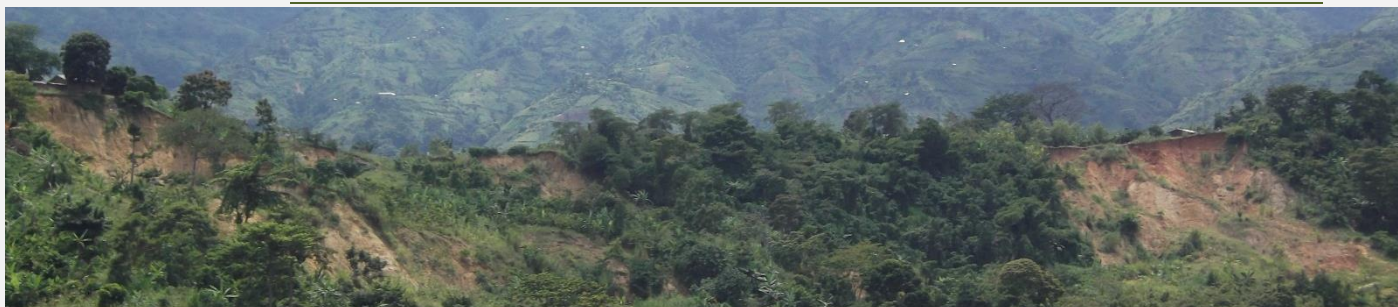




AfReSlide Newsletter

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



Dear reader,

The AfReSlide project is now in its second phase and has reached major milestones over the last few months. This includes the finalization of the landslide inventories for the Mt Rwenzori (Uganda) and the Mt Bamboutos (Cameroon) that will serve as an essential basis for the production of landslide susceptibility maps. For the Mt Elgon in eastern Uganda, a master student supported by the VLIR UOS Surelive project, produced the first regional landslide susceptibility map.

The analyses of the first large-scale socio-economic survey and of the multi-stakeholder disaster risk management in Uganda resulted in scientific articles submitted to international scientific journals. Finally, thanks to in-depth discussions with cultural leaders of the Bakonzo community, the anthropologist of AfReSlide has identified cultural traditions related to plants and trees used to prevent the occurrence of calamities.

In this newsletter, you will find a short overview of some of these new results as well as an account of two workshops conducted by AfReSlide researchers in the Rwenzori. It was a great occasion to discuss the best way to communicate the project findings with the affected communities, taking into account the traditional culture.

AfReSlide researchers will further be present in the study areas in the rest of 2016 with new focus group discussions to investigate the most effective landslide risk reduction strategies, and a second large-scale survey investigating the role of land transaction on the exposure of small-holder farmers to landslide risk. As since the start of the project, we encourage you to give them a warm welcome.

The tragic landslide events in Bundibungyo district during May 2016, reminds us once more that a better understanding of the factors controlling the location and timing of these events and the best way to mitigate their impacts remain a challenge. Keep sharing your observations and remarks with us through our website, email or meetings. Your input is crucial for the success and relevance of the AfReSlide project.

Matthieu Kervyn – AfReSlide coordinator

News flash


 In Bundibugyo district (Uganda), several fatal landslides occurred on the 10th of May, 2016. Over 15 people died as a consequence. At the same time floods destroyed several houses leaving many homeless (New Vision). The most affected sub-counties are Bubukwanga, Bukhonzon and Humya.



Figure 1: (New vision, 2016)

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!

Field work in the Bamboutos caldera, NW Cameroon

In May and June 2015, L. Jacobs went on the field to map landslides in the Bamboutos Caldera (NW Cameroon).



Fig 2. Illustration of a shallow landslide (Jacobs, 2015)

Together with Christan Guedjo (PhD student, Dschang University) and Hope Mungwa Feminui (Msc student, Buea University). Over 650 landslides were mapped in this region of ca. 100 km². The landslide density amounts in some places to almost 20 slides/km². The diversity of landslides was also remarkable: rock-slides,

debris-flows, mudflows, landslips... you can find a whole range of movements in this well-confined region.

In 2003, landslides caused over 25 fatalities and destroyed 309 houses in the caldera. More recent landslides were not associated with fatalities but mainly caused destruction of

cropland, resulting in the relocation of some villages. The Bamboutos represent one of the main hotspots for landslides in Cameroon. Mapping landslides in this region will allow us to better understand where the landslides occur and why. This is a relevant and necessary step towards risk reduction. For the Bamboutos we hope to present the first susceptibility maps by the end of 2016.



Fig 3. Illustration of the high landslide density (left) and of a complex landslide (right)

Indigenous knowledge on disaster risk reduction in the Rwenzori Mountains region

According to the Obusinga Rwenzururu kingdom Prime Minister, Enoch Muhindo, *'the Bakonzo are a spiritual community, not a scientific one. Anything that comes to them is determined by some spiritual power'*. *'Geologists could deal with the spirits and handle the disasters'*, said the King of the Bakonzo, Charles Wesley. One reason evoked for landslides is that people tend to trespass cultural norms, leading to landslides or river floods sent by Kythasamba - a major god - in reaction to their misbehaviors. Rain can also be sent by Nyabebuya as a punishment to mess with the land.

One essential means to calm the annoyed spirits is to grow traditional plants in which cultural beings enjoy dwelling. Given the plant's connections with the spiritual world, their use involves much more than their medicinal value. Plants, shrubs and trees can be used to cope with disasters; around 60 plants have been identified to prevent misfortune as a whole (the inventory is not complete yet). 36 plants are specifically connected to disasters like lightening, landslides, earthquakes, epidemics, social and family issues. These plants can be planted, displayed on a shrine, worn as an amulet or used as a vehicle of communication with spirits.

If a landslide (or any other hazard) has happened, there is a way to use the plant for coping with the landslide and another way to use the same plant for preventing a new landslide. If the landslide has led to casualties, you can make sure the spirit of the dead will not affect the remaining people by using the same plant in a different way. For

instance, *Dracaena steudneri* (known as *omughorogoro*) should be planted straight without branches on the four corners of an area which has slid, so that further landslides would be avoided. Besides, moral codes and specific requirements should be respected to handle plants. The way you are handling a plant matters as well as the words said. When a planted tree grows, it is considered a sign of the presence of spirits.

As the complexity of the procedure often requires the intervention of a specialist, depending on the context, customary leaders, like the *omuthawa*, plant them as well as *abathahwa* (ritual specialists renown to deal with cultural beings). As a whole, the *omuthahwa* is in charge of mitigating disasters and misfortune, taking measures to deal with hazards and giving explanations for their occurrence.

The Rwenzori is a region where radical social, cultural and political changes occurred in the last decades, in addition to uneasy habitat and climate conditions. Instead of staying passive, the Bakonzo use traditional explanations of life, customary leadership structures and rituals dealing with spirits to keep control over their lives. To consolidate social cohesion - often threatened due to land shortage, massive arrival of other cultural groups and regular disasters - and to strengthen the individuals' self-confidence, these traditions should be encouraged and even advertised, giving visibility to the rich cultural landscape of this misknown cultural group.

Community stakeholder workshops in Kasese and Bundibugyo, Uganda

In February 2016, we organized two workshops with each 40 participants from local governments, NGOs and farmer organizations in both Kasese and Bundibugyo district, Uganda. The workshops concluded the two-year VLIR SI collaboration on soil degradation processes between Belgian and Ugandan Universities, and stressed the ongoing presence of the AfReSlide project in the Rwenzori region.

The VLIR SI has identified the three main environmental degradation processes as being flash floods, landslides and erosion by water. Ugandan and Belgian researchers involved in the project reported other findings regarding disaster management policies and the impact of landslides on farmers' income. Its final workshop allowed the environmental officers, cultural leaders and researchers to identify the way forward. We discussed about three fundamental questions. How to reconcile scientific and cultural views? How to communicate about the results? And, how do these degradation problems interact with institutional processes like land markets?



Figure 4. Workshop at Bundibugyo district (2/02/2016)

Scientific and cultural interpretation

Science and culture are complementary, rather than opposing forces. That is the main conclusion of the discussion! Cultural explanations can be taken as working hypotheses for scientists, while science can be used to identify positive environmental effects of cultural practices. Cultural leaders stress that their culture is dynamic and not opposed to change, but that it should be taken into account more systematically. Integration of the scientific results into local practices could be assured by first sensitizing the different levels of the cultural hierarchy.

Communicating results

Involving cultural leaders and other local hierarchies is key for promoting the adoption of proposed measures against landslides. According to the workshop's participants, good communication channels are the radio, paintings on schools, WhatsApp and Facebook, as well as gatherings at market and church days. If using maps, it is very important to use local symbols so that people can understand and recognize their churches, mosques, rivers and trading centers. In Bundibugyo district, a partnership with the Ugandan Red Cross Society is important for long-term cooperation and the implementation of research findings.

Landslides and land markets

In Mahango sub-county, selling land with a landslide risk is difficult because the price is low and limited investments have been made on these lands. Moreover, as most land is customary, it has to be sold to other clan members, who are often well informed of the landslide risk. In Bundibugyo district the story is different, as most people do not take into account landslide risk when buying land. In general, only rich households do take landslide risk into account. They do not sell dangerous land, as land is very scarce, but generally move their house to safer areas. These differences between regions will be further investigated during fieldwork this summer. It will therefore be necessary to map plots. As farmers frequently fear land grabbing, we kindly request your support in informing farmers about the scientific necessity of this mapping. Collected information will remain private and will in no case be shared with any other party.



Figure 5. Workshop at Kasese district (4/02/2016)

These workshops provided the opportunity to inform community stakeholders on research findings and collect input for future research, which is key for the AfReSlide project.

Landslide susceptibility of the Mount Elgon region

The Mount Elgon region in Eastern Uganda is frequently affected by large landslides often with many negative consequences for the livelihood of the local population (e.g. flooding, pollution of drinking water, damage to private property and infrastructure and many casualties). The goal of our research was to create a landslide-susceptibility map for the dominant type of landslides in the Mount Elgon region of Uganda. In the framework of the VLIR-UOS TEAM Surelive project, an intensive field campaign was conducted in the summer of 2015 during which 195 landslides were mapped. The inventory was further extended by analyzing Google Earth imagery and contour maps in three delineated, representative sample areas. Also landslides mapped in 2002 (Knapen et al. 2006) were added to the inventory. The final inventory counts 277 landslides and 74 rock falls.

We observed different processes controlling landslides in the different districts of Mt Elgon Region. In the southern part of the study-area (Bududa district) strongly weathered granites and gneisses, steep slopes and heavy precipitation are the most important causal factors. Together with an increasing population and ongoing deforestation, the region is very susceptible to landslides. Secondly, we found that in the central and northern part of the region (Kapchorwa, Bukwo, Kween, Sironko and Bulambuli), rock falls are the most common type of mass-movements. These rock falls

originate at steep cliffs which are formed in volcanic deposits (volcanic mudflows and agglomerates). Thirdly we also observed that these central and northern districts are suffering from slides. These slides can occur on steep slopes after prolonged rainfall events. Landslides were also found at the bottom of cliffs, where concentrated runoff water cascades and causes the soil below the cliffs to become saturated which then starts sliding.

The observations were then used to calibrate a model that predicts the landslide susceptibility of the Mount Elgon region. The final susceptibility map was classified into 5 susceptibility-classes.

Based on this map we could conclude that 40% of Mt Elgon region is susceptible to landslides. Of these susceptible areas, 10% and 4% are classified as highly susceptible and very highly susceptible respectively. Figure 6 shows a classified susceptibility-map for the Mt Elgon region in Uganda with an overlay of a validation dataset (475

observed landslides). This figure indicates that most landslides occur in the moderate to high susceptible zones. This map offers a basis to produce a landslide hazard and risk map of the Mount Elgon Region.

Authors: Michiel Maertens, Jean Poesen, Seppe Deckers, Liesbet Vranken, Jente Broeckx, Betty Namazzi, Joseph Tamale, Moses Isabirye, Miet Maertens, Matthieu Kervyn, Bruno Verbist, Karen Vancampenhout.

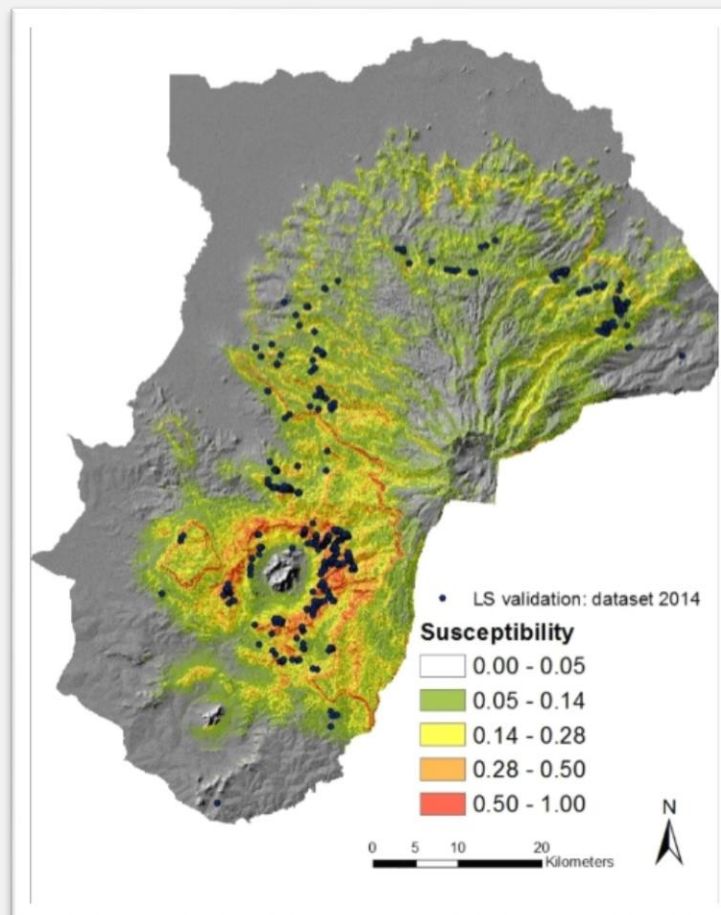






Fig 6. Classified landslide (LS) susceptibility-map for Mt Elgon region in Uganda. Source of topographic data: SRTM 1" (USGS, 2015). Each black dot represents a landslide mapped in 2014 (n = 475).

Upcoming missions & conferences

In the following months, research is planned in Uganda:





-  Field work on selection of appropriate landslide risk reduction measures in the Rwenzori Mountains by J. Maes from 12th of July until 14th of August 2016.
-  Field work on land markets in the Rwenzori Mountains by K. Mertens from August until mid-November 2016.
-  Master thesis field work on landslide risk map of Mahango sub-county by L. Schoonenbergh from 12th of July until 20th of August 2016.

Currently, one of our PhD students collaborates with the University of Perugia:

-  Training at University of Perugia on landslide susceptibility mapping by L. Jacobs from June until August 2016.

Scientific output



1. Publications

-  Jacobs, L., Dewitte, O., Poesen, J., Delvaux, D., Thiery, W., Kervyn, M., 2015. The Rwenzori Mountains, a landslide-prone region?. Landslides, doi: 10.1007/s10346-015-0582-5. [I.F. 2.870]
-  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, doi:10.1016/j.scitotenv.2016.01.171
-  Kervyn, M., Vranken, L., Maes, J., Bih Che, V., de Hontheim, A., Dewitte, O., Isabirye, M., Sekajugo, J., Kabaseke, C., Poesen, J., Mertens, K. 2016. Landslide resilience in Equatorial Africa: Moving beyond problem identification! Belgeo. doi: 10.4000/belgeo.15944
-  Jacobs, L., Dewitte, O., Poesen, J., Maes, J., Mertens, K., Sekajugo, J., Kervyn, M., In press. Landslide characteristics and spatial distribution in the Rwenzori Mountains, Uganda. Journal of African Earth Sciences.



2. Conference presentations

Research of the AfReSlide project was presented:



At UNISDR Science and Technology Conference, 27-29/01/2016, Geneva:

-  Maes J., Mbella, J., Poesen, J., Mbafor, U., de Hontheim, A., Dewitte, O., Jacobs, L., Mertens, K., Vranken, L., and Kervyn, M. From risk assessment to implementation of risk zonation: a case-study of Limbe city, Cameroon. Poster presentation.
-  Maes, J., Poesen, J., de Hontheim, A., Dewitte, O., Jacobs, L., Mertens, K., Trefois, P., Vranken, L., and Kervyn, M. Landslides in Equatorial Africa: Identifying culturally, technically and economically feasible resilience strategies. Poster presentation.

At the VUB PhD day, Brussels, 27 May 2016:

-  Jacobs, L., Dewitte, O., Poesen, J., Maes, J., Mertens, K., Sekajugo, J., Kervyn, M. Landslide characteristics and spatial distribution in the Rwenzori Mountains, Uganda. Poster presentation.
-  Maes J., Mbella, J., Poesen, J., Mbafor, U., de Hontheim, A., Dewitte, O., Jacobs, L., Mertens, K., Vranken, L., and Kervyn, M. From risk assessment to implementation of risk zonation: a case-study of Limbe city, Cameroon. Poster presentation.

At other conferences:

-  Maes, J., Parra, C., Poesen, J., Kabaseke, C., Bwambale, B., Mertens, K., Jacobs, L., Dewitte, O., Vranken, L., de Hontheim, A., Kervyn, M. Disaster governance-beyond-the-state: Evidence from landslide risk management in Uganda. Oral presentation at LSAS, 12/01/2016, Leuven.
-  De Hontheim, A., Poesen, J., Maes, J., Dewitte, O., Jacobs, L., Mertens, Vranken, L., and Kervyn, M. Du médium botaniste au faiseur de soleil : des réponses culturelles aux catastrophes naturelles et au climat dans les Rwenzori (Ouganda). Oral presentation at the Royal Academy for Overseas Sciences, 15/03/2016, Brussels.

Thank you note

We would like to thank all of you for your cooperation. Furthermore, we deeply regret to announce the passing away of Felista Bikorwa, who participated in research activities of the AfReSlide project in 2014, in Bundibugyo on the 28th of December 2015. We would like to express our sincerest condolences to her family and friends.