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Swelling clays a camouflaged geohazard: a case study in the Liwonde area, Malawi

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Liwonde is a small township located in south-east Malawi, an area with swelling clays. Swelling clays are clays that expand when they absorb water and shrink when they dry out. The presence of these clays which include: smectite, montmorillonite and bentonite makes soil have the capability to expand and shrink, hence are called expansive soils. There are a number of factors that affect the behaviour of these soils such as water content, vegetation and topography. The continuous change in volume of these clays cause structure built on such to crack. These soils pause a great problem in Liwonde on the Lilongwe Zomba road which year in year out develop cracks and pot holes causing the government to spend a lot of money in continuous rehabilitation of the road. The communities around this area are also affected because their houses develop cracks. There are other areas along this road and elsewhere in Malawi with soils that have a shrink-swell component due to montmorillonites that are included in the soils. The presence of these soils has not been completely mapped.

The hazard that these expansive soils create can be significant although they are mostly just ignored. There may also be secondary effects such as frequent road accidents in such areas due to poor road conditions. Many of the expansive soils do not create large areas of destruction; but, they can disrupt supply lines such as power lines, railways, bridge and damage structures. Expansive clays do not change size quickly making the observation of damage instantaneously sometimes difficult. Despite this, the clays have the potential to severely damage structures and roads over time if not sufficiently mitigated as has been observed in the study area.

So far little or no work has been done to study the extent of expansive soils in Liwonde area and all other areas where these clays exist in Malawi. Government strategic plans and other relevant documents describing natural hazard mitigation plans have nothing that deals with these recurring problems caused by expansive clays. This only reflects little or even no recognition of the hazard posed by expansive clays in the country. It is high time that this camouflaged hazard is revealed and put to the exposure of those responsible for making natural hazards mitigation plans otherwise this will remain unaddressed. There is need to map the extent of their existence, population affected, property impacted and probability of occurrence of destructive effects of these soils. Identification of the existence of these soils is the first step before coming up with measures to mitigate their deleterious effects.