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Soil and Water Conservation Practices to Combat Impacts of Drought in the Semi-Arid Region of Mali

Birhanu Zemadim[1], Kalifa Traore[2], Murali Khrisha Gumma[3], Felix Badolo[1], Anthony Whitbread[3], Ramadjita Tabo[1]

[1] *International Crops Research Institute for the Semi Arid Tropics (ICRISAT), Mali*
[2] *Institut d'Economie Rurale (IER), Laboratoire Sol-Eau-Plante Sotuba, Mali*
[3] *International Crops Research Institute for the Semi Arid Tropics (ICRISAT), India*

Abstract

Soil and water conservation (SWC) practices like that of erosion control and soil fertility measures were commonly practiced in the semi-arid region of southern Mali since the 1980s. A total of 2562 cotton producing villages benefited from SWC practices and other technological innovations from 1982 to 2000 through the Compagnie Malienne pour le Développement des Textiles (CMDT). Since the year 2000 individual farmers took the initiative to implement SWC practices in their fields. The SWC practices were mainly meant to increase soil water content, reduce farm erosion, and improve nutrient content of the soil, thereby increasing crops yield. Despite such efforts to promote at scale SWC practices, the landscape of southern Mali are still affected by high rates of soil erosion and low crops yield. Data is lacking on previous beneficial SWC practices that could be adapted for wider application. In 2015 and 2016 a field experimentation was conducted in a small watershed in southern Mali to evaluate the biophysical and economic benefits of SWC practices. Results revealed that with the implementation of SWC practices runoff was reduced significantly (p value 0.005) and soil water content increased with significant variation ($p < 0.0001$) along the soil profile. Temporal variation of soil moisture showed an increase in soil water content by 33 % during the middle of the rainy season and 85 % at the end of the rainy season for fields treated with SWC practices. The increase in soil water content was necessary to meet the consumptive water demand by crops and vegetation in the watershed. The implementation of SWC practices was found to be socially viable with a 20 % more net returns from fields treated with SWC practices.

Keywords: Contour bunding, land use and land cover, participatory approach, rainfed agriculture, semi-arid region, shallow wells, soil and water conservation, southern Mali, watershed management

Contact Address: Birhanu Zemadim, International Crops Research Institute for the Semi Arid Tropics (ICRISAT), Samanko, BP 320 Bamako, Mali, e-mail: z.birhanu@cgiar.org