

Africa RISING in the Ethiopian Highlands

Impacts of SWC interventions and land use on discharge and sediment yield at plot and watershed scale

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Soil erosion is a serious problem for agricultural production in Ethiopia (Fig. 1). To tackle it, communities are engaged in various soil and water conservation (SWC) and water harvesting practices.

Objective: Evaluating the impacts of SWC interventions at different scales.

Research methodologies

- Hydrological bounded runoff plots used to evaluate at plot scale (Fig. 2).
- Gauge hydrological stations were used to evaluate at watershed scale (Fig. 2).

Results

- Plot-and catchment-level experiments showed significant differences in runoff and sediment yield between treatments and land use/cover types (Fig. 3, 4 and Table 1).
- Terraces with trenches on cropland reduced runoff and soil loss by 44% and 52%, respectively.
- At the catchment scale, discharge reduced by over 40% for the sub-watershed with SWC practices.
- Sediment yield at catchment scale reduced by 70% due to SWC and water harvesting measures.



Fig.1. Gully and Sediment load at Gudoberet Kebele

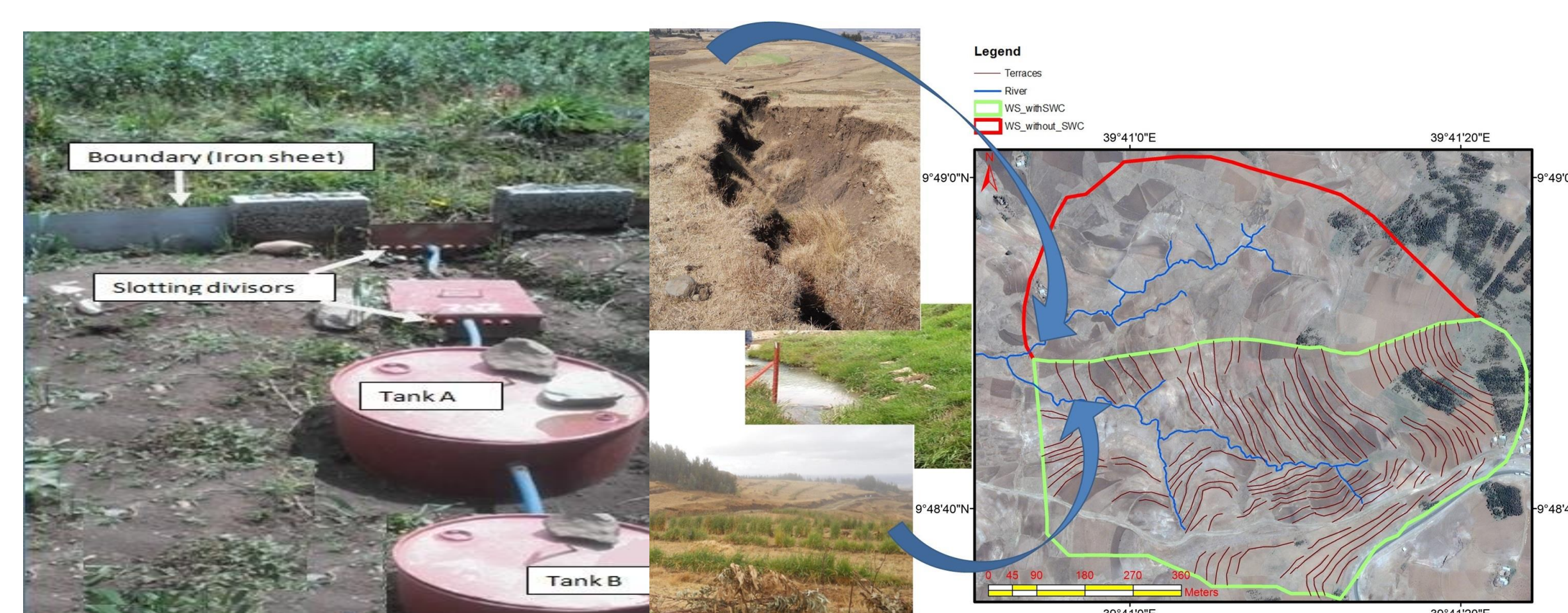


Fig. 2. Runoff Plot and Hydrological Station

Table 1. Sediment and discharge summary data

Parameters	Watersheds	
	With SWC	Without SWC
Area (Ha)	33.83	22.08
Rainfall (mm)	737.60	737.60
Discharge (m ³ /watershed)	134682.40	105933.00
Discharge (m ³ /ha)	3981.15	4797.69
Sediment Yield (ton/watershed)	31.03	102.05
Sediment Yield (ton/ha)	0.92	4.62

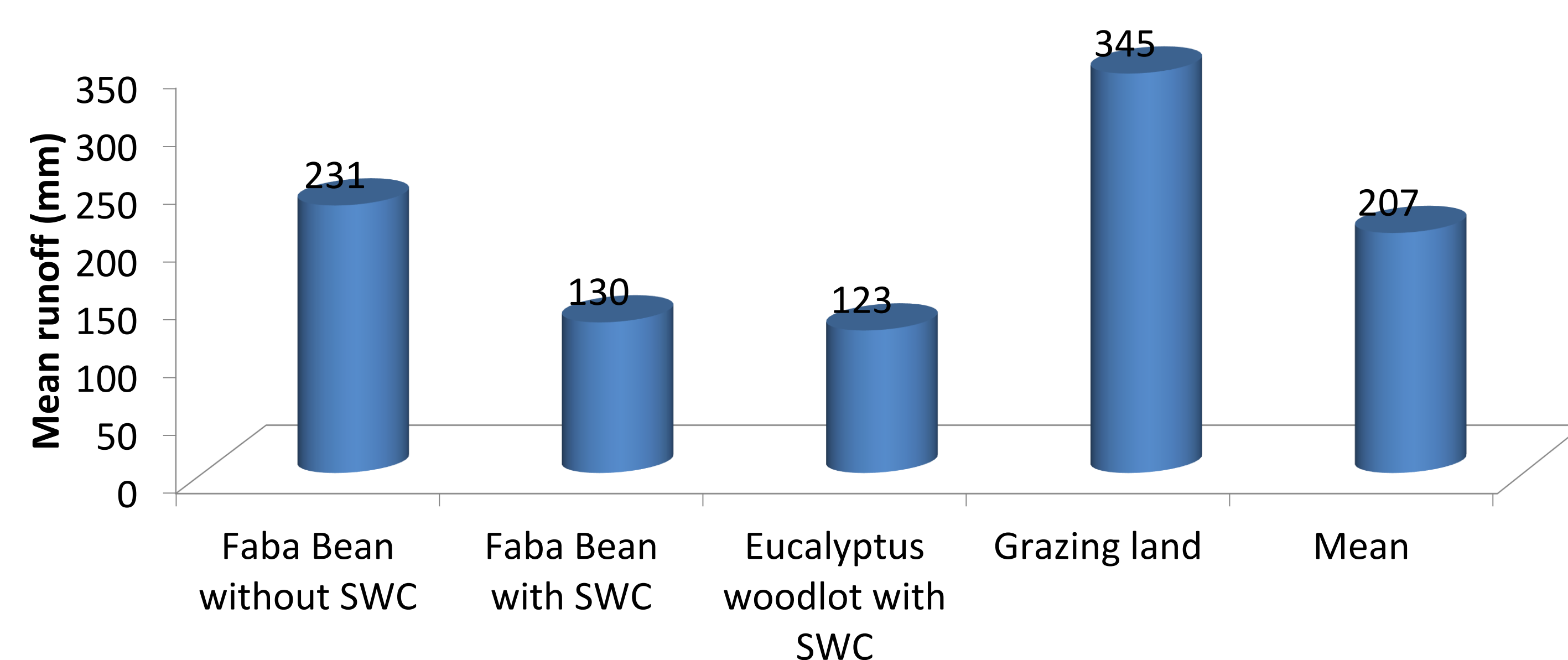


Fig. 3. Runoff estimated for different land use and management types

Conclusion

The SWC mobilization program achieved the intended target to reduce soil erosion and increase retention capacity of the watersheds. Integrating physical measures with biological options and supplementing these with water harvesting structures can promote their adoption.

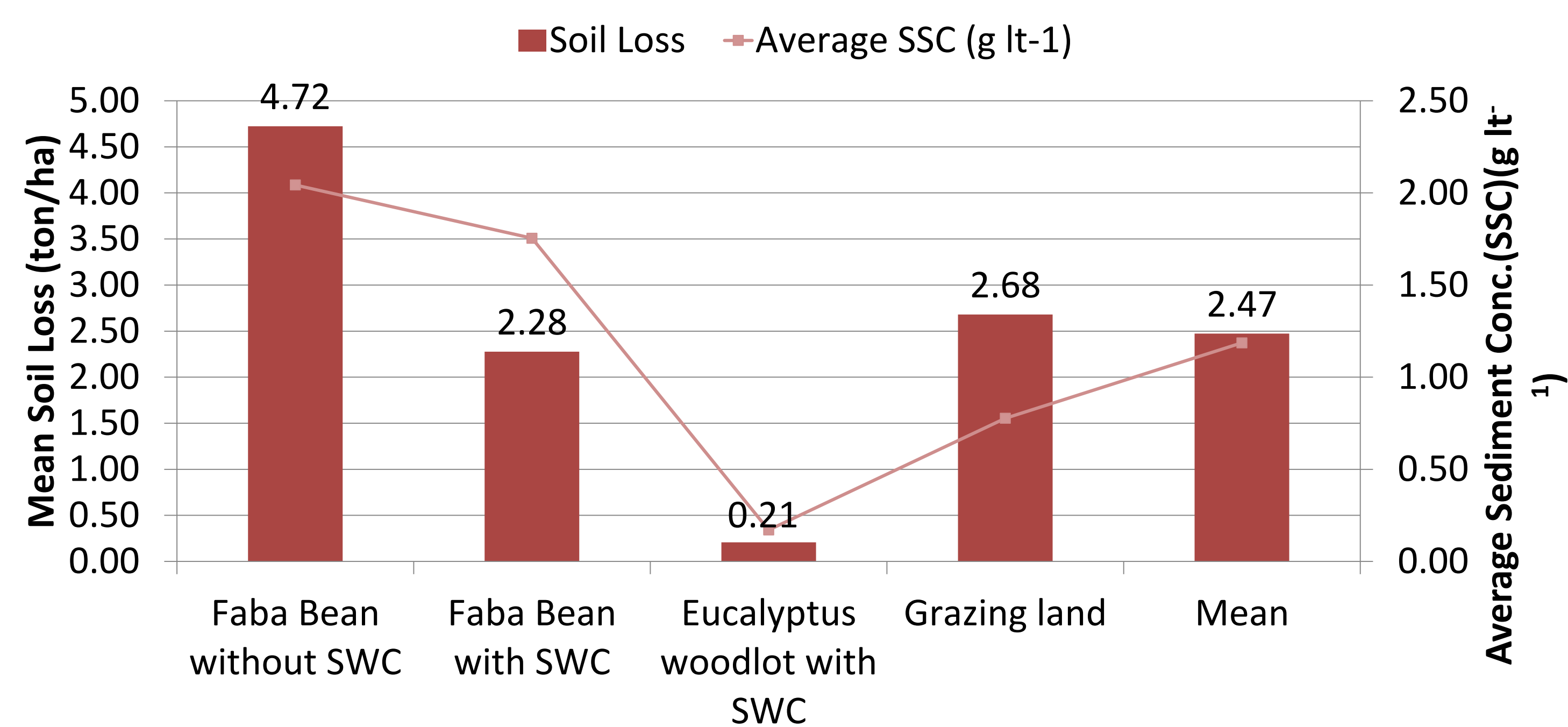
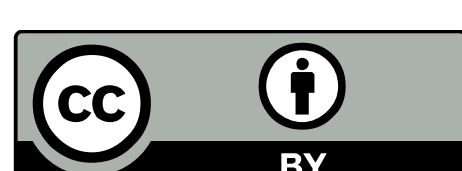


Fig. 4. Effects of land use and management on soil loss

Core partners



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