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## Can soil quality in subtropical agriculture be improved by selected forage species?

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Ethiopia is experiencing severe loss of farmable soil due to high erosion and nutrient depletion. The loss of agricultural land puts pressure on Ethiopian farmers to produce more food on less land. The large number of livestock in Ethiopia further exacerbate the situation, since the high grazing intensity removes plant cover and crop residues and limits the return of organic matter to the soils. Introduction of perennial forage species could break the vicious circle by providing high-quality feed to animals while increasing the input of organic matter to the soil and stimulating soil life. We investigated the effect of four forage species, two grasses, *Brachiaria* hybrid Cayman and *Panicum maximum*, and two legumes, *Desmodium intortum* and *Stylosanthes guianensis*, in varying mixtures planted according to a simplex design at two locations in Southern and Northern Ethiopia. The field sites were established in six different locations, three in the Sidama and three in the Amhara region. In each region we had one large scale site, at Hawassa and Bahir Dar university respectively, and two smaller farm sites. To assess how the species mixtures affected the soil, we measured the above-ground biomass and took soil samples before and after 2 years of plant growth. We measured labile carbon, nitrification rate, and soil enzymatic activity involved in C, N and P acquisition. The effect of plant input will be compared to time-zero measurements to discern if there are any effects of the species mixtures on the soils. Currently, we see an effect of the total above ground yield of the plots on soil functions, indicating that a higher density of plant coverage influences the soil microbial activity and turnover in the soil.