The gullies of southeast Nigeria: an ecogeomorphic investigation

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Brief

I attended and presented my research findings at the virtual EGU General Assembly held from the 4th – 8th of May 2020. This event which holds yearly, is the biggest international conference of geoscientists in Europe and had in attendance experts drawn from different branches of earth science. Thanks to the BSG who assisted with the conference award of £500.00.

Project aim, methods and main findings

This paper aims to improve understanding of ecogeomorphic drivers of gully erosion using case studies from the Orlu area of southeast Nigeria, and to achieve this aim, focus-group meetings and analyses of remotely sensed data were adopted. High-resolution (0.61 – 5 m) satellite imagery for 2009 and 2018 were acquired from different platforms and used for gully mapping and monitoring while ASTAR DEM was used to estimate topological parameters. Using the D-8 and Multiple flow algorithms, upslope contributing areas were produced for two gullies in Amucha and Urualla, while gully evolutions between 2009 and 2018 were related to changes in contributing areas during same time span. Ecogeomorphic and climatic drivers such as vegetation-cover change, change in runoff volume, slope angle, elevation, rainfall, and nearness to roads and rivers were studied and their associations with gullying established. Vegetation cover was classified into three: non-vegetated, open vegetation and trees while daily surface runoff between 2009 and 2018 was estimated for these vegetation classes using the Curve Number approach. Results from focus-group meetings show that both gullies started in 1969 during the civil war as a result of increase in population density arising from the influx of refugees as well as other military activities. Gully growth was sustained after the civil war as a result of changes in vegetation cover. Average gully headcut retreat rate between 2009 and 2018 was 22 m yr^{-1} and 12.2 m yr^{-1} for Amucha and Urualla gullies respectively. A positive correlation was recorded between change in vegetation cover in the gully contributing areas and increase in gully length with Pearson's correlation of 0.73 and r^2 of 0.53.

Value of BSG grant

Attending this virtual conference was beneficial to me in many ways. For example, I had the opportunity to co-convene a session; Soil erosion and driving factors of soil carbon distribution: a worldwide threat, which is good for my professional career. I shared my results with a wide range of professionals and thus got important feedbacks from geoscientists who only come together once in a year. This EGU meeting afforded me the avenue to listen to other experts in various fields of geosciences, with the aim of gaining new insights into current practices to mitigate gully erosion problems. Finally, presented my findings to an international audience from different specialties thereby improving my academic presentation skills.

Figure 1, A) 492 m long Obibi-Ochasi gully, Orlu LGA, Imo State, B) 895 m long gully in Urualla, Ideato North LGA, Imo State, Nigeria