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Assessment of Active Landslides in Sanbaro Sago Valley, Blue-Nile Catchment, Ethiopia

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In fall of 2009, a detail field mapping was carried out in the Sanbaro Sago Valley, south-eastern of Blue-Nile catchment, to inspect the landslide processes that affected the livelihood of more than 6,000 peoples. The valley is a part of Ethiopian highlands where long histories of rainfall triggered landslides are prominent. The villagers suffered the recurring landslides for the last five years, even at present; there are numerous evidences of active landslides, with some actual slides currently taking place. The nature their activity indicate high probability of destructive phenomena within the foreseeable future. The landslides already damaged houses, farm plots and drainage ditch, as well; more than 40 causalities are recorded. Most of the dwellers have been permanently displaced from their residences, as they lost their houses and farm plots.

A preliminary zoning was made through the interpretation of satellite images (+ETM Land sat) that drape over the digital elevation model of the area, which followed by detail field investigation to map the geological, geomorphological, and anthropogenic factors that contribute to the landslide activity.

The valley consists of low lying graben bounded by steep scarps that characterized by highly weathered Tertiary basaltic rocks covered with Quaternary deposits. Structurally controlled, alluvial and denudational landforms are present. There are distinct geomorphic units formed by differences in the lithology of the various basalt types. The Quaternary deposits along the ridge that has many rills and incised gullies are characterized by weathered basalts and alluvial–colluvial deposits. The elevation of the valley ranges from 1290m to 3200m m.a.s.l. The steep slopes, volcanic hills, exposed on the downthrown side of the major scarps have been modified by erosion, resulting in a highly dissected topography with steep gullies. This makes the steep slopes of the ridge to be one of landslide prone areas. Many of the active landslide sites are also localized close to the riverbanks and along these gullies.

The study revealed that the most important landslide types are complex and progressive earth and debris slides, dominantly silty clay and clay soils, that associated with colluvial deposits. The large scale landslides involved mainly the loose surficial deposits of alluvial origin overlying the highly weathered basalts. In places, where rock creep and topple, rock falls resulted rolling of large basaltic boulders. Some important earth and soil slumps are also mapped, besides, few old landslide complexes show current signs of reactivation.

Most of the large slides are occurred after heavy rainfall with high intensity, especially in the last recent wet years following extremely dry years. Although most slides occur during the rainy season, rock falls and debris creep in steep scarp areas are happening both in dry and wet seasons. The instant hazards are associated with the boulder falls in the steep slope, due to slides of toe masses. There are also active landslides and tension cracks that could be dangerous in near future. Small and rapid translational landslides, and earth flows, as well as reactivation of large slides can be easily triggered by surface water during the wet season. Due of all these factors the area is potentially dangerous for any habitation.