

## SUPPLEMENTARY MATERIALS

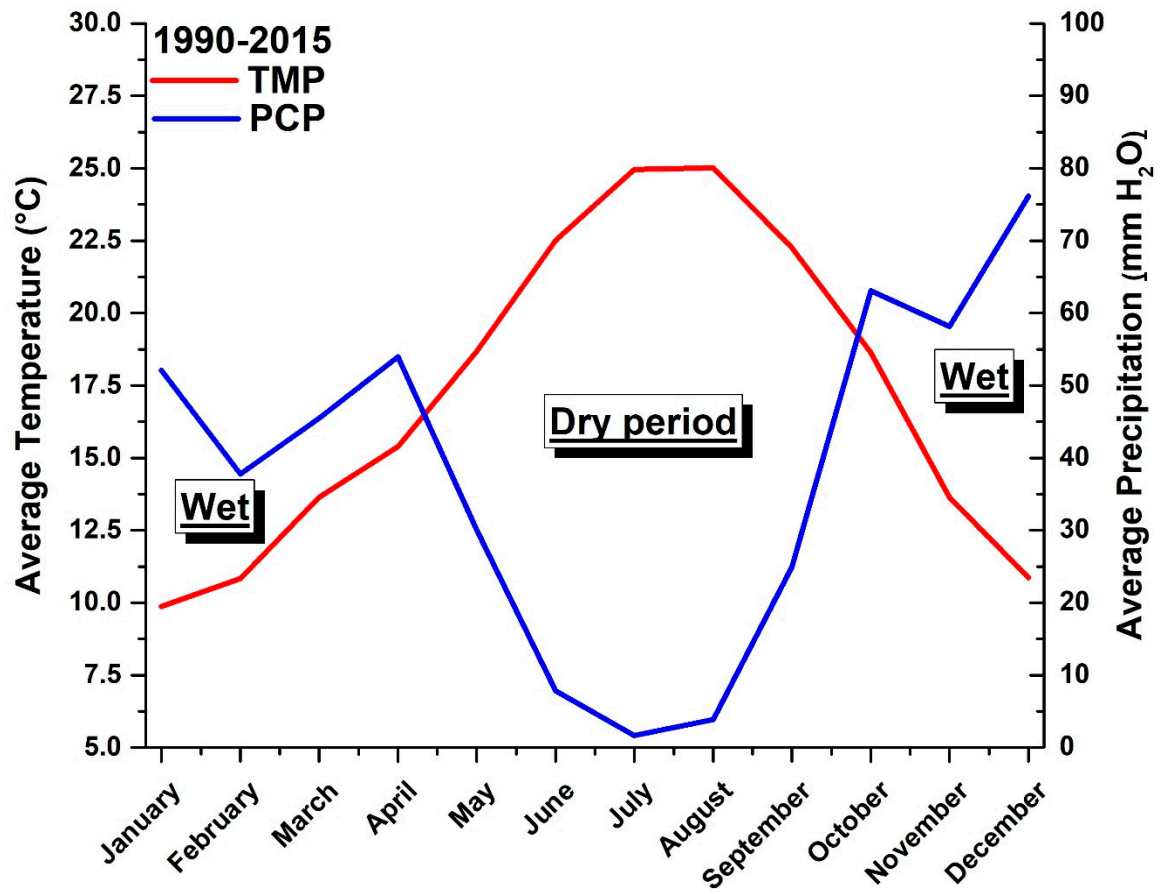


Figure S1: Thermo-pluviometric diagram for the Alentejo region.

**Table S1:** Morphology-slope and land cover classification (CLC, 2018) for the four study sites.

<b><u>Morphology-Slope</u></b>					
<b>CLASSIFICATION (%)</b>		<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>
<b>0-5</b>	Flat-Gently sloping	7%	55%	17%	77%
<b>5-10</b>	Moderately sloping	10%	25%	16%	21%
<b>10-15</b>	Strongly sloping	14%	15%	20%	2%
<b>15-20</b>	Moderately steep	23%	5%	19%	0%
<b>&gt;20</b>	Steep	46%	0%	28%	-
<b><u>Land Cover (CLC-Categories)</u></b>					
<b>CLASSIFICATION</b>		<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>
<b>FRSE</b>		96%	62%	36%	7%
<b>OLIV</b>		-	19%	-	3%
<b>OATS</b>		-	11%	-	1%
<b>WPAS</b>		4%	8%	64%	89%

**Table S2:** SWAT soil parameters for the identified soil groups.

<b>SOIL TYPE</b>	<b>SWAT main parameters</b>							
	<b>BD (g*cm<sup>-3</sup>)</b>	<b>AWC (%)</b>	<b>Ks (mm*h<sup>-1</sup>)</b>	<b>OC (%)</b>	<b>Clay (%)</b>	<b>Silt (%)</b>	<b>Sand (%)</b>	<b>Rock (%)</b>
<b>Eutric Cambisols</b>	1.52	0.14	33.46	0.85	10	25	65	11
<b>Leptosols</b>	1.50	0.18	28.71	0.70	10	25	66	23
<b>Gleyic Luvisols</b>	1.20	0.17	17.98	1.55	17	33	50	10
<b>Haplic Luvisols</b>	1.37	0.15	21.20	1.03	10	30	55	5
<b>Chromic Vertisols</b>	1.07	0.15	26.27	0.82	38	32	30	0
<b>Pellic Vertisols</b>	1.06	0.20	7.74	0.67	45	30	25	0

## LIST OF ABBREVIATION

AET = actual evapotranspiration  
ALPHA\_BF = Baseflow alpha factor  
AR5 = Fifth Assessment Report  
AWC = available water content  
BD = bulk density  
BAU = business as usual, BAU  
CC= climate change  
CLC = Corine Land Cover  
DEEP\_IMP = Distance to the impervious layer  
DGADR = Direcção-Geral de Agricultura e Desenvolvimento Rural  
DEM = Digital Elevation Model  
EPCO = plant uptake compensation  
ESCO = soil evaporation factor  
FRSE = rainfed forest  
GCM = Global Climate Model  
GHG = greenhouse gas  
GW\_DELAY = Groundwater delay time  
GW\_REVAP = groundwater "revap" coefficient  
HIST = EURO-CORDEX historical  
HRU = Hydrological Response Unit  
IPCC = Intergovernmental Panel on Climate Change  
Ks = hydraulic conductivity  
LISEM = Limburg Soil Erosion Model  
MUSLE = Modified Universal Soil Loss Equation  
NSE = Nash-Sutcliffe efficiency  
OATS = rainfed crop  
OLIV = olive plantations  
PBIAS = percent of bias  
PET = potential evapotranspiration  
PINE = coniferous and mixed forest

RCHGR\_DP = deep aquifer percolation fraction

RCMs = Regional Climate Models

RCP4.5 = Representative Concentration Pathways 4.5

RCP8.5 = Representative Concentration Pathways 8.5

REVAP\_MN = Threshold depth of water in the shallow aquifer for "revap" or percolation to the deep aquifer to occur (mm H<sub>2</sub>O)

RUSLE = revised Universal Soil Loss Equation

SE= Soil erosion

SLM= sustainable land management

SLSUBBSN = Average slope length

SOC = soil organic carbon

SRTM = Shuttle Radar Topography Mission

SUFI-2 = Sequential Uncertainty Fitting version 2

SWAT = Soil and Water Assessment Tool

URMD = artificial settlements

UROSEM = European Soil Erosion Model

USLE\_C = erosion lad cover factor

USLE = Universal Soil Loss Equation

USLE\_K = USLE equation soil erodibility

WEPP = Water Erosion Prediction Model

WPAS = Winter Pasture here intended as “montado” system