AfR*e*Slide *Newsletter*

AfR*e*Slide - Landslides in Equatorial Africa:
Identifying culturally, technically and economically feasible resilience strategies

Dear reader,

The AfR*e*Slide project has now been running for 3 years and is entering its final year. Major accomplishments have already been reached and some exciting research results are being finalized. This includes the first maps showing the spatial distribution of landslide-prone areas at regional scale for the Mt Rwenzori and Elgon in Uganda, and the Mt Bamboutos in Cameroon based on field data collected over the last years.

As reported in this issue of the newsletter, the research on the socio-economic component of landslide risk is also making great progress. The results of a second household survey conducted at the end of 2016 are now being analyzed to understand how the land market dynamics in the Rwenzori are influenced by landslide hazards and the reasons why some households settle in landslide-prone areas.

AfR*e*Slide activities are continuously conducted in collaboration with Ugandan and Cameroonian scientists and stakeholders. In this newsletter we acknowledge these scientific collaborations and present a new spin-off project funded by VLIR UOS for 2017-18. This project aims at developing participative environmental monitoring in the Rwenzori through the training of a network of geo-observers. An educative game to raise awareness and initiate policy discussions about natural risk management will also be designed and tested. We are looking forward to develop this project with partners of Mountains of the Moon University and all stakeholders, as it may serve as an example for other landslide-prone regions in Africa.

Finally, AfR*e*Slide also aims at providing specific recommendations for landslide-risk reduction. In that perspective a two-round consultation of stakeholders is currently being undertaken in the Rwenzori region to identify the most appropriate intervention measures and their key selection criteria. As reported in this newsletter, insights from this research will help to identify suitable recommendations and could again serve as a basis for implementation projects in other regions.

We more than ever count on and welcome your active participation and contribution to the AfR*e*Slide research and dissemination activities. Do not hesitate to contact us through the project email afreslide@vub.ac.be or via our website. Any information related to landslide events or management is of interest.

I wish you all a very prosperous and healthy 2017!

Matthieu Kervyn – AfR*e*Slide coordinator

News flash

- **Landslide on 27th of September, 2016, destroying two houses in Mount Elgon, Uganda (Mbale district)**
- **3 scientific articles published in the *Proceedings of the World Landslide Forum, 2017*, as well as one article in the first issue of *The Rwenzori Outlook Magazine*.**

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

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 mapping in the Mount Elgon region

Frequent landsliding is a major threat in the Mount Elgon region in eastern Uganda. These landslides affect the livelihood of the local population with damage to private property, infrastructure and even fatalities (Fig. 2). A field campaign in the summer of 2015 focused on the mapping of landslides in three sample areas within the Mount Elgon region.

Fig 2. Landslide on 27th of September, 2016, destroying two houses (Mbale district, 3 km northeast of Bufumbo, 1.0628°N 34.2723°E)

Complementary to this campaign, we recently undertook an additional 10-day mapping campaign (October 2016) in the framework of the VLIR-Surelive project. The goals were (1) to fill the gaps between the previously sampled areas, in order to have a better data coverage for the entire region, (2) to supplement the dataset with non-landslide sites that were generally lacking. Those data are required to calibrate and validate a landslide susceptibility model for the entire Mount Elgon region, i.e. a model that will help to identify the characteristics and spatial distribution of landslide-prone areas over the entire region.

During this field campaign ca. 180 landslides, 60 rockfalls and 170 non-landslide sites were mapped. Observations on the landslide type, land use and dimensions were recorded. For 75% of the slides, we have at least information on the period of occurrence and often we know the exact day. Remarkably, 85% of the dated landslides occurred in 2016. Moreover, almost 50 of the mapped slides occurred in a single event on October 5, 2016, during the field campaign. These recent landslides confirm that parts of the Mount Elgon region are very prone to landsliding.

The next step, will be to integrate all collected field data for producing a first detailed landslide susceptibility map for the Mount Elgon Region in Uganda.

Authors: Jente Broeckx, Betty Namazzi, Jean Poesen, Liesbet Vranken, Moses Isabirye.

Second household survey in the Rwenzori region

The socio-economic analysis about landslides in the AfReSlide project is progressing well. After assessing the impact of landslides on household income and investigating actions implemented at local level to reduce hazards, a second household survey was run in the Rwenzori region during the months of August and September 2016.

The purpose of this survey is to understand why some households are actually living in landslide-prone areas. We investigate the importance of landslide risk for land transactions. Who takes landslide risk into account when buying plots and to what extent does this affect who is being exposed to landslides? We are particularly interested in the role social norms can play in determining who is exposed to landslides, but also in differences regarding risk preferences, wealth and education level. The survey was performed on tablets. This allowed faster interviews, better quality and interesting interactions with the farmers. The enumerators were trained at the Mountains of the Moon University

(MMU), before going into the field for four weeks. During that time, around 400 household heads were interviewed and many of their plots have been mapped.

Fig 3. A team member taking notes while mapping a plot. Why is he not taking notes with his tablet? (Because the tablet is being used for taking this picture.)

Identifying appropriate landslide risk reduction measures for the Rwenzori Mountains

In order to identify appropriate landslide risk reduction measures for the Rwenzori Mountains, a two-phase social multi-criteria evaluation (SMCE) is being conducted using local knowledge of members of decentralised platforms for disaster risk reduction (DRR) at two scales: district and sub-county level. More specifically, two districts of the Rwenzori sub-region that are highly prone to landslides (Kasese and Bundibugyo districts) and their most affected sub-county (Mahango and Kirumya sub-counties) have been selected for analysis.
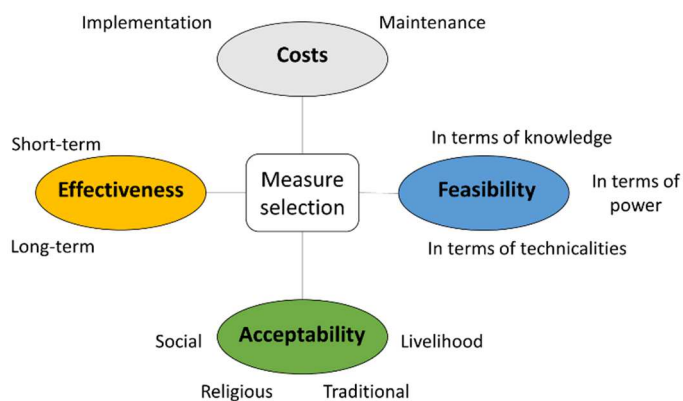

Fig 4. Main and sub-criteria to evaluate appropriate landslide risk reduction measures for the Rwenzori Mountains.

appropriate a DRR measure is perceived by local stakeholders (Figure 4).

In this first phase, conducted over the summer 2016, the members of the local DRR committees have evaluated the 25 landslide risk reduction measures against the various criteria. The second phase is planned for the start of 2017. This second phase involves the same procedure as the first phase but also includes the confrontation of the participants with the summary results of the first phase. Through an iterative process of matching local risk knowledge with scientific literature, the debate on appropriate landslide risk reduction to be recommended in the Rwenzori Mountains is expected to advance.

Based on scientific literature and discussion with members of the local DRR committees, a list of 25 landslide risk reduction measures was compiled for the Rwenzori Mountains. Additionally, four main criteria and 11 sub-criteria have been identified as relevant to evaluate how

Collaboration with local scientists

The AfR*e*Slide project builds on a strong collaboration with scientific actors from the targeted African regions. Contacts already existed with the University of Buea (UB, Cameroon), Mountain of the Moon University (MMU, West Uganda) and Busitema University (BU, East Uganda) and new contacts were established with the University of Dschang (Cameroon). Each field mission involves scientists or students from these institutions. These collaborations have been supported by small budgets available for sub-contracting and through additional projects (e.g. SureLive TEAM project with U Busitema).

The AfR*e*Slide partners applied and obtained funding for a new VLIR UOS South Initiative project to collaborate for 2 years (2017-18) with Mountain of the Moon University. This small funding will enable to further support ongoing actions, such as the maintenance and monitoring of the raingauge network, as well as developing two complementary actions : 1. Establishing and training of a network of geo-observers that will report on new landslides and other hazards in their

environment with the help of cellphones; 2. Development of a serious game to raise awareness of local stakeholders on the role of land use planning, demographic, socio-economic and risk reduction policies on controlling the impact of landslides and other natural hazards. The available budget in the South Initiative project will fully benefit the local MMU partners and will facilitate the transfer of research results to local policy makers.

Finally we continue to interact with promising and talented local bachelor, master and PhD students, conducting joined field work and making sure that they all benefit from the AfR*e*Slide data for their thesis. Some of them have now became junior lecturer (MMU) and continue collaborating with AfReSlide researchers. One AfR*e*Slide PhD student (J. Maes) is currently writing up a manuscript with a geography PhD student of UBuea (J. Molombe) based on shared data of risk zones in Limbe city. A PhD student from Dschang university is also in close collaboration with an AfReSlide PhD student (L. Jacobs).

Upcoming missions & conferences

In the following months, research is planned in Uganda:

- From 16th of January until 16th of February, 2017, J. Maes will conduct the second phase of the social multi-criteria evaluation to identify appropriate landslide risk reduction measures for the Rwenzori region at district and sub-county level.
- In February, L. Jacobs will collect additional data on recent landslides in Bundibugyo district. This will hopefully provide us more information on which types of rainfall events trigger these landslides.
- During the period of January-March Kewan Mertens will be a visiting PhD student at the Center for Studies on African Economies (CSAE) at the University of Oxford. At the end his stay he will also participate in the annual CSAE conference.
- In February 2017, the new South Initiative project with Mountains of the Moon University will be launched in Fort Portal. M. Kervyn and other AfR*e*Slide members will participate in the training of the selected geo-observers and will develop the serious game with partners of Mountains of the Moon University

Scientific output

1. Publications

- Jacobs, L., Dewitte, O., Kabaseke, C., Kervyn, F., Maes, J., Mertens, K., Nobile, A., Sekajugo, J., Poesen, J., Samyn, D., Kervyn, 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.
- Jacobs, L., Maes, J., Mertens, K., Sekajugo, J., Thiery, W., van Lipzig, N., Poesen, J., Kervyn, M., Dewitte, O., 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.
- 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 [I.F. 2.612], in press.
- Maes, J., Parra, C., Poesen, J., Vranken, L., Dewitte, O., Kabaseke, C., Bosco Bwambale, B., Mertens, K., Jacobs, L., de Hontheim, A., Kervyn, M., *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.
- Mertens, K, Jacobs, L., Maes, J., de Hontheim, A., Dewitte, O., Poesen, J., Vranken, L.,. Kervyn, M., *2017*. AfReSlide: Landslides in the Rwenzori Mountains. The Rwenzori Outlook Magazine, December 2016, 1, 28-29.

2. Conference presentations

Research of the AfR*e*Slide project was presented at several conferences in France, South Africa and Belgium:

- Dewitte., O., Jacobs, L., Maes, J., Mertens, K., de Hontheim, A., Poesen, J., Vranken, L., Kervyn, M., 2016. Landslides in Equatorial Africa: identifying culturally, technically and economically feasible resilience strategies. 35th International Geological Congress (IGC), Cape Town, South Africa, 27 August – 4 September 2016 (Oral).
- Jacobs, L., Maes, J., Mertens, K., Sekajugo, J., Thiery, W., van Lipzig, N., Poesen, J., Kervyn, M., Dewitte, O., 2016. Reconstruction of a flash flood event through a multi-hazard approach: focus on the Rwenzori Mountains, Uganda. 18th Joint Geomorphological Meeting (JGM) "Source to sink, from erosion to sedimentary archives", Chambéry, France, 27 – 29 June 2016 (Oral).
- Jacobs, L., Kervyn, M., Nobile, A., Poesen, J, Coleta. A.J., Dewitte, O. Synthetic stereo-mate generation for geomorphologic interpretation to improve landslide-susceptibility mapping in remote settings: Rwenzori Mountains National Park. Young Researchers Overseas - Royal Academy for Overseas Sciences, Brussels, 13 December 2016 (Poster).
- Maes, J., Vranken, L., Poesen, J., Mertens, K., Jacobs, L., Kervyn, M., 2016. Identifying appropriate landslides risk reduction strategies: a social multi-criteria evaluation for West Uganda Young Researchers Overseas - Royal Academy for Overseas Sciences, Brussels, 13 December 2016 (Poster).

Workshops:

- Mertens, K. Participation at workshop by Prof. Nicholas Magnan on Field Experiments to Inform Policy and Programs in Development Economics, AFEPA, UCL, Louvain, July 2016.
- Mertens, K., Vranken, L. Co-organization of summer school on Choice Experiments in Agricultural and Food Economics, KUL, Leuven, 28-29 June, 2016.