Landslide risk governance and resilience

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Fatal landslide events

Non-seismically triggered from 2004 to 2016 (Froude and Petley, 2018)
SCOPUS search with different “keywords”
SCOPUS search with different “keywords”

Number of articles

landslide
risk
mitigation

1268
SCOPUS search with different “keywords”

- Landslide risk mitigation: 1268 articles
- Landslide disaster risk reduction: 477 articles

Number of articles
The landslide risk management framework
(Fell et al., 2005)

Risk management guidelines
(ISO 31000, 2018)

Risk defined as “the effect of uncertainty on objectives”
The two “sections” of this lecture

1. **Community participation** for landslide disaster risk reduction
   (main source: https://link.springer.com/article/10.1007/s10346-019-01246-z)

2. The role of **landslide early warning systems** in increasing **community resilience**
   (main source: https://www.landaware.org/)
1. Thematic collection of papers (Klimes et al., 2019)

✓ (Maes et al., 2019)
Social multi-criteria evaluation to identify appropriate disaster risk reduction measures: application to landslides in the Rwenzori Mountains, Uganda

✓ (Hostettler et al., 2019)
Community-based landslide risk reduction: a review of a Red Cross soil bioengineering for resilience program in Honduras

✓ (Klimeš et al., 2019)
Community participation in landslide risk reduction, a case history from Central Andes, Peru

✓ (Raska, 2019)
Contextualizing community-based landslide risk reduction: an evolutionary perspective
Participatory social multi-criteria approach
(Maes et al., 2019)
Soil bioengineering for resilience

(Hostettler et al., 2019)
Local community – scientists cooperation
(Klimes et al., 2019)

Community attitudes: mistrust (felt largely on their own); catastrophic landslide understood as a result of external anthropogenic activity; adopted traditional DRR measures were inadequate, but considered as sufficient; external intervention is not welcome.

External actor attitudes: top-down technical approach did not consider the R.G. community distrust in external actors, insensitive attitude to the community’s cultural specifics, and political situation; different knowledges of the landslide problem.

DRR project acceptance and active community participation on implementation and protection of the project installations against surrounding communities; application of the hazard map for community development.

Active collaboration with the community; context-sensitive risk communication; knowledge sharing, maintaining community responsibility to decide and act independently according to their local needs.
An historical perspective
(Raska, 2019)

Czech republic
Remarks

- The ultimate aim of any community-centered DRR should be improving community governance of landslide risk so that the community should be able to continue the adopted risk reduction strategy on its own as an integral part of its regular responsibilities.

- Achieving this aim requires a number of carefully designed steps and approaches—including adoption of national or regional wide legislation—and repeated external supervision after the termination of the main DRR project.

- Long-term involvement of external actors in permanent community-based risk reduction approaches requires changes in the typical policies to fund research and NGOs adopted by national and international agencies.

- External stakeholders need to fully recognize and reflect on the dynamic nature of the structures that determine the ability of a community to be successfully involved in landslide DRR projects.

- Multidisciplinary engagement in global landslide DRR effort is very important to reduce landslide risk effectively.
2. LandAware – the international network on LEWS

https://www.landaware.org/
Landslide early warning systems (LEWS): activities, components

Di Biagio and Kjekstad (2007)
Four activities

Intrieri et al. (2013)

I
DESIGN
• Geological knowledge
• Risk scenarios
• Design criteria
• Choice of geo-indicators

II
MONITORING
• Instruments installation
• Data collection
• Data transmission
• Data elaboration

III
FORECASTING
• Data interpretation
• Comparison with thresholds
• Forecasting methods
• Warning

IV
EDUCATION
• Risk perception
• Safe behaviours
• Response to warning
• Population involvement

Di Biagio & Kjekstad (2007). Early Warning, Instrumentation and Monitoring Landslides. 2nd Regional Training Course (RECLAIMPhase II)
Early warning systems (EWS): definition and elements

An integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables *individuals, communities, governments, businesses and others* to take **timely action** to reduce disaster risks in advance of hazardous events

(UNDRR)
EWS for weather-induced landslides: components

**WARNING SYSTEM**
- Warning dissemination
- Communication & Education
- Community involvement
- Emergency plan

**WARNING MODEL**
- Warning criteria
- Warning event

**LANDSLIDE MODEL**
- Weather
- Monitoring
- GEO characterization
- Landslide event

LandAware: cooperation agreement (July 2020)

LandAware is a multi-disciplinary, knowledge-based, non-profit network of individuals (managers, researchers, stakeholders) who are interested in cooperating for addressing and promoting issues related to Landslide Early Warning Systems (LEWS). The primary purpose of LandAware is to share experiences, needs and innovations among LEWS experts and to develop and promote guidelines and best practices for upcoming LEWS.
LandAware: bottom-up structure

General Assembly
Agenda set by Executive Committee, presided over by President

All WG-Chairs + Other members (i.e. WG-Associates) + Observers without voting rights

Executive Committee

All WG-Chairs (electing the president among them, for a term of two years)

Working Group «A»
1 WG-Chair
(1 WG co-Chair)
WG-Associates
Observers

Working Group

Working Group

Working Group «Z»
1 WG-Chair
(1 WG co-Chair)
WG-Associates
Observers
LandAware: currently active working groups

1. Catalog of LEWS
2. Communication-Networking
3. Communication with stakeholders
4. eLearning
5. Innovations
6. LEWS data
7. Operational LEWS
LandAware: currently active working groups

1. Catalog of LEWS
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community resilience
LandAware: currently active working groups

1. Catalog of LEWS (Hiroaki Nakaya, Graziella Devoli)
2. Communication-Networking (Stefano Luigi Gariano)
3. Communication with stakeholders (Katy Freeborough, Joanne Robbins)
4. eLearning (Michele Calvello)
5. Innovations (Manfred Stähli)
6. LEWS data (Dalia Kirschbaum, Ben Mirus)
7. Operational LEWS (Graziella Devoli)
LandAware: executive committee
212 Members (as of May 2021)
LandAware: network-wide activities

Over 300 participants
from 51 countries

https://www.landaware.org/blog/
Thank you for your attention

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https://michelecalvello.wordpress.com/publications