

Preliminary Results of the Bududa Landslide Geologic and Survey and Needs at Bulecheke Camp for the Displaced Population

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Geologic Survey

In July 2010, a geologic field survey and mapping of the March 1, 2010 Nametsi landslide and surrounding areas was conducted using GPS equipment (Trimble ProXH receiver and Nomad data logger). Additionally, images from World View 1 and QuickBird satellites with resolution 0.5 – 0.6 m. were used to identify landslide area before and after March 1 event. Using ASTER GDEM elevation data we “draped” satellite images over the terrain to create a 3D visualization of the area (Figure 1).

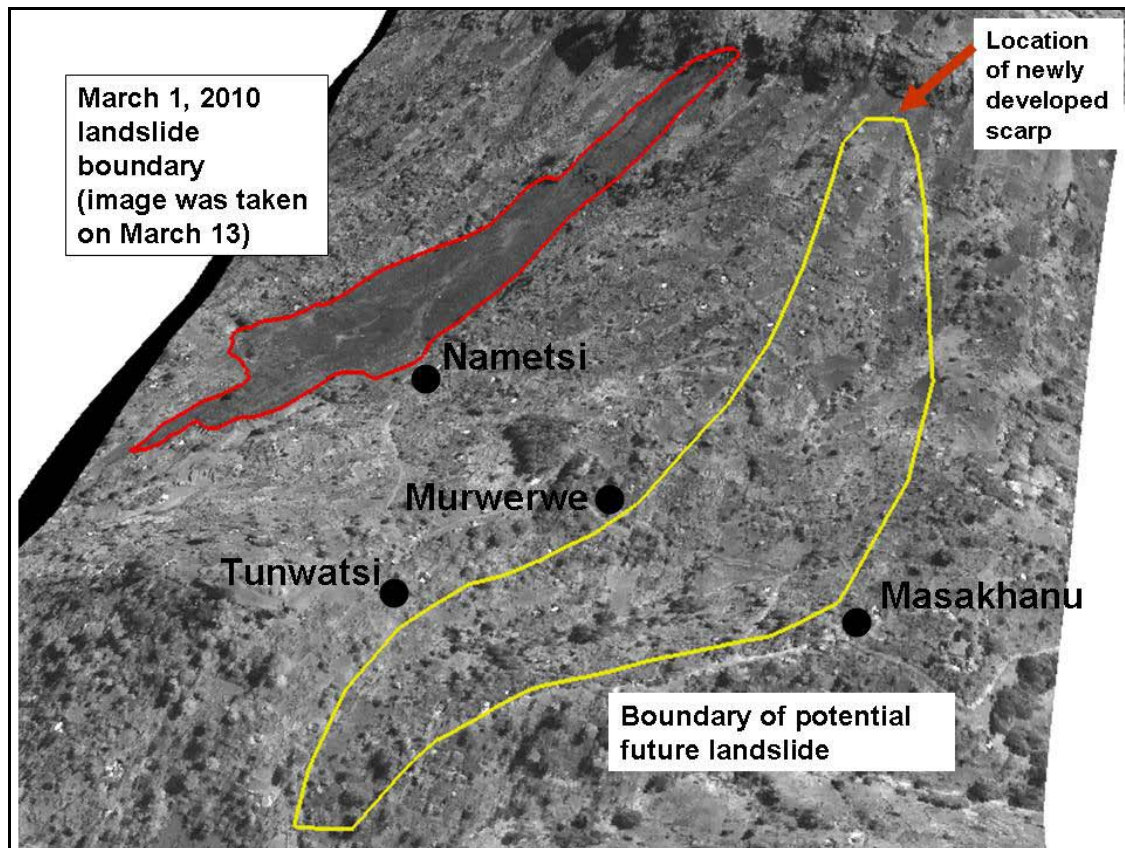


Figure 1. Location of March 1, 2010 landslide and boundary of potential future landslide identified from elevation data and field survey (by newly developing scarp). Images were obtained from eMap Inc.

Mapping of the slope area above the adjacent village of Murwerwe revealed a newly developed scarp or crack between 0.5-2.0m high, 25m long and 9m wide at the apex (Figure 2). The apex, located at 2,076 m, is at the same elevation as the apex of the fatal March 1, 2010 Nametsi landslide. The distance between the two is approximately 300m along the convex slope which is completely covered with crop fields. Along the bottom of the scarp, a newly developed crack 10-15 cm wide is visible for at least 100m. By overlaying field survey data and elevation model from ASTER GDEM data we found that the apex of the scarp is in the upper- middle part of the concave slope which is a common location in many landslides. Considering the very high slopes (up to 60 degrees) in the area, the location of the scarp signifies a critical situation where an excess of rainfall could trigger another massive landslide.



Figure 2. Newly developing scarp above village Murwerwe. World View 1 image was obtained from eMap Inc.

Using high resolution (0.5m) satellite imagery of the Nametsi area, we estimated that at least 29 households are in eminent danger if a new landslide develops (Figure 3). Assuming the geologic structure of the slope above Murwerwe is similar to nearby Nametsi, the potential landslide will affect not only Murwerwe village but also nearby Masakhanu.

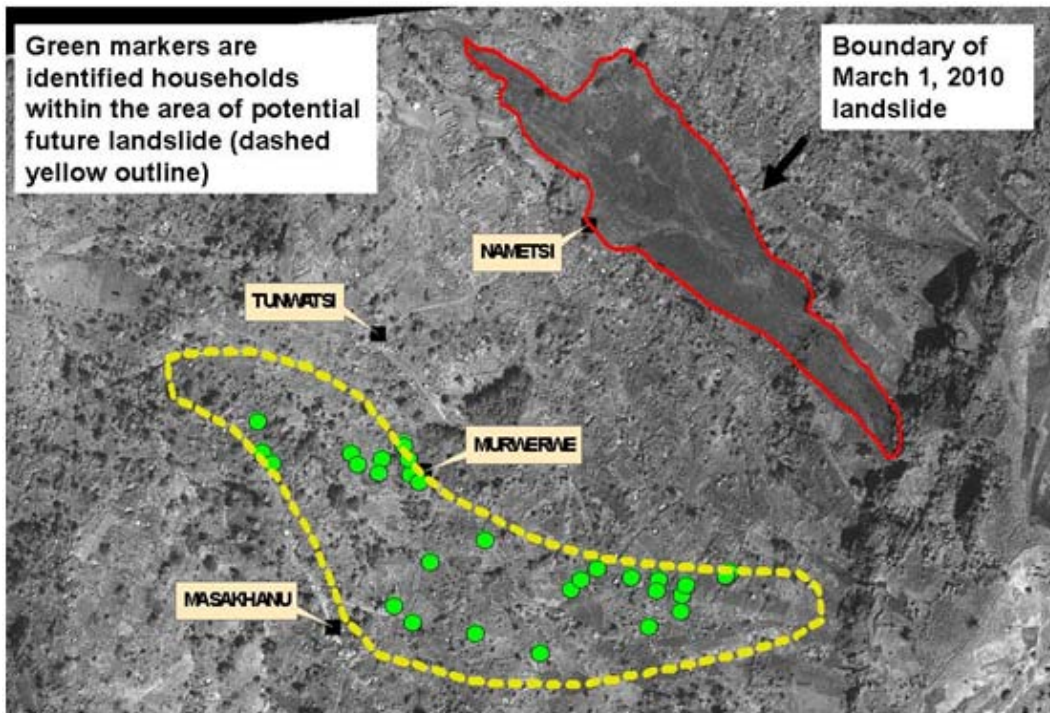


Figure 3. Households (green markers) that are at eminent danger from the future potential landslide.

Although it is difficult to predict a landslide event without a detailed analysis of slope stability, the approaching rainy season which begins in November could likely act as a triggering mechanism. Detailed landslide risk assessments or landslide monitoring programs should be implemented throughout Nametsi and Orukosi Parishes and potentially in other at risk areas of Bududa District. To avert further tragedy, populations should be given regular updates of landslide risk for their communities and resettlement options should be made available.

One of the necessary steps to prevent future landslide fatalities is to establish a landslide monitoring program; this is particularly urgent for the area above Murwerwe. The proposed monitoring scheme is simple and inexpensive and could consist of series of vertical bars (metal or wooden) placed in rows along and across the slope, both above and below the scarp area (Figure 2). A benchmark in a relatively stable area located above the scarp and possibly on the bedrock should also be established. Using theodolite station (a precision instrument for measuring angles in the horizontal and vertical planes) or a level meter and geodetic rod (a lower cost alternative where a metal rod is used as a standard measure of length) the position of each vertical bar should be recorded. The subsequent bi-weekly or monthly mapping will reveal any slight movements of bars which can be used to identify the presence and speed of slope deformations. Monitoring frequency should increase in the rainy season and if there are considerable increases in the speed of deformations. Any increase in the speed of deformations should be considered a serious warning of an impending landslide and the local population should be evacuated.

Bulecheke Camp Situation

Much of the surviving population in Nametsi as well as thirteen other surrounding at risk villages were resettled to nearby Bulecheke Camp. Our assessment of Bulecheke Camp was limited to key informant interviews because Makerere University recently completed a larger evaluation of the camp population and living conditions.¹ The overcrowded camp was originally planned as a temporary settlement for a population of 4,000; however, the current camp population exceeds 8,170, more than double the planned capacity. The camp was scheduled to be closed in May 2010, however, identifying permanent resettlement options for the population has been problematic and the camp remains open without an anticipated closure date. As a result of the planned camp closure, many UN agencies and international NGOs phased out of the camp. Currently the Red Cross is the lead agency in the camp and food rations are provided by the Office of the Prime Minister (OPM); Transcultural Psychosocial Organization (TPO) has remained in the camp to address psychosocial needs.

Because the camp is overcrowded, new residents are not allowed into the camp and populations in high risk villages have no resettlement options. Additional landslides have occurred as recently as June, and new cracks and scarps continue developing in the ground above the neighboring villages such as Murwerwe, which suggests a need for temporary resettlement options for populations that remain in high risk landslide areas.

Living conditions in Bulecheke camp are challenging and indicate that additional support for the displaced population is needed. Many families live in shared communal tents which house as many as 30-40 individuals; in addition, there is a shortage of tarps and mud is a problem in tents which do not have floors. Rations, provided by OPM, consist of 4.5kg/person/week of maize flour and beans; no sugar, cooking oil, or other commodities are provided. The camp primary school, initially supported by Save the Children, is overcrowded with an estimated 2,100 students; with only 15 teachers it is grossly understaffed, with a teacher to student ratio of approximately 140:1 learning is nearly impossible. Secondary school age children attend schools in the surrounding community which has also resulted in

¹ A copy of the report can be requested from Dr. Juliet Kiguli (jkiguli@musph.ac.ug)

overcrowding. The camp health facility is understaffed, which leads to wait times sometimes in excess of five hours. Drug stocks are limited and referrals, either to Bulecheke health center or Bududa hospital are problematic because patients are carried by hand; obstetric cases are a particular challenge and several babies died in en route since the departure of the Red Cross ambulance in April. Camp water supplies are reportedly adequate; however, hygiene and sanitation are major concerns. Approximately half of the 70 initially constructed latrines are no longer in service because they are full; more latrines and permanent structures are urgently needed in the camp.

The local government does not have the resources to adequately support the Bulecheke camp population and the remaining NGOs do not have the capacity to address all of the issues in the camp. Additional resources are required to meet the needs of the camp population, and long term resettlement strategies for affected populations in both the camp and the at-risk communities should be developed and implemented since geologic conditions of the area indicate a high possibility of the next fatal landslide event (and further displacement) during the coming rainfall season.

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In July 2010 a team from Johns Hopkins School of Public Health, City University of New York Lehman College, and Makerere University School of Public Health conducted an assessment of populations affected by the March 2010 landslides (Bududa District) and the March 2010 floods (Butaleja District). Complete results of the assessment are forthcoming.