



Lavaka, the unusual gullies of Madagascar: A review for improved data collection

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Land degradation in Madagascar is a complex challenge due to the spectacular gullies (called lavaka) that have a number of undesirable effects. These hillslope gullies have been observed for a long time, but the causes of lavakization are still controversial and many questions remain unanswered.

Our aim is to assemble and review lavaka researches since 1953 to understand why these didn't lead to success. Exact location of the field surveys, cited triggering factors and results of these scientific papers have been studied in detail. An overview of the many contributing factors is given in order to better understand lavaka formation and distribution.

A review is also given on our 3 years work that included the evaluation of lavaka distribution and evolution using satellite images, investigation of the role of the different factors contributing to lavakas formation (concentrating first of all on geology, topography and climatology) and classification done based on earlier studies and satellite images.

We conclude that most of the lavaka researches have been achieved along the main roads and therefore are restricted to the middle part of the Malagasy Highland. The study areas designated by different researchers have similar properties in term of soils, climate, and vegetation leading mainly to the same conclusions and although lithology and climatic conditions are mentioned as key factors, their effect on lavaka density and characteristics have not been revealed in details yet.

Our studies based on field survey, remote sensing and GIS showed a strong relationship between gully presence, vegetation cover, elevation, relief and slope angle. Geology, soil and precipitation seem to be less important in a medium scales notwithstanding with the fact that many studies dealing with lavaka emphasize their importance in lavakization process.

Gully abundance maps showed that lavaka can also occur at lower topographic levels, gentle slopes and sandy sediments notwithstanding with the fact that previous studies emphasize the importance of elevated topography, steep slope and lateritic soils as preconditions in lavakization.

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