

Supplementary Information for “Assessing the effectiveness of Sustainable Land Management for large-scale climate change adaptation”

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References

Jacob, D., et al., EURO-CORDEX: new high-resolution climate change projections for European impact research, *Regional Environmental Change*, 14, 563–578, 2014.

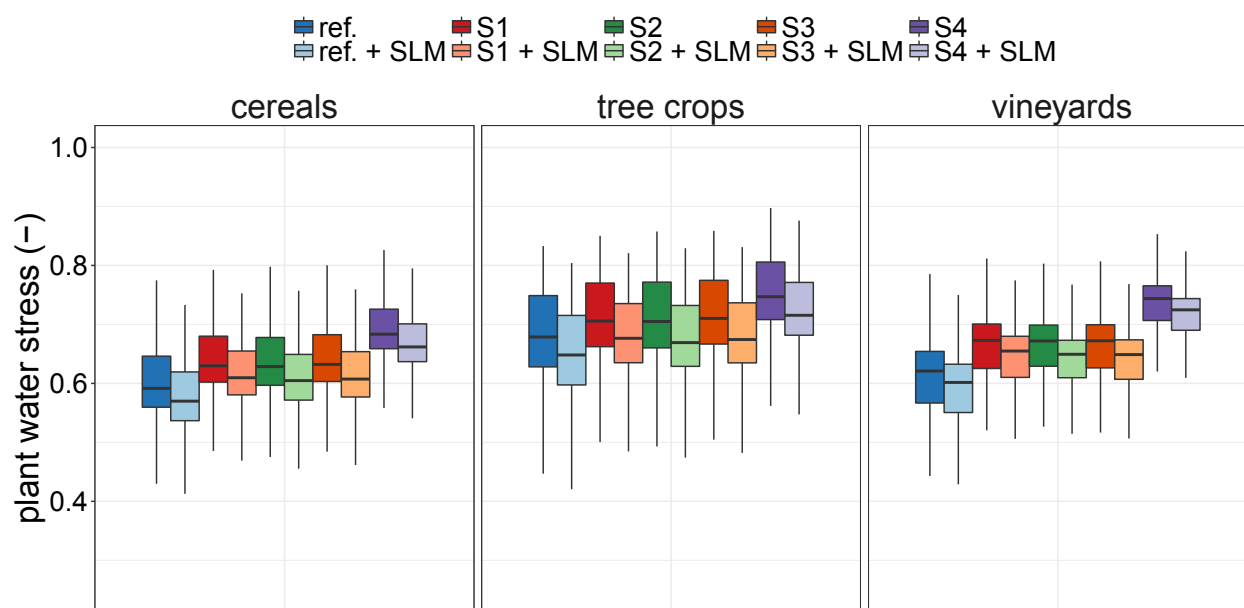


Figure S1: On-site plant water stress (-) per landuse class (cereals, tree crops and vineyards). The hinges indicate the 25th and 75th percentiles, the thick horizontal line the median and the whiskers 1.5 times the inter quantile range from each of the two hinges.

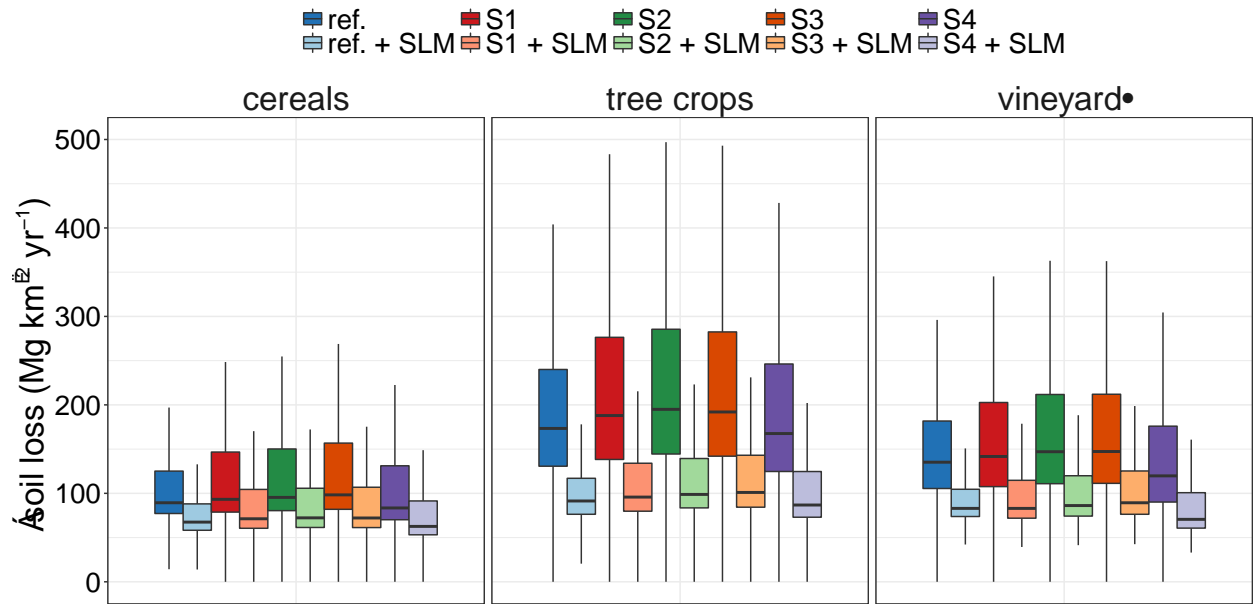


Figure S2: On-site hillslope erosion ($\text{Mg km}^{-2} \text{ yr}^{-1}$) per landuse class (cereals, tree crops and vineyards). The hinges indicate the 25th and 75th percentiles, the thick horizontal line indicates the median and the whiskers indicate 1.5 times the inter quantile range from each of the two hinges.

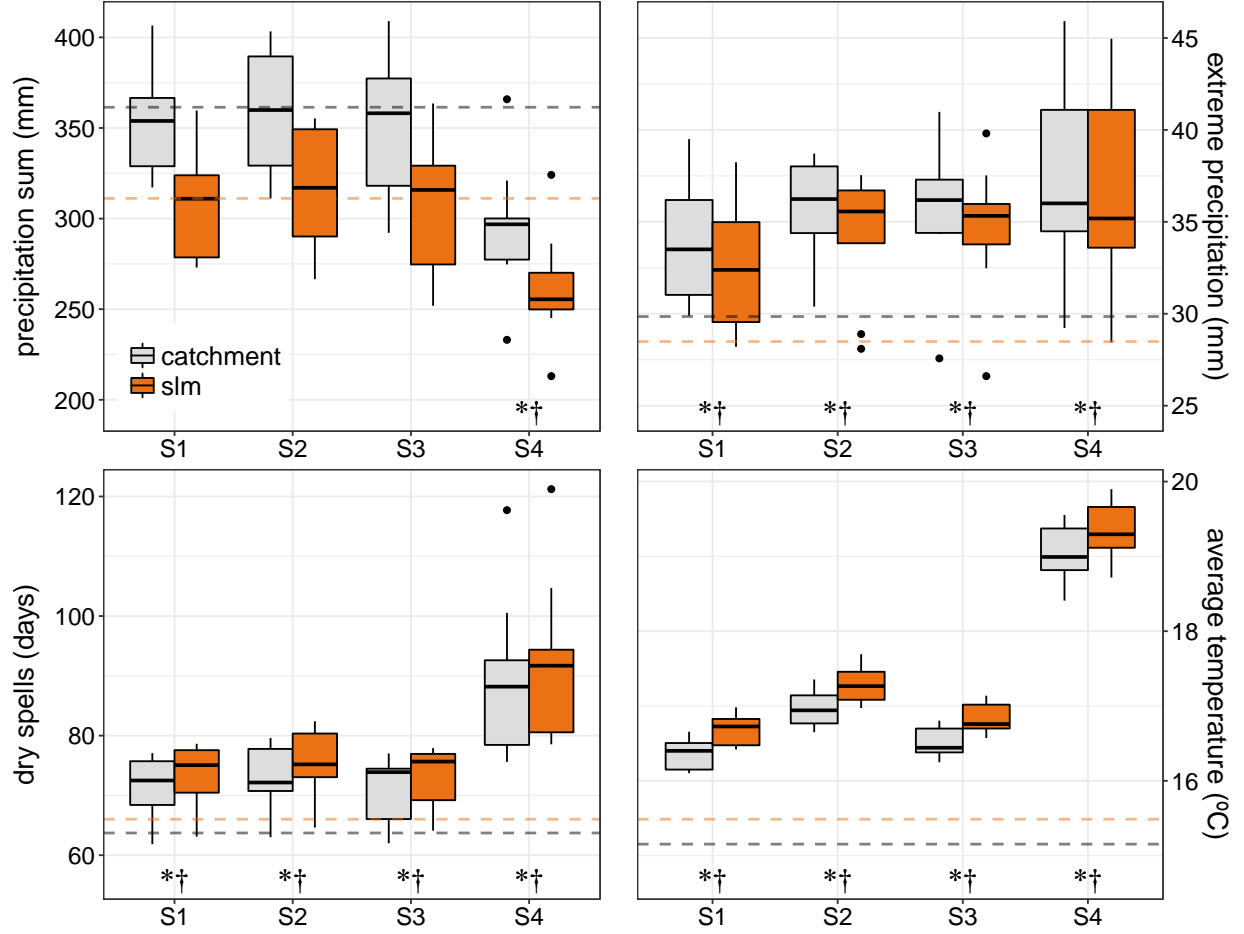


Figure S3: Catchment-average (gray) and on-site (orange; where SLM is implemented) climate signal indicators, i.e. precipitation sum (mm), extreme precipitation (mm) (defined as the 95th percentile of daily precipitation, considering only rainy days ($>1 \text{ mm day}^{-1}$), *Jacob et al.*, 2014); dry spells (days) and average temperature ($^{\circ}\text{C}$). The boxplots indicate the spread of the catchment-average among the nine climate models. In each panel the horizontal dashed lines represents the catchment-average (gray) and on-site (orange) value for the reference scenario. An asterisk (*) indicates a robust change and a dagger (†) indicates a significant change ($p < 0.05$). The hinges indicate the 25th and 75th percentiles, the thick horizontal line indicates the median and the whiskers indicate 1.5 times the inter quantile range from each of the two hinges.

Table S1: The nine climate models used in this study, with their corresponding RCM, GCM and research institute.

	RCM	CCLM ¹	HIRHAM5 ²	RACMO ³	RCA ⁴	WRF ⁵
GCM						
CNRM-CM5		X			X	
EC-EARTH		X	X	X	X	
IPSL-CM5A-MR						X
MPI-ESM-LR		X			X	

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Table S2: Average on-site and off-site impact of water security indicators. The on-site indicators (plant water stress and hillslope erosion) are average values obtained in the cells where SLM is implemented. From the off-site indicators, sediment yield and reservoir inflow are taken as the sum of all the reservoirs in the catchment and flood discharge is taken as the average of all the discharge stations. Values for the reference scenario without SLM are the absolute values. All other values are differences with respect to the reference without SLM and are accompanied with percentages in parentheses. Values marked in bolt are significantly different ($p < 0.05$).

scenario	on-site				off-site		
	plant stress (-)	water	hillslope erosion (Mg km ⁻² yr ⁻¹)	erosion (Gg yr ⁻¹)	sediment yield (Hm ³)	reservoir inflow (m ³ s ⁻¹)	flood discharge (m ³ s ⁻¹)
ref.	0.64		3.6		1301.0	815.4	6.3
ref. + SLM	-0.03 (-4.2)		-1.5 (-40.9)		-90.9 (-7.0)	-119.5 (-14.7)	-0.8 (-12.2)
S1	0.04 (5.5)		1.7 (46.5)		96.9 (7.5)	199.3 (24.4)	1.9 (29.6)
S2	0.03 (5.3)		1.9 (53.1)		39.4 (3.0)	240.4 (29.5)	1.6 (25.2)
S3	0.04 (5.9)		2.0 (55.0)		45.4 (3.5)	234.6 (28.8)	1.9 (29.8)
S4	0.09 (13.4)		1.2 (33.7)		-436.6 (-33.6)	53.0 (6.5)	0.0 (0.4)
S1 + SLM	0.01 (1.6)		-0.4 (-11.2)		-23.0 (-1.8)	66.3 (8.1)	0.8 (13.6)
S2 + SLM	0.01 (0.8)		-0.3 (-7.8)		-84.8 (-6.5)	93.3 (11.4)	0.5 (7.7)
S3 + SLM	0.01 (1.3)		-0.2 (-5.3)		-82.4 (-6.3)	88.6 (10.9)	0.8 (13.0)
S4 + SLM	0.06 (9.5)		-0.7 (-18.8)		-538.8 (-41.4)	-76.3 (-9.4)	-1.0 (-15.5)

Table S3: Average on-site impact of hydrological indicators. The indicators (precipitation, actual evapotranspiration, surface runoff, infiltration, and rootwater content) are average values obtained in the cells where SLM is implemented. Values for the reference scenario without SLM are presented in absolute values. All other values are differences with respect to the reference without SLM and are accompanied with percentages in parentheses. Values marked in bold are significantly different ($p < 0.05$).

scenario	precipitation (mm)	actual evapo- transpiration (mm)	surface runoff (mm)	infiltration (mm)	soil moisture content (mm)
ref.	311.1	222.7	39.8	223.8	11.8
ref. + SLM	0.0 (0.0)	20.5 (9.2)	-23.1 (-58.0)	23.0 (10.3)	1.9 (15.9)
S1	-4.4 (-1.4)	-13.8 (-6.2)	15.3 (38.3)	-12.9 (-5.8)	-0.9 (-7.6)
S2	2.7 (0.9)	-8.8 (-4.0)	19.6 (49.2)	-9.0 (-4.0)	-1.1 (-9.3)
S3	-1.9 (-0.6)	-12.6 (-5.7)	19.4 (48.8)	-13.3 (-5.9)	-1.2 (-10.5)
S4	-48.1 (-15.5)	-44.8 (-20.1)	13.5 (33.9)	-46.1 (-20.6)	-3.2 (-27.1)
S1 + SLM	-4.4 (-1.4)	8.9 (4.0)	-12.1 (-30.4)	14.4 (6.4)	0.8 (6.9)
S2 + SLM	2.7 (0.9)	16.3 (7.3)	-9.4 (-23.6)	19.9 (8.9)	0.8 (6.8)
S3 + SLM	-1.9 (-0.6)	12.6 (5.7)	-9.4 (-23.6)	15.5 (6.9)	0.7 (5.6)
S4 + SLM	-48.1 (-15.5)	-22.7 (-10.2)	-11.6 (-29.1)	-21.1 (-9.4)	-1.6 (-13.7)