

Multi-criteria evaluation of soil conservation practices to sustainable cropland management in northwest highlands of Ethiopia

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Abstract

Although substantial efforts have been carried out to reduce land degradation and improve livelihoods, farmers' acceptance performance of soil conservation practices in economic, social, and ecological perspectives remains below the expected level in sub-humid highlands of Ethiopia. The study aimed to evaluate the acceptance performance in ecological and socio-economic aspects for adoption decision to combine the use of introduced and indigenous soil conservation practices in Goncha district, Northwest highlands of Ethiopia using a multi-criteria analysis method. Against a range of identified relative criteria, soil bunds stabilized with *Sesbania sesban* shrubs, followed by, Fanya-juu complemented with *Sesbania sesban* shrubs are the most preferred by providing multi-benefits. After that, compost use, followed by legume-cereal crop rotation provides short-term benefits in enhancing soil fertility, increasing crop yields, and reducing the cost of chemical fertilizer. Hence, the combined use of compost and soil bunds or Fanya-juu complemented with the growth of *Sesbania sesban* shrubs under legume-cereal crop rotation is the best alternative approach to sustainable cropland management in the sub-humid mid-highland agroecosystem of Ethiopia. It can suggest that local social, economic, and site-specific ecological criteria should incorporate in the decision-making process of soil conservation practices to increase utility.

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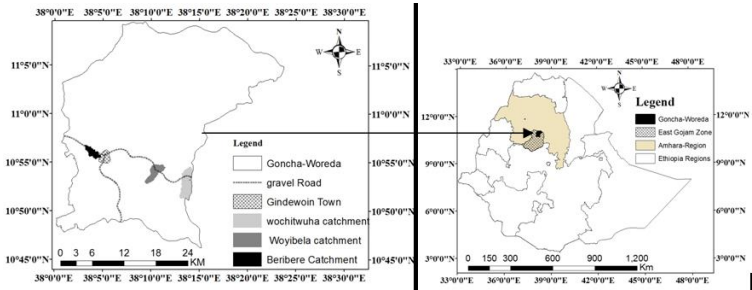


Figure-1: Location map of study sites

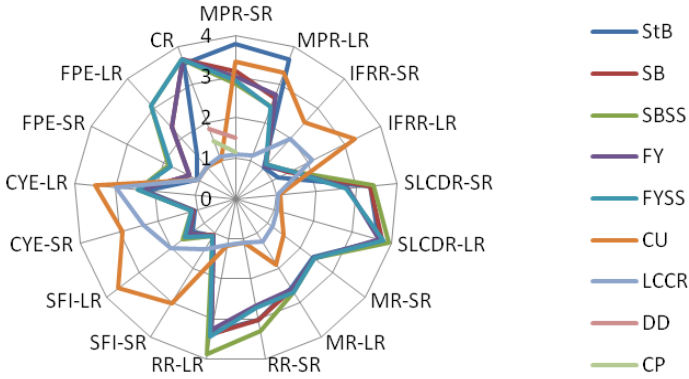


Figure-2: The average rank of soil conservation practices in terms of cost and benefits in temporal perspective (n=28)

Practices StB- Stone Bund; SB- Soil Bund; SBSS-Soil Bunds Stabilized with Sesbania sesban; FY- Fanya-juu; FYSS-Fanya-juu stabilized with Sesbania sesban; CU- compost use; and LCCR- legume-cereals crop rotation; DD-drainage ditches; and CP- contour plowing.

Time ST_ short-term and LT_ long-term