0	227.71
39	34	65	NA	99	9672.1	14477.21	24149.31
40	0	3	NA	3	0	704.17	704.17
<b>Total</b>	<b>1378</b>	<b>613</b>		<b>1991</b>	<b>235876.36</b>	<b>137030.73</b>	<b>372907.09</b>



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Contact or Visit  
us for more  
information

[info@excelgeomatics.com](mailto:info@excelgeomatics.com)

[www.excelgeomatics.com](http://www.excelgeomatics.com)