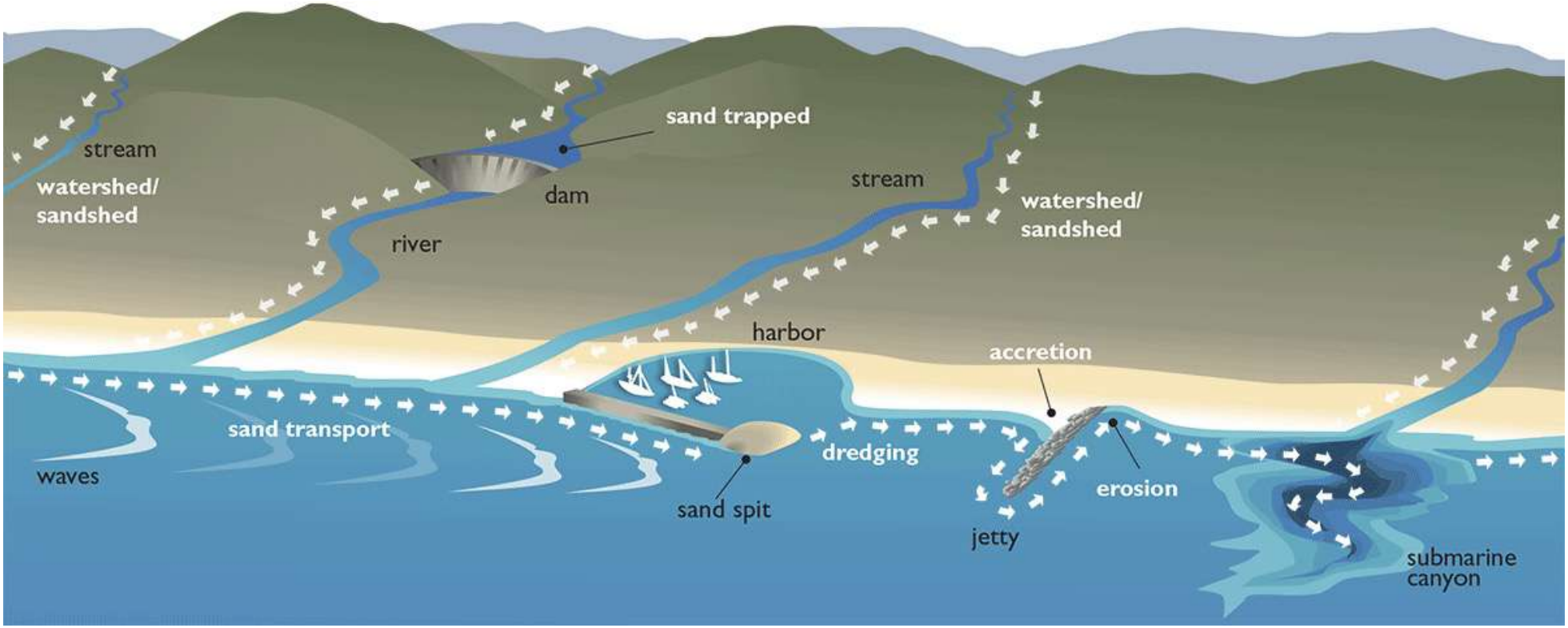
# THE IMPACT OF DAMMING IN SEDIMENT DELIVERY TO COASTAL ZONES: CASE OF MAINLAND PORTUGAL

Rafael Braz, Cristina Ponte Lira, Rui Taborda

Ciências ULisboa
Faculdade de Ciências da Universidade de Lisboa

INSTITUTO DOM LUIZ

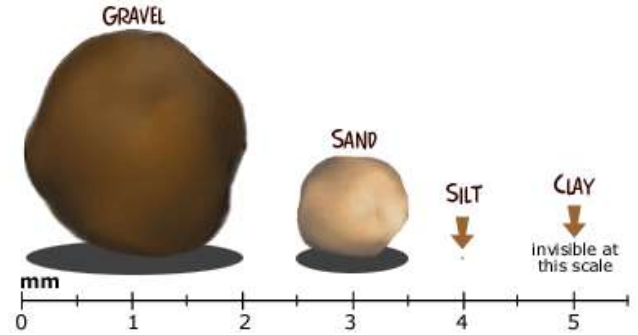
SedNet



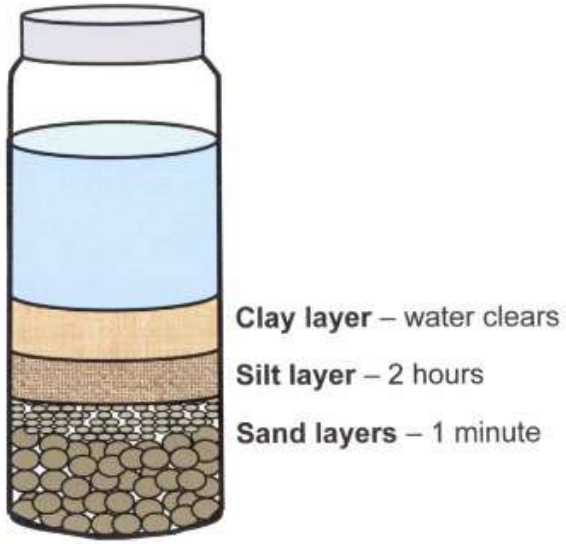

*https://explorebeaches.msi.ucsb.edu/sandy-beach-life/sand-movement*

Coast depends on river sediment supply

"Not All Sediment Is Created Equal"

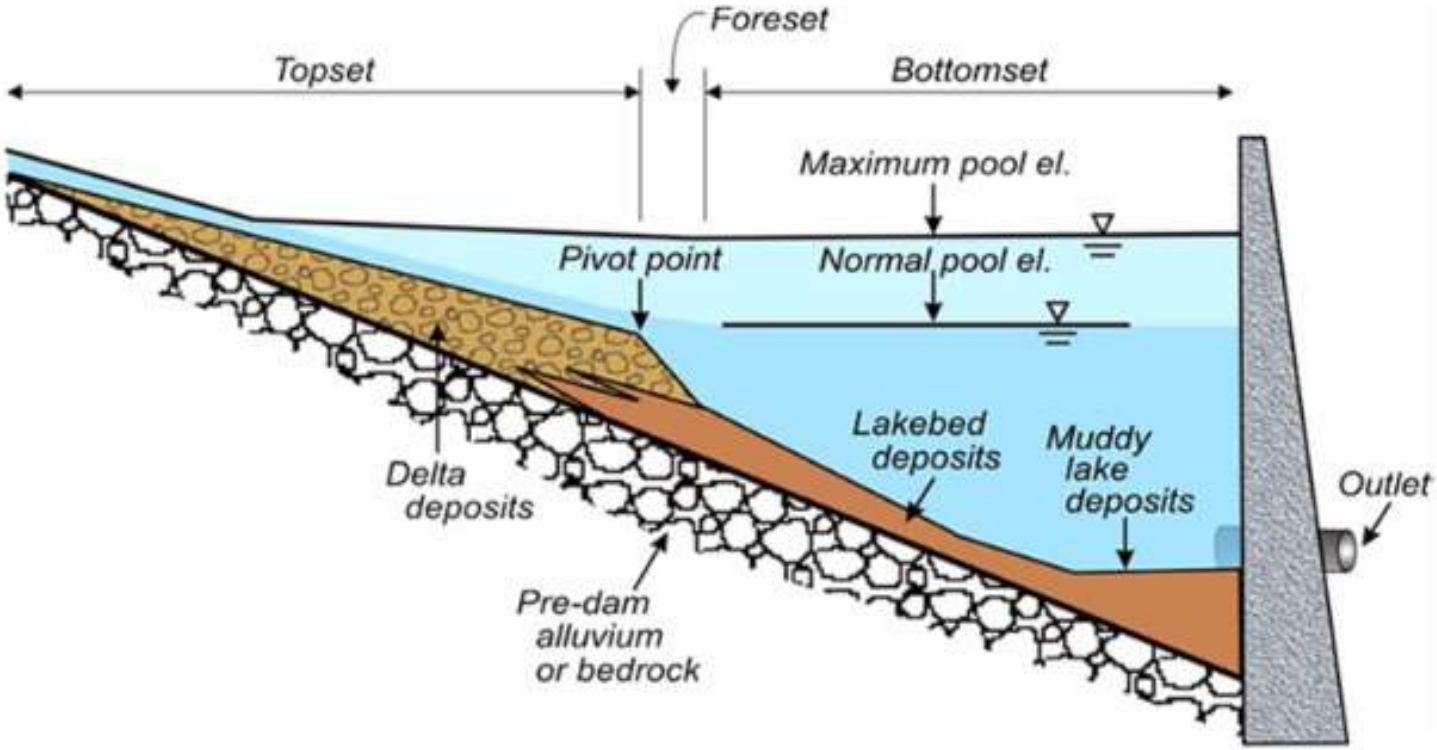



https://civilblog.org/2014/02/10/how-to-identify-silt-clay-in-the-field/




https://www.caryinstitute.org/sites/default/files/public/downloads/lesson-plans/estimating_soil_texture.pdf

**Fig. 1** Reservoir sediment profile with delta and lakebed sediment deposits [16, 33]



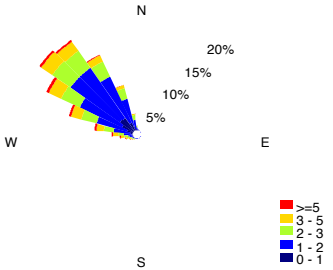

Oladosu, S. O., Ojigi, L. M., Aturuocha, V. E., Anekwe, C. O., & Tanko, R. (2019). An investigative study on the volume of sediment accumulation in Tagwai dam reservoir using bathymetric and geostatistical analysis techniques. SN Applied Sciences, 1, 1-13.

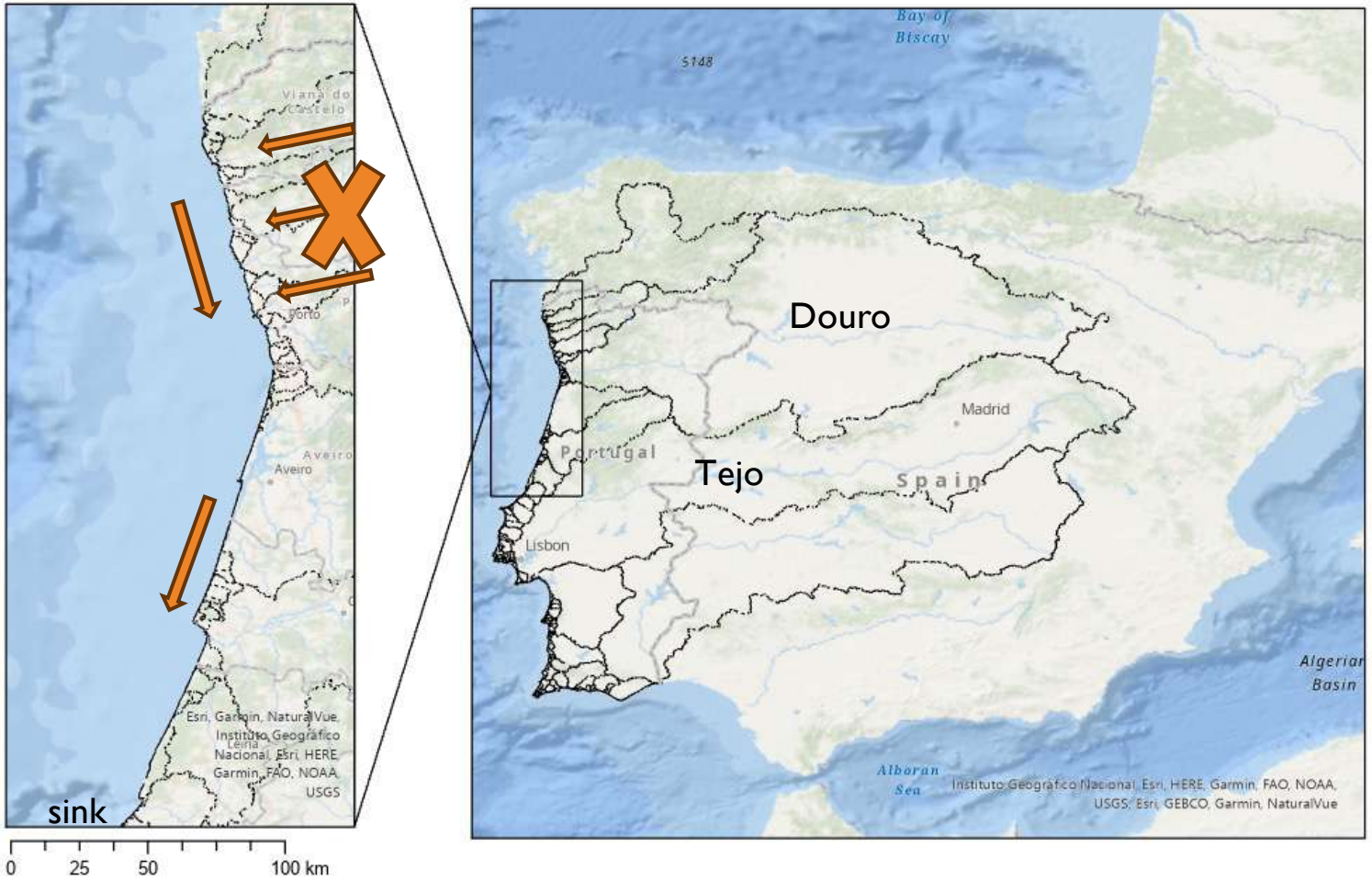
# Objectives

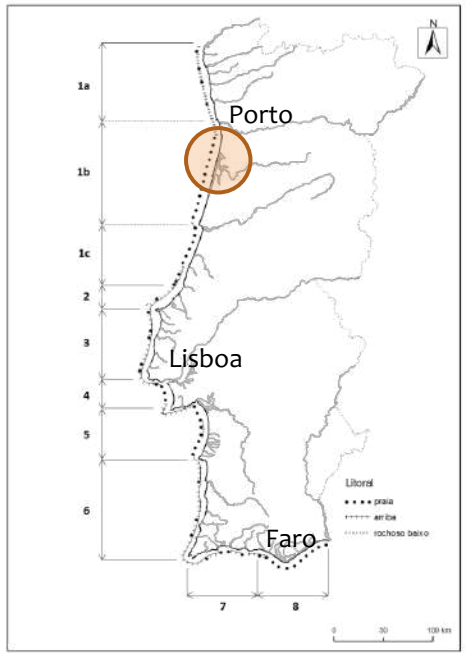
Investigate the effects of dams on sediment delivery to the Portuguese coast.

# Study site – the problem

Wave climate







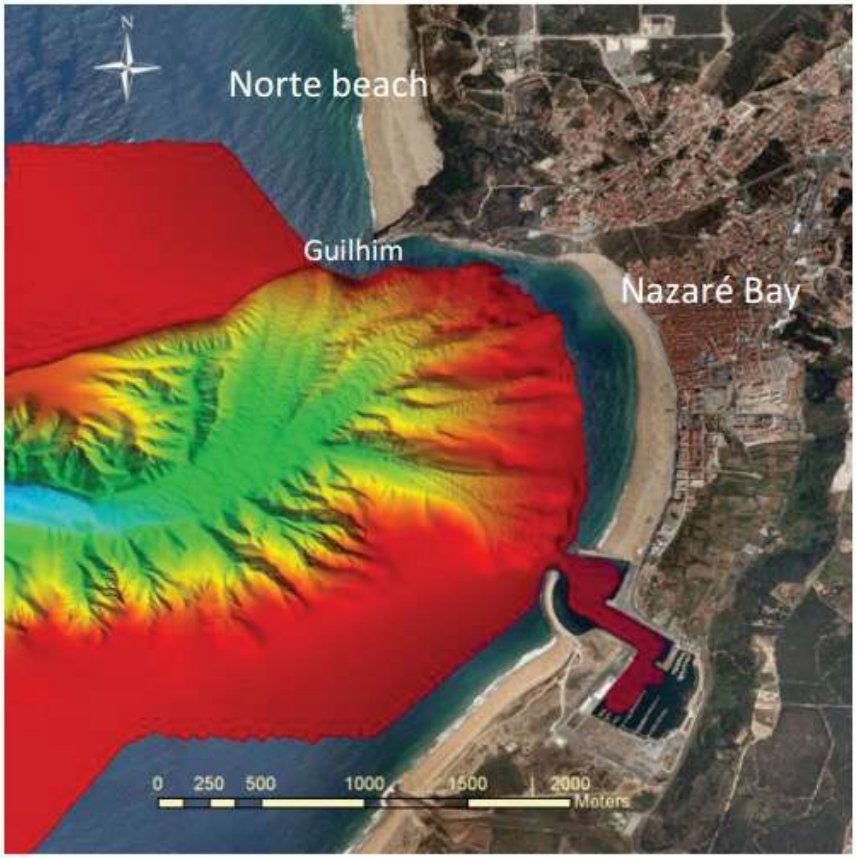
0 200 m

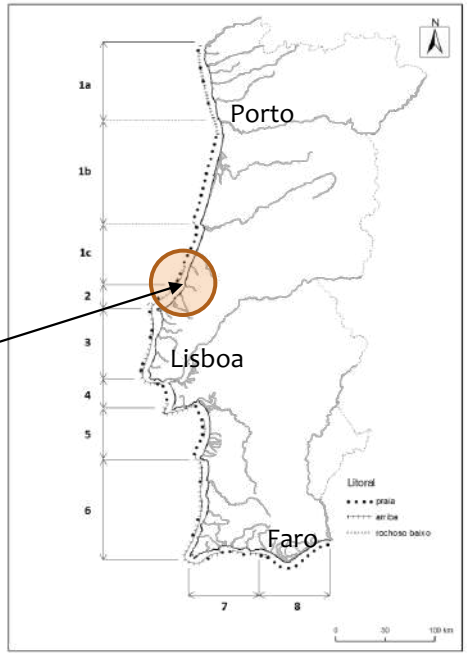
2004

2018

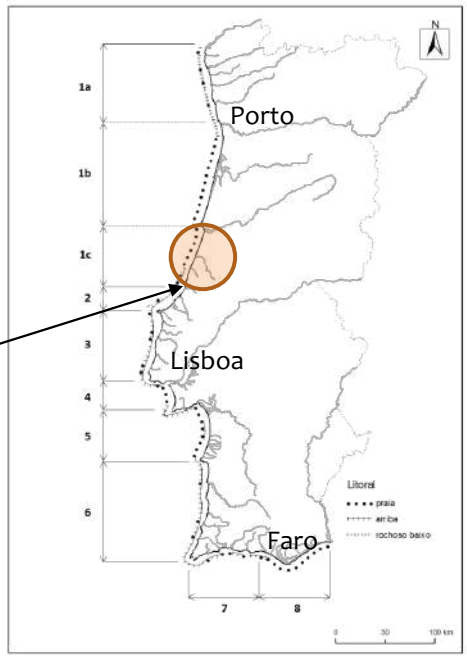
2023

Nazaré canyon



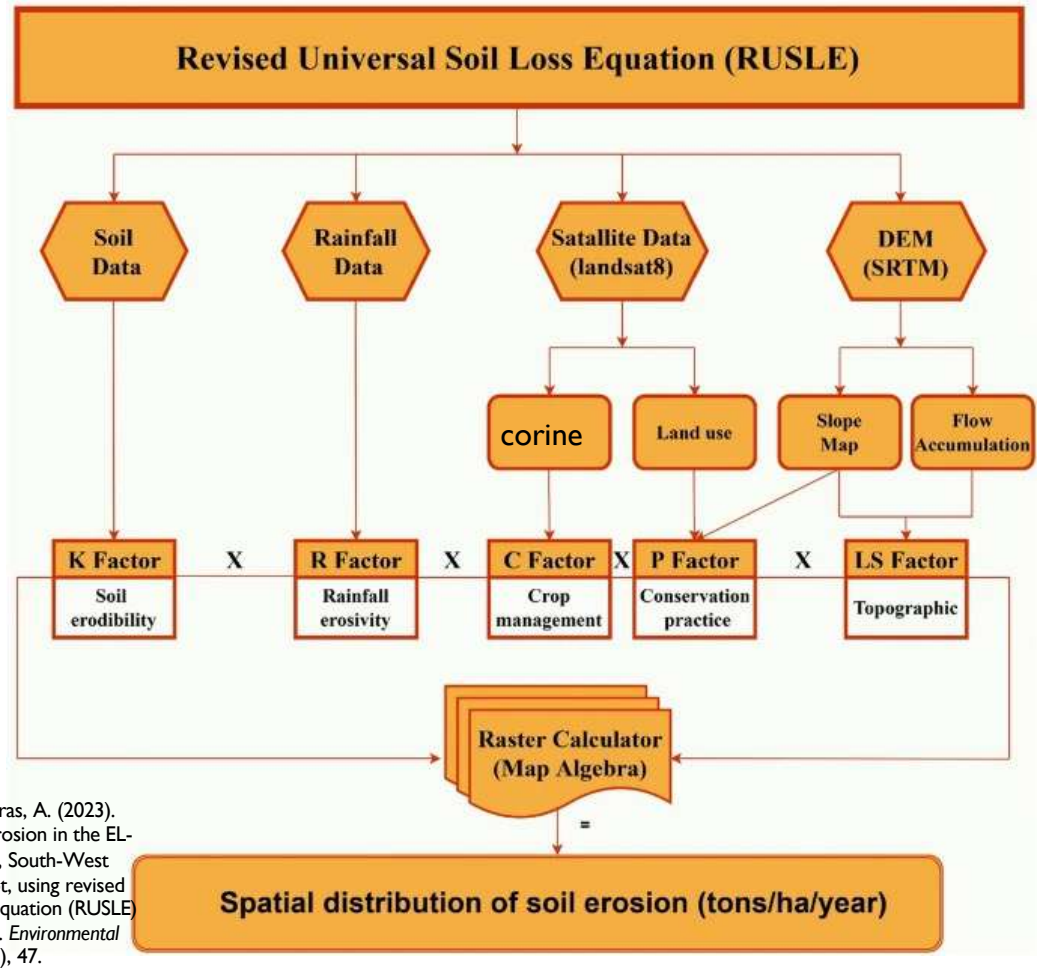



https://www.reshumana.com/wp-content/uploads/2021/12/waves.jpg




costa arenosa baixa

# Methods



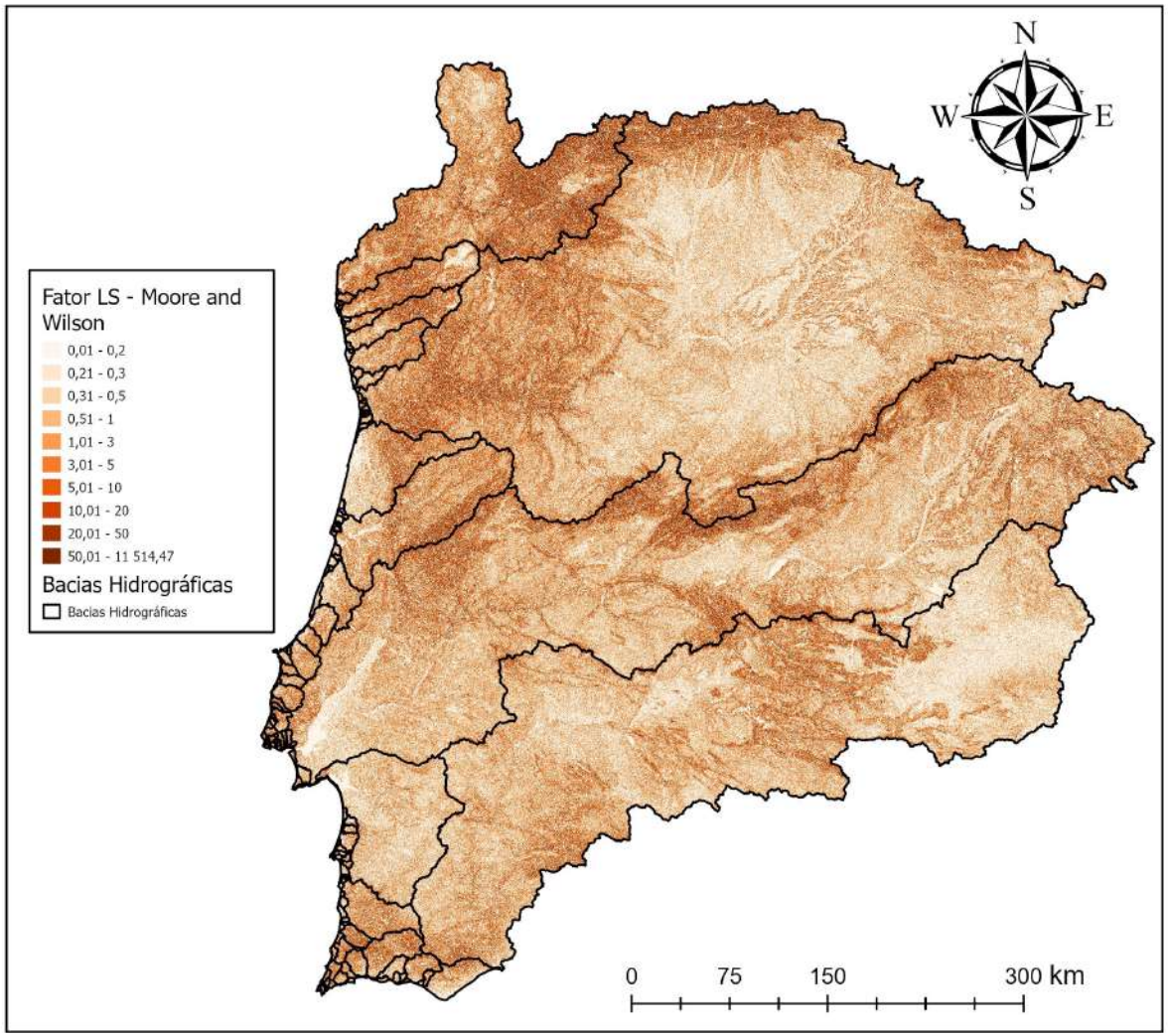

Adapted from: Hagras, A. (2023). Estimating water erosion in the EL-Mador Valley Basin, South-West Matrouh City, Egypt, using revised universal soil loss equation (RUSLE) model through GIS. *Environmental Earth Sciences*, *82*(1), 47.

The Revised Universal Soil Loss Equation (RUSLE) is a mathematical model used to estimate soil erosion rates by factoring in **various environmental parameters**, including rainfall, soil type, topography and land cover and use.

# TOPOGRAPHIC PARAMETER (LS)

combined effect of slope length and steepness on soil erosion

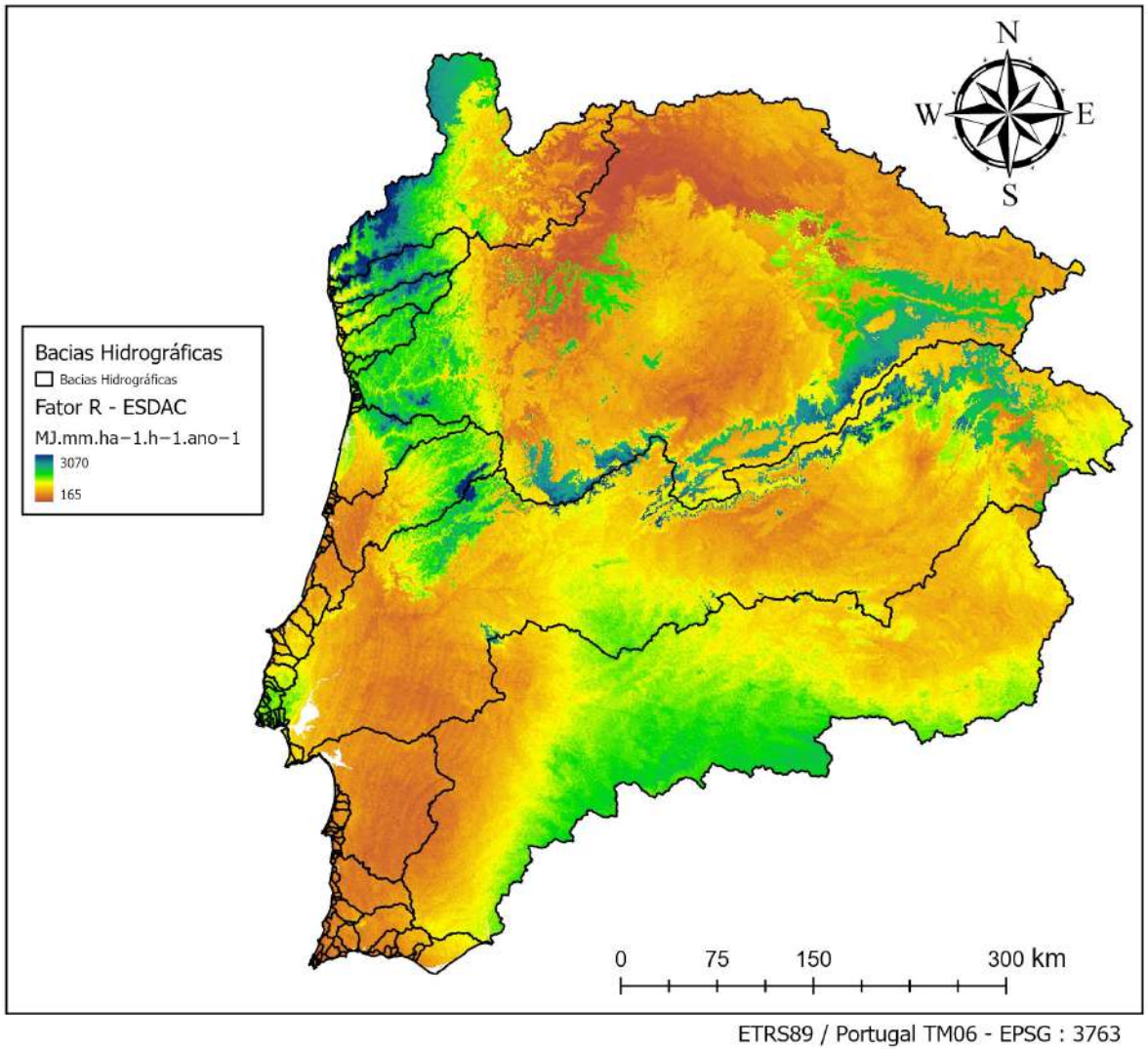
Moore and Wilson, Desmet and Govers, Boehner and Selige



# RAINFALL EROSIVITY PARAMETER (R)

quantifies the erosive power of rainfall and runoff

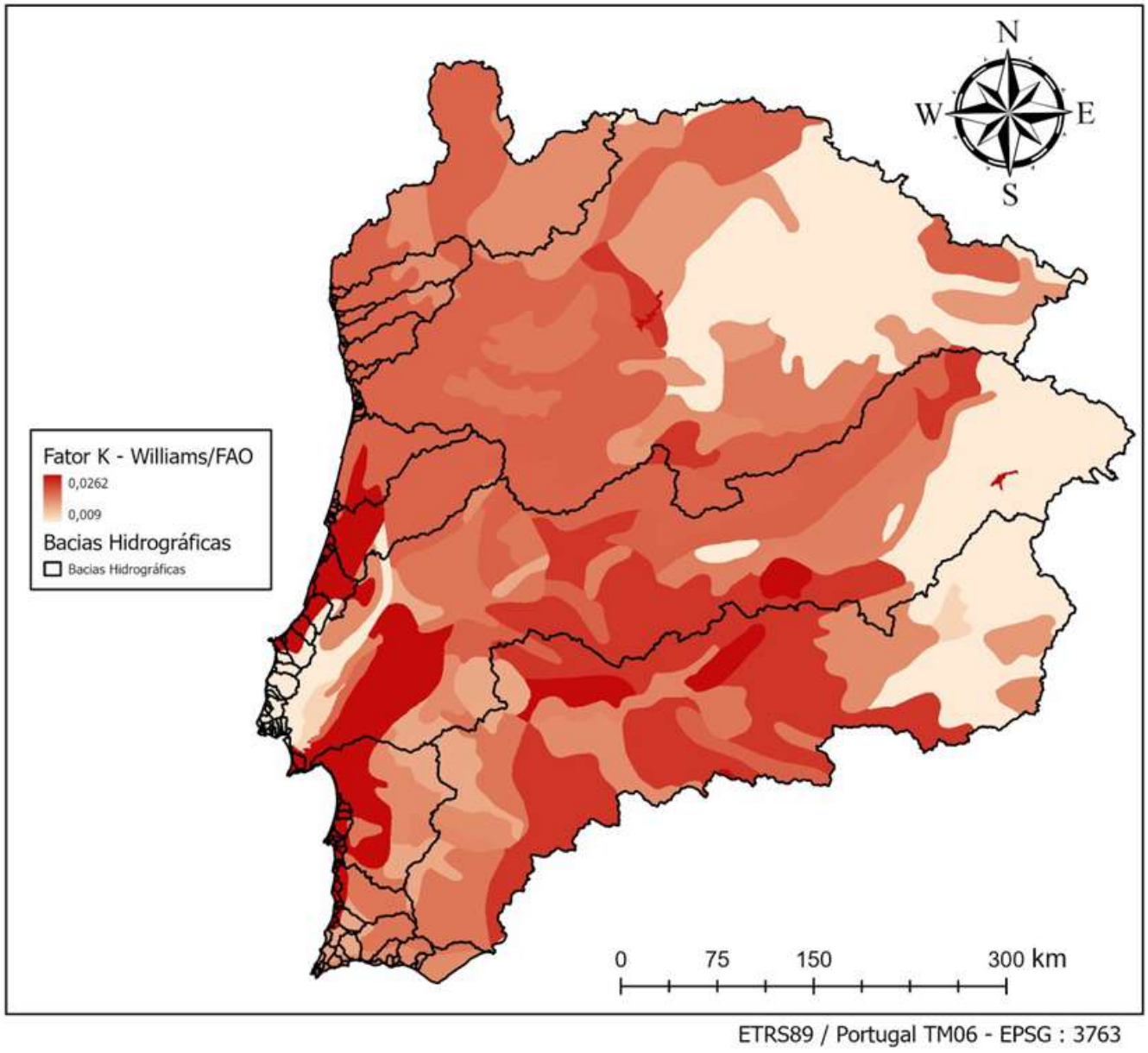
Sniamb, Panagos – EU scale



# SOIL ERODIBILITY PARAMETER (K)

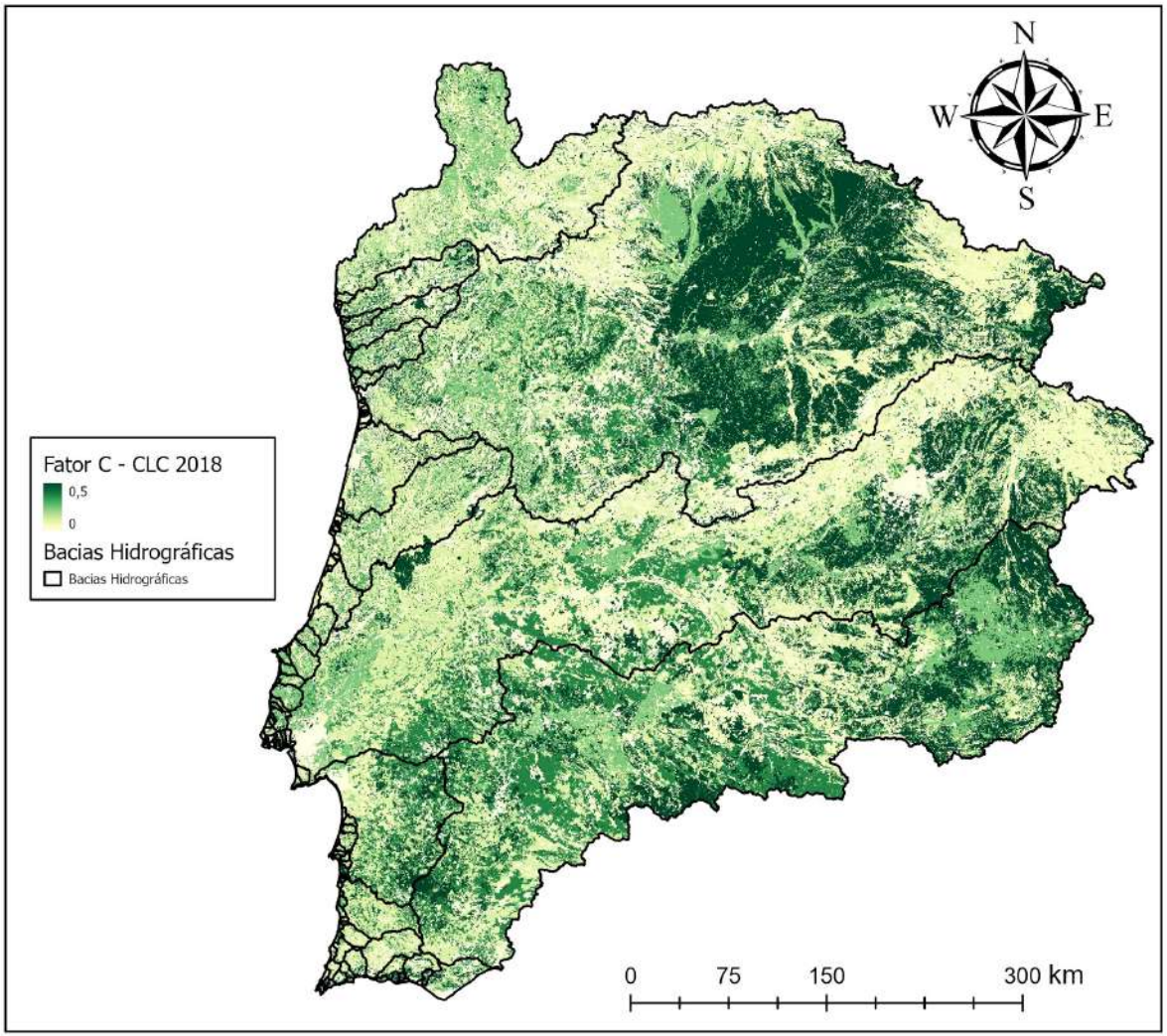
quantifies the susceptibility of a specific soil type to erosion and accounts for various soil properties, such as texture, organic matter content, structure, permeability, and erodibility

Sniamb, Panagos – EU scale, FAO – soil composition



# COVER AND MANAGEMENT FACTOR (C)

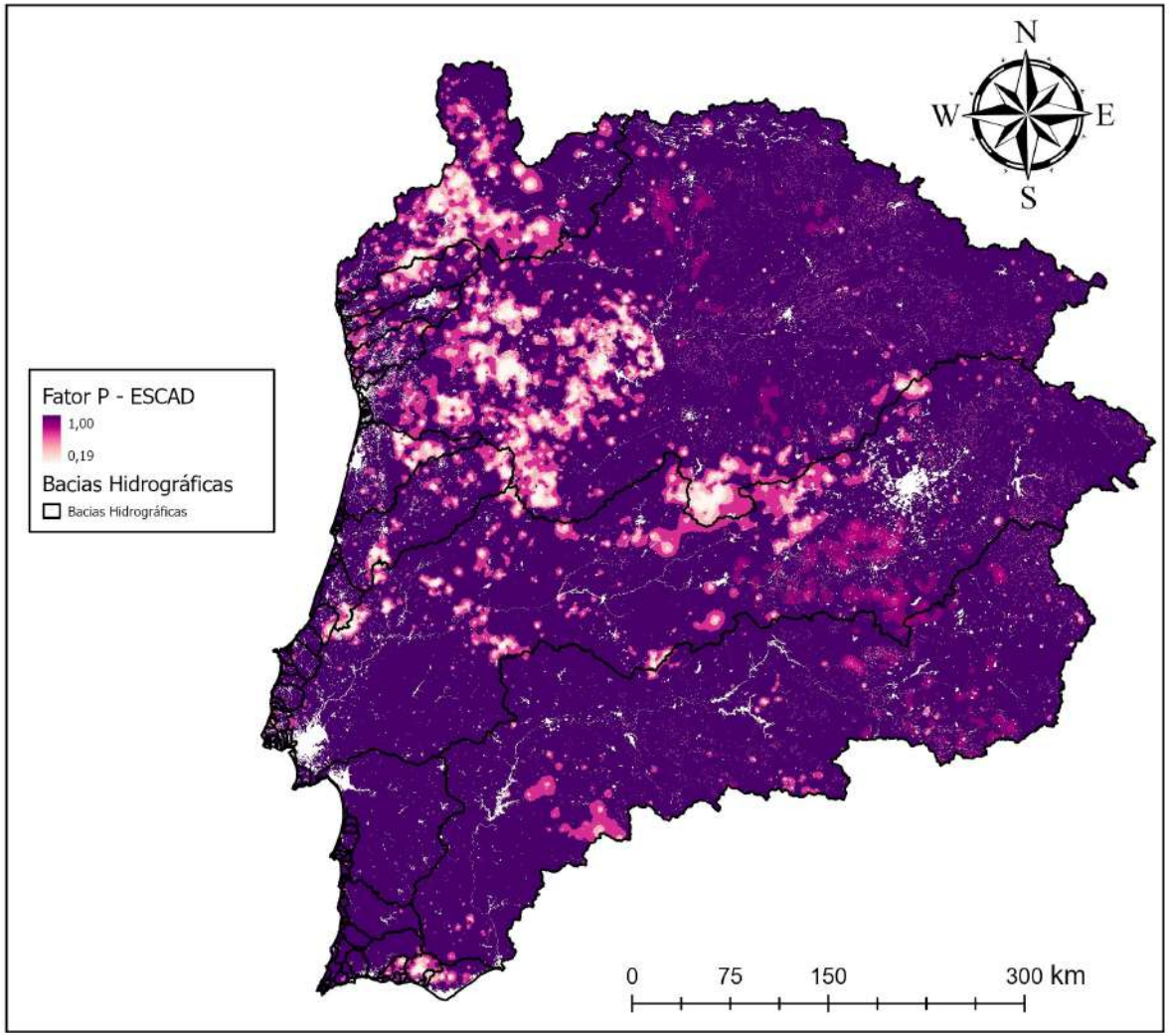
quantifies how the type of vegetation or ground cover and the way the land is managed influence soil erosion rates



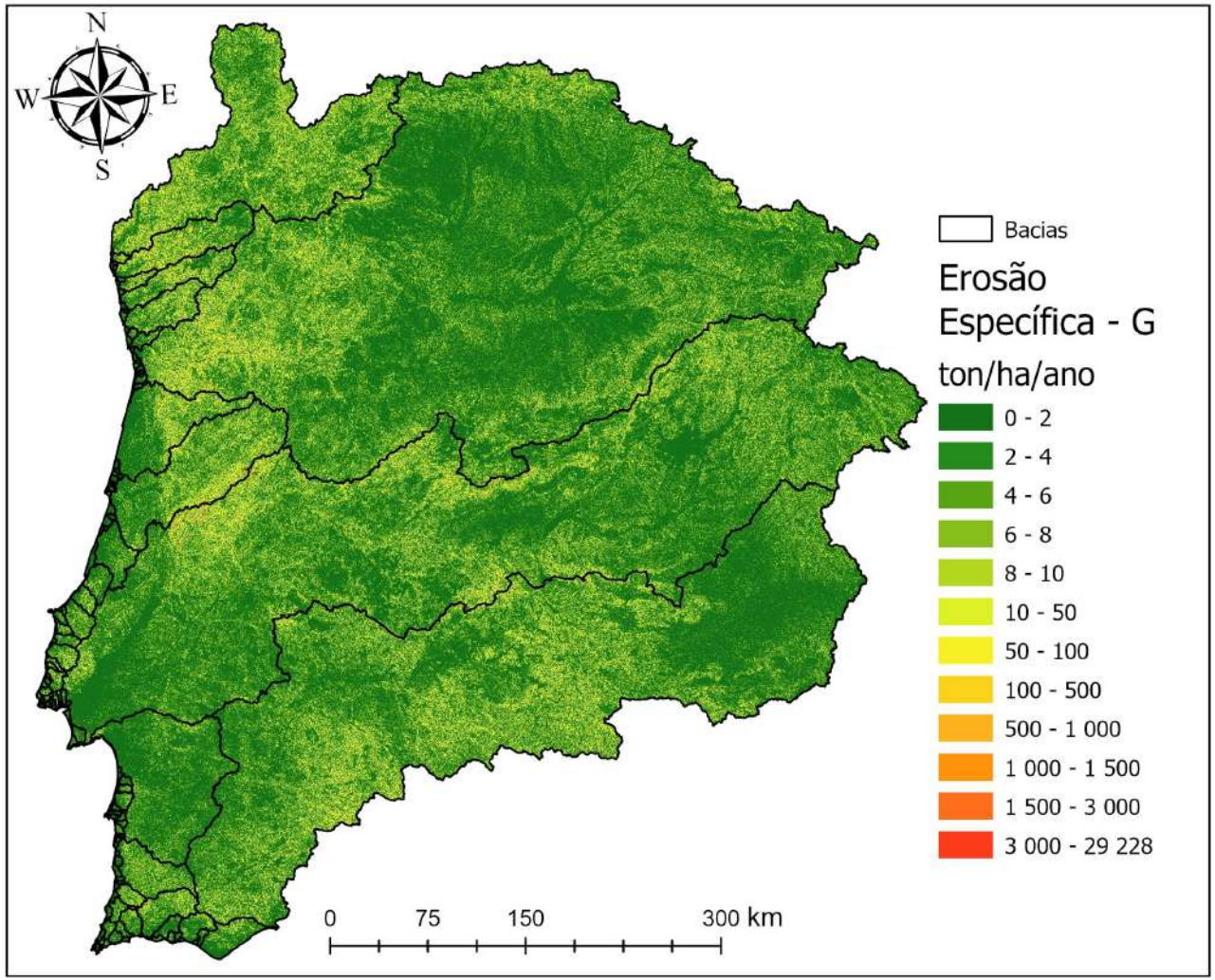
# CONSERVATION PRACTICES' PARAMETER (P)

quantifies the effect of erosion control practices, such as terraces, contour farming, and other soil conservation measures, on reducing soil erosion

MDT (agricolas + declive)/não Agricolas + Corine Panagos – EU scale



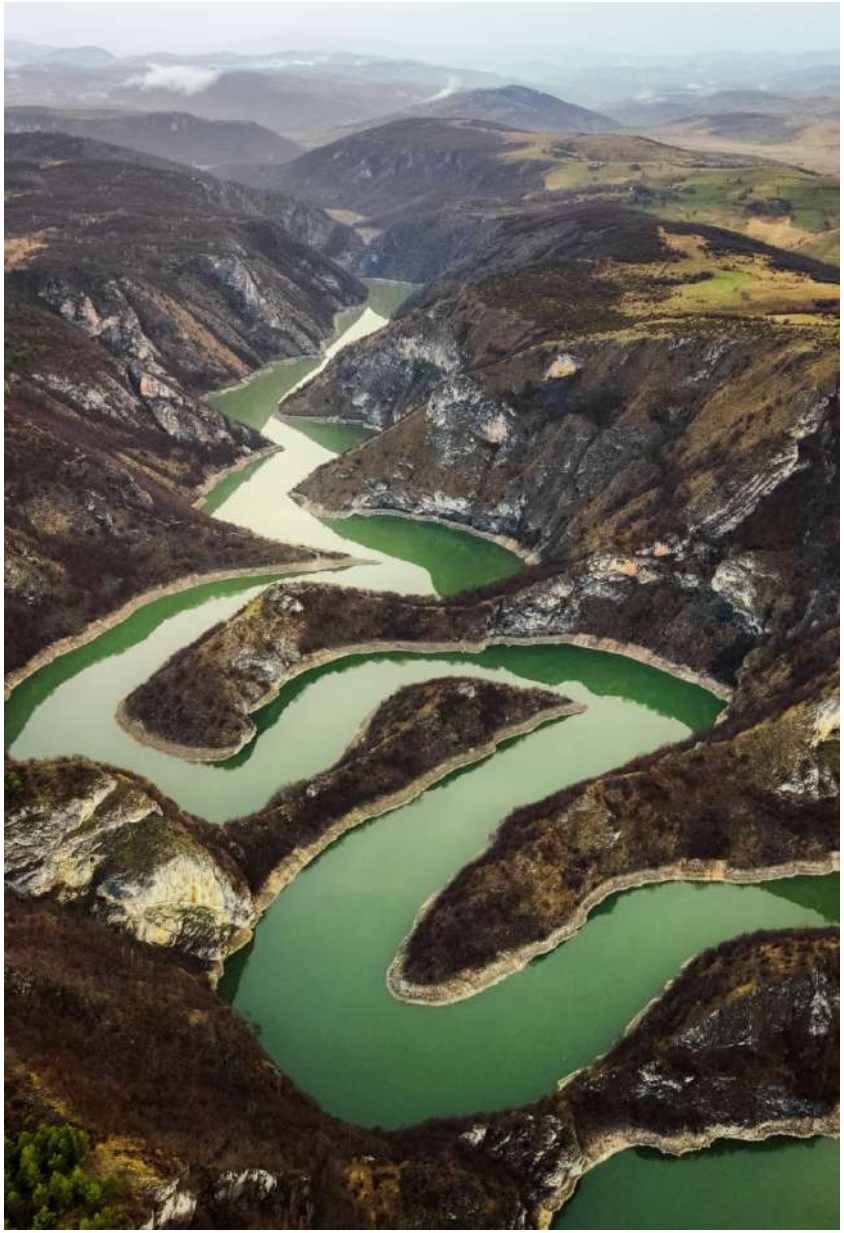
Rate of soil erosion




Validation – RUSLE

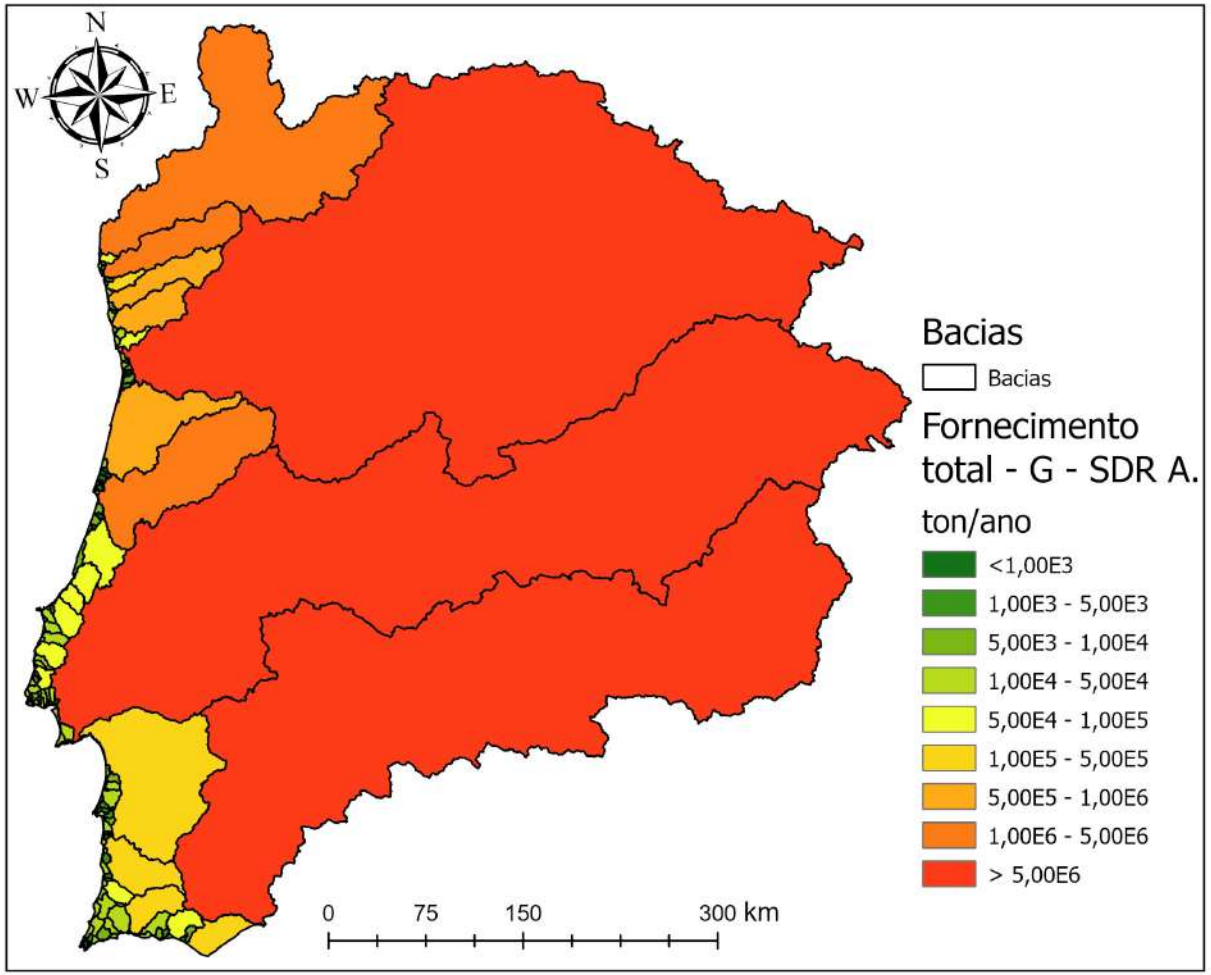
# Sediment delivery ratio - SDR

quantify the proportion of eroded sediment that actually reaches a particular downstream location, such as a river or reservoir



The sediment delivery ratio (SDR) **connects the weight of sediments eroded and transported from slopes of a watershed to the weight that eventually reaches the coast**

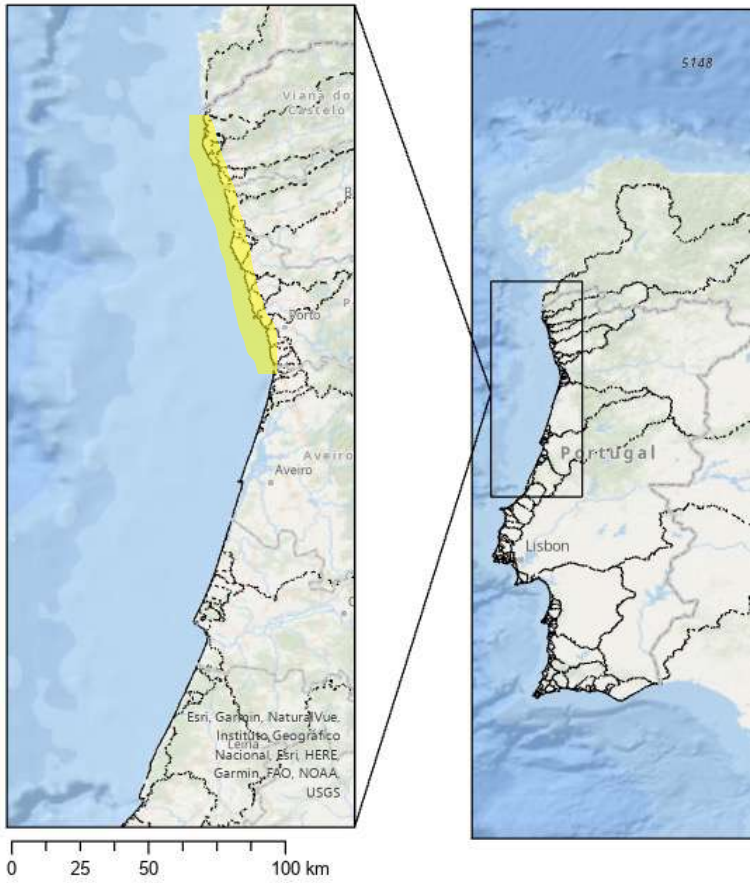
# TOTAL SEDIMENT DELIVERY

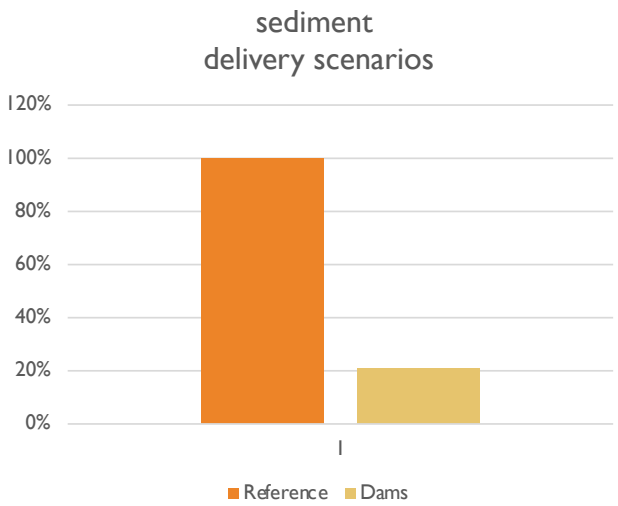


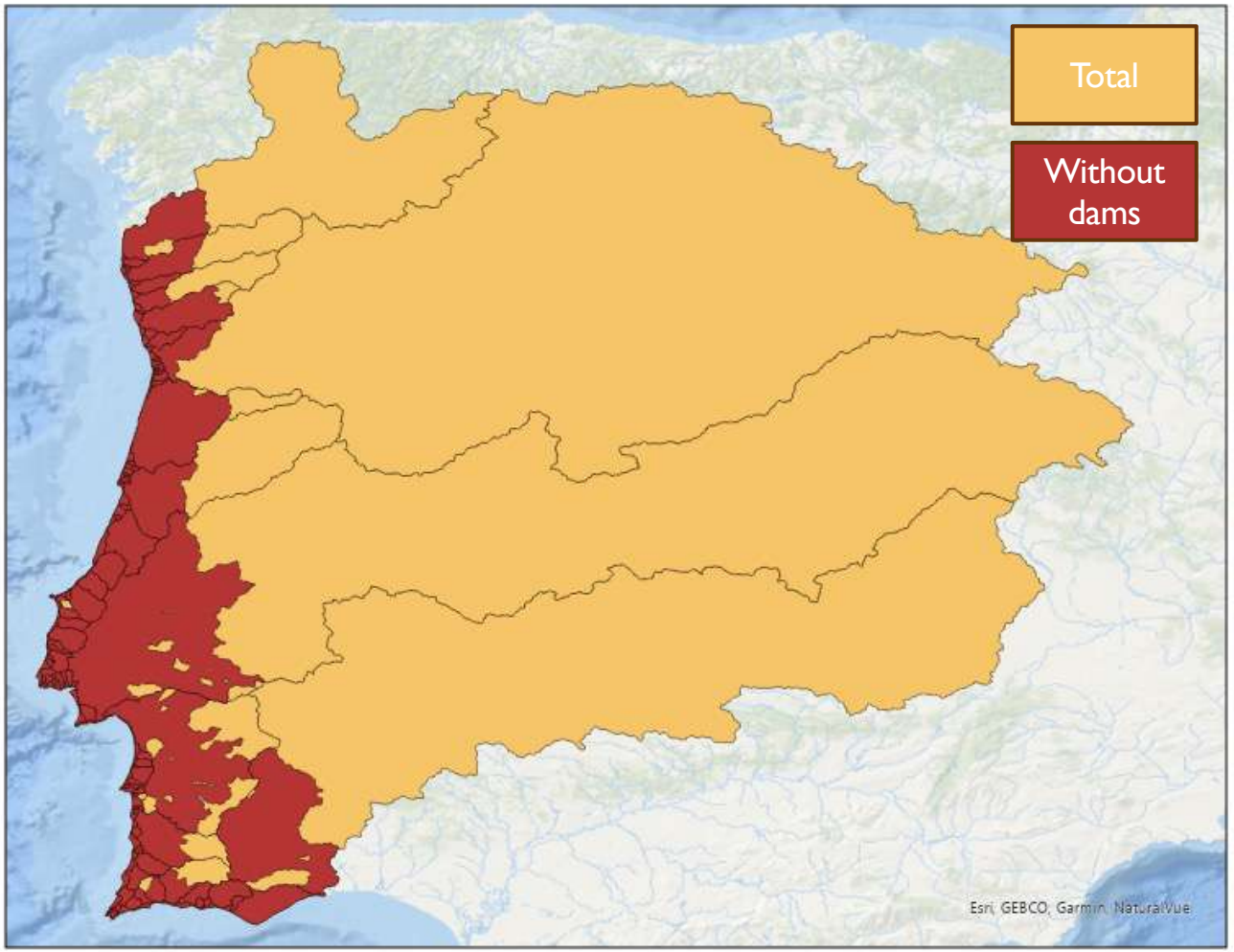
# Reference scenario – present day conditions with no dams

Sediment delivery: 1.8E+07 t $yr^{-1}$

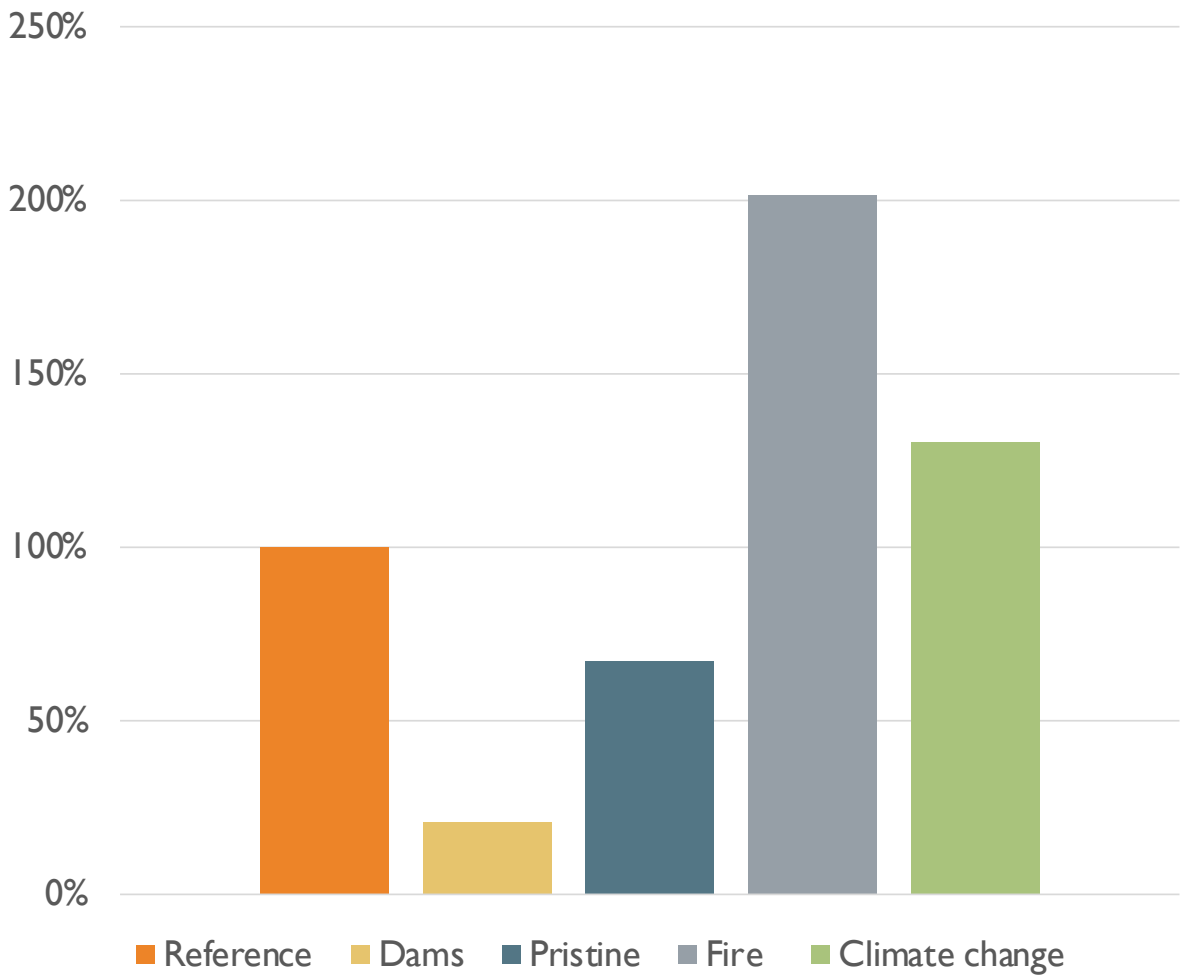
Sand delivery: 1.8E+06 t $yr^{-1}$




sediment
delivery scenarios
120%
100%
80%
60%
40%
20%
0%
1
Reference
Dams


Total
Without dams
Esri, GEBCO, Garmin, NaturalVue

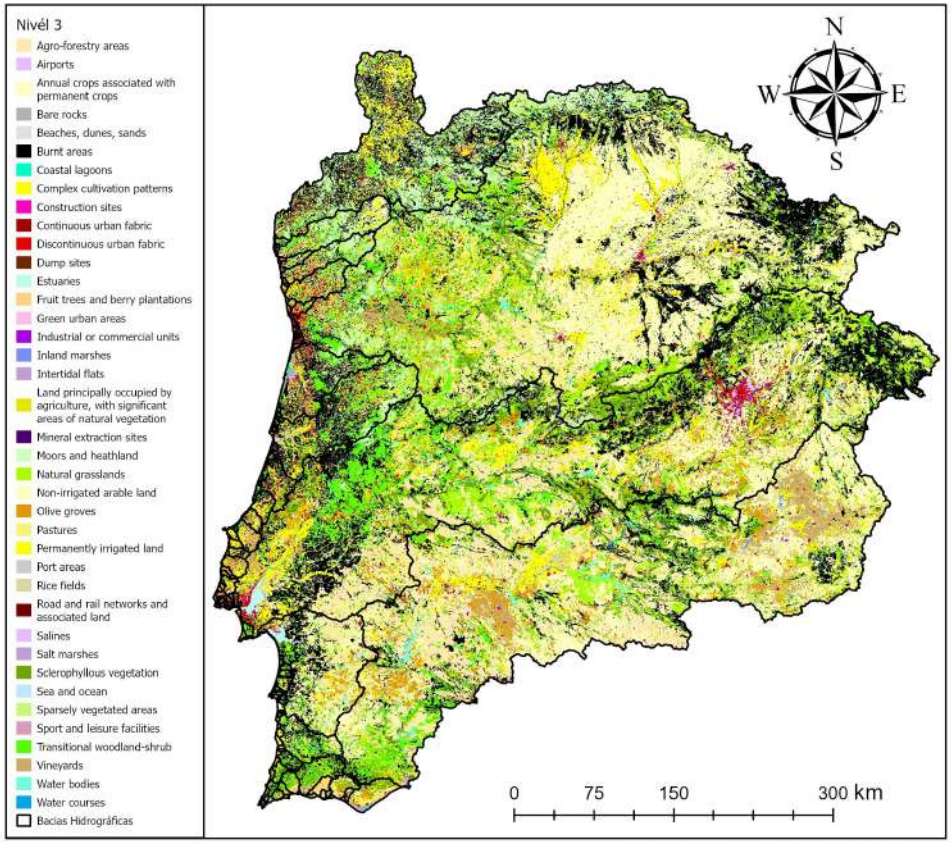
# SEDIMENT DELIVERY SCENARIOS



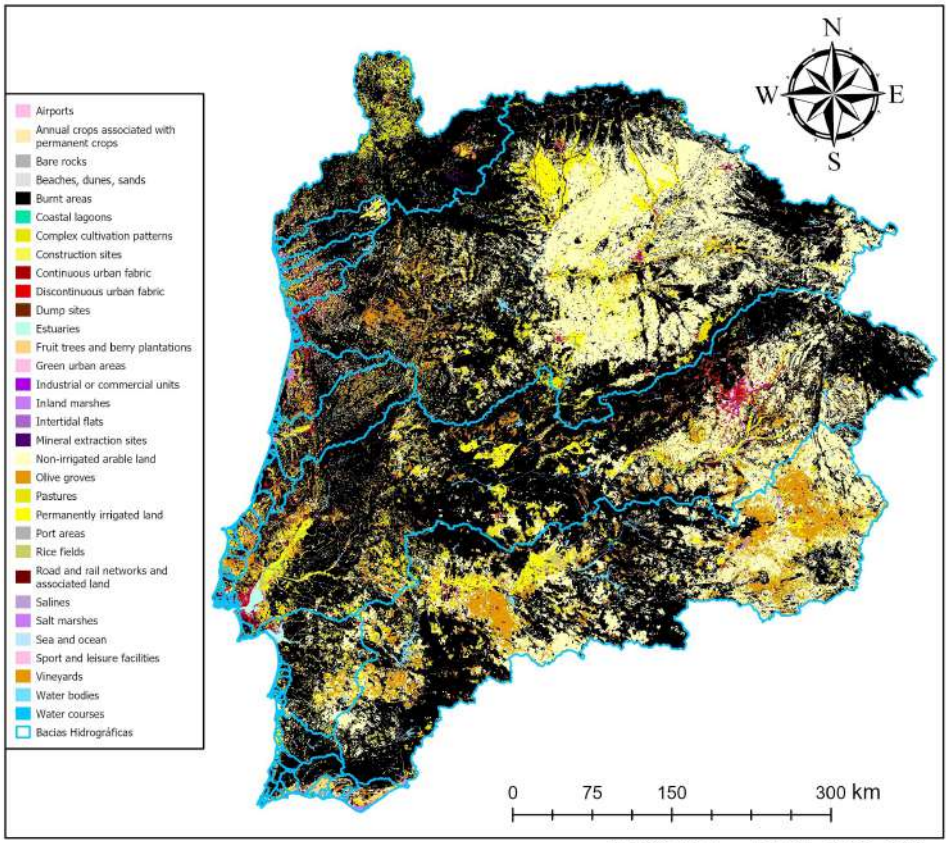

RCP8.5 2070

***Enhance our understanding of the obstacles impacting the***


Thank you




ETRS89 / Portugal TM06 - EPSG : 3763




ETRS89 / Portugal TM06 - EPSG : 3763