Tropentag, September 16-18, 2026, hybrid conference

"Towards multi-functional agro-ecosystems
promoting climate resilient futures"

Potential of perennial legumes for restoration and reutilisation of small-scale gold mined sites in Ghana

Enoch Opoku[1], Beloved Mensah Dzomeku[2], John Opata[3], Adam Muhammad Adam[1], Frank Rasche[4]

[1] *University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany*
[2] *Council for Scientific and Industrial Research-Crops Research Institute (CSIR-CRI), Ghana*
[3] *University of Environment and Sustainable Development, Dept. of Biological Sciences, Ghana*
[4] *International Institute of Tropical Agriculture (IITA), Kenya*

Abstract

The increasing small-scale gold mining activities in recent years have led to degradation of arable lands. This is projected to surge due to high demand driven by advancements in artificial intelligence, cloud computing, nanotechnology and among others. In view of this, the study explore how perennial legumes can support restoration and reutilisation of gold mined sites and to what extent the restored sites support crop productivity.

Five years field experiment was established using three perennial legumes species namely Pueraria, Leucaena and Gliricidia on a degraded surface gold mined site at Anumso in the Ashanti Region of Ghana. Notably, Pueraria and Leucaena were established via seeds while Gliricidia through stem cuttings. The plots were monitored for a period of five years and data was collected on soil fertility parameters including soil organic carbon (SOC) and nitrogen (N). Three years after establishment maize was planted in each plot without any external amendments including fertilisers to assess whether the restored fertility is enough to support crop production.

The results show that perennial legumes increased fertility relative to control by at least 60 % for soil organic carbon and 90 % for total nitrogen regardless of the species used. Surprisingly, after three years of establishment, the fertility level was not enough to support grain production despite substantial improvement in growth parameters. These highlight the potential of these legumes for the reutilisation of these sites for agricultural activities. However, future studies should explore the use of modelling approach to assess the long term benefits and optimise management practices that support better utilisation of these sites.

Keywords: Agroforestry, artisanal mining , productivity, revegetation

Contact Address: Enoch Opoku, University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Garbenstraße 13, 70599 Stuttgart, Germany, e-mail: enoch.opoku@uni-hohenheim.de