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Project OPTIMUS PRIME – Optimal greening of irrigated farmland to achieve a prime environment

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International Society for River Science
RIVERINE LANDSCAPES AS COUPLED SOCIO-ECOLOGICAL SYSTEMS
6TH BIENNIAL SYMPOSIUM OF THE INTERNATIONAL SOCIETY FOR RIVER SCIENCE
8 -13 SEPT. 2019 - VIENNA, AUSTRIA

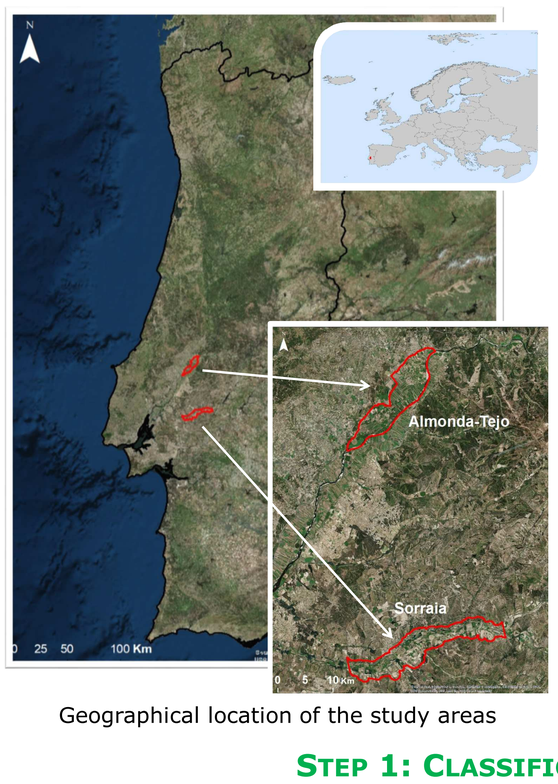
OBJECTIVE

This project aims to **identify types and spatial configurations of Ecological Focal Areas** (EFAs) that **potentiate biodiversity and the provision of Ecosystem Services** (ES) in Mediterranean irrigated agricultural systems, taking also into consideration the **connectivity impairment** in such fragmented landscapes.

METHODS

The project focuses on **2 study areas of irrigated farmlands**: the **Sorraia valley** and the **Almonda-Tejo valley**, both on the **Tagus river** system.

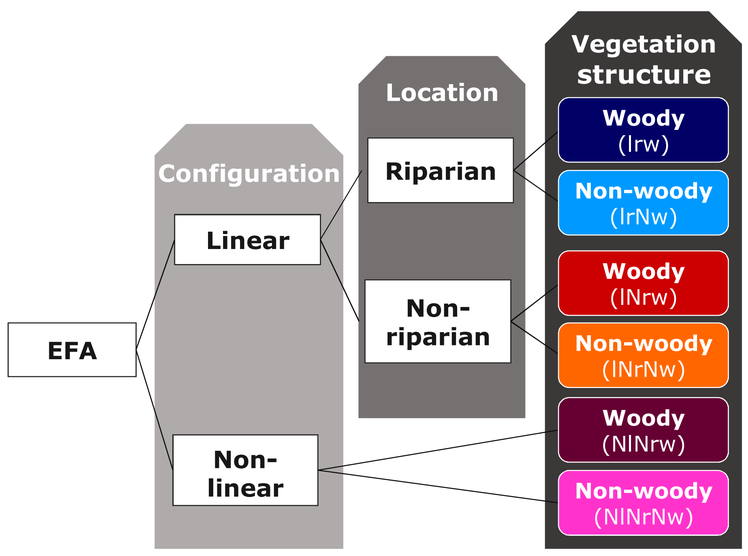
EFAs are a key element in the **greening of the EU's Common Agricultural Policy** aiming to **benefit biodiversity** while **maintaining or enhancing structural and functional connectivity**. Criteria based on **temporality** (at least 3-4 years without any land-use intervention), **configuration** (linear vs non-linear), **location** (riparian vs non-riparian) and **vegetation structure** (woody vs non-woody) was applied to establish the **EFA classification system**.



Geographical location of the study areas

STEP 1: CLASSIFICATION SYSTEM

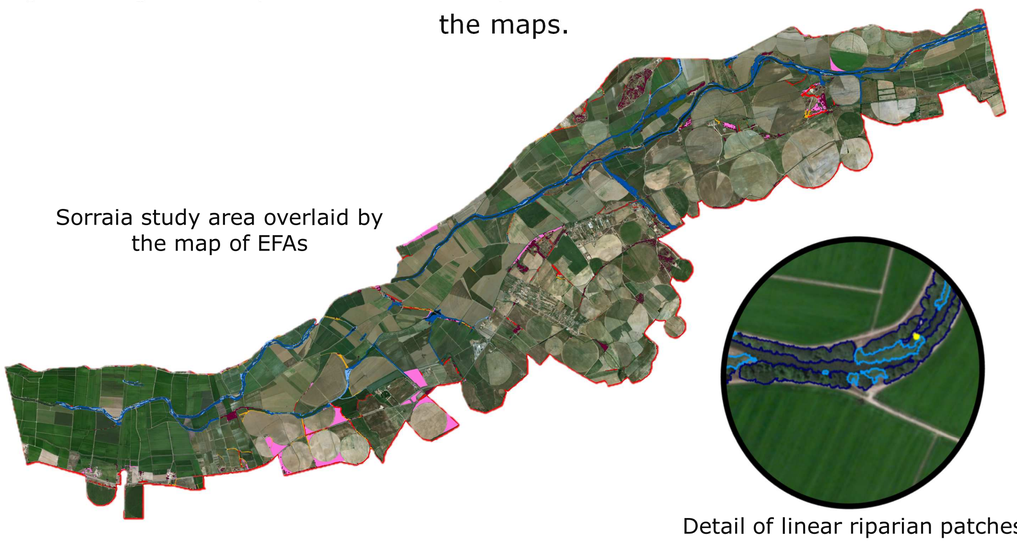
6 classes were defined to categorise the EFAs



EFA classification system

STEP 2: MAPPING & VALIDATION

EFAs mapping was achieved by visual **classification of World Imagery Layer** using a GIS system. Field surveys will be conducted to refine & validate the maps.



Sorraia study area overlaid by the map of EFAs

Detail of linear riparian patches

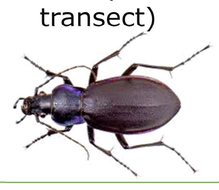
STEP 3: BIOLOGICAL SURVEYS

8 distinct biodiversity or ecosystem services indicators

(surveys done in articulation with landowners & farmers associations)

Ground Beetles

Pitfall traps
(5 replicas 5m apart in a linear transect)



Flora

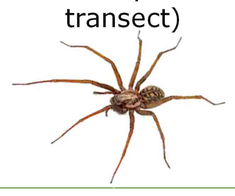
Biodiversity Potential Index
adapted from the French IBP
(Indice de Biodiversité Potentielle; Larrieu & Gonin 2009)

Predation services on catterpillars

Exposure of **green dummy caterpillars** of moulding clay (10 per site)

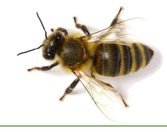
Spiders

Pitfall traps
(5 replicas 5m apart in a linear transect)



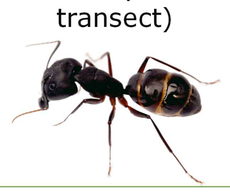
Pollinators

Coloured bowl traps
(blue, white & yellow bowls 5m apart in a linear transect)



Ants

Pitfall traps
(5 replicas 5m apart in a linear transect)



Bats

Passive acoustic sampling
using AudioMoth devices

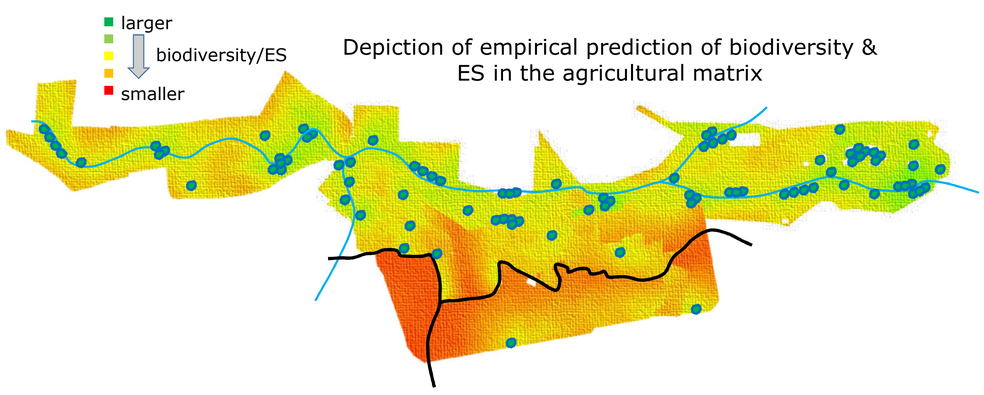
Birds

Visual and acoustic sampling
during breeding season

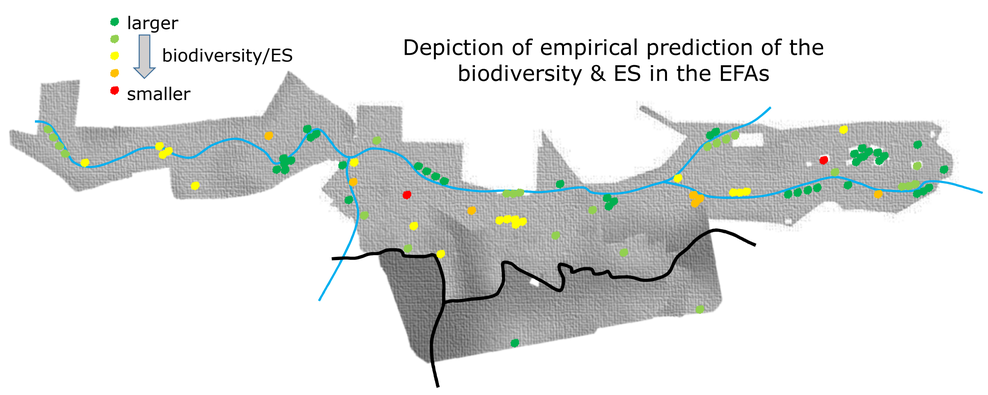
STEP 4: DATA TREATMENT

Predictive empirical models will be developed to relate the EFA classes and their landscape metrics with the biodiversity/ES indicators. Landscape metrics will be calculated for every mapped and outlined EFA. Given that connectivity amongst EFAs is important for habitat conservation, structural and functional connectivity will be assessed.

PROJECT OUTPUTS



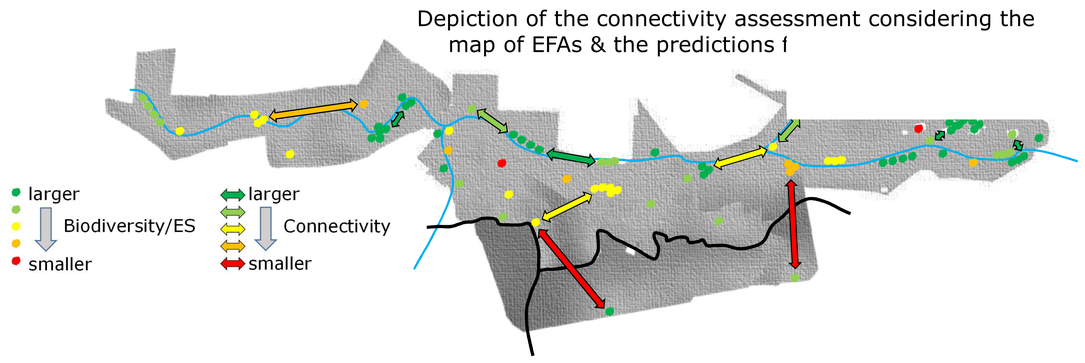
Depiction of empirical prediction of biodiversity & ES in the agricultural matrix



Depiction of empirical prediction of the biodiversity & ES in the EFAs

Evaluate the Biodiversity and Ecosystem Services in the agricultural matrix

Assess the Biodiversity and Ecosystem Services per EFA type



Depiction of the connectivity assessment considering the map of EFAs & the predictions f

Calculate **connectivity indexes per group** and an overall determination of the **status of the connectedness of the EFA network**

The project will also **perform simulations** of **water and habitat delivery of biodiversity services** under different **climate change and agriculture scenarios**.

The project will contribute to the **development of management guidelines** for such agricultural landscapes, farmers associations and local communities.

Acknowledgements: G. Duarte has been financed by national funds via FCT –Fundação para a Ciência e a Tecnologia, I.P., within the project PTDC/ASP-AGR/29771/2017. M.R. Fernandes has been financed by national funds via FCT –Fundação para a Ciência e a Tecnologia, I.P., under "Norma Transitória –DL 57/2016/CP1382/CT0019". A. Fonseca & V. Zina benefitted from a Ph.D. grant (PD/BD/142884/2018 & PD/BD/142882/2018) under the Doctoral Program FLUVIO – River Restoration and Management, sponsored by FCT. P. Segurado (IF/01304/ 2015) and P.M. Rodríguez-González (IF/00059/2015) have been financed by national funds via FCT –Fundação para a Ciência e a Tecnologia, I.P., under the IF Researcher Programme. F.C. Aguiar has been financed by national funds via FCT –Fundação para a Ciência e a Tecnologia, I.P., under "Norma Transitória –DL 57/2016/CP1382/CT0019". P Branco has been financed by national funds via FCT –Fundação para a Ciência e a Tecnologia, I.P., under "Norma Transitória –DL 57/2016/CP1382/CT0019". This research was funded by the Forest Research Centre, a research unit funded by Fundação para a Ciência e a Tecnologia I.P. (FCT), Portugal (UID/AGR/00239/2019).