

## **Targeting various organic resources and legume best bets to various system niches to reverse decline in land productivity in East African Highlands** (Abstract)

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### **Abstract**

Sustainable land management is a complex phenomenon affected by biophysical, socioeconomic and policy factors, which is partly associated with a decline in the vegetation cover. Decline in the system biomass affects systems and livelihoods through a shortage of fuel wood, shortage of feed, and a decline in the soil fertility status, a decline in the water holding capacity of soils and systems, exposure to erosion and land slides and a decline in the overall system productivity. Up to very recently, natural fallows were used to restore soil fertility, mainly in the cereal-based highlands of Ethiopia. However, due to an increasing demand for land as a result of population pressure, natural fallows with such a long duration are no longer a viable option for improving soil fertility. It has been recognised that natural fallow requires longer time to achieve the required level of soil fertility that can lead to optimal crop yields. Short duration fallows of legume cover crops and selected multi-purpose trees are now becoming more appreciable, although short-duration fallows do not maintain soil fertility at levels similar to those achieved under long-duration natural fallows. Legume cover crops have the advantage of in situ accumulation of biomass, optimising nutrient cycling through nutrient pumping from subsoil layers and litter falls, enhancing soil biological activities and maximizing the use efficiency of minimal external inputs. Successful experiences have been drawn in East and Central Africa in identifying best bets of forages, multipurpose trees and dual-purpose legumes and to integrate these options into various system niches, considering agro-ecology, socio-economic status, system variability, adoption of the species to the specific niches and compatibility to the targeted farming systems. The paper will display experiences of the African Highlands Initiative and Tropical Soils Biology and Fertility of CIAT on how to identify best-bets, with win-win benefits, addressing trade-offs among different household production objectives, including soil fertility decline, livestock feed and cooking fuel in the Ethiopian highlands. It will also consider the after-effects and residual effects on crop yields, address organic quality indicators, but also display decision guides on how to use the different types of organic resources to various land management scenarios.