Landslide hazard mapping, monitoring and management using remote sensing

Group 7

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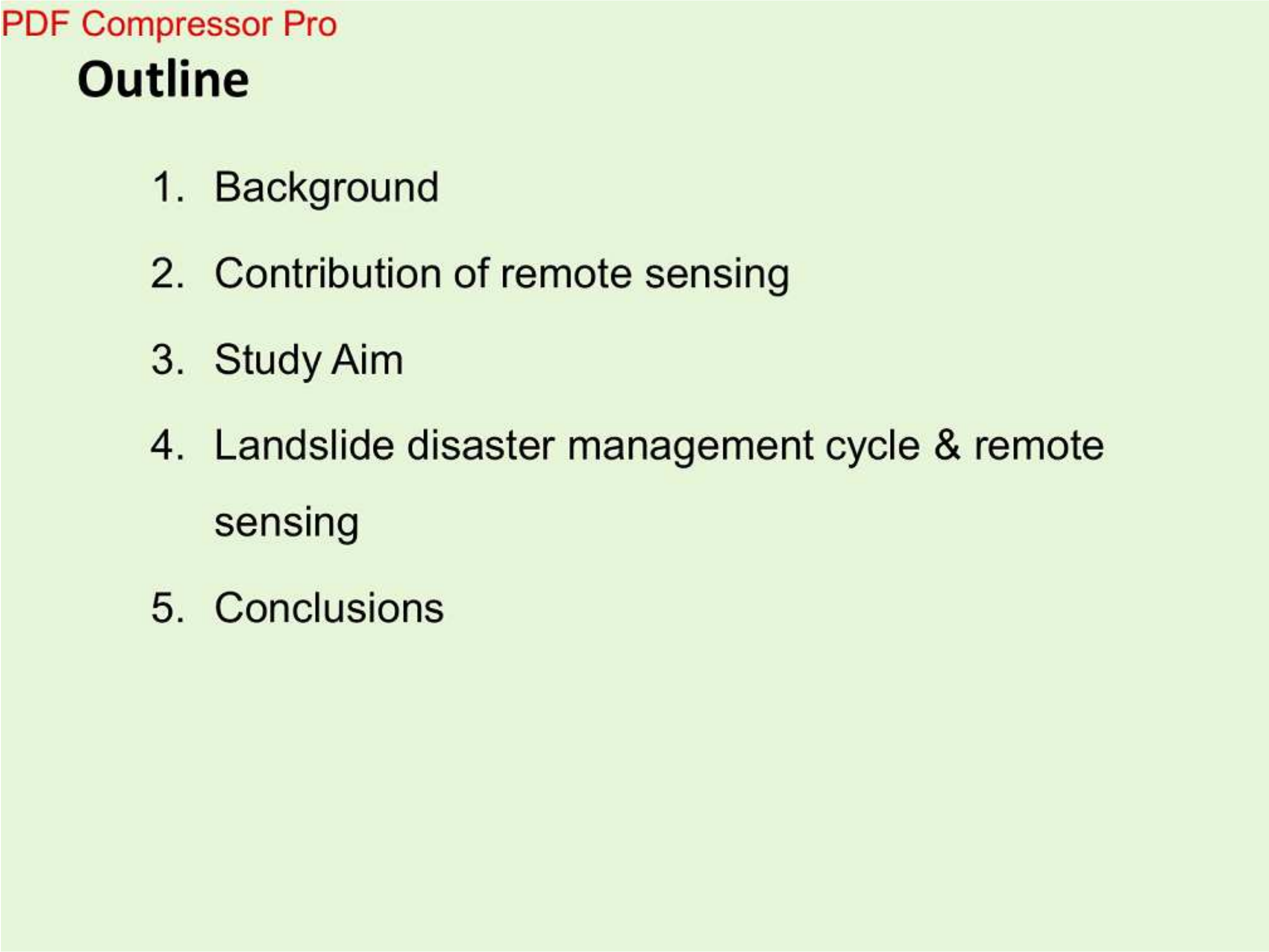


Outline

1. Background
2. Contribution of remote sensing
3. Study Aim
4. Landslide disaster management cycle & remote sensing
5. Conclusions

Background: Landslide disaster

- One of the most dangerous and devastating natural disasters
- Many hilly regions are regularly affected
- During 1990-2012, 5.62 million people were affected across the world

Background: Impacts of Landslide

- Responsible for loss of lives, properties and environmental damage

Banjernegara Landslide, Indonesia, 2014

http://blogs.agu.org/

Ugandan, Africa, 2010

http://burmacampaign.org.uk/

Hiroshima, Japan, 2014

http://www.huffingtonpost.com/

Shenzhen, China, 2015

http://www.boston.com/

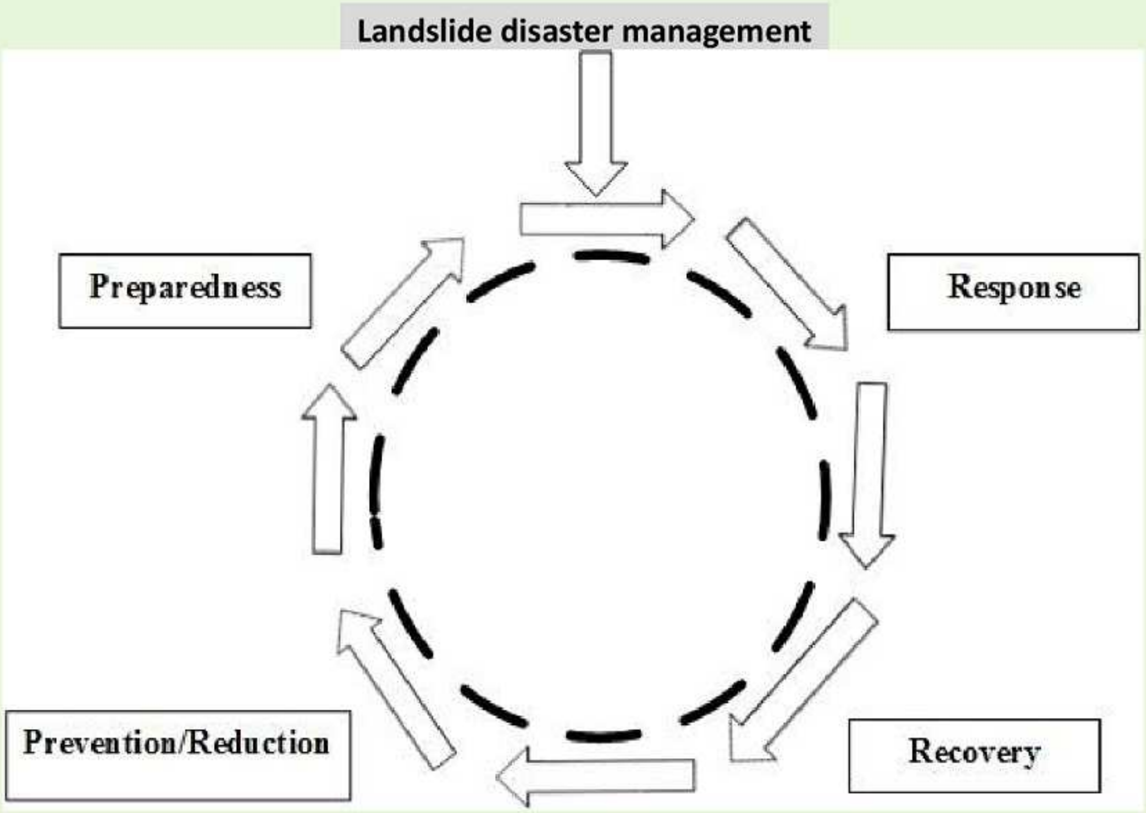
Background: Contribution of Remote sensing

- Satellite remote sensing are a potentially effective tools for managing and reducing the impacts of landslide by-
  - Providing the high resolution satellite images pre- and post-disaster.
  - Providing up to date satellite derived data for identifying the present and future risk.

Study Aim

To give an overview about the uses of remote sensing for landslide mapping, monitoring and management

Landslide disaster management cycle



Landslide disaster management

Preparedness

Response

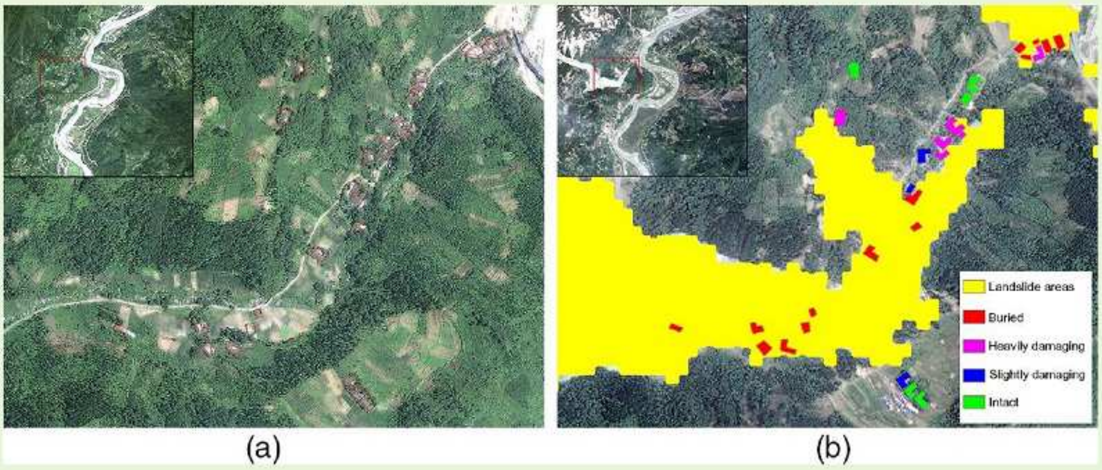
Recovery

Prevention/Reduction

Response and recovery

Process: Impact and recovery assessment

Data required	Sensor Example	Type of information
Moderate to high resolution SAR, Optical imagery	Radarsat, SPOT, ASTER, Quickbird, Ikononos, WorldView, UAV	Area, amount, rate and type of impacts on particular landscapes; Recovery -debris removal, reconstruction, vegetation regrowth



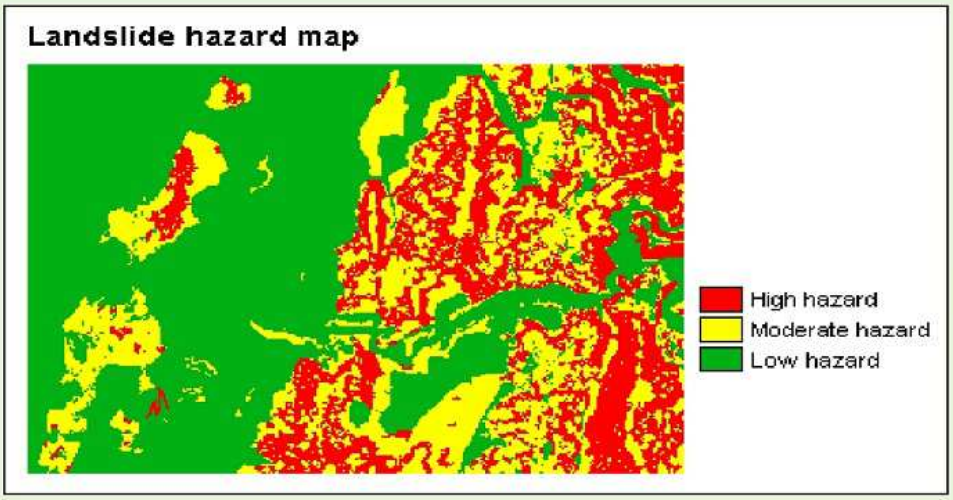
(a) (b)

Source: http://remotesensing.spiedigitallibrary.org/

Prevention and reduction

Process: Risk assessment

Data required	Sensor Example	Type of information
Moderate to high resolution DEM, SAR, and optical imagery	Airborn LiDAR, Radarsat, SPOT, ASTER, Quickbird, Ikononos, Worldview, UAV	The key infrastructures and areas at risk at present with spatial location, level of risk, factors liable for risk, and suitable mitigation options

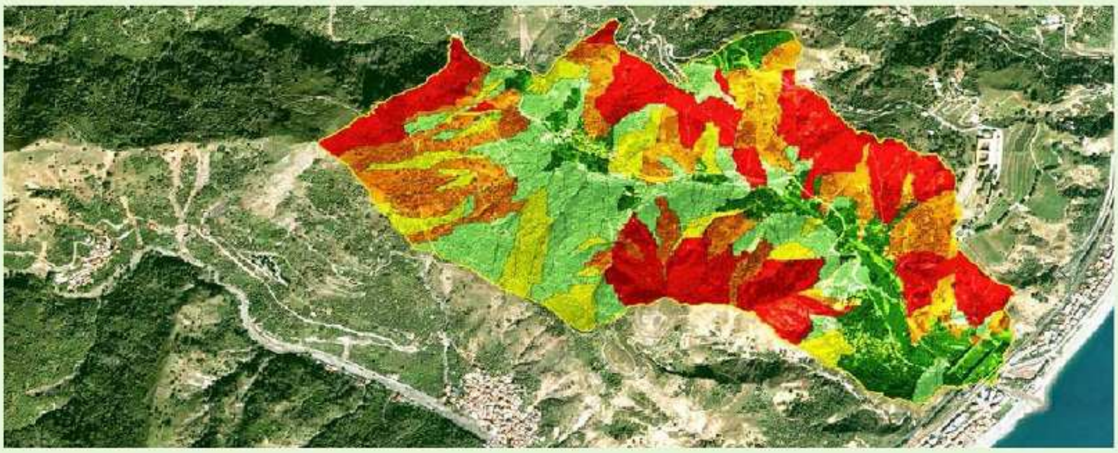


Source: http://www.itc.nl/ilwis/applications

Preparedness

Process: Risk modeling

Data required	Sensor Example	Type of information
Moderate high resolution SAR, Optical imagery, DEM	Aerial photography, Airborne LiDAR, MODIS Radarsat, Quickbird, Ikononos, UAV	The key infrastructure and areas that would be at risk in the future with spatial location



Source: http://www.lampre-project.eu/

Example: Collection of high resolution data using UAV

Conclusions

- The study demonstrates that remote sensing can provide spatial information in a spectrally, temporally and specially relevant context.

- Remote sensing derived spatial information can be used by planners and local administration for landslide disaster management to reduce the impacts on people, property and environment.

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Acknowledgements

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