TERM PAPER PRESENTATION

ON

GIS APPLICATION IN LANDSLIDE INVESTIGATION

PREPARE BY

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OUTLINE.

- Definition of landslide
- Why investigating landslide?
- Causes of landslide
- GIS and landslide
- Landslide investigation techniques
- Case studies
- Conclusion.

What is landslide?

- Landslide is a geological phenomenon which includes a wide range of ground movement such as rock falls, deep failures of slopes and shallow debris .
- It may also be referred to as any down slope movement of soil, vegetation and rock under the direct influence of gravity.

Why do we need to investigate landslide?

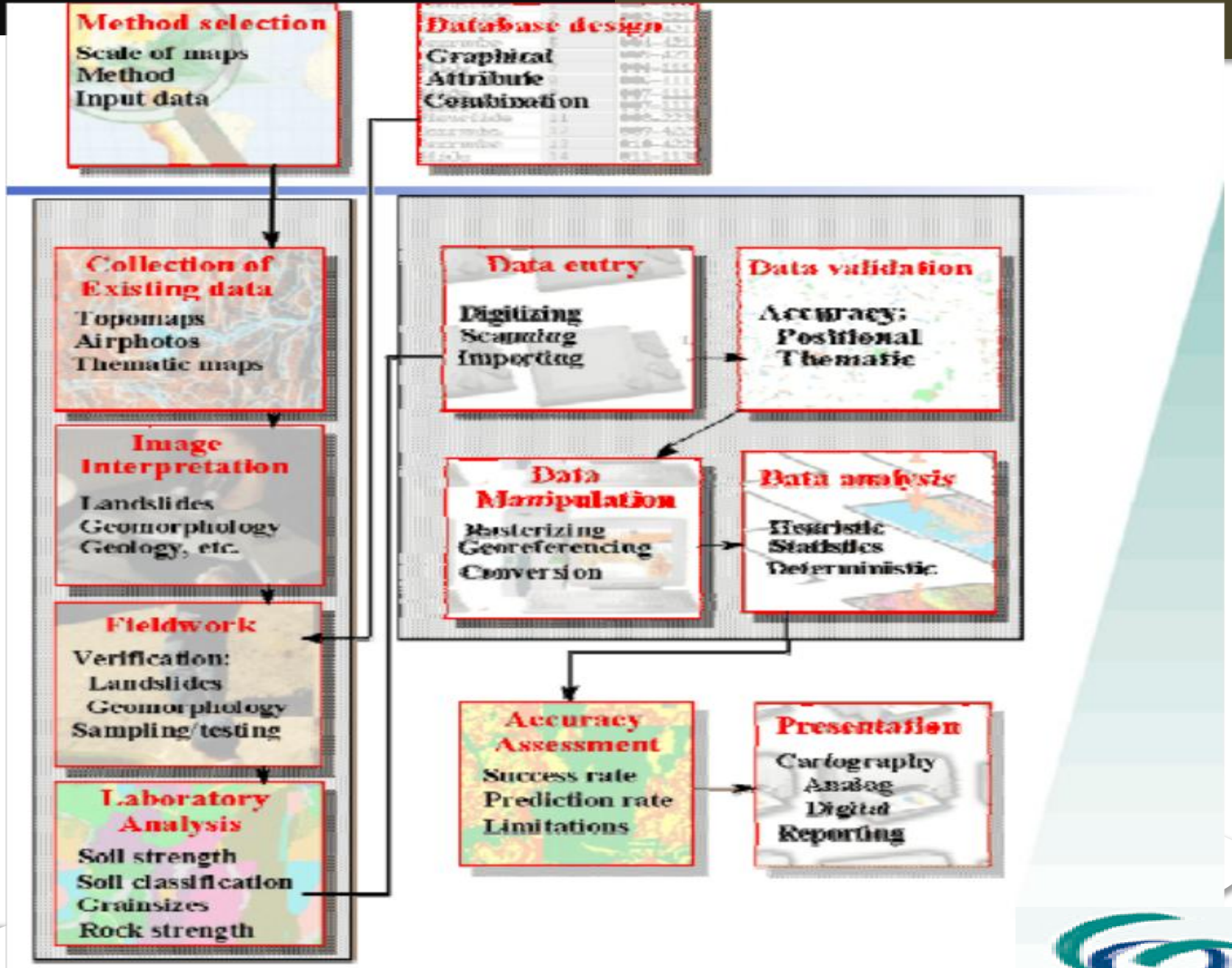
- For an environmental impact study for engineering works;
- For the disaster management of a town or city;
- For the modelling of sediment yield in a catchment ;
- For a watershed management project;
- For a community participation project in disaster management;
- For a the generation of awareness among decision makers;
- For scientific purposes.

What are the causes of landslide?

- ✓ It can be initiated by rainfall and erosion
- ✓ volcanic activity
- ✓ earthquakes
- ✓ slope saturation of water
- ✓ change in groundwater
- ✓ Deforestation
- ✓ disturbance and change of a slope by man-made construction activities

Why do we need GIS in landslide investigation?

- ✓ to analyze various generated elevation models and surface analysis which will provide useful data for monitoring and proper decision making on landslide susceptibility
- ✓ better interpretation and understanding of the failures could be derived from model in a GIS environment.

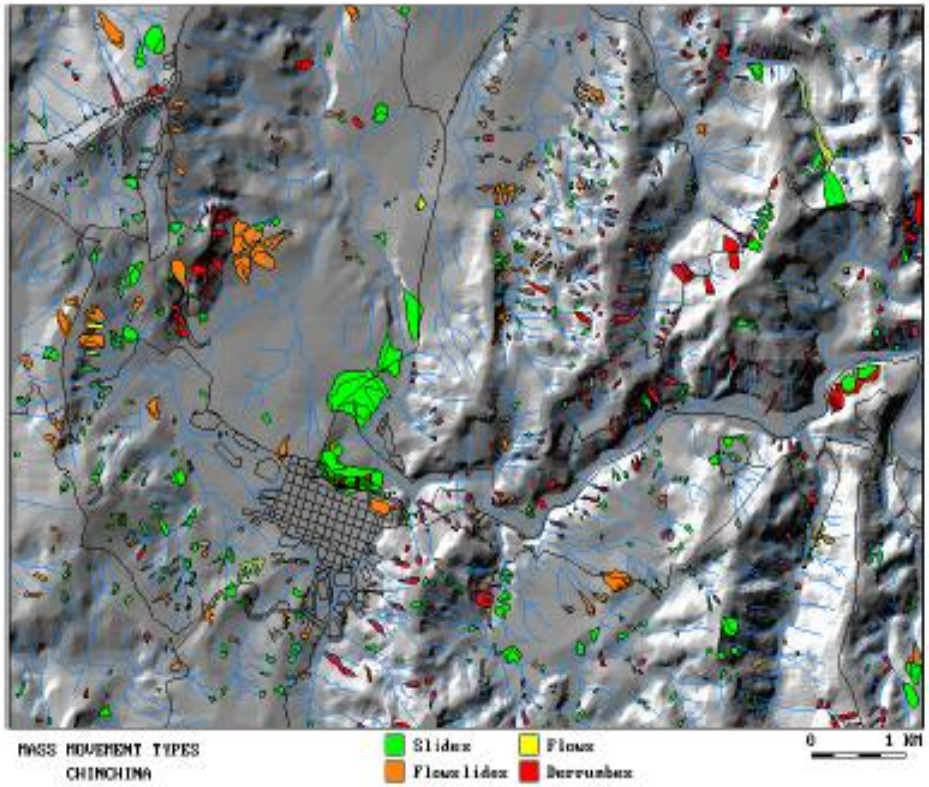

Method selection
Scale of maps
Method
Input data
Database design
Graphical
Attribute
Combination
Collection of Existing data
Topomaps
Airphotos
Thematic maps
Image Interpretation
Landslides
Geomorphology
Geology, etc.
Fieldwork
Verification:
Landslides
Geomorphology
Sampling/testing
Laboratory Analysis
Soil strength
Soil classification
Grainsizes
Rock strength
Data entry
Digitizing
Scanning
Importing
Data validation
Accuracy:
Positional
Thematic
Data Manipulation
Rasterizing
Georeferencing
Conversion
Data analysis
Heuristic
Statistics
Deterministic
Accuracy Assessment
Success rate
Prediction rate
Limitations
Presentation
Cartography
Analog
Digital
Reporting

Method selection

Scale of maps
Method
Input data

- First define the objective of the study.
- Danger exists that the data that will be collected will not be in accordance with the scale of analysis, or the method of analysis.
- This might lead to a waste of time and money if too detailed data is collected, or an oversimplification if too general data is collected.
- The following things should be considered:
  - The objective of the study
  - The scale of the study
  - The type of analysis that will be followed
  - The types of input data that will be collected.

Scales of analysis



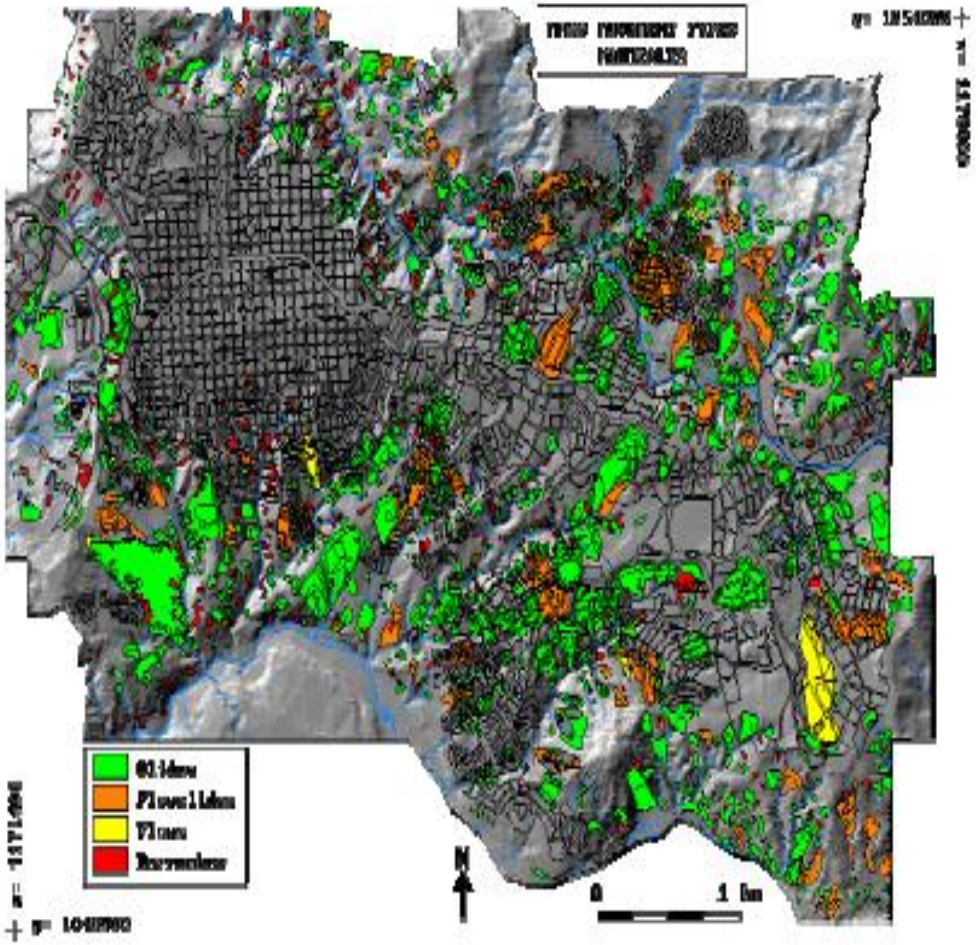
- Medium scale

  Between 1:25.000 and 1:100.000, covering a municipality or smaller catchment area.

  Intended for the detailed planning phases of projects for the construction of infrastructural works, environmental impact assessment and municipal planning.

Extracted from www.itc.nl

Scales of analysis



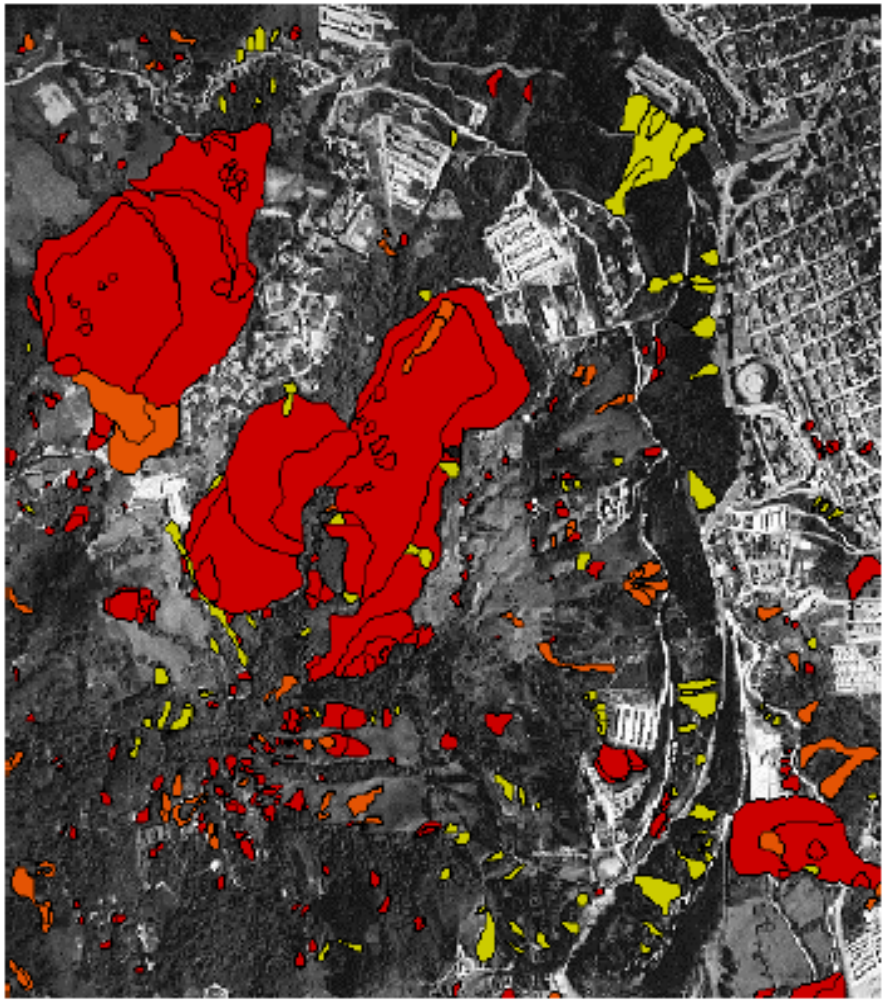
- Large scale

  Between 1:2.000 and 1:25.000, covering a town or (part of) a city.

  They are used for disaster prevention and generation of risk maps, as well as for the design phase of engineering works.

Extracted from ITC

Scales of analysis



- Site investigation scale

  Between 1:200 to 1:2.000, covering the area where engineering works will be carried out, or covering a single landslide. They are used for the detailed design of engineering works, such as roads, bridges, tunnels, dams, and for the construction of slope stabilisation works.

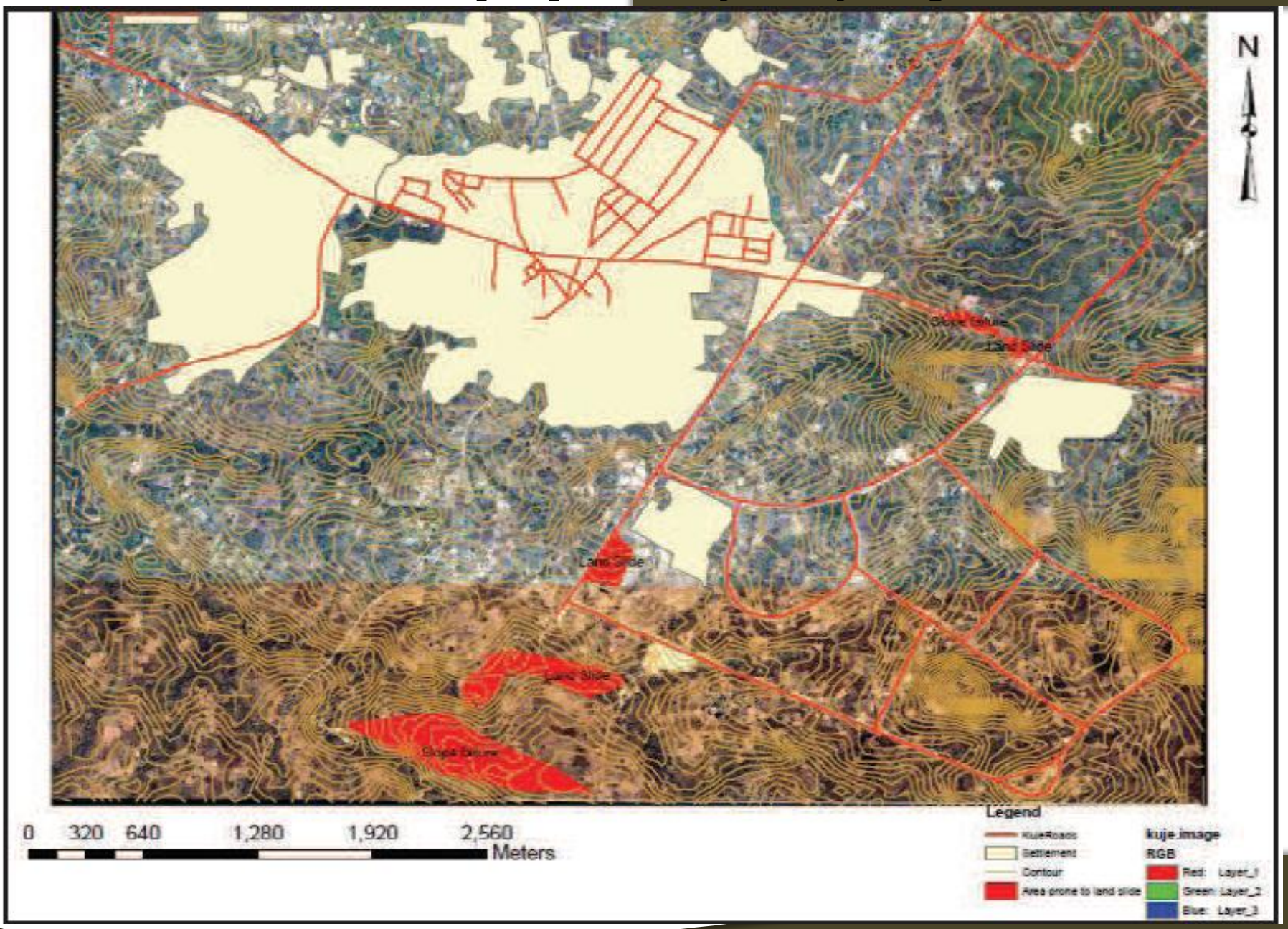
Landslide investigation case study.

Extracted from www.googleearth.com

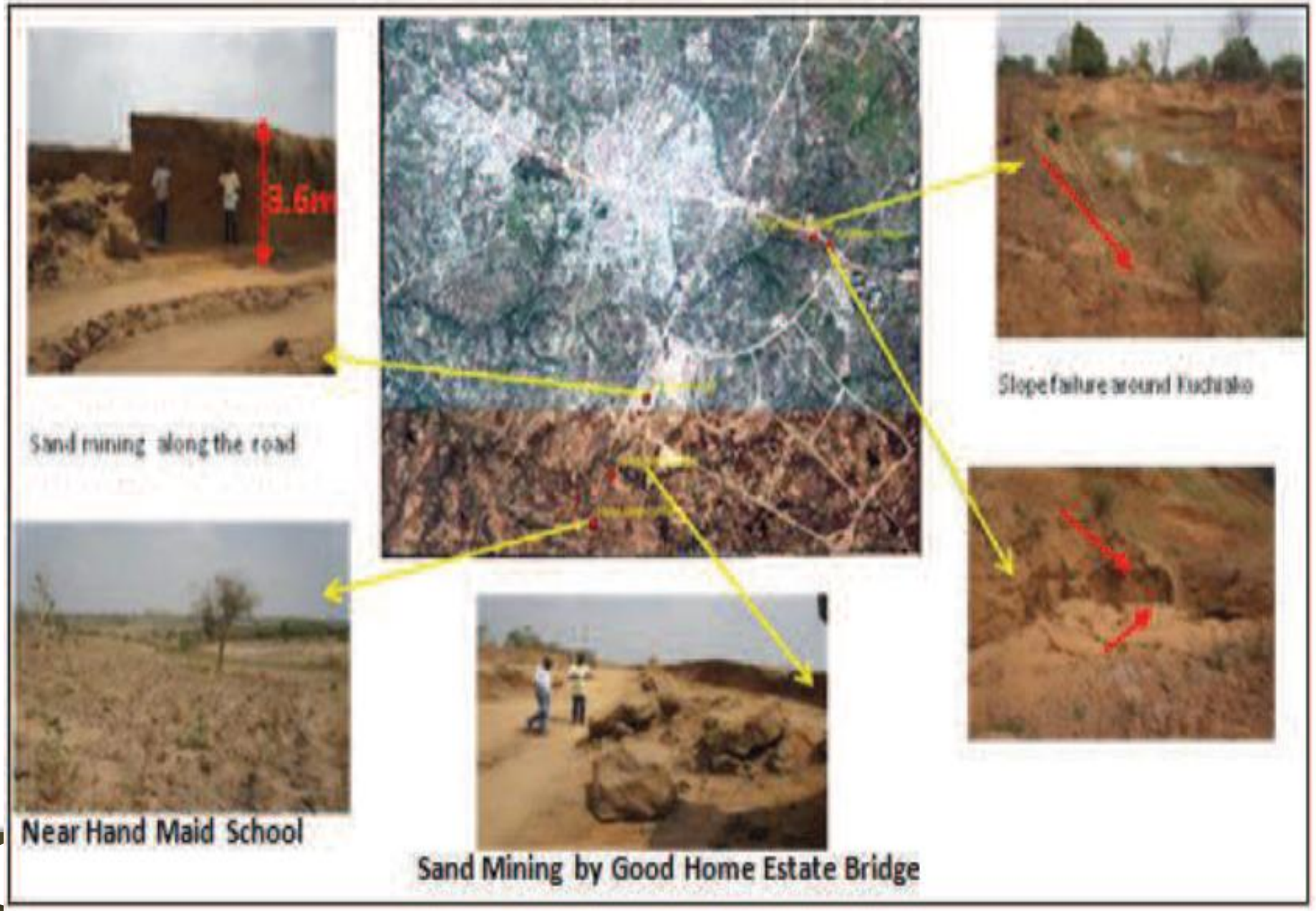
Equipment used.

- Printed copies of satellite imageries.
- Maps.
- Digital camera and GPS receiver.
- Linear tapes.

Land use and landslide map of part of Kuje, Abuja, Nigeria.



Sand mining- induced landslide scenario in part of Kuje, Abuja.



Result.

✓The areas identified as vulnerable to landslide in the study area are largely areas subjected to intensive deep surface sand mining and gullies due to erosion.

CONCLUSION.

- ✓GIS technology was used for mapping and analysis of areas vulnerable to landslide in the study area.
- ✓Statistical analysis are made easy via GIS.
- ✓Human impact seems to be responsible for landslide in the study area than the natural cause.

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THANK U.