August, 2017
Issue 7

AfReSlide *Newsletter*

AfReSlide - Landslides in Equatorial Africa:
Identifying culturally, technically and economically feasible resilience strategies

Dear reader,

AfReSlide has now entered its final year. Now is the time to finalize and disseminate the research results to all stakeholders that contributed to the project and to all those concerned about landslide risks in Central Africa. It is also time to look at the future and see how we can build upon the success of AfReSlide to identify and tackle new relevant research challenges contributing to landslide risk reduction.

The researchers of AfReSlide are currently working hard to finalize their PhD theses and to submit several manuscripts for scientific publications. In parallel we start reflecting on the best ways to communicate our findings to the public, using locally designed posters, policy briefs and closing workshops at the start of 2018. Your ideas and input on how to ensure that research results can have an impact on risk reduction actions and policies is most welcome!

In this issue you will read about the first regional landslide susceptibility map produced for the Rwenzori Mountains region, based on the extensive field works of the last years. Next, the research questioning the relevance of risk zonation, and its application to the city of Limbe in Cameroon, is summarized. The research stay of Kewan Mertens at Oxford University (UK), to analyze the link between landslide risk and land markets is also presented briefly. Finally, this newsletter introduces a new project, called South initiative, started by the colleagues of Mountain of the Moon University and AfReSlide partners. This small development project funded by VLIR UOS aims at documenting natural hazards in the Rwenzori Mountains with local geo-observers, and at developing tools to raise awareness and to develop natural resource community planning.

News flash

- **Early August 2017, severe floods in Kasese district (Uganda) caused at least four deaths, including three children. These floods are due to severe rainfall in the previous weeks.**

- **End of August 2017, landslides occurred in Bundibugyo district (Uganda), with at least one fatality.**

Provide us with your observations on these or other events in your region!

Again, I would like to thank all of you who have contributed and shown interest in the AfReSlide project over the last three years. AfReSlide will run until June 2018 but be sure that the AfReSlide partners will remain active in tackling the issue of geohazards and risk reduction in Central Africa for many years to come. You are all warmly encouraged to continue sharing your observations and suggestions via our project emails.

Enjoy the reading of this newsletter

Matthieu Kervyn – AfReSlide coordinator

We need your input!

In case you have information to share about landslides in Uganda or Cameroon, please contact us!
afreslide@vub.ac.be

Don't forget to subscribe to our newsletter!

Landslide susceptibility assessment for the inhabited zone of the Rwenzori Mountains

Based on landslide inventories collected through field work in the inhabited Rwenzori region in 2014 and 2016, the first regional and local landslide susceptibility assessments for this area are produced. The Rwenzori is a diverse region, full of unexpected observations. The same appeared to be true for the investigation of landslide susceptibility in the region. Bundibugyo district, with its hilly lowlands has less steep slopes than the highlands of Kasese and Kabarole, yet this region appears to be very landslide prone due to the presence of rift-alluvium, a clay-rich material that is at least several tens of meters thick and provides a medium for deep-seated landslides. But also the Kilembe and Bugoye valley appear as very landslide prone, as well as the southern portions of Kasese district. The Bugoye and Kilembe valley are exploited for hydropower. The potential impact of landslides on the waterflow, sediment delivery and electricity production needs to be assessed. In Kabonero, a high landslide susceptibility seems to coincide with a lower population density and vice versa. Landslides in the whole Rwenzori region are mostly related to steep slopes, and places with high rainfall. We hope this susceptibility map will be used to increase our understanding of where landslides happen in the region and can be used as a tool by researchers and policy-makers to direct landslide risk reduction research and efforts. For more information on how the map is built please visit www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-259/. We would like to thank all the guides, the researchers at Mountains of the Moon and Busitema University and the families hosting us in the Rwenzori for supporting this study.

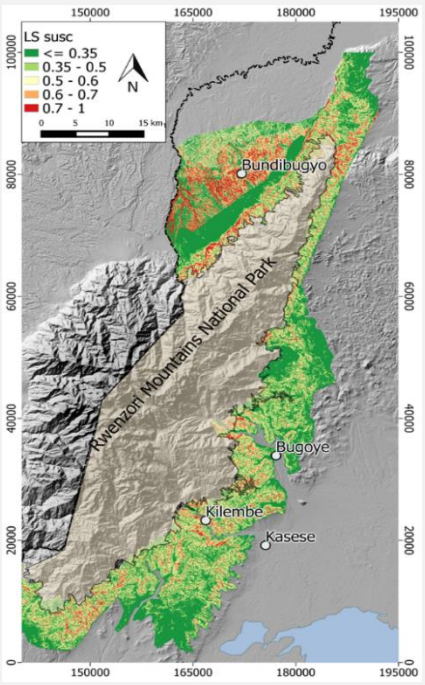

Fig 1. Landslide susceptibility map of the Rwenzori Mountains, West Uganda.

Any question or comment on these maps are most welcome and can be directed to afreslide@vub.ac.be

Enhancing community-based natural resource management in the Rwenzori Mountains

This year, a new VLIR South Initiative was launched in the Rwenzori mountain area, more specifically in the districts of Kabarole, Kasese and Bundibugyo. It involves the collection of data by 21 geo-observers through the use of a KoBo-toolbox installed on a smart phone and taking daily records about the daily weather conditions and any other observations related to changes in natural resources. The hazards being targeted for data collection include: landslide, flood, hailstorm, lightening, drought, pest and disease, windstorm, and earthquake. Other than data collection, designing a game prototype for sensitizing communities on natural resource and disaster management is also being developed.

Rose Katutu, a Masters student at the Natural Resources Management department of the Mountains of the Moon University in Fort Portal, plays a key role in the general project administration as well as in monitoring the activities done by the different geo-observers. The target area of these geo-observers are well distributed over the entire Rwenzori Mountains region. The hazard-data from the geo-observers are carefully checked and stored in a central database which will be used for research purposes by the AfReSlide partners. These data are edited and monthly reports are prepared.

Also interested in what will come out of this community-based data collection? We hope to share with you more information in the following newsletter(s).

Fig 2. Field testing of the hazard protocols on day 2 of the first training in Mitandi village (Kateebwa sub-county) on a landslide that occurred in 2010.

The economics of landslides: AfReSlide at the University of Oxford

Kewan Mertens represented the AfReSlide project and its partners at the University of Oxford. As a visiting PhD researcher he acquired new skills in economics and presented the latest evolutions in his research. During his stay he progressed on both his research on farmers' intentions to plant trees and his research on how land markets are affected by the presence of landslide risks.

A fundamental insight, that motivates Kewan's research, is that farmers living in the Rwenzori Mountains necessarily take landslides into account when making decisions. Yet, sometimes they are not aware of the importance of landslides in their decisions. Kewan tries to understand how the presence of landslides determines income strategies and investments made by farmers in the region. He therefore makes use of techniques and insights from the discipline of development economics.

The University of Oxford, in the United Kingdom, has a strong research group specialized in development economics. It also has a long-lasting experience in research on disasters. To improve his skills in economics and to share his insights about landslides in Equatorial Africa, Kewan therefore resided at the University of Oxford for three months. During this research stay he met various researchers specialized in the economics of disasters. He also presented the work of AfReSlide several times.

Among others, Kewan presented his study on farmers' intentions to plant trees at the CSAE conference. As such, he successfully increased the awareness about landslides in Uganda and contributed to the international outreach of the AfReSlide project. Kewan also made significant progress in his research on the interaction between land markets and landslide risk. This will likely result in a publication soon.

Disaster risk zonation in Limbe city, Cameroon

The city of Limbe in South West Cameroon is known to be disaster-prone. Citizens are forced to settle in unsafe terrain, ranging from wetlands to unstable hillslopes due to the city's geographical location and its economic attraction. Following the fatal landslides and floods in 2001, a local crisis committee identified affected areas and declared them 'risk zones' to prevent further exposure from then onwards.

Fig 3. House located within the so-called 'risk zones' (Note: RZ stands for 'Risk Zone').

In Cameroon, risk zonation policy is basically interpreted as a restriction policy regarding settlement and encroachment in high risk zones. Nevertheless, this policy does not prevent people from continuing to live, without official permission, in hazardous zones and under extremely vulnerable conditions. As a result, disaster risk remains very high.

An important gap between policy and practice thus exists. We found that authorities from national to local level portray the issue of risk reduction as a purely technical issue based on objective scientific assessment of risk, while the used assessments are not that scientifically valid. It thus becomes difficult for citizens to contest the proposed disaster risk reduction measures. We argue that risk zonation can lead to risk accumulation and increased vulnerability instead of risk reduction. This was the observed situation in Limbe city which is characterized by ad-hoc risk assessment and poor law enforcement of the current risk zonation policy.

Citizens living in so-called risk zones are thus left on their own to find potential measures to reduce disaster risk. Some measures we have observed are cheap slope stabilization on steep slopes (Figure 4) and community work to keep gutters clean. It might be interesting to inventorize these and look for potential ways to improve and extrapolate these.

Fig 4. Slope stabilization using car tyres, in a so-called 'risk zone'.

Upcoming missions & conferences

In the following months, research is planned in Cameroon and Uganda:

- Midas Baert, a master student from KU Leuven, is currently in the Bamboutos to investigate why some households have shifted their house in order to reduce their exposure to landslide risk, while others haven't. This will increase our understanding on which factors are important determinants of willingness to shift. Midas will be in Cameroon from 08/08 until 17/10 2017.
- Kewan Mertens, the PhD student from the KU Leuven conducting research on socio-economic impacts of landslides has travelled to Cameroon from 10 to 26 August to help Midas Baert to set up his research.
- End of the project field mission in February 2018

Scientific output

1. Publications

- Maes, J., Kervyn, M., de Hontheim, A., Dewitte, O., Jacobs, L., Mertens, K., Vanmaercke, M., Vranken, L., Poesen, J., 2017. Landslide risk reduction strategies: A review of practices and challenges for the tropics. *Progress in Physical Geography*, Vol. 41: 191–221.
- CAARD, 2016. AfReSlide: Landslides in the Rwenzori Mountains. *The Rwenzori Outlook Magazine*, 1: 28-29.
- NASA, 2017. Overlooked landslides – Image of the day. Available at: https://earthobservatory.nasa.gov/IOTD/view.php?id=89969&src=eorss-iotd
- Mertens, K., Jacobs, L., Maes, J., Kabaseke, C., Maertens, M., Poesen, J., Kervyn, M., Vranken, L., 2016. The direct impact of landslides on household income in tropical regions: a case study on the Rwenzori Mountains in Uganda. *Science of the Total Environment*, Vol. 550: 1032-1043.
- Kervyn, M., Jacobs, L., Maes, J., Bih Che, V., de Hontheim, A., Dewitte, O., Isabirye, M., Sekajugo, J., Kabaseke, C., Poesen, J., Vranken, L., Mertens, K. 2015. Landslide resilience in Equatorial Africa: Moving beyond problem identification! *Belgeo*.
- Jacobs, L., Maes, J., Mertens, K. et al. Natural Hazards, 2016. Reconstruction of a flash flood event through a multi-hazard approach: focus on the Rwenzori Mountains, Uganda. *Natural Hazards*, Vol. 84:851–876.
- Jacobs, L., Dewitte, O., Poesen, J., Maes, J., Mertens, K., Sekajugo, J., Kervyn, M., 2016. Landslide characteristics and spatial distribution in the Rwenzori Mountains, Uganda. *Journal of African Earth Sciences*.
- Jacobs, L., Dewitte, O., Poesen, J., Delvaux, D., Thiery, W., Kervyn, M., 2016. The Rwenzori Mountains, a landslide-prone region?. *Landslides*, Vol. 13:519–536.

2. Recent conference presentations

Research of the AfReSlide project was presented at several conferences in France, the UK, South Africa and Belgium. In September, a presentation will be given in Italy.

- Jacobs, L., Dewitte, O., Kabaseke, C., et al., M. 2017. Landslide diversity in the Rwenzori Mountains (Uganda). In: World Landslide Forum 4, Vol. 2, Advances in Landslide Science (ed. Binod Tiwari), Springer Nature.
- Maes, J., Parra, C., Poesen, J., et al., 2017. A multi-policy level approach for landslide risk management in Uganda. In: World Landslide Forum 4, Vol. 3, Advances in Landslide Technology (ed. Željko Arbanas), Springer Nature.
- Jacobs, L., Maes, J., Mertens, K., et al., 2017. Flash floods in the Rwenzori Mountains – Focus on the May 2013 multi-hazard Kilembe event. In: World Landslide Forum 4, Vol.4, Diversity of Landslide Forms (ed. Nicola Casagli), Springer Nature.
- Mertens, K., Jacobs, L., Maes, J., et al.. (2017). Lower Risk Reduction Intentions Among Households Exposed To Landslide Risk: A Tentative Explanation. Oral presentation in Oxford (UK) and Parma (Italy)
- Mertens, K., Vranken, L., Jacobs, L., et al. (2017). Investing in land and simultaneously changing exposure to risk? Land transactions in a landslide prone region. Oral presentation at XV EAAE Congress, in Parma, September 2017.

Thank you note

We would like to thank all of you for your cooperation. Special thanks go to the geo-observers in the Rwenzori Mountains for their diligence and tremendous work. Over 170 occurrences of hazards have been reported over the past months, including pest and diseases, windstorms and landslides.