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Space and Disaster Risk Reduction
Planning for resilient human settlements

UN-SPIDER

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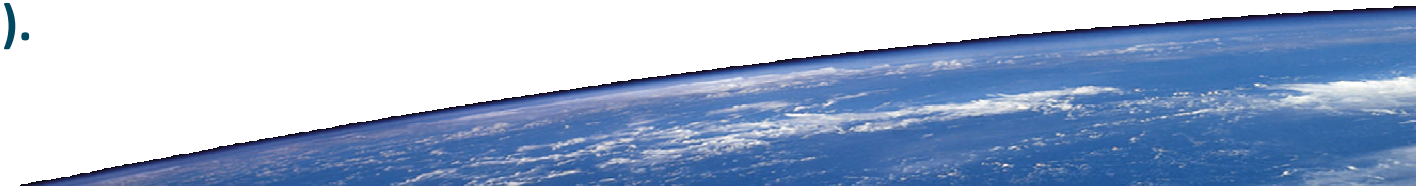
The UN-SPIDER Programme

On 14 December 2006 the United Nations General Assembly established UN-SPIDER as a programme implemented by UNOOSA with the following mission statement:

"Ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle."

- **Especially by being *a gateway* to space information for disaster management support;**
- **serving as *a bridge* to connect the disaster management and space communities; and**
- **being *a facilitator of capacity-building and institutional strengthening* (A/RES/61/110).**



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Space Technologies for Disaster Risk Management and Emergency Response

Images from earth observing satellites help assess the damage caused by disasters and assess vulnerability to hazards.

Satellite communications help warn people who are at risk, especially in remote areas. They help connect a disaster zone to the outside world.

Global navigation satellite systems enable us to obtain positional information on events that have to be mapped.

Activities

- Knowledge Management
- Technical Advisory Support
- Capacity Building
- Fostering Cooperation

The UN-SPIDER Network

UN-SPIDER in Vienna

UN-SPIDER Beijing Office

UN-SPIDER Bonn Office

RSO Romania

RSO Ukraine

RSO Russian Federation

RSO Hungary

RSO I.R. Iran

RSO Turkey

RSO ICIMOD

RSO ADRC

RSO UWI

RSO Pakistan

RSO Algeria

RSO CATHALAC

RSO RCMRD

RSO INDONESIA

RSO Nigeria

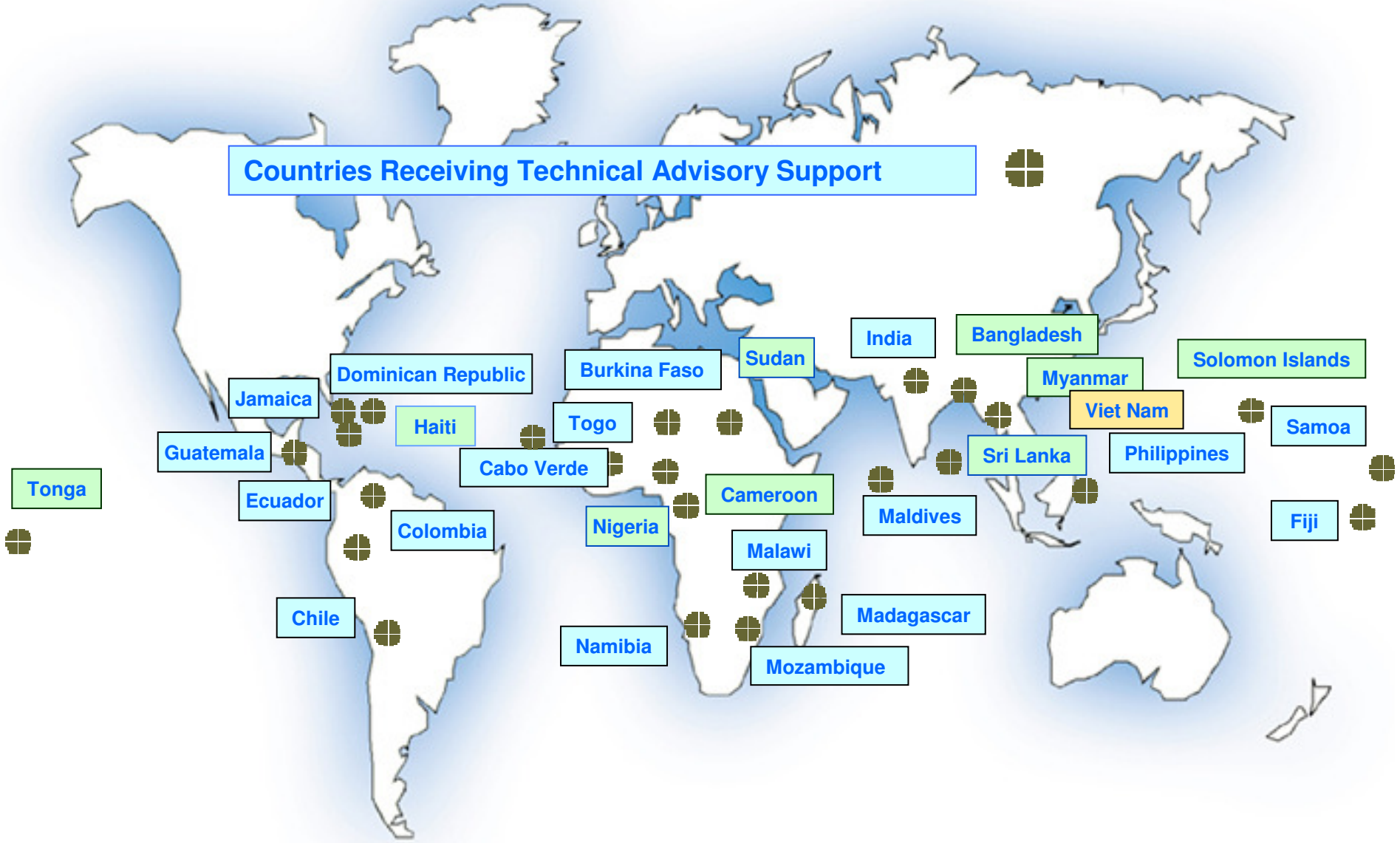
RSO COLOMBIA

RSO South Africa

RSO ARGENTINA

Network of Regional Support Offices

Technical Advisory Support (2009 - 2013)



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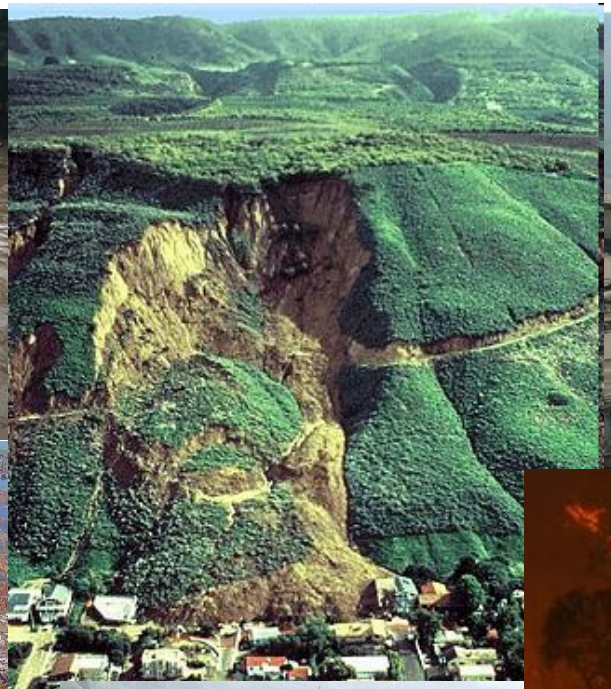
…Disaster risk reduction aims to avoid the following…



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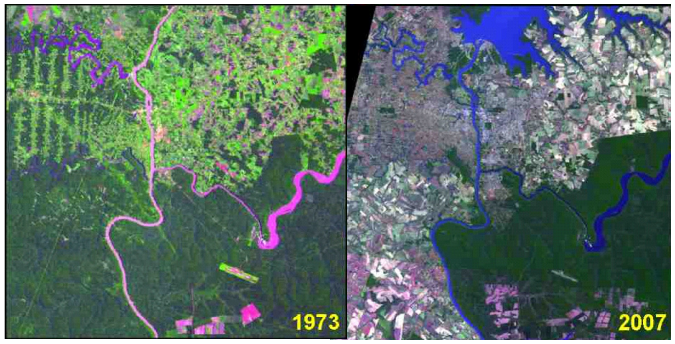
Floods

USING ARCHIVED IMAGERY TO TRACK IMPACTS OF LAND-USE CHANGES



Land-use changes such as the transformation of:

- **forests into agricultural areas;**
- **agricultural areas into urban areas.**

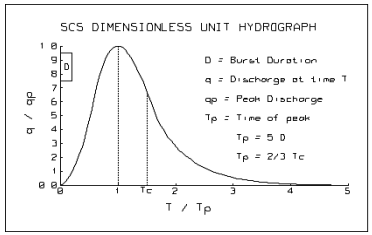
Reduce the capacity of the vegetation and the soil to store temporarily rainfall water, leading to increases in runoff, which in turn lead to more intense floods.

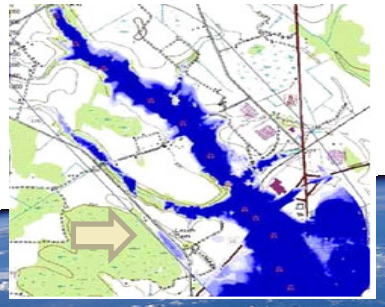
A three-step process is conducted to model floods in flood plains :

1.Derive a land-use map from imagery.

2.Run a hydrological model to estimate how rainfall is transformed into discharge at any place in the basin.

3.Run a hydraulic model to estimate which areas will be flooded.





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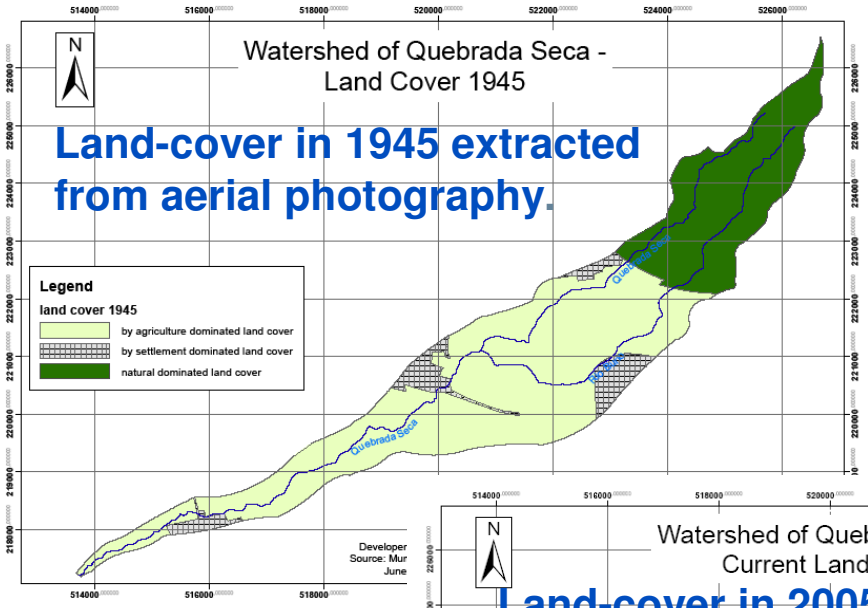
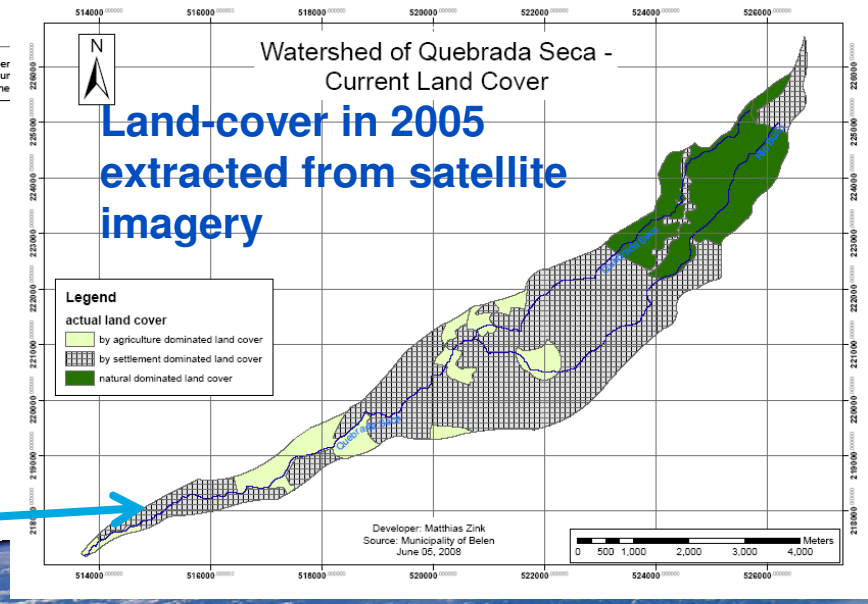
Case Study: Costa Rica

San Antonio de Belen, near San Jose, Costa Rica, now facing more frequent and more intense floods without the need to introduce the potential impacts of climate change





San Antonio de Belen

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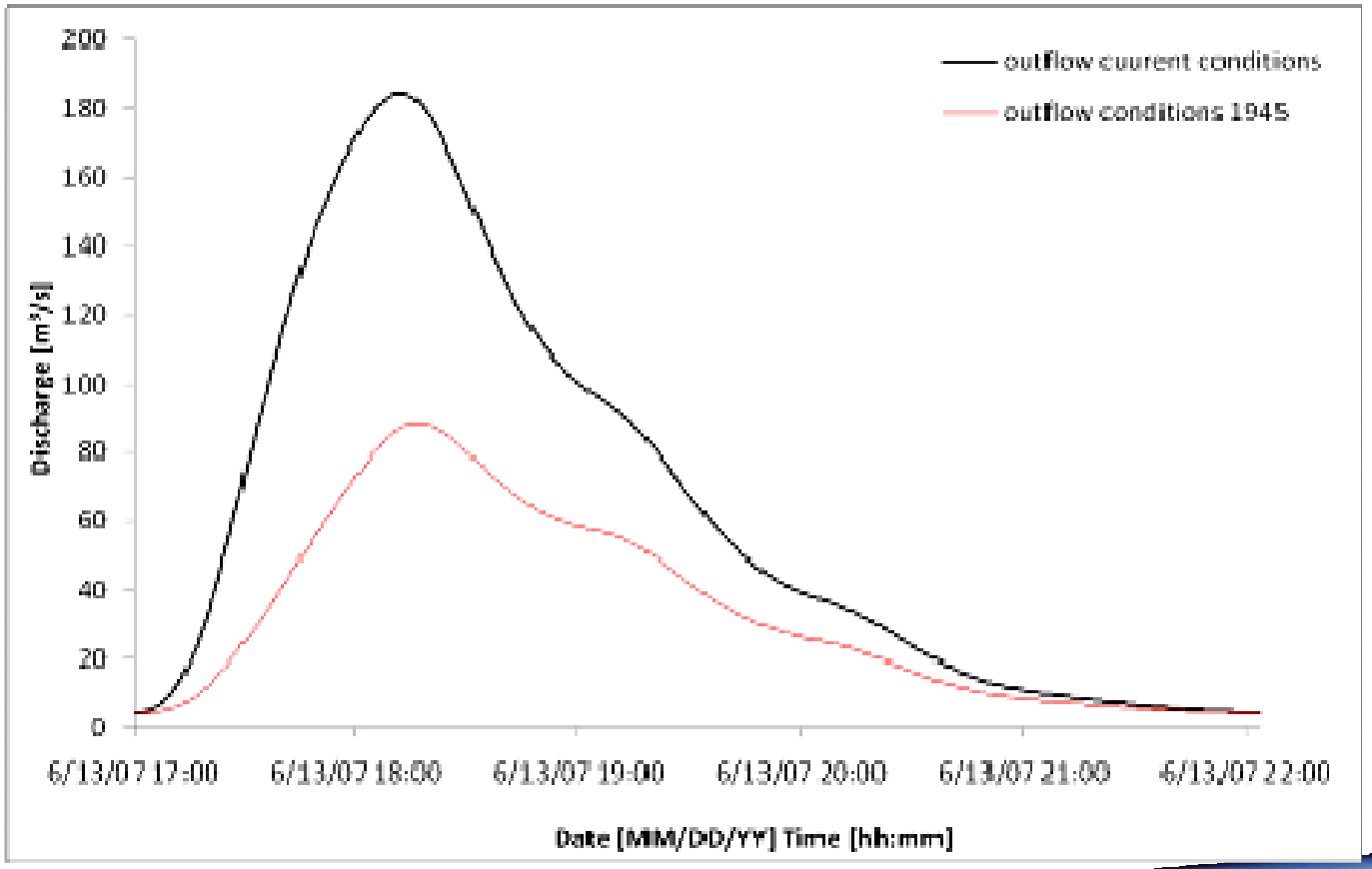
Case Study: Costa Rica

Changes in the discharge using same conditions of rainfall for an event in 13 July 2007.



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Case Study: Volcanic Activity (INGV, Italy)

Satellite imagery allows experts to track the deformation of volcanic domes in case of volcanic activity.

For example in Mount Etna, Italy.

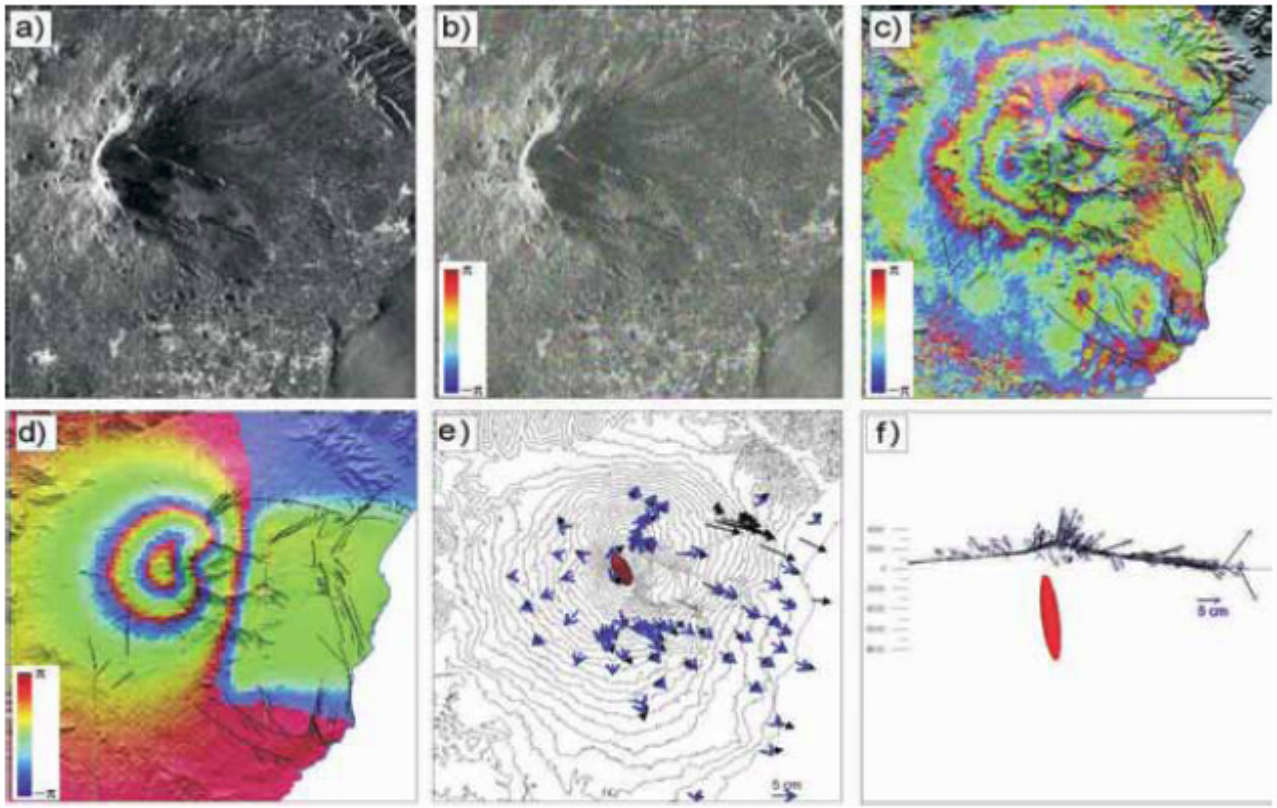

Figure 3: This image shows: a) ERS image. b) Phase interferogram obtained by combining an ERS pair from 20 July 2005 and 5 July 2006. c) Interferogram obtained by subtracting the terrain model. d) Synthetic interferogram obtained by inverting GPS data. e) GPS displacement vectors (July 2005 -July 2006). The black arrows represent the horizontal displacement vectors and the blue are those modelled as compatible with a volcanic pressure-source (in red). f) Cross section showing the source model in red.

C. Spinetti et al, Geoinformation for Disaster and Risk Management – Examples and Best Practices JBGIS- UNOOSA, 2010.

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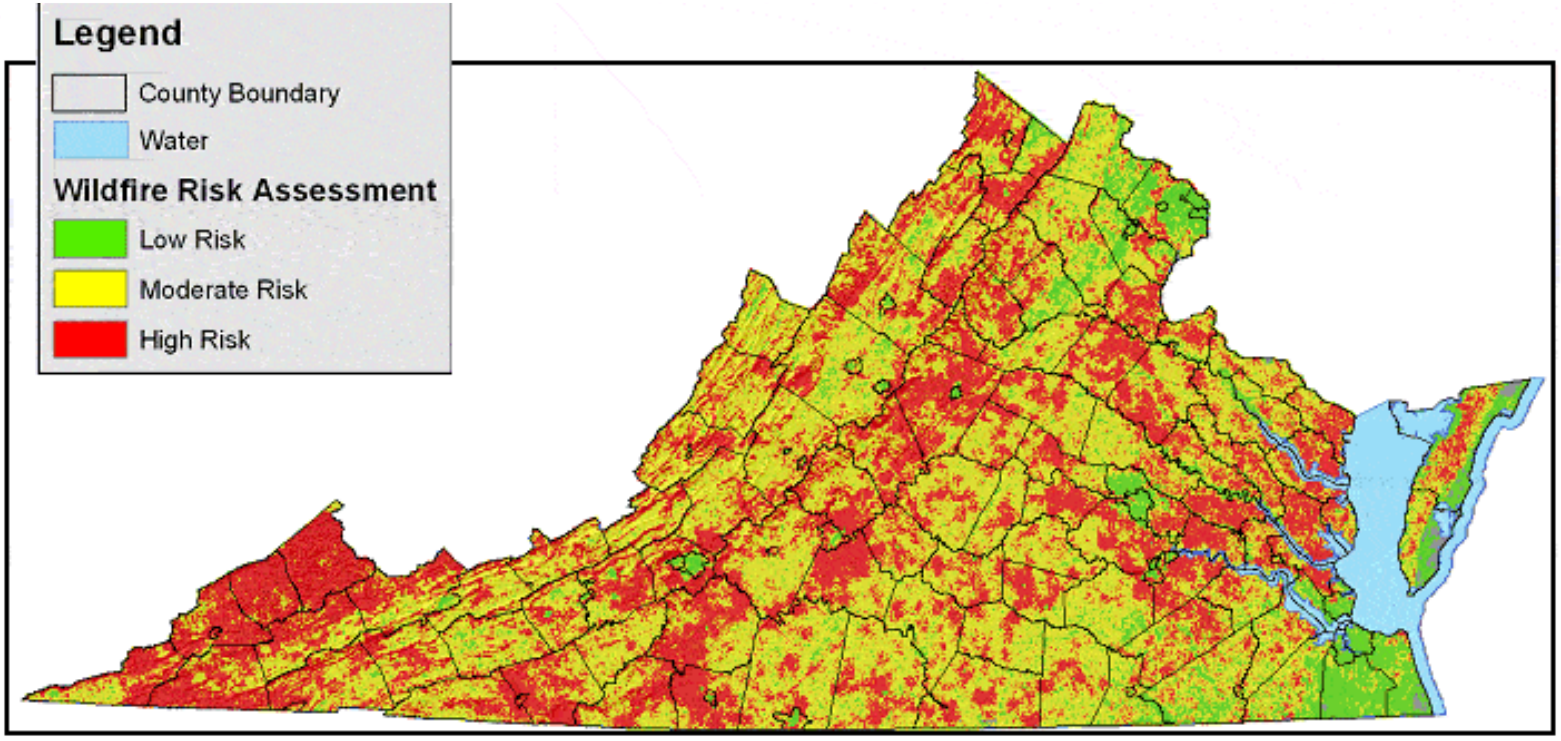
Case Study:
Forest fires

GIS-based Wildfire Risk Map

- Slope
- Aspect
- Landcover
- Distance to roads
- Distance to railroads
- Population density
- Fire occurrence history



http://www.dof.virginia.gov/gis/

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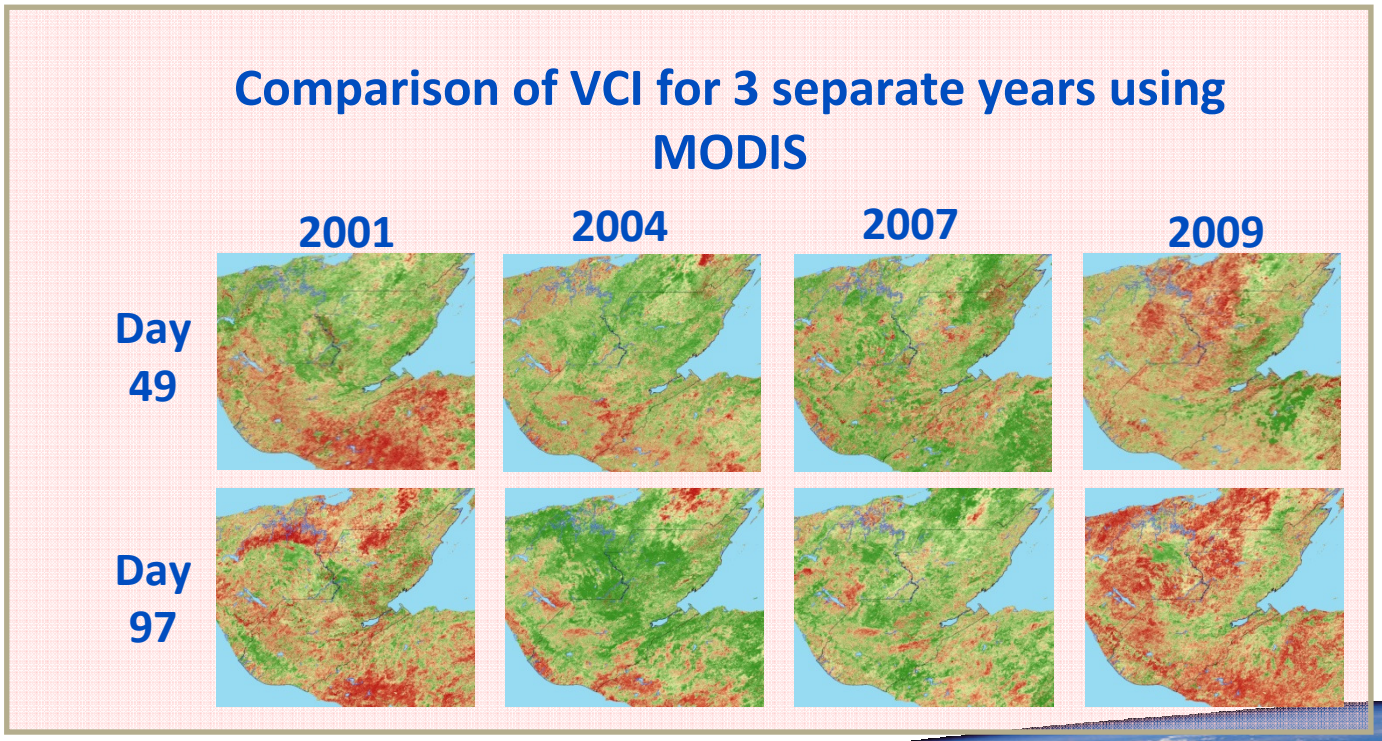
Case Study: Drought in Guatemala

Improving Drought early warning in the Dry Corridor of Guatemala

Using archived satellite imagery to compare the condition of the vegetation at a particular month of a year and the condition of vegetation for a year in which there was a severe drought using satellite imagery.



UN-SPIDER and CONRED

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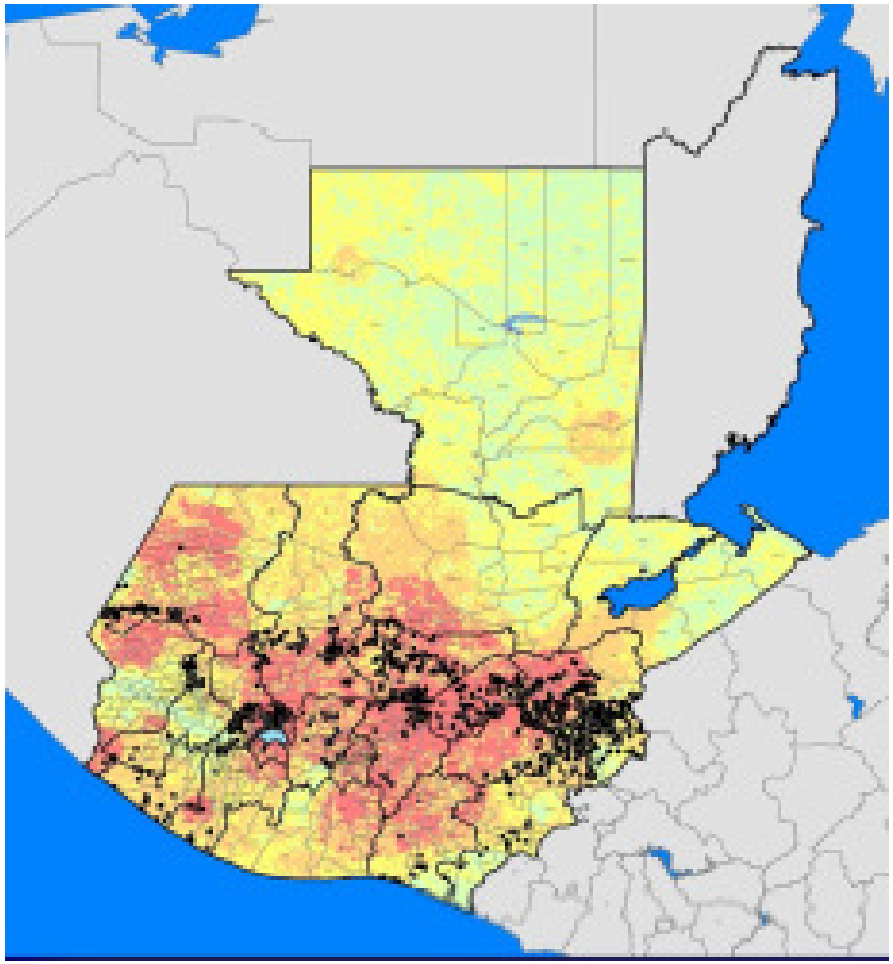
Case Study: Drought in Guatemala

Tracking drought in Guatemala using space-derived vegetation indices (EVI)



B. Pineda F.: CONRED, Guatemala, 2012

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They way forward:

I To institutionalize the use of space-based information in developing countries through the establishment of technical, inter-institutional teams that process satellite imagery to generate relevant geo-spatial information;

II To train these technical groups on the use of methodologies targeting different hazards;

III To enhance horizontal cooperation among such groups through synergies.

IV To enhance the process of generation of information through Spatial Database Infrastructures which are aimed to facilitate the exchange of geo-spatial data.

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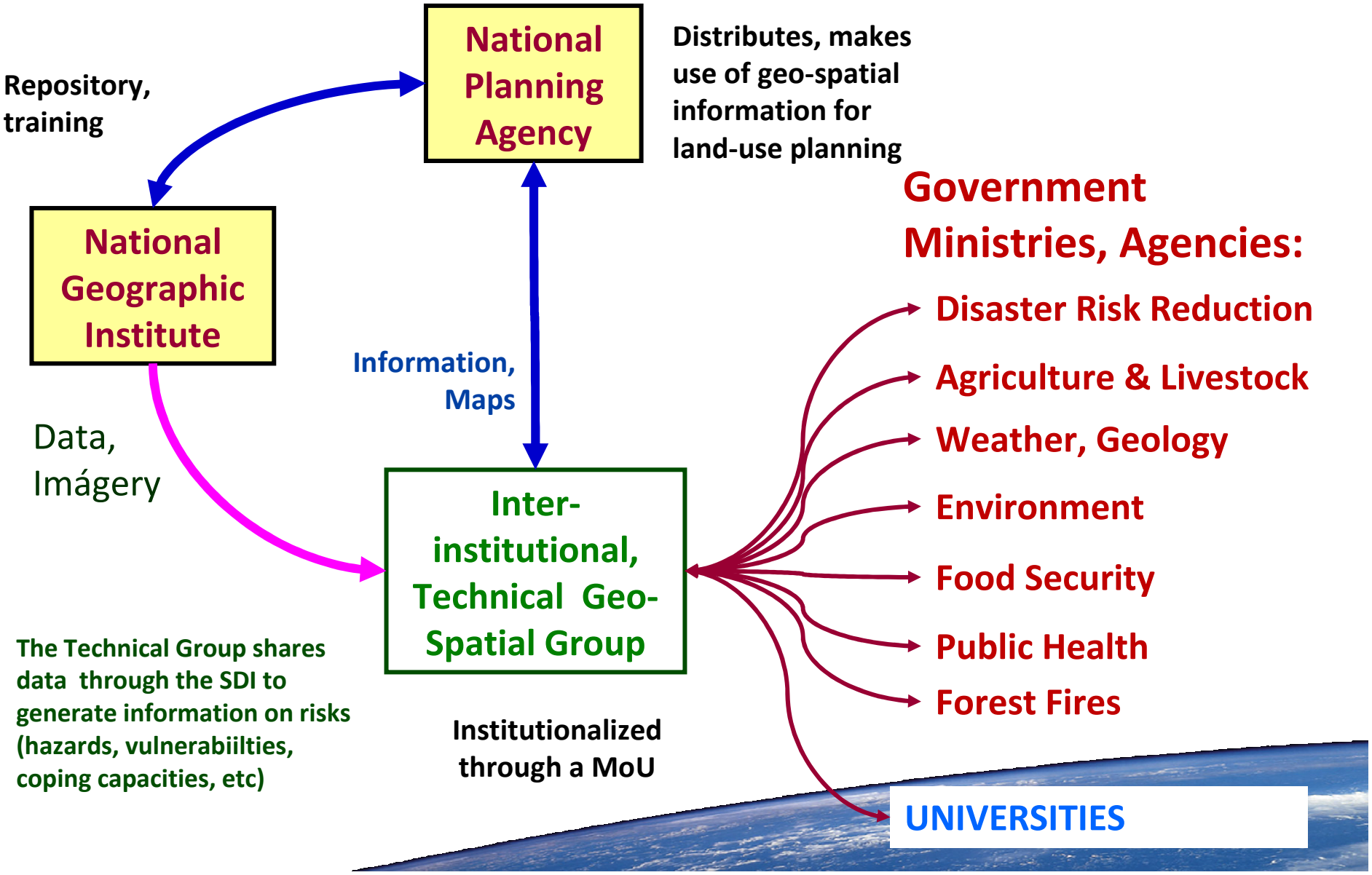
On-going efforts On SDIs…



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Thanks for your kind attention

http://www.un-spider.org