



**unitar**

United Nations Institute for Training and Research

# Operational Satellite Applications Programme (UNOSAT)

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# UNOSAT

- UNOSAT is part of the United Nations Institute for Training and Research (UNITAR)
- UNOSAT = Operational Satellite Applications Programme – entirely dedicated to **researching and applying solutions in geospatial information and integrated systems** (GIS, navigation, geopositioning)
- Launched in 2000 as a project, evolved into a UN centre of excellence with global outreach supported by a worldwide network of partners
- UNOSAT means over 1000 maps/analyses since 2000, taskings in over 250 emergencies & conflicts; professional training; research & methodology



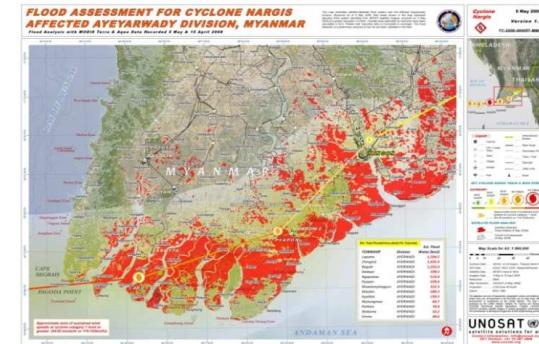
knowledge, international, participatory approach, if  
diversity, innovation, knowledge sharing, research  
in. transfer, expertise, new technology  
learning by doing, network  
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# SYSTEM AREAS

3

## Humanitarian Aid and Relief Coordination

- Crisis & Situational Mapping
- Damage assessment



## Human Security

Monitoring

Human Rights

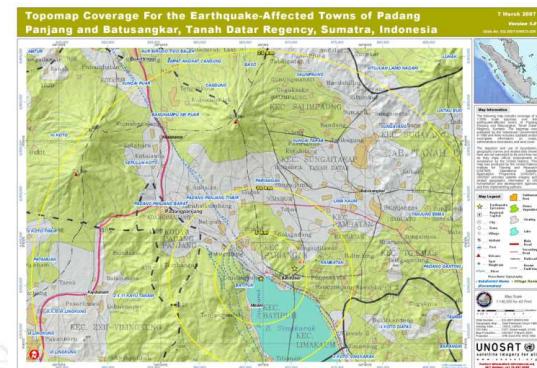
Safety and Security

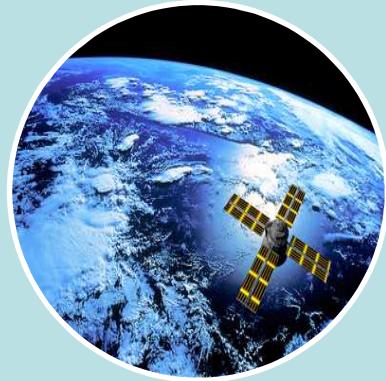


## Territorial Planning and Monitoring

Capacity Development & Technical Assistance

Training and Knowledge Transfer





## MAPPING

Research,  
Analysis &  
Applications



## IN-FIELD

Technical Support  
and Capacity  
Development



## PROJECTS & METHODOLOGY

Training, Design,  
Knowledge Dev



knowledge, inc.  
diversity, innovation,  
train. transfer, expertise,  
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**TECHNOLOGY & INNOVATION**

**CHANGE**

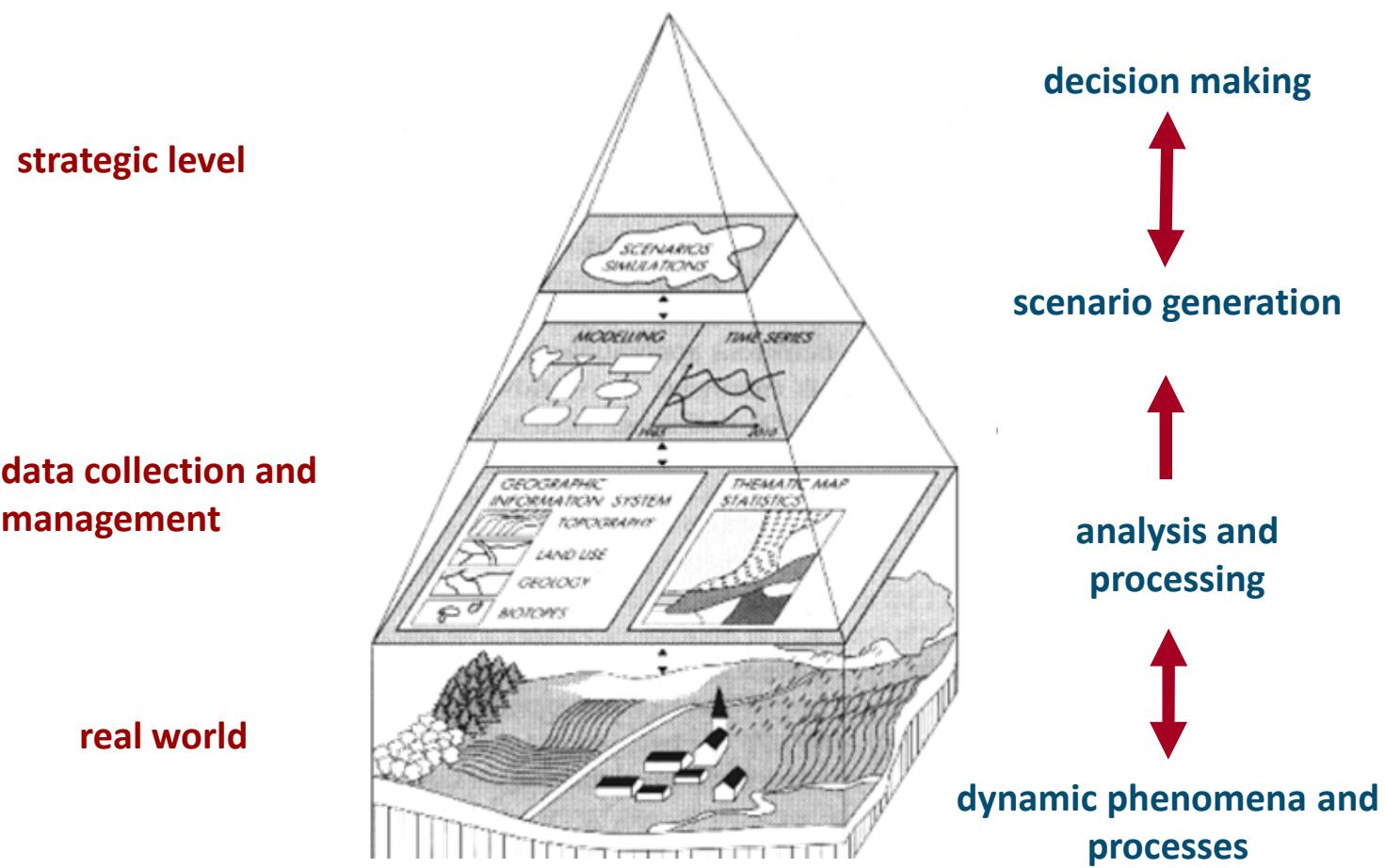
**FROM NEEDS TO SOLUTIONS**

**PROCESSES**

**CAPACITY DEVELOPMENT**

knowledge, international, participatory approach, if  
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# GIS: rendering information in geographic layers



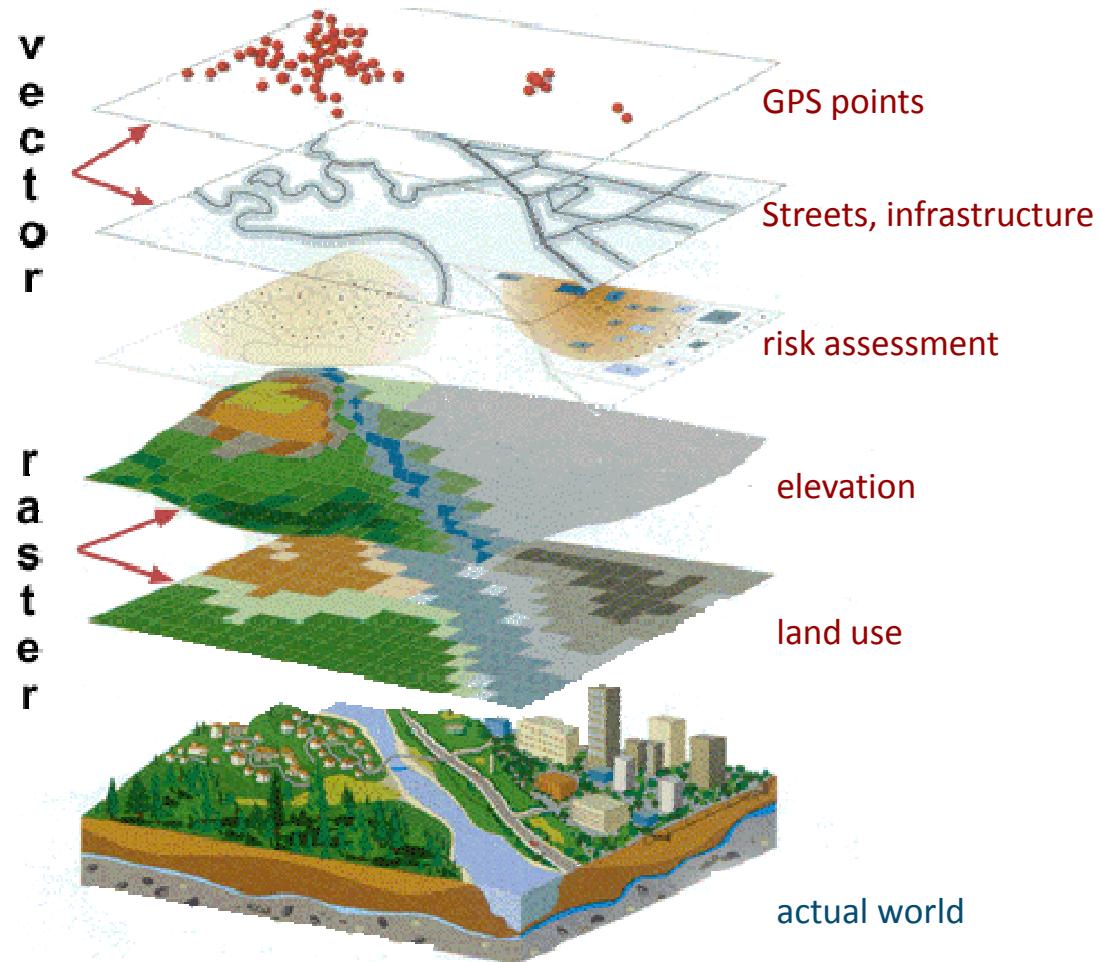
By using a GIS a simplified world can be visualised in a dynamic way to support decision making and monitoring

knowledge, intercultural participation, sharing, research  
diversity, innovation, knowledge sharing, research  
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# GIS data integration

GIS integrates a variety of data layers (spatial datasets) from different sources and digital formats (e.g. satellite images, topographic maps, spreadsheets, etc.).

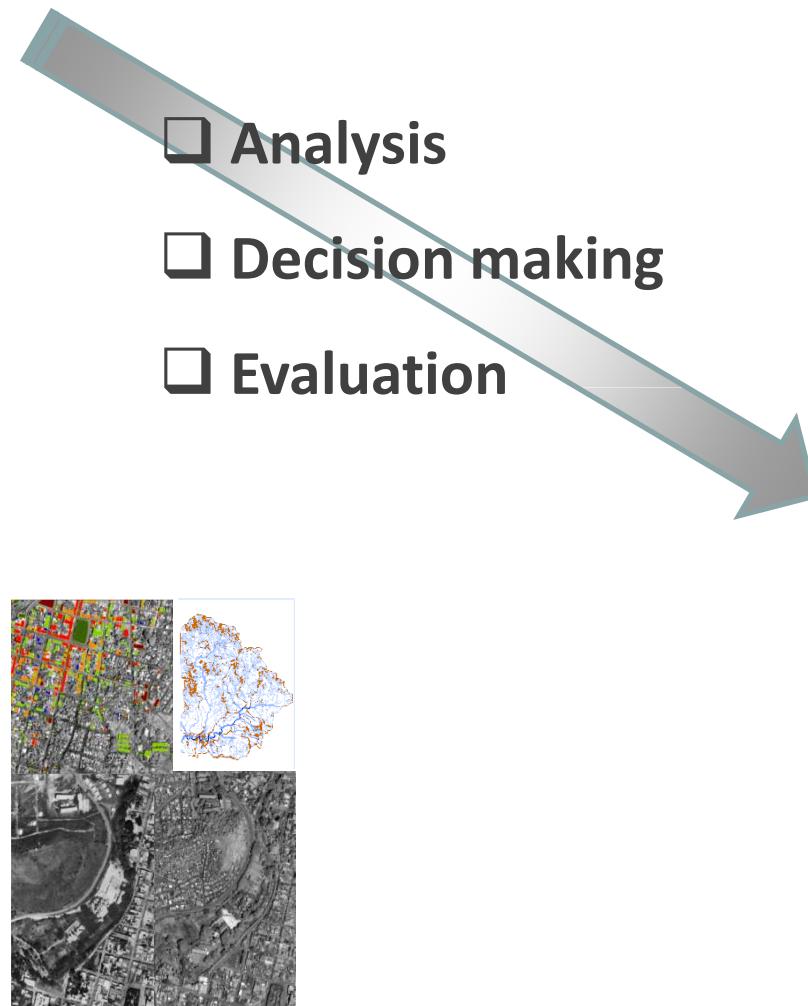
Condition for data integration within a GIS is that all data are geo-referenced in a given coordinate system with a known datum.



knowledge, international, participatory approach, if  
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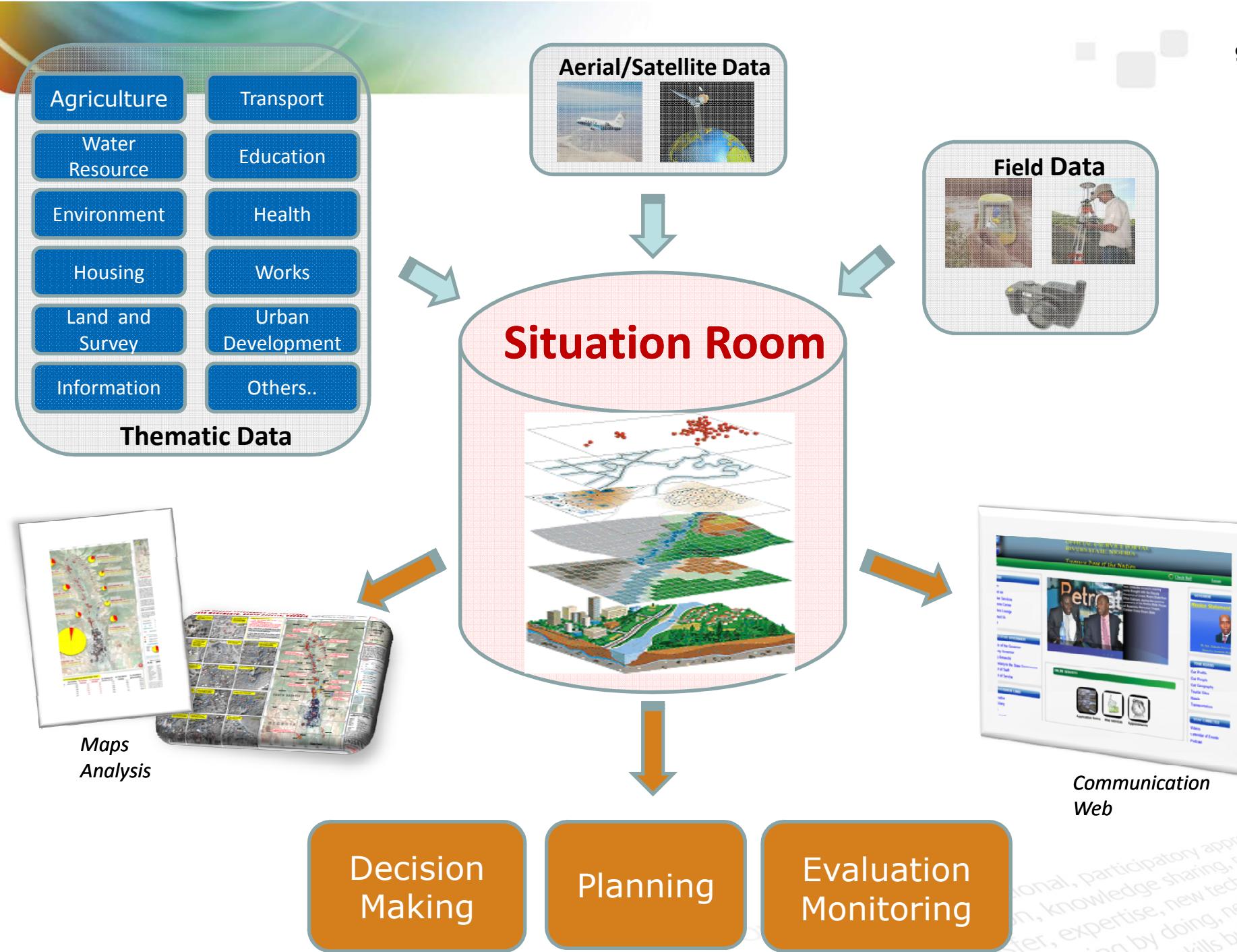
# GIS competency centres

## Dashboard



- Territorial management
- Urban planning
- Disaster risk reduction
- Environmental assessment
- Project monitoring

Knowledge sharing, international, participatory approach, diversity, innovation, transfer, expertise, new technology, learning by doing, network, skills building, etc.



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## **UPDATE 2: FLOOD WATER OUTFLOW FROM INDUS NEAR SUKKUR BARRAGE ENTERING BALOCHISTAN PROVINCE, PAKISTAN**

Flood Analysis Based on Satellite Data Recorded on 18 August 2010

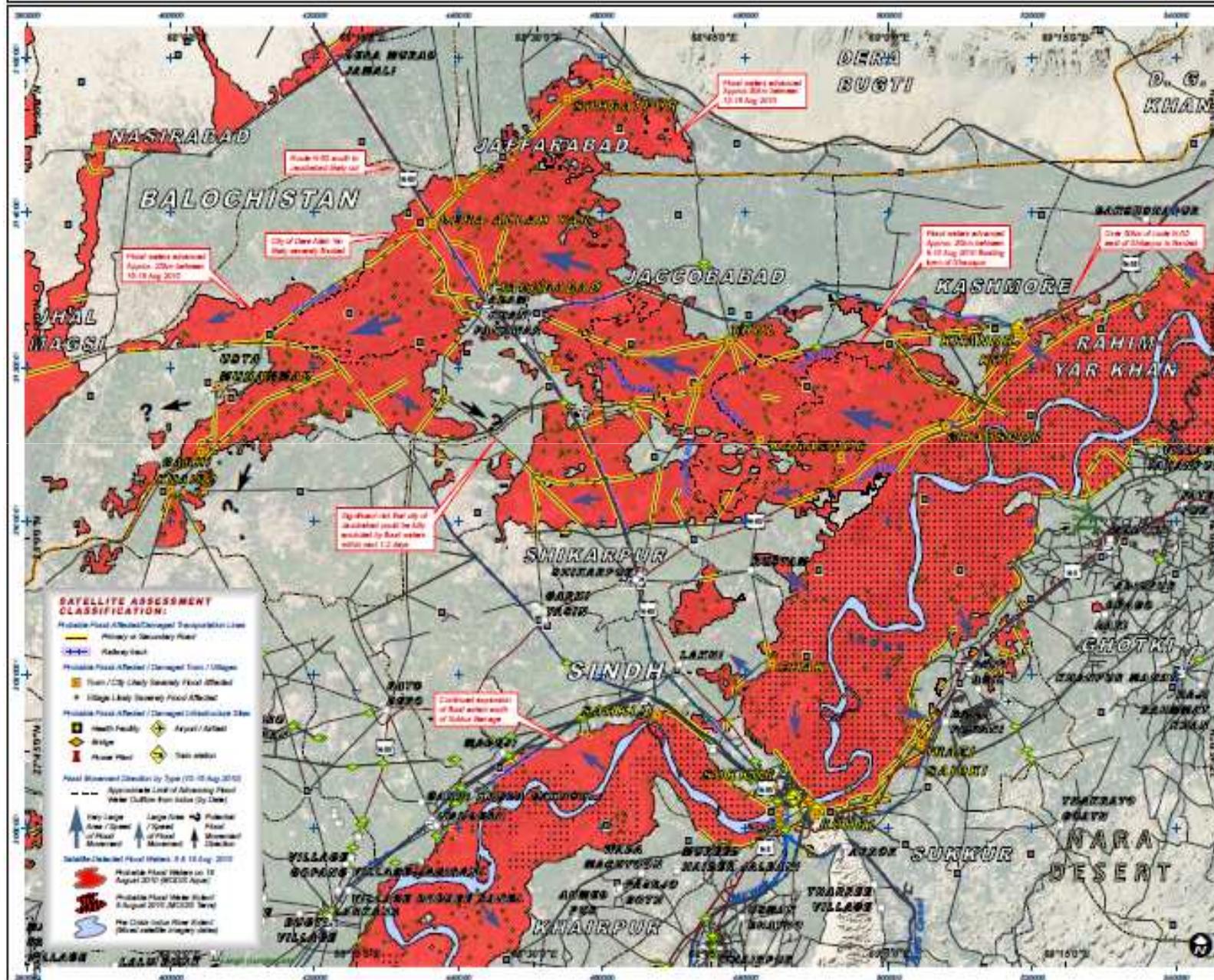


## Monsoon Rains & Flooding

18 August 2010

Version 3.0

PL-2010-000141-PAK



This study presents an updated literature analysis of the arsenic exposure of Aral water users within the Indian Aral immediately south of the city of Kostan' (Kostan' district, Kazakhstan). The study period is 1 January 2000 to 31 August 2010. This analysis is based on post-satellite imagery collected by Landsat between 9 June 2000 and September 2008 and National-2 data on 10 August 2010. Please note that the numbers of affected families presented in this study represent minimum estimates because of limitations in available settlement and transportation data. It is evident that the numbers of affected villages, towns and affected households are higher than those presented here. The data presented under 'Settlements' reflect an amalgamation of all Aral-related areas within the study extent. Please understand that not all data presented in the table are necessarily valid and have been validated in the field. Please understand that data presented in CDR/UNDP/UNICEF

A legend box containing a list of symbols and their corresponding labels: Residential Area (square), Industrial Area (circle), Commercial Area (triangle), Water Body (diamond), Airport/ Airfield (hexagon), Rail station (square with a circle), Harbor (triangle with a circle), Highway (double line), Secondary Road (single line), Boundary Road (thin line), National (dash-dot line), and Vegetation Cover (blue line).

| MAP SCALE FOR A3: 1:500,000 |                       |               | Centimeters |             |    |    |
|-----------------------------|-----------------------|---------------|-------------|-------------|----|----|
| 0                           | 2.5                   | 5             | 10          | 15          | 20 | 30 |
| Circle Satellite Date (1)   | 30/09/2004            | Asia & Africa | 200         | centimeters |    |    |
| Resolution                  |                       |               |             |             |    |    |
| Image Date                  | 04-09-2010            |               |             |             |    |    |
| Source                      | MAXAR Royal Resources |               |             |             |    |    |
| Circle Satellite Date (2)   | 14/08/2012            | RADARSAT-2    |             |             |    |    |
| Resolution                  |                       | 23 meters     |             |             |    |    |
| Image Date                  | 21/08/2010            |               |             |             |    |    |
| Copying By                  | Radarsat 2            | 2.5 M         | OSM         | 2010        |    |    |
| Source                      | MAXAR Royal Resources | OSM           | 2010        | 2010        |    |    |
| OSM Date                    | MAXAR Royal Resources | 2010          | 2010        | 2010        |    |    |
| Transport Date              | 2010                  | Google Earth  | 2010        | 2010        |    |    |
| Transport Date Copying By   | Google Earth          | 2010          | 2010        | 2010        |    |    |
| with Google Map Usage       |                       |               |             |             |    |    |
| Refugee Date                | UNHCR                 |               |             |             |    |    |
| Hospital Date               | WMS                   |               |             |             |    |    |
| Point Analysis              | UNHCR / UNOSAT        |               |             |             |    |    |
| Map Production              | UNHCR / UNOSAT        |               |             |             |    |    |
| Attribution                 | UNHCR / UNOSAT        |               |             |             |    |    |
| Source                      | UNHCR                 |               |             |             |    |    |



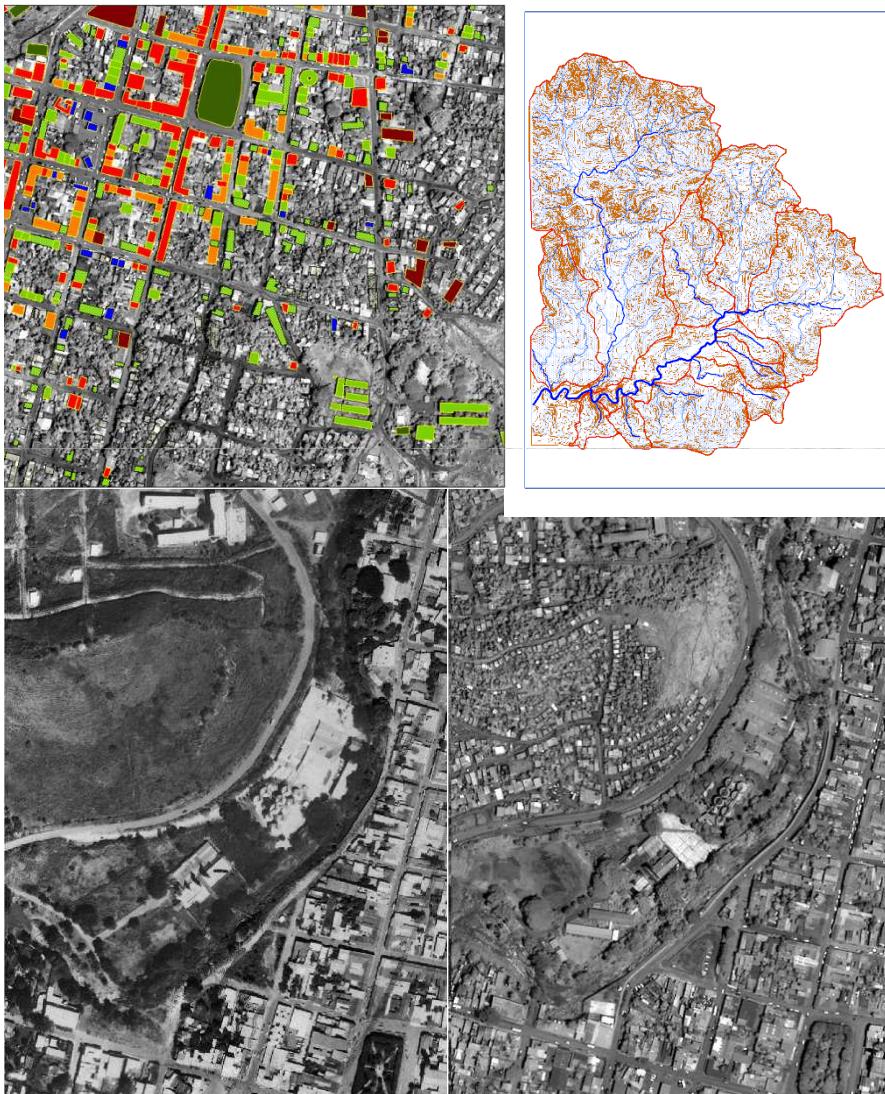
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# Risk identification at the local level Matagalpa example



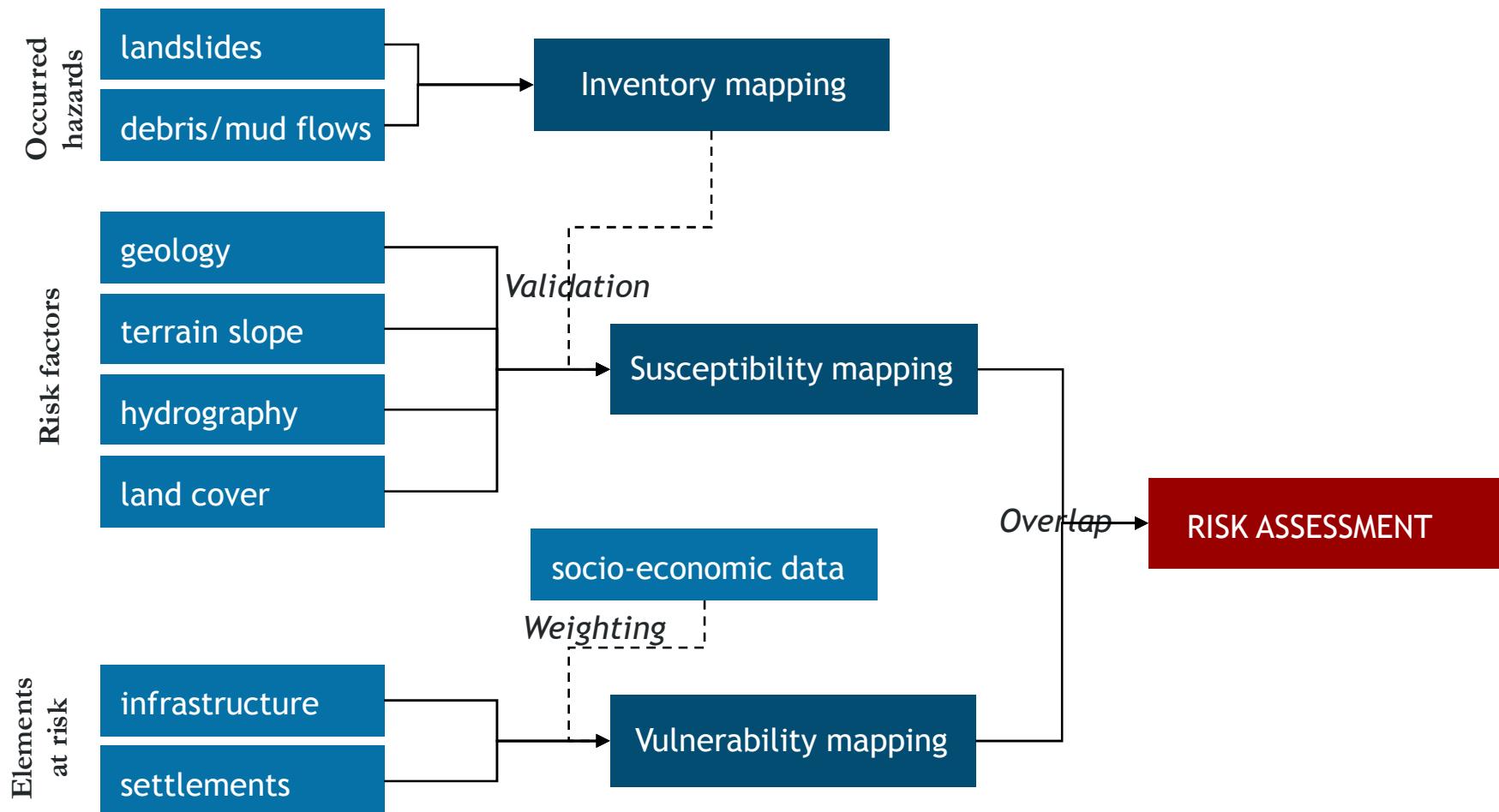
- Collaboration with local authorities in the aftermath of Hurricane Mitch, 1998;
- - Destructive phenomena: flash floods, debris flows, landslides
  - Immediate assistance to victims and their settlements based on poorly informed decisions

# Implementation of a GIS resource center - CIGMAT

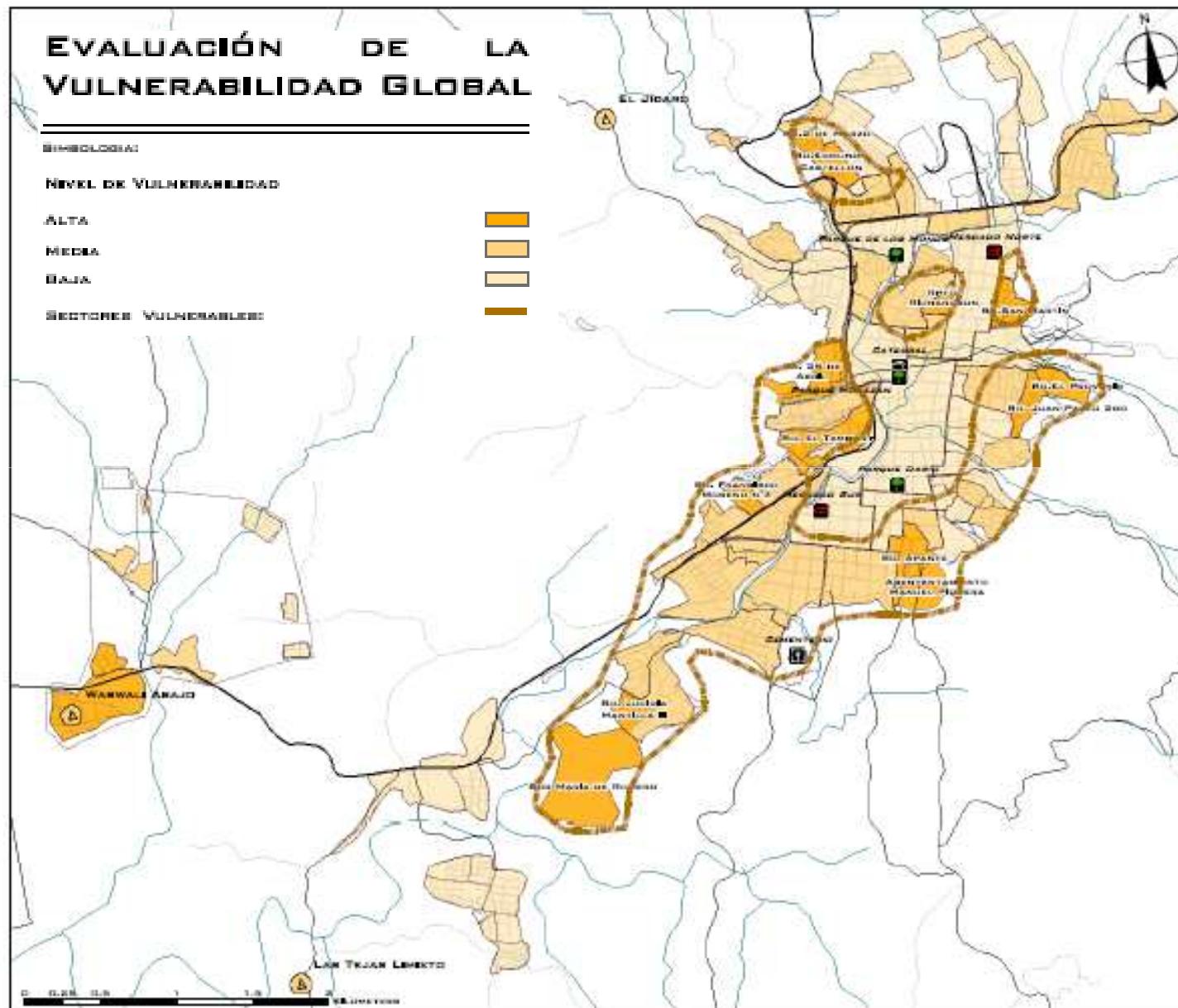


- ❑ Establishment of GIS office for improved risk assessment and urban planning
- ❑ Local authorities focus on safety and territorial management
- ❑ Know-how transfer to facilitate geographic data management (staff trained by UNOSAT)
- ❑ CIGMAT is currently generating its own projects and has its own clients

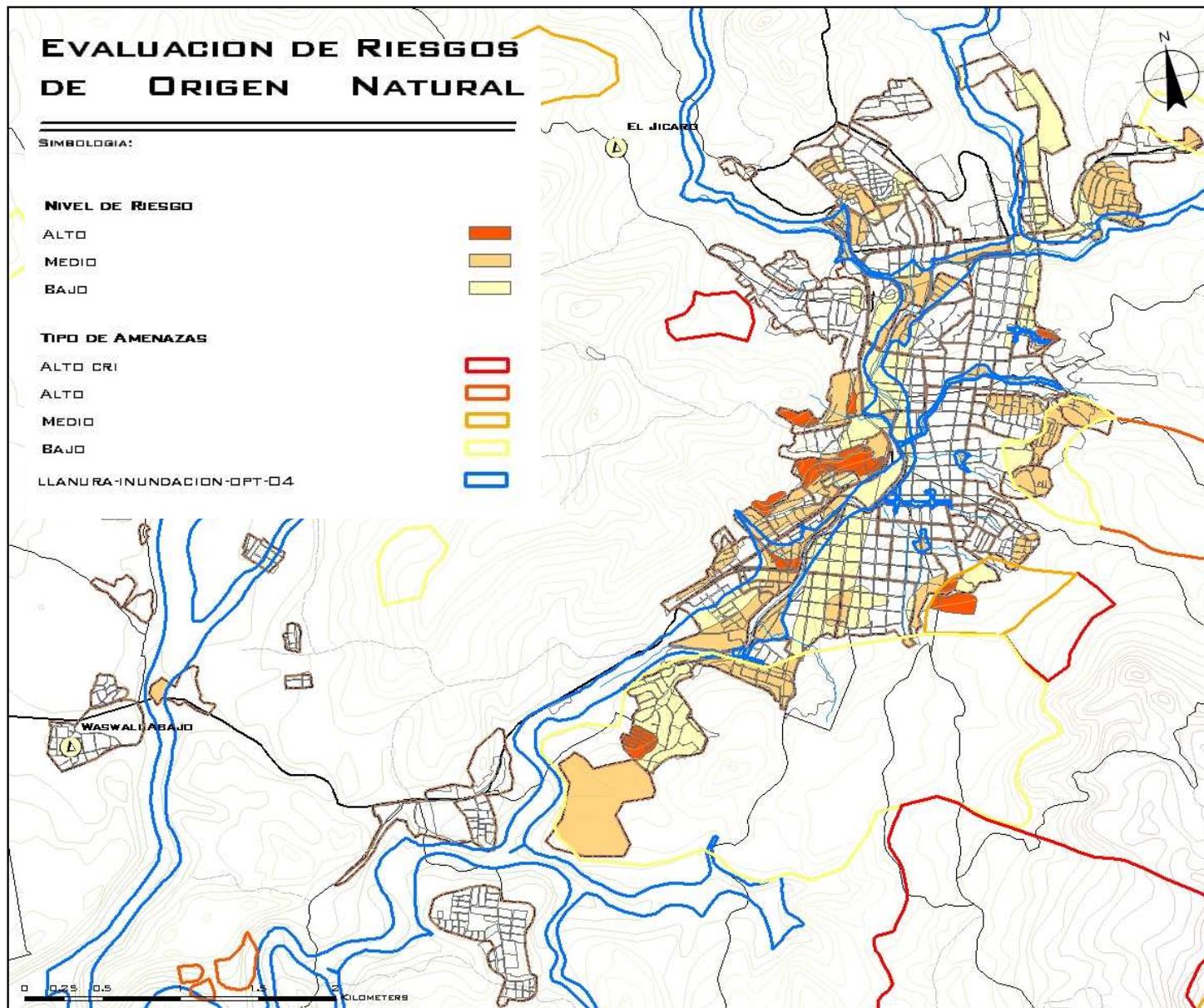
# From hazard mapping to risk assessment



# Vulnerability mapping

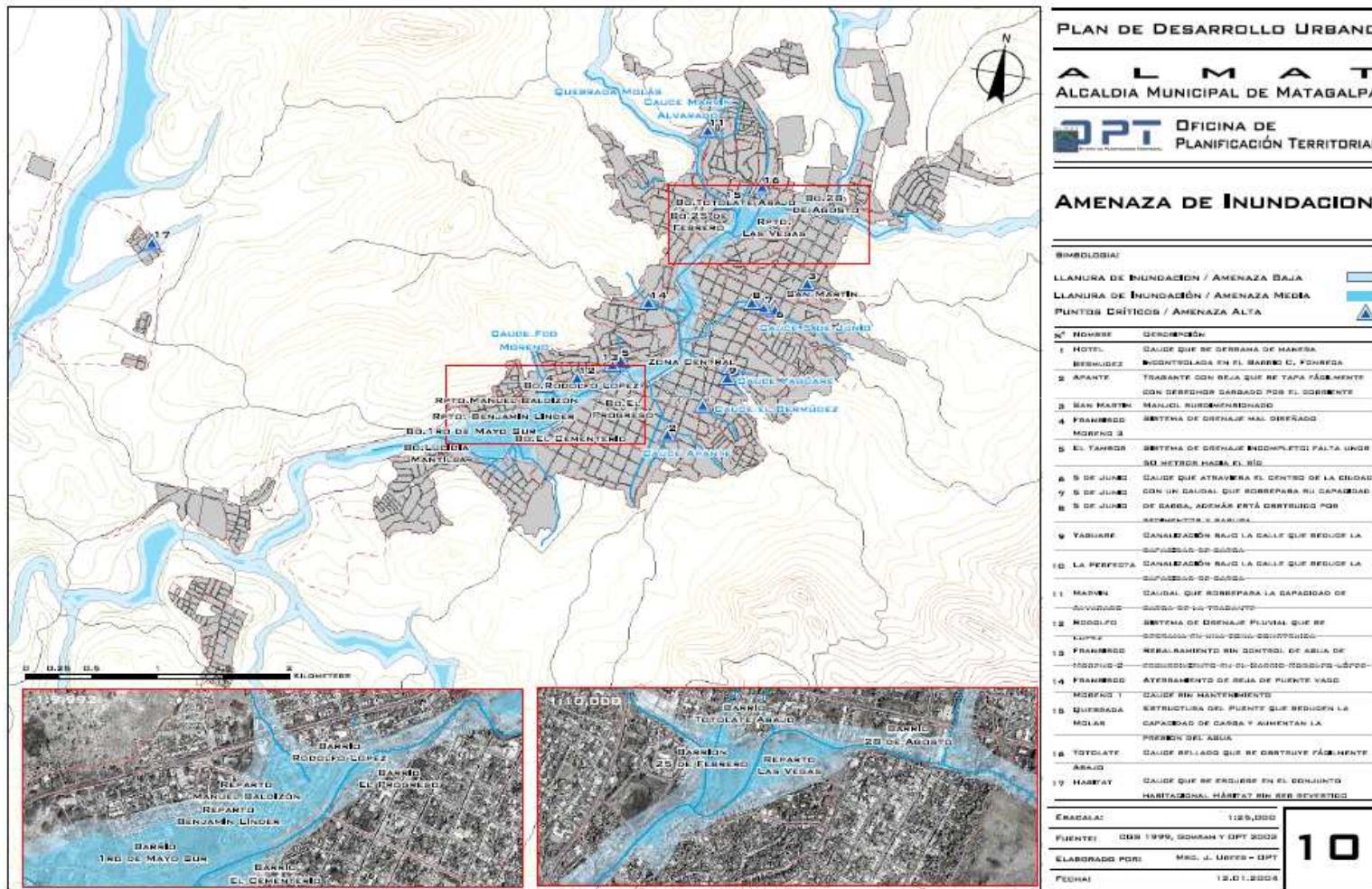


# Risk mapping



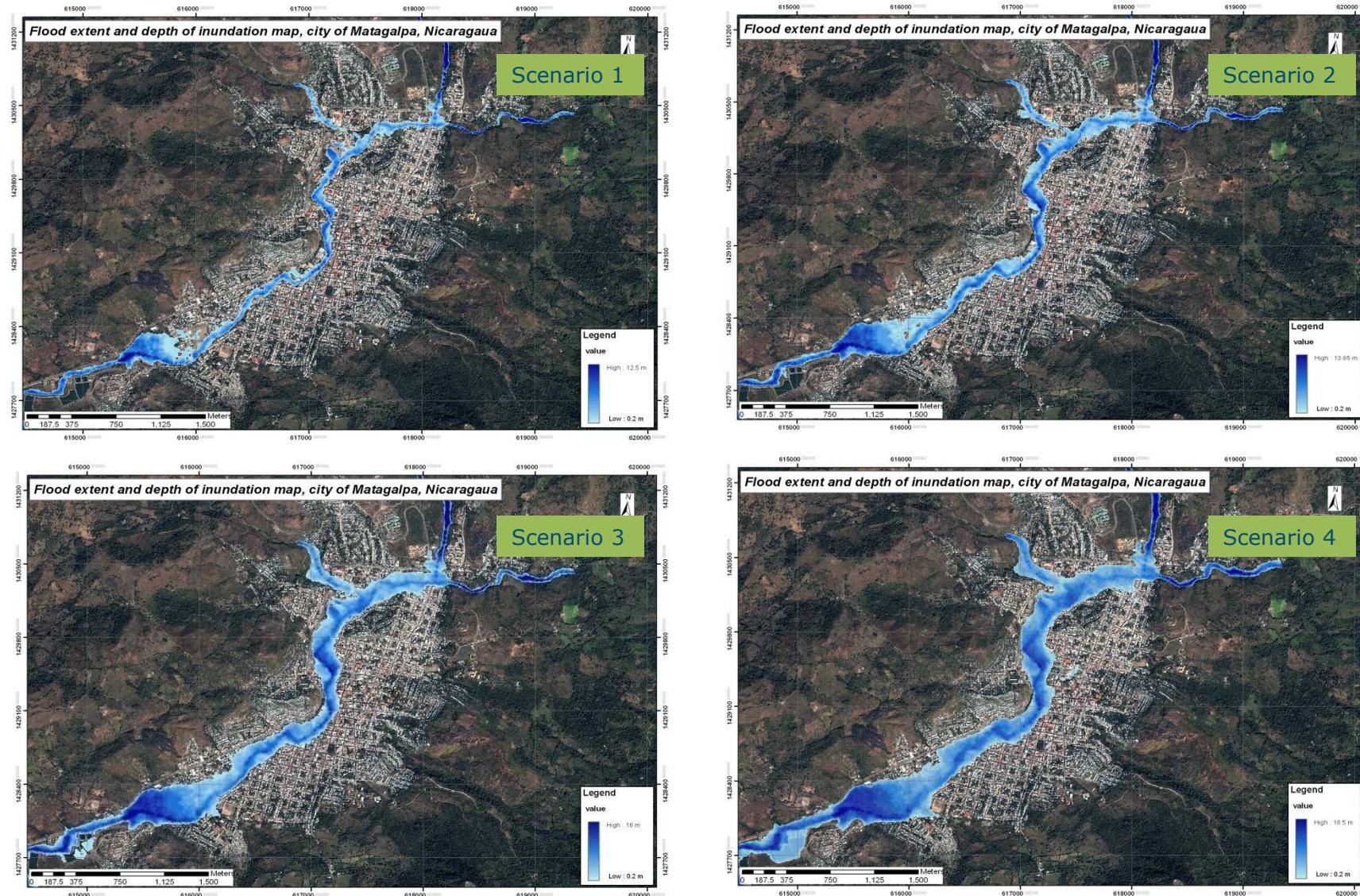
**Susceptibility X Vulnerability**

## Risk identification at local level : flood preparedness



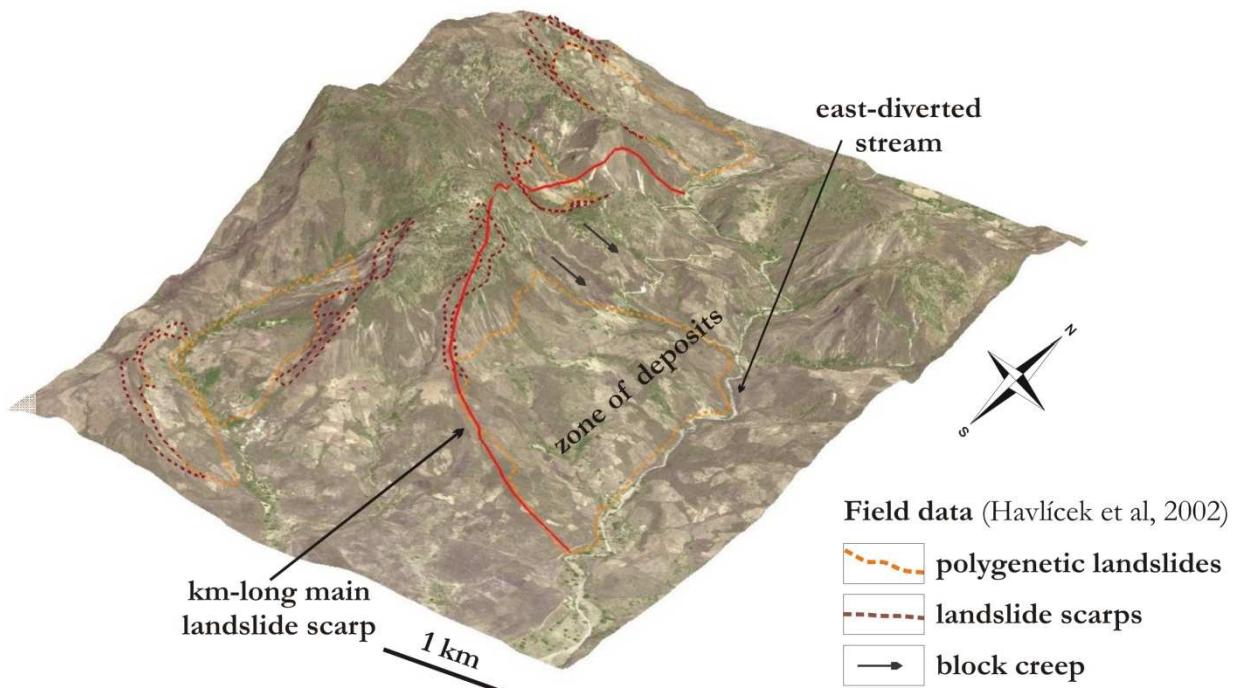
# Risk Mapping & Prevention

## Phenomena modeling in GIS



## landslide risk assessments using 3D analysis

- ❑ Tailored for detection of landslides and recent debris and mud flows at scales up to 1:25'000 (master plan)
- ❑ Satellite image detected hazard phenomena are consistent with field observations
- ❑ Qualitative monitoring of landslide activity through vegetation disturbance
- ❑ Senior geologist interpreter required



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