

## Habitat restoration and management in the Ebro delta coastal lagoons <sup>[1]</sup>

The Alfacada and Tancada coastal lagoons are located in the Delta del Ebro Natural Park. The lagoons are vulnerable to the effects of climate change, particularly sea level rise, in combination with sediment deficit due to river regulation, leading to exacerbated coastal erosion and subsidence. Local management practices (e.g. intensive rice farming) have also affected the natural habitats and species, causing wetland loss and changes in salinity and water quality. Habitat restoration and management measures have thus been implemented to improve resilience against sea level rise and recover the hydrological connectivity and the ecological quality of the coastal lagoons.

### Case Study Description

#### **Challenges:**

The Alfacada and Tancada coastal lagoons are located in the Delta del Ebro Natural Park. Although the Alfacada lagoon is a protected area, it was until recently a private estate used for hunting; this has led to isolation from the sea and the river and the introduction of freshwater from the irrigation system for the neighboring rice fields. The Alfacada lagoon is also vulnerable to the effects of climate change and sediment deficit, since the area close to the river mouth is quickly retreating. Therefore specific management and restoration measures are necessary to mitigate these negative effects. The salt marshes of the Tancada lagoon have been damaged by intensive fish farming and much work was required to restore this now protected area to its natural state, recovering its connectivity with the Alfacs Bay through the removal of dikes.

#### **Objectives:**

The main objective of this project is to improve the ecological status of the Alfacada and Tancada lagoons through habitat restoration and management measures, such as the removal of infrastructures that interfere with this connectivity, creating new lagoon habitats in existing rice fields and restoring marsh habitat in abandoned aquaculture facilities. The main specific objectives of the project are to:

1. Improve the ecological and hydrological connectivity of the Alfacada lagoon with the implementation of restoration measures designed to reduce the effects of coastal erosion and climate change, and improve the status of priority habitats and species;
2. Increase the Alfacada coastal lagoon habitat, restoring the original lagoon areas that have been converted to rice fields;
3. Improve the ecological status and the hydrological connectivity of the old salt pans of Sant Antoni (Tancada lagoon area), through the restoration of areas affected by abandoned aquaculture facilities;
4. Develop procedures to monitor and disseminate ecological values of the restored areas, so as to increase public awareness and knowledge among users and managers of the spaces, as well as society in general.

#### **Solutions:**

The main adaptation measure, to increase resilience against sea level rise, is the reestablishment of the hydrological connectivity between the lagoons and the sea such that the sediment inputs to the lagoons are increased during marine storms. Several measures have been implemented to deal with the consequences of sea level rise and habitat degradation. Main measures implemented included:

1. To improve the hydrological network of the Alfaca lagoon, by cleaning the canals that bypass the lagoon and building a new canal that connects directly the lagoon and the river;

2. To improve the hydrological connection of the salt marshes, that were divided by dikes and isolated one from another;
3. To naturalize rice fields back to coastal lagoon and an old aquaculture facility back to salt marsh habitat;
4. To create small islands as nesting areas for sea birds;
5. To limit land accesses to some areas in order to mitigate the impacts of predators and human frequentation;
6. To reintroduce the European pond turtle.

Results of the implementation of these measures are being monitored. However, monitoring has not finished and there are no results available yet.

**Importance and relevance of the adaptation:**

Case mainly developed and implemented because of other policy objectives, but with significant consideration of CCA aspects.

**Additional Details****Stakeholder engagement:**

The main institutional stakeholders (Government of Spain and Government of Catalonia) are partners of the project. The project is formally supported by the city councils of the two towns where the lagoons are located (Amposta and Sant Jaume d'Enveja). Other stakeholders are informed and consulted during several meetings but they don't actively participate in the project.

**Success and limiting factors:**

So far the project has achieved all the planned goals, though some actions have been delayed, due to administrative problems between the Government of Spain and the Government of Catalonia. The main delay has been the restoration of rice fields back to coastal lagoon in Alfacada.

**Budget, funding and additional benefits:**

The total cost for the implementation of the project was 3.054.703 € (EU Life+ funding was 1.490.084 €). The main benefits are the restoration of wildlife habitats (62 ha of new habitats), the recovery of some protected species and the increased resilience of the lagoons and marshes against sea level rise. Economic benefits include the creation of jobs for the execution of the project and for the new visitor centre built in the Tancada lagoon. No monetary valuation of the benefits has been carried out.

**Legal aspects:**

The main legislation framework to support the Project implementation was the Habitats Directive.

**Implementation time:**

4 years (2011-2014).

**Reference Information****Contact:**

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**Websites:**

<http://lifedeltalagoon.eu/lifedeltalagoon> [3]

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