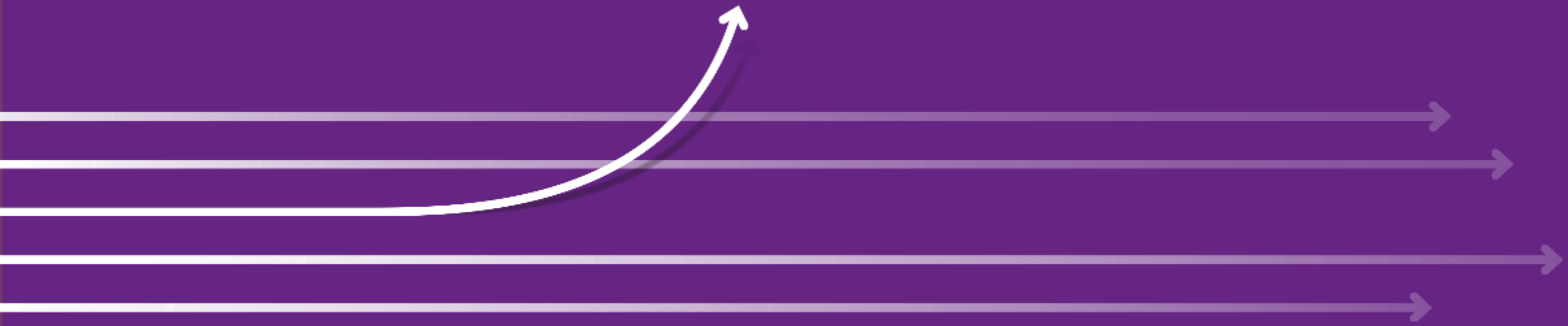
# eurecat



*"innovating with businesses"*

# Life EBRO-ADMICLIM

## Adaptation and mitigation measures to climate change in the Ebro Delta

**Partners:**

- Institute of Agrofood Research and Technology (IRTA)
- Catalan Water Agency (ACA)
- Tarragona Water Consortium (CAT)
- Irrigation Farmers' Association and Ebro Farmers' Union (CRSAE)
- Cartographical and Geological Institute of Catalonia (ICGC)
- Catalan Office on Climate Change (OCCC)
- University of Córdoba (UCO)

**Start date: 02/06/2014** **End date: 01/06/2018**

**Total project budget: 2.260.960 €**

EU financial contribution requested: 1.124.341 €

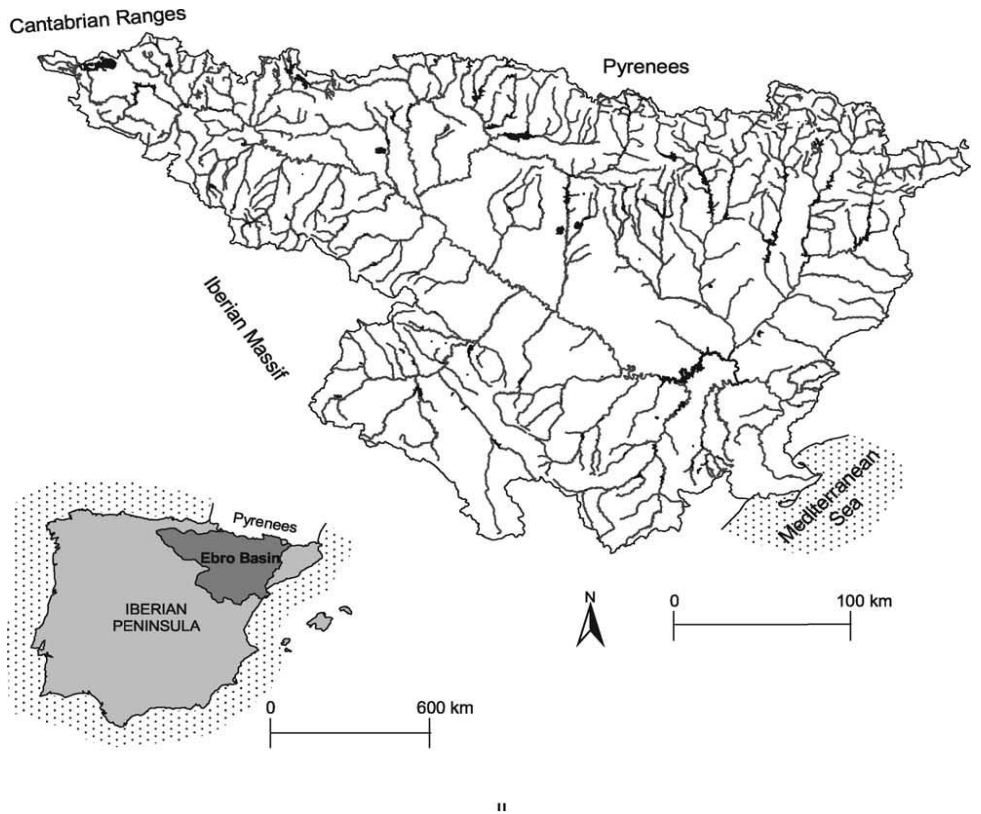
[http://www.lifeebroadmiclim.eu/](http://www.lifeebroadmiclim.eu/) *(338K visits)*

**Nil Alvarez Segura**
*Eurecat - Climate Change Unit*
Cagnes-sur-Mer

## The sediment deficit: the case of the Ebro Delta

The **Ebro Delta** has a watershed with a Mediterranean climate in which large river floods with a **high suspended sediment load** were usual before and after human intervention. Values **from 0.1 to 10 g/l** were usual in the Ebro River before dam construction (Ibañez et al. 1996).

Only recently, after 1960's the Ebro River has undergone a **dramatic reduction of sediment fluxes (up to 99%) due to dam construction for hydropower**. Suspended sediment load is presently <0.01 g/l (Rovira et al. 2012).

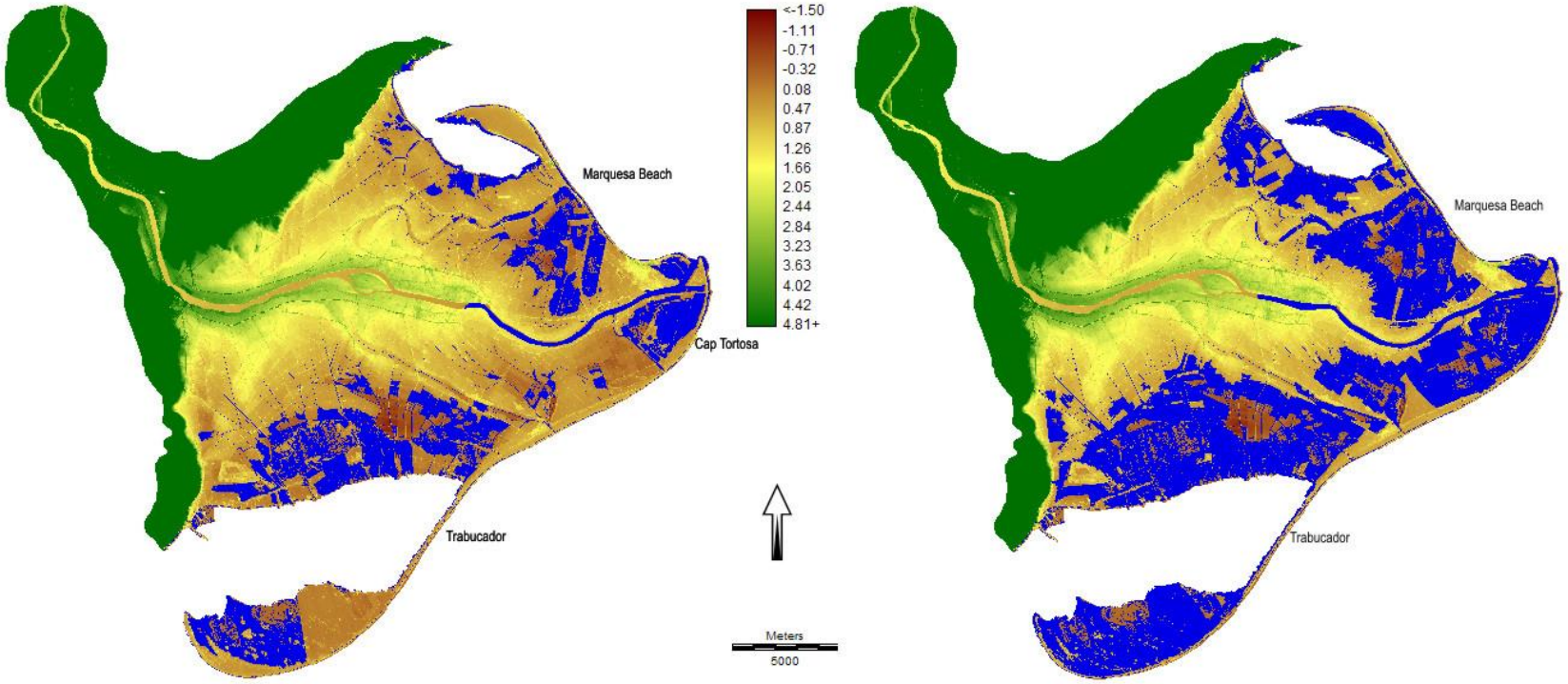



Ibáñez, C., Prat, N. and Canicio, A. (1996). Changes in the hidrology and sediment transport produced by large dams on the lower Ebro river and its estuary. *Regulated Rivers* 12(1):51-62.

Rovira, A., Alcaraz, C. & Ibañez, C. (2012). Spatial and temporal dynamics of suspended load at-a-cross-section: The lowermost Ebro River (Catalonia, Spain). *Water Research* 46: 3671-3681.

# Expected coastal retreat in the Ebro Delta

## Flooding risks




*Flood hazard areas (in blue) to RSLR of 0.25 m (left) and 0.5 m (right) at the Ebro delta.*
*Source: Alvarado-Aguilar and Jiménez*

## The Project Life EBRO-ADMICLIM – Action Plan

**B1. Pilot test of injection of sediment from a water treatment plant into the Ebro Delta irrigation network.**

**B2. Pilot test of injecting sediment into the final stretch of the river Ebro.**

**B3. Operational optimization of two constructed wetlands to maximize carbon sequestration, the soil elevation, and the assimilation of nutrients and pollutants.**

**B4. Optimization of GHG emissions and carbon sequestration in the rice fields of the Ebro Delta.**

**B5. Evaluation of the effects of sediment from a water treatment plant on rice production and GHG emissions.**

**B6. Assessment of areas vulnerable to subsidence and sea-level rise.**

**B7. Developing a Climate Action Plan of the Ebro Delta.**

We proposed an **integrated approach for managing water, sediment and habitats** (rice fields and wetlands), with the **multiple aim** of **increasing ground elevation** (through inputs of inorganic sediment and organic matter), **reducing coastal erosion**, increasing **carbon sequestration** in the soil, **reducing emissions of greenhouse gases** (GHG), and **improving water quality**.

Put it in another way, the idea is to **jointly manage the inputs of inorganic and organic matter** (i.e. sediment and plant residues respectively) of the ground, in order to optimize vertical accretion processes (soil formation) and organic matter decomposition (GHG emissions) in **rice fields** and in **constructed wetlands**.

## Combining adaptation and mitigation measures in rice fields

Rice is the second most important crop worldwide and **is the basic food for 50% of the world** population, as well as **one of the major anthropogenic sources of CH4**.

Around **65% of the Ebro Delta is occupied by rice fields** (ca. 20000 Ha). It is a **widespread crop in many Mediterranean and Asian deltas**.

**Rice fields are the "perfect habitat" for integrating adaptation and mitigation goals**:
- The supply of water with nutrients and sediments **promote inorganic and organic accretion and carbon sequestration**.
- The change in water management **reduce GHG emissions** and increase carbon sequestration as well.


On the left, the evolution with the current contribution of sediments. On the right, the evolution with the planned contribution of sediments to the project. In red, areas below sea level but not connected to the sea.

## Execution of sediment injection pilot tests in the irrigation canals

# Life EBRO-ADMICLIM

Adaptation and mitigation measures to climate change in the Ebro Delta

## Beyond the project…

REST-COAST

Large scale RESToration of COASTal ecosystems through rivers to sea connectivity (Green Deal)

Fundación Biodiversidad

BIORESILMED - Promotion of bioeconomy and climate resilience in Mediterranean landscapes (NextGenEU)

Centre en Resiliència Climàtica by eurecat

Climate Resilience Center (CRC) of Catalonia and Ebro Delta Living Lab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