GICHD

GIS in Mine Action

GICHD Five pillars of Mine Action

Humanitarian Demining

Mine Risk Education

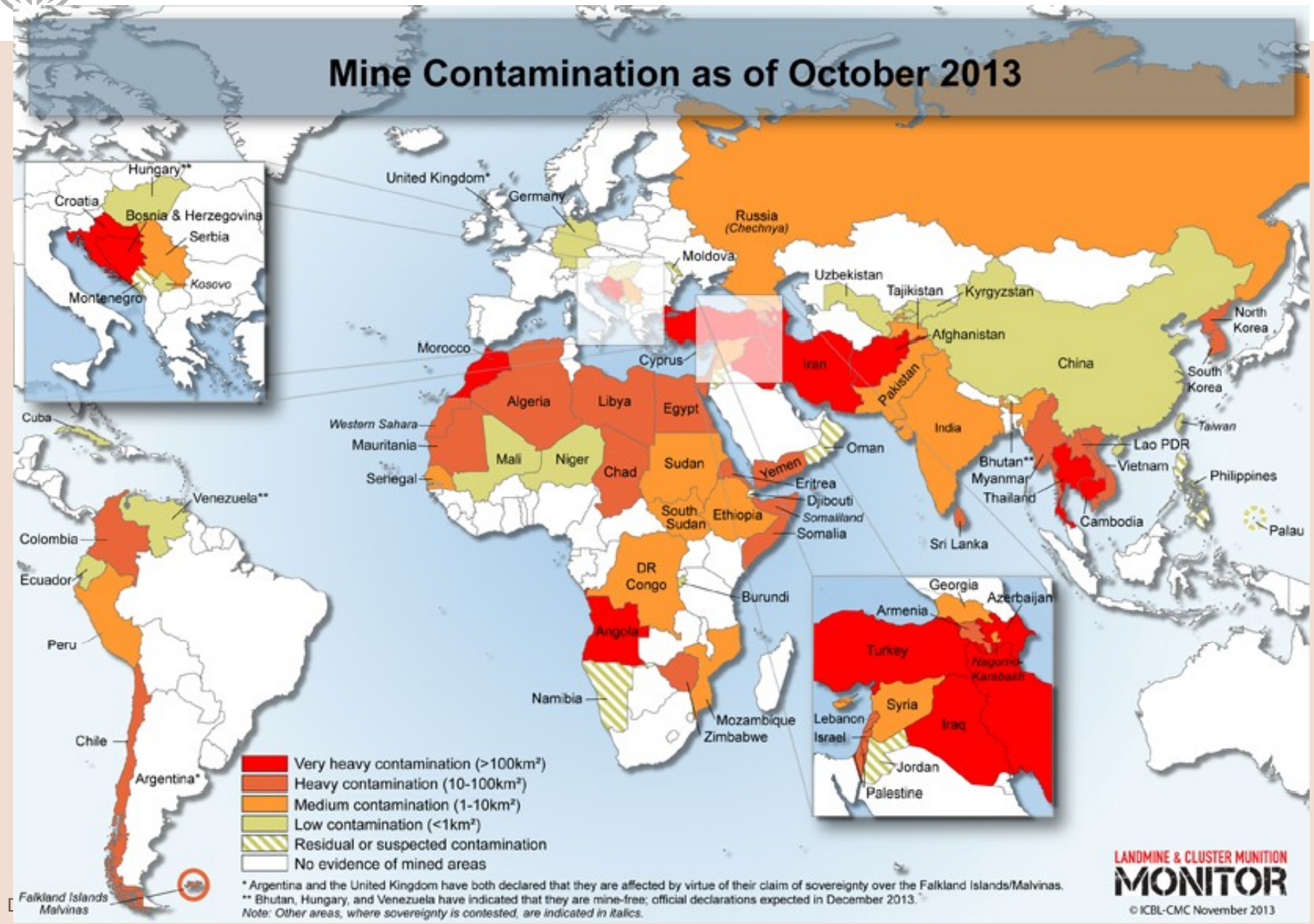
Stockpile Destruction

Advocacy

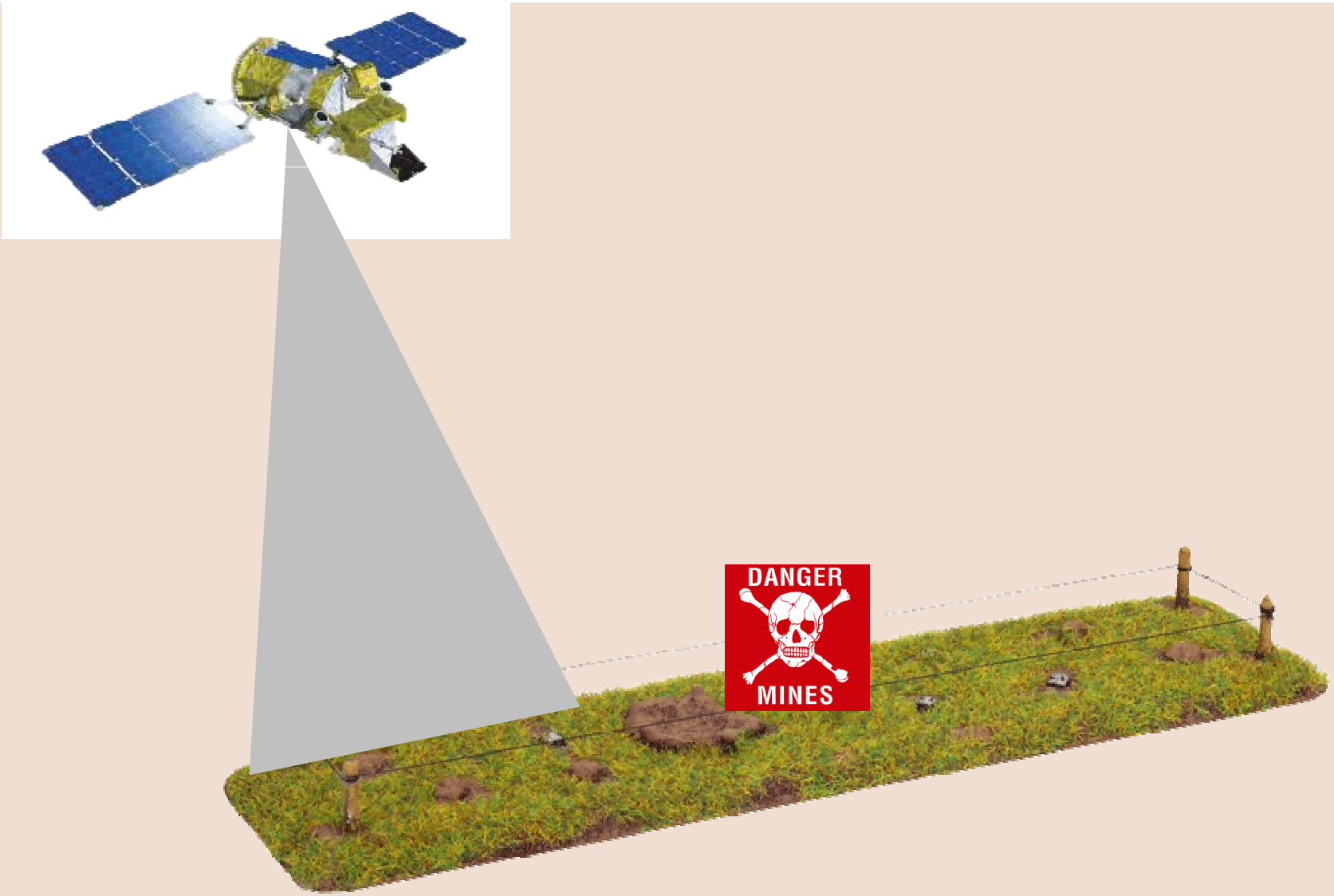
Victim Assistance

GICHD

The Global Landmine and ERW Problem

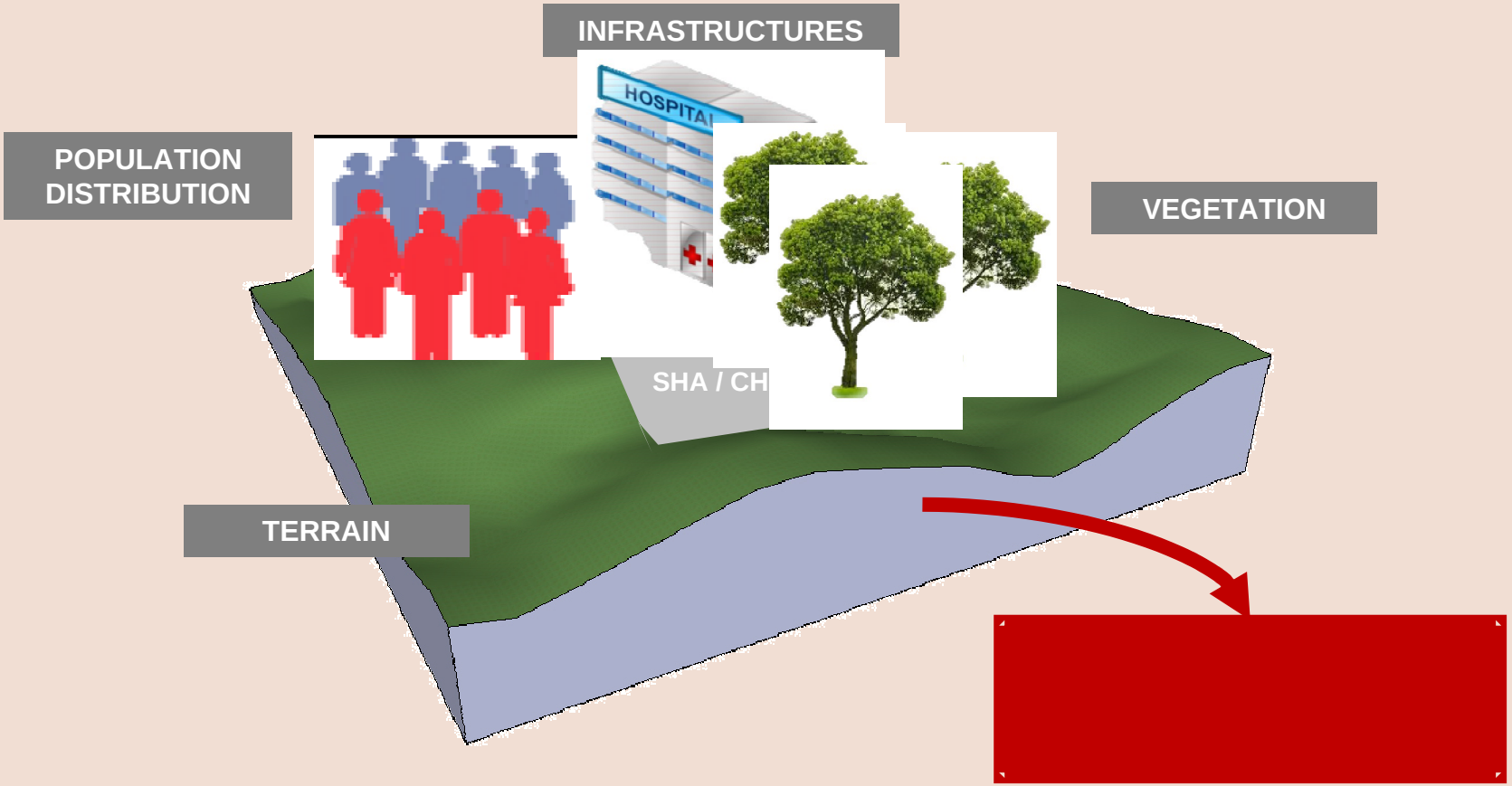


GIS and RS in Mine Action



GIS and RS in Mine Action

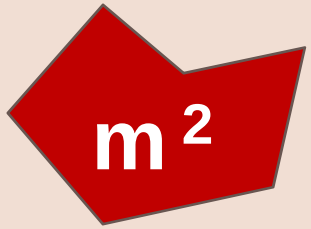
- Effective decision-making in mine action is driven by geographic factors



Applications in Mine Action

- generate intuitive maps at various scales, eg, for operators in the field and for strategic stakeholders at country level

- increase the accuracy of area size calculations



- improve prioritisation and planning of field operations

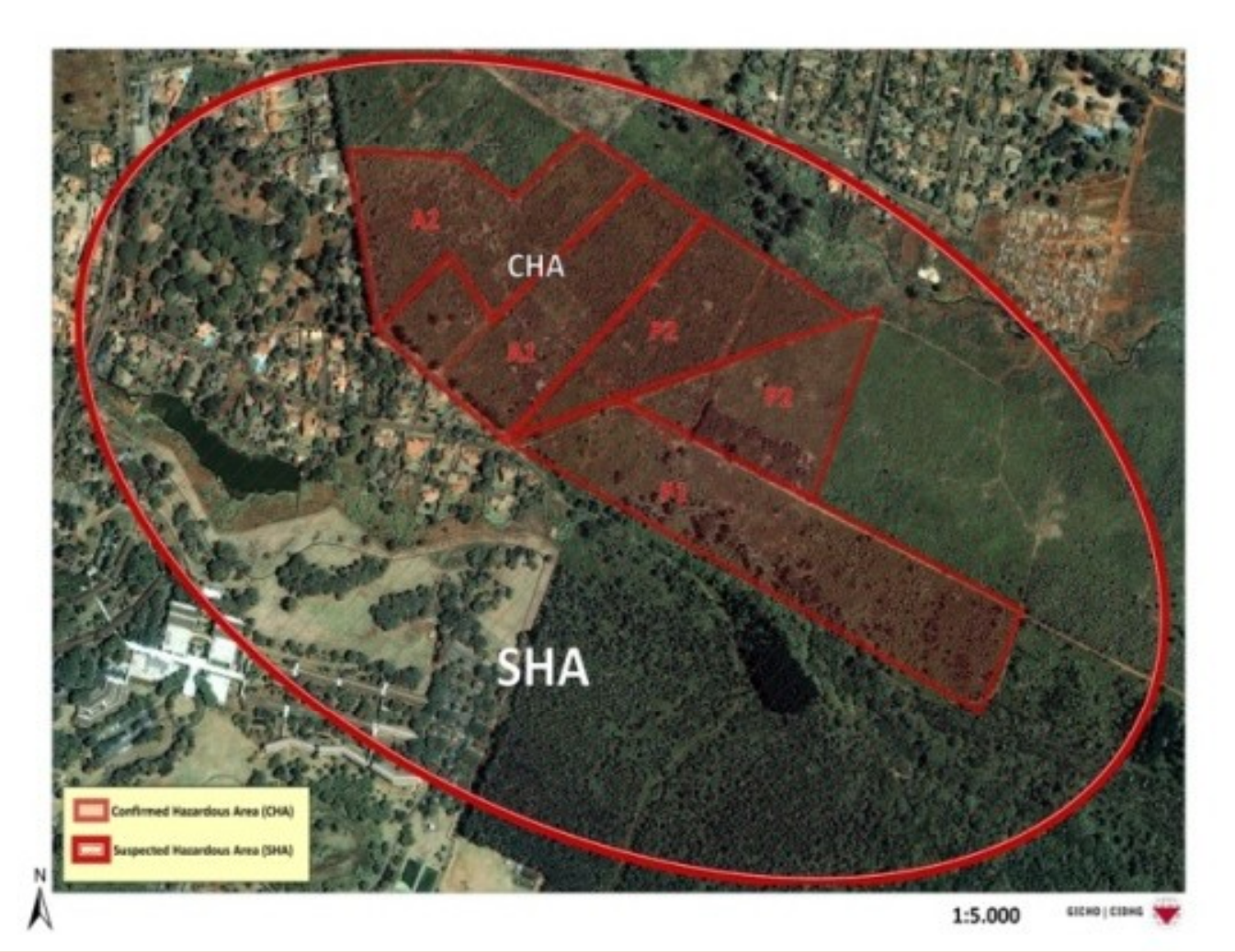
- help model the nominal operational difficulty of demining and determine which assets are suitable for a given task

Main info shown in 2D overview maps

- Geographic location of hazards, population, IDPs, infrastructures, working teams
- Historical information about hazardous areas
- Local conditions: terrain, weather, accessibility, traffic, security, logistical constraints
- Task management: number and type of assets deployed in an area

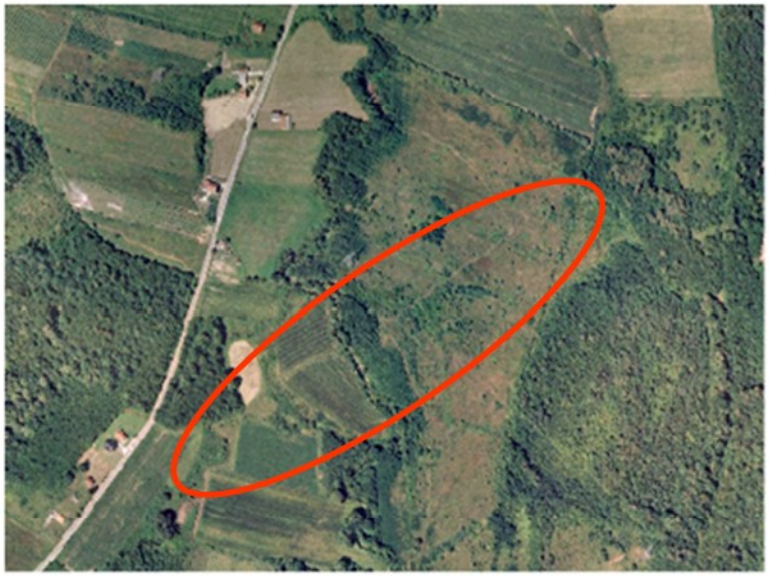
Representation of every hazardous area by a polygon delimiting its boundaries, and/or by a point symbol marker at its central XY coordinates

Base map for planning purposes



GICHD Mine presence/absence Indicators

Road/path not longer in use (Bosnia & Herzegovina)



1996 **2005**

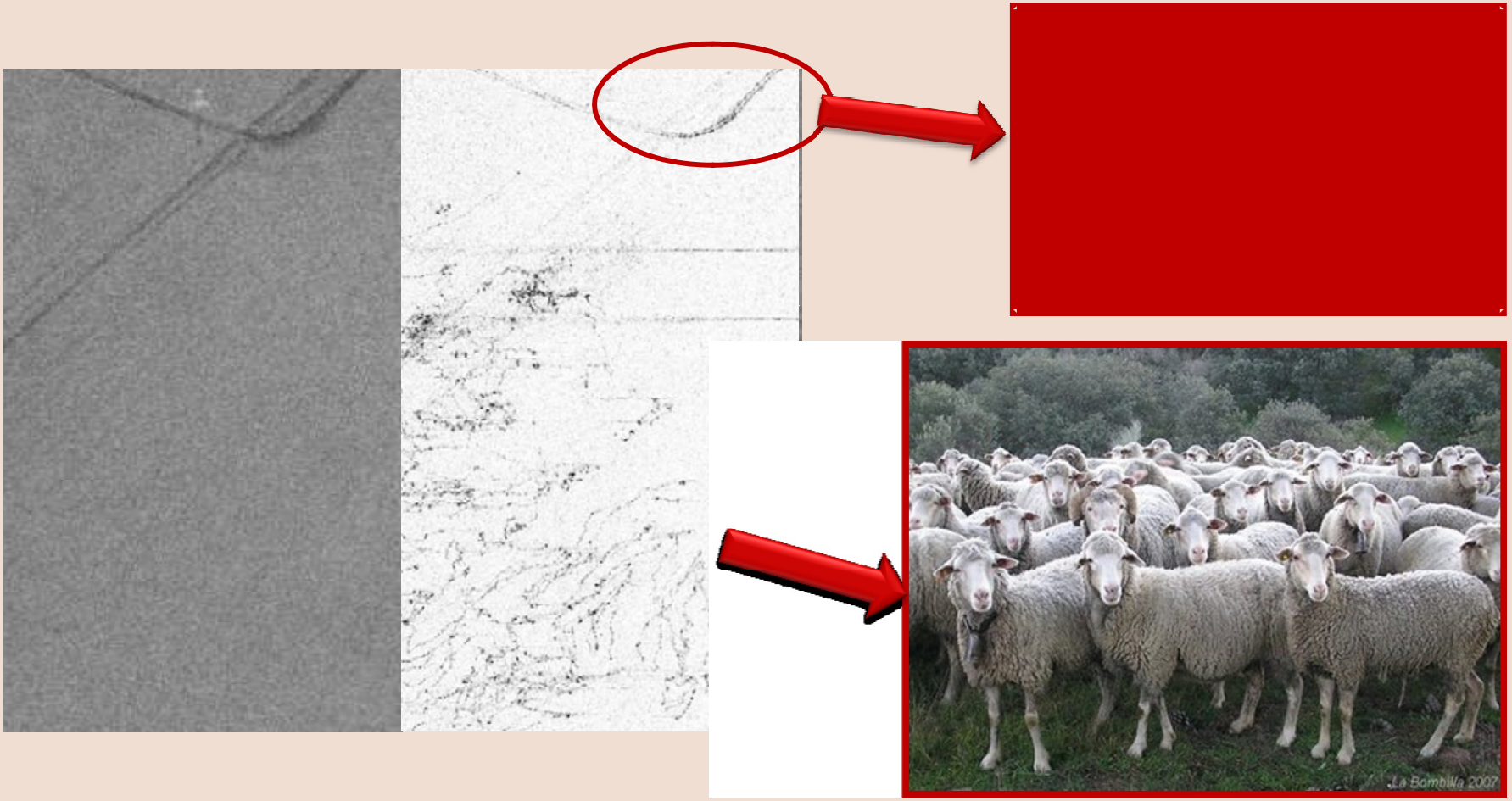
GICHD Mine presence/absence Indicators

Land use change (Bosnia & Herzegovina)

2005 **2011**

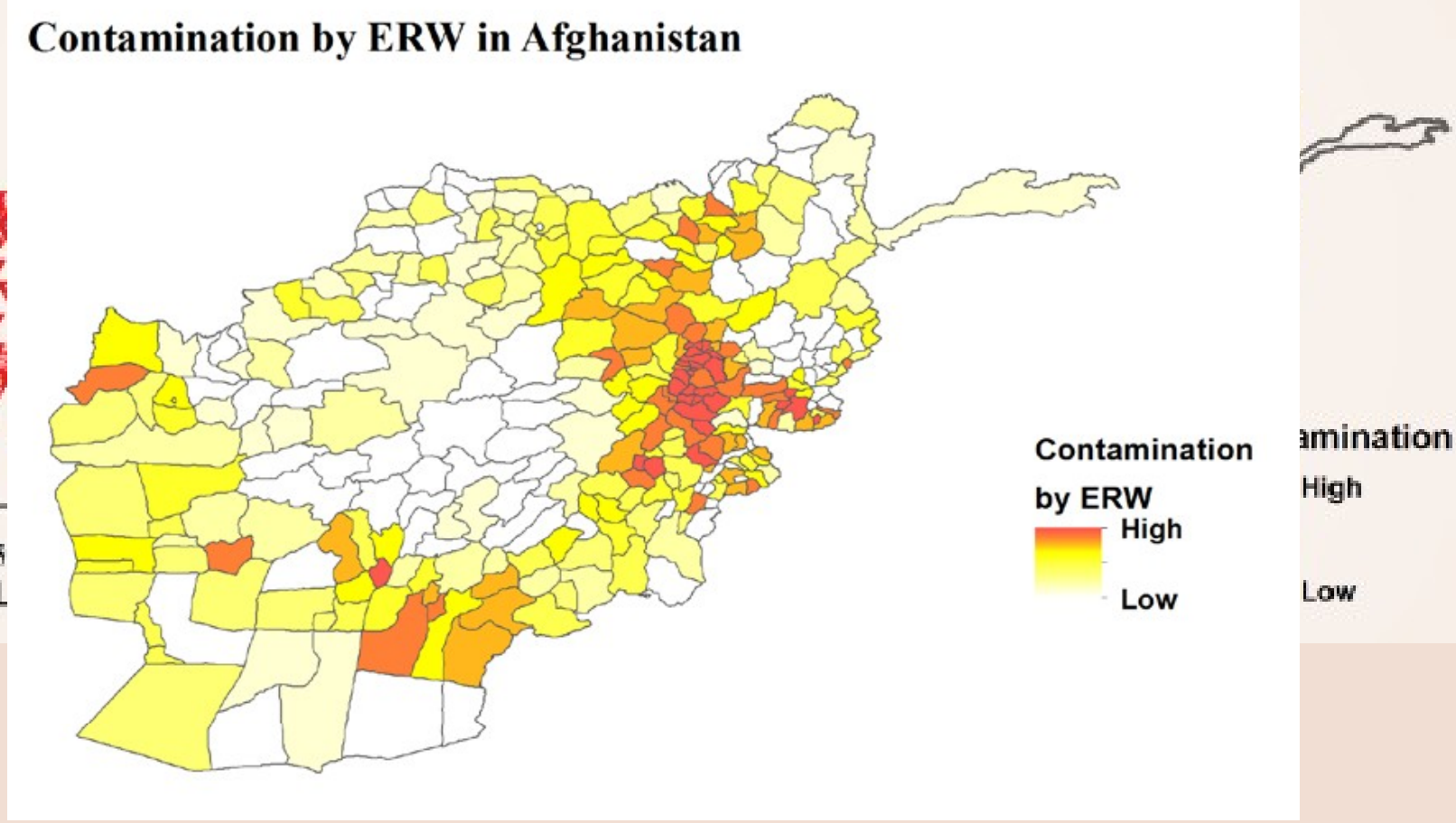
Land use change maps

Activity maps



Contamination density maps

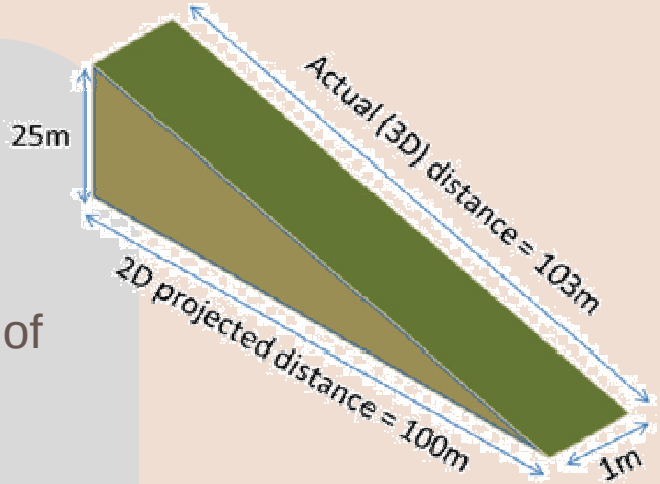
CONTAMINATION BY ERW:
CORE DATA (LEFT) VERSUS CONTAMINATION DENSITY (RIGHT)

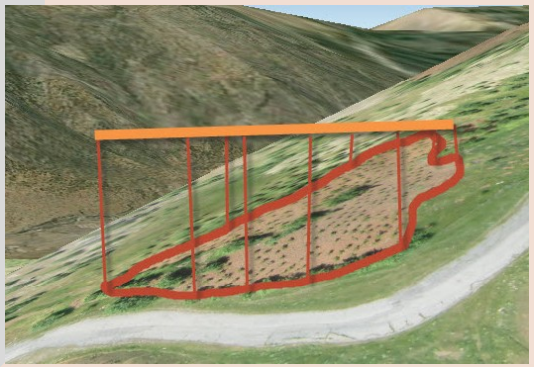


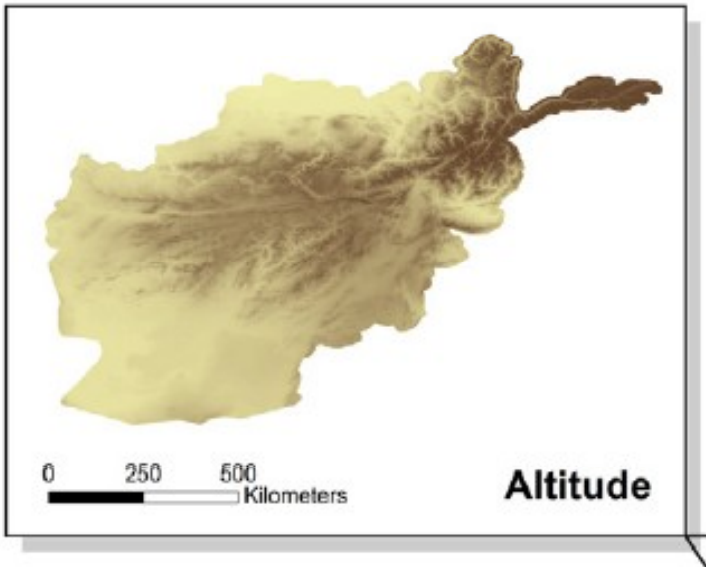
3D analysis

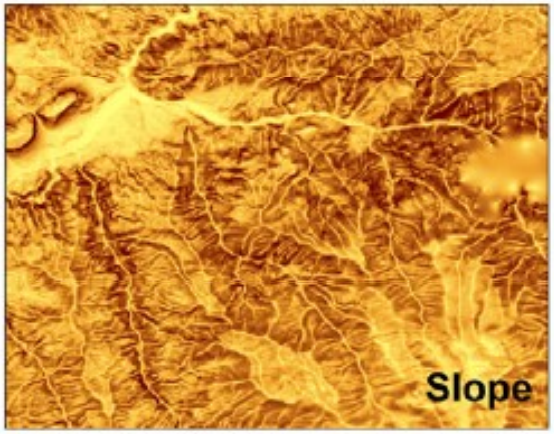
- Easy generation of 3D surfaces using RS data and GIS tools

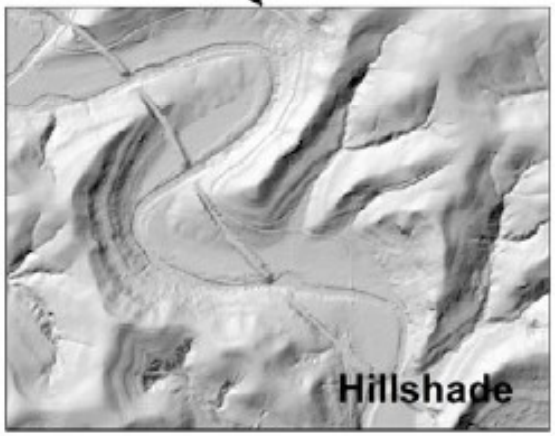
- Advantages of the 3D analysis:
  - increase the accuracy of area size calculations of contaminated surfaces;
  - more realistically assess the operational difficulty of demining in a region by integrating slope and elevation into the analysis;
  - better prepare field operations;
  - determine the potential location of mines that may have moved over time through water run-off or surface movement; and
  - report on demining activities in a more visually intuitive manner.



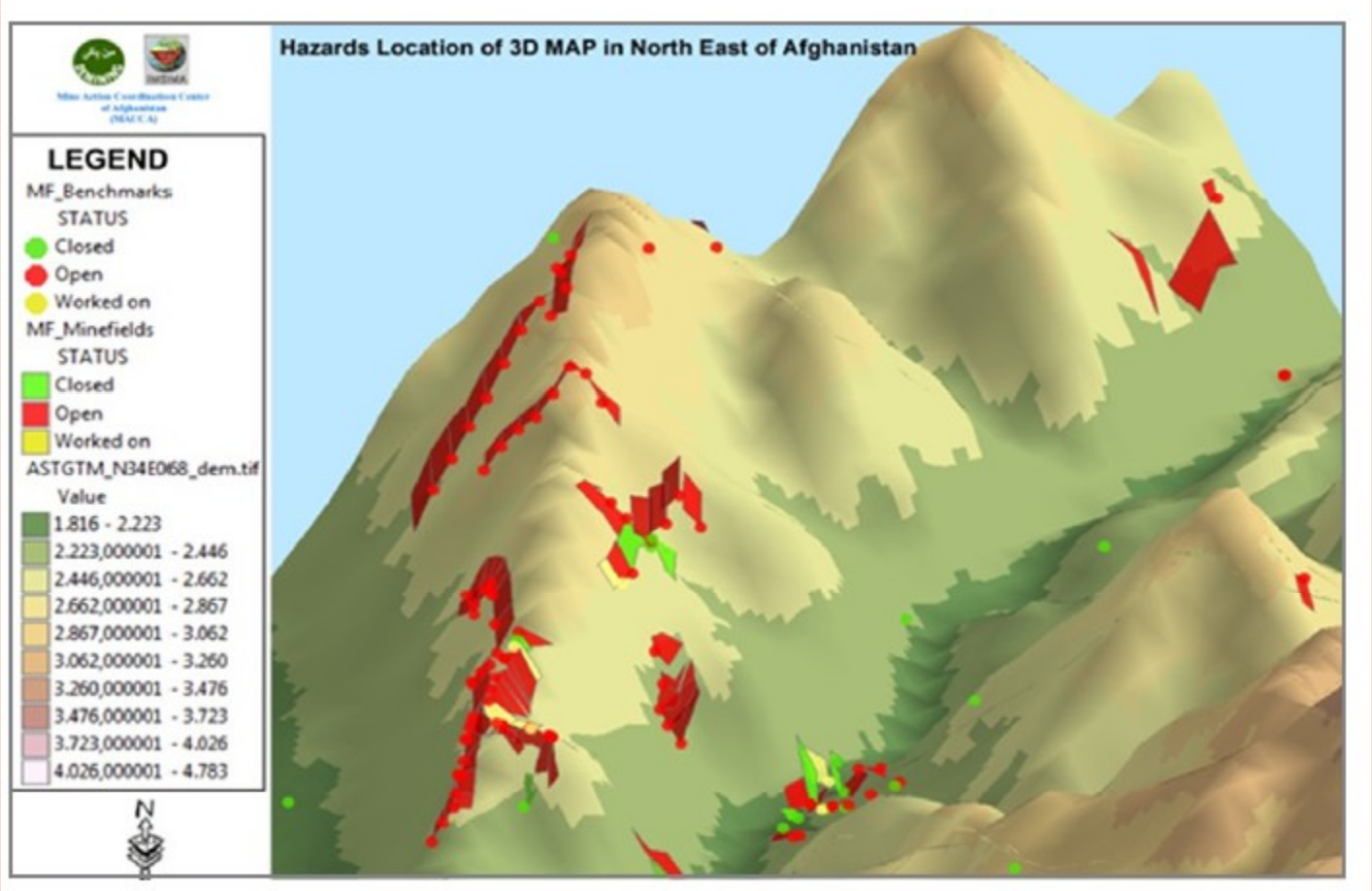



0 250 500
Kilometers
Altitude


Slope

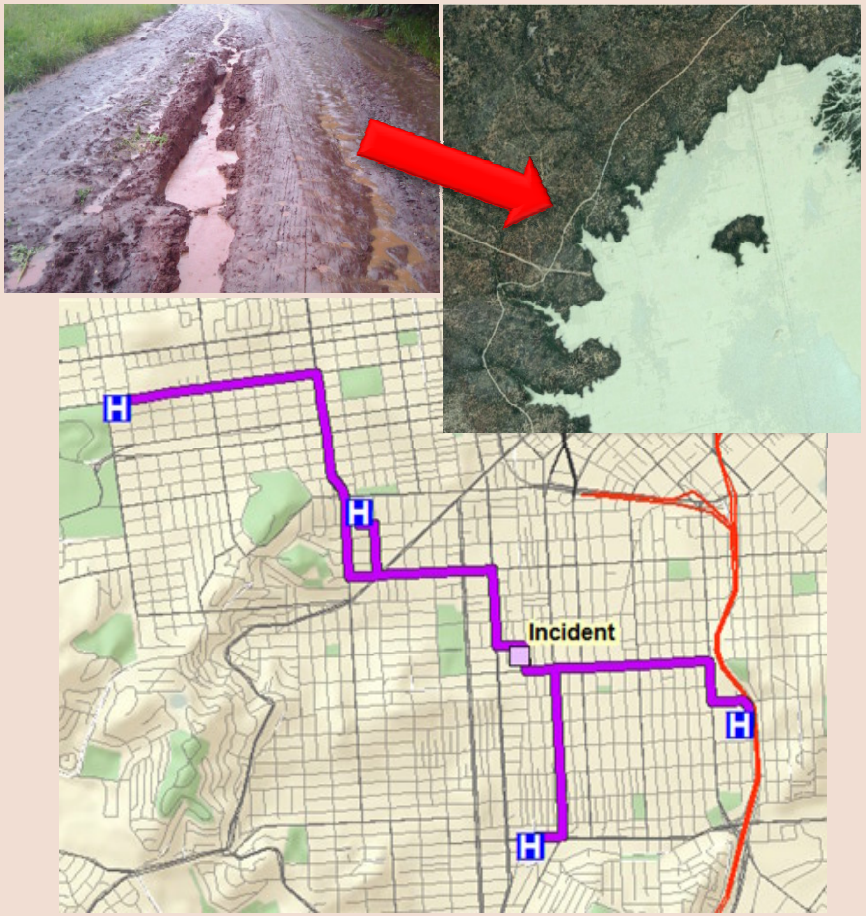

Hillshade

Example of 3D map



Analysis of accessibility

- Best route between two points according to terrain conditions (slope, land cover, road quality), season, temporary/permanent blockages, hazardous areas
- Improvement of the logistical efficiency
- Applicable to road clearance management (analysis of impacts)

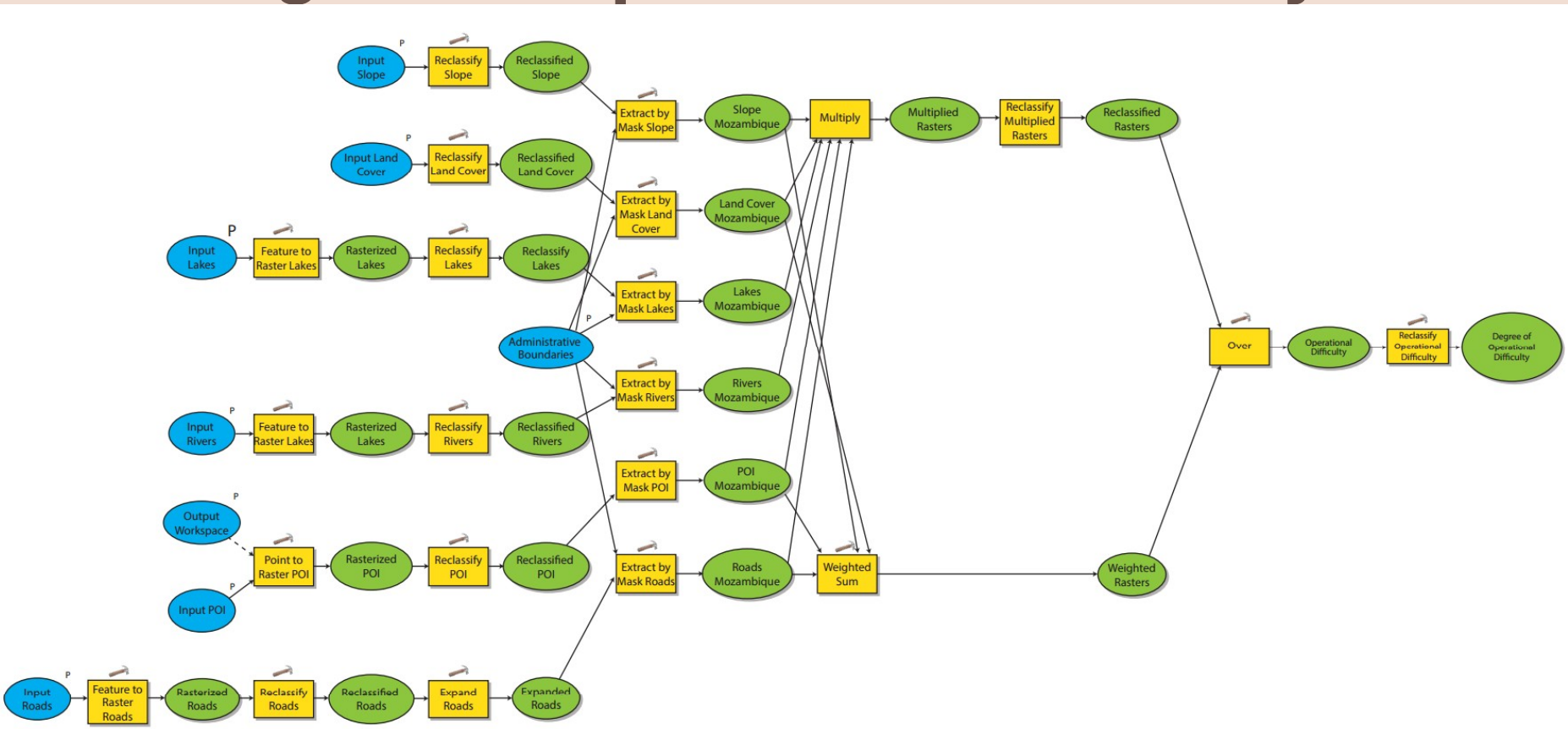


Prioritising Activities and Evaluating Costs

- Combining different data sources and spatial relationship between features (i.e. proximity) to:
  - prioritise hazard clearance
  - determine time and effort for clearance by integrating local terrain and infrastructure conditions
  - decide most suitable asset by comparing different scenarios under similar terrain conditions;
  - have better knowledge of the accessibility of a hazardous area
  - assess the degree of clearance difficulty on the basis of quantifiable terrain criteria (cost evaluation)

GICHD

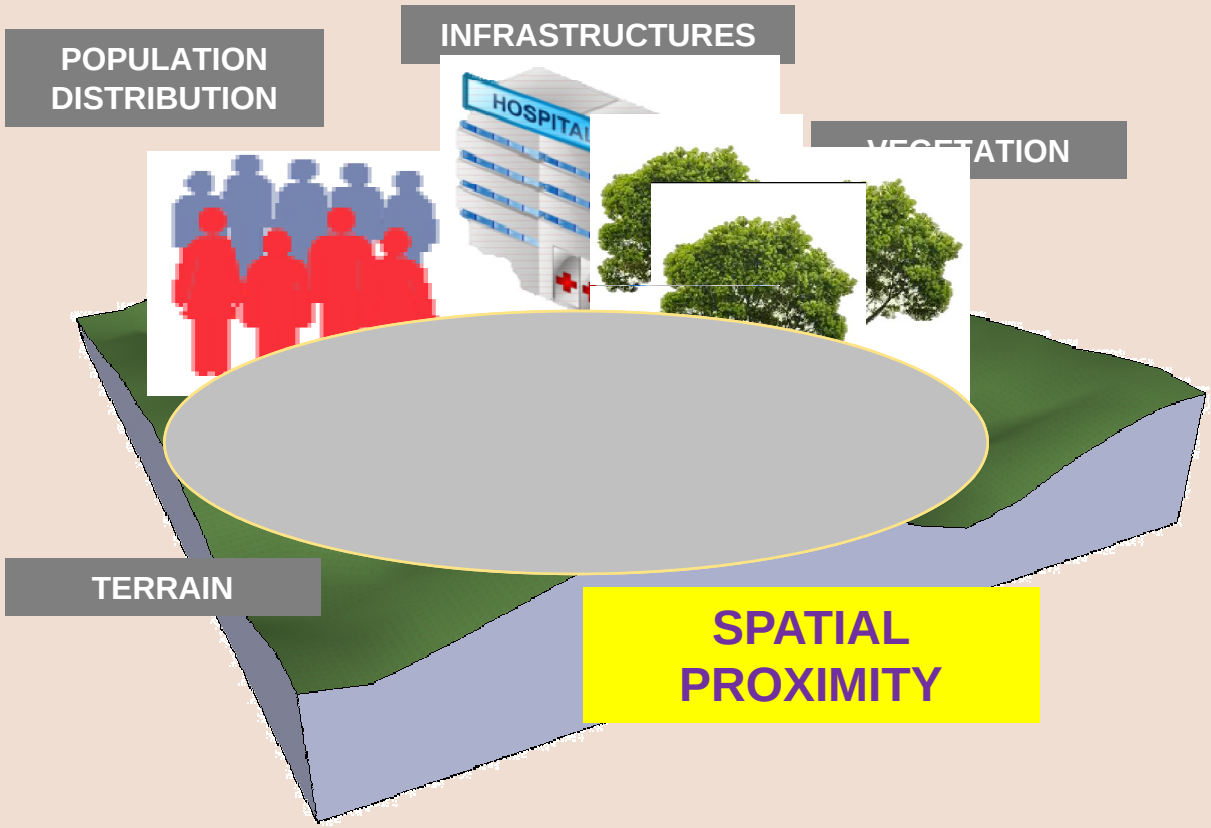
5D:Determining and Displaying the Degree of Operational Difficulty of

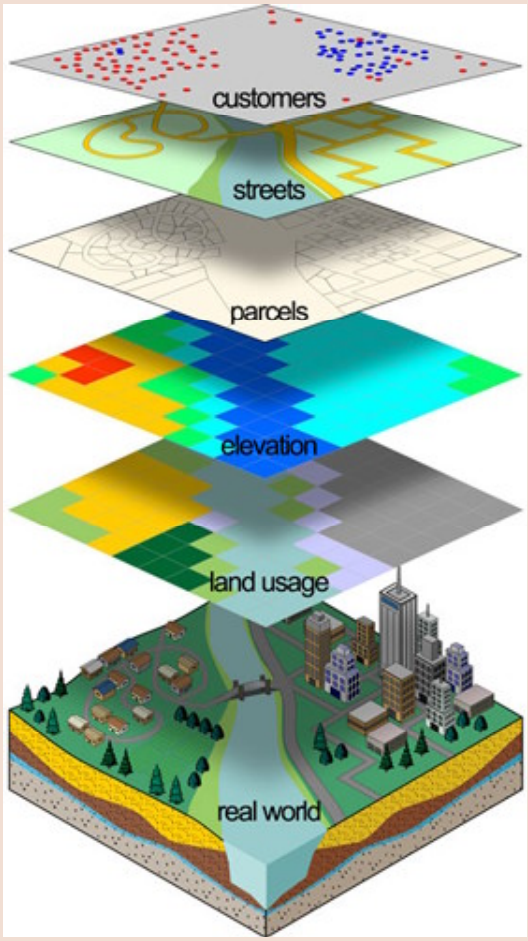


GICHD


Operational difficulty of demining
Low difficulty
Medium difficulty
High difficulty
Very High difficulty
0
150
300 Km

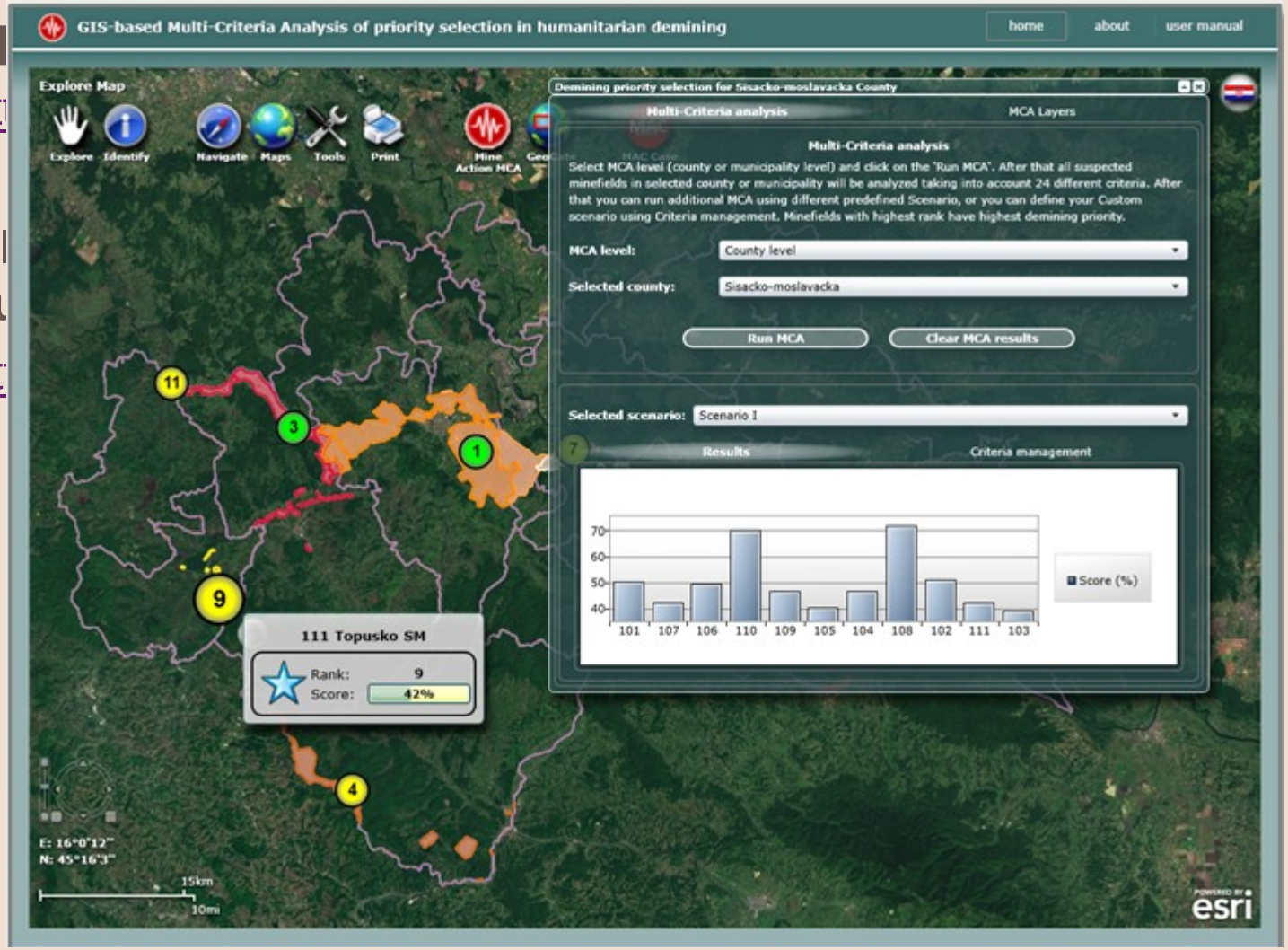
Multi Criteria Analysis (MCA)





Several options…

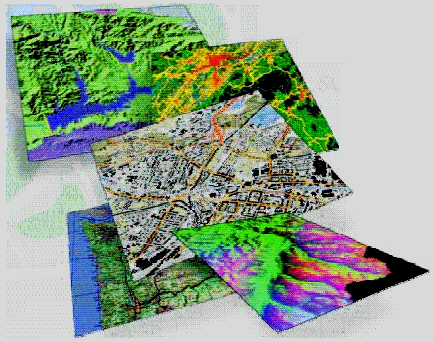
- M
  ht
- Gl
  hu
  ht



Conclusions

Advantages of RS and GIS

- Low risk
- *Low cost ***
- Multitemporal
- Consistent
- Objective
- Systematic



Thank you!