

ERAHUMED DSS

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Preface

The purpose of this book is to provide a comprehensive reference for the [ERAHUMED Decision Support System](#). Here you can find the technical descriptions of the algorithms employed by the system, as well as the user manual for the accompanying software.

The Support System and, hence, this book are currently under development on [Github](#). In particular, the `{erahumed}` R package is hosted [here](#).

For general information on the ERAHUMED project, please refer to the [official website](#). If you want to get in touch, you can contact any of us via e-mail:

- [Andreu Rico](#) (Coordinator)
- [Pablo Amador](#) (PhD Researcher)
- [Valerio Gherardi](#) (Software Developer)

1 Introduction

This is a book created from markdown and executable code.

See Martínez-Megías et al. (2024) for additional info.

Part I

Technical description

2 The ERAHUMED model: a bird's eye view

This section should contain a brief overview of how the model is structured, introducing the three main model components (hydrology, exposure, risk) and hydrological elements (lake, ditches, clusters), as well as explaining how the various components are interconnected with each other (*e.g.* the order of calculation).

3 Model inputs

This chapter will collect all model inputs (numeric parameters, as well as more complex information such as time-series or data-frames). The description should be generally succinct and parameters should be collected in a table - leveraging on `erahumed::erahumed_docs()` to retrieve parameters documentation).

The goal here is not to explain in detail what every parameter represents, which will be clarified when explaining the algorithms. Rather, the goal is to have a central reference for all users inputs.

The table could contain links to the sections describing the specific algorithms for which the parameters being described play a role.

4 Hydrological model of the Albufera Natural Park

4.1 Overview

4.2 Scheme of the hydrological model

The content of this sections should be roughly the same as the corresponding [package vignette](#).

4.3 Water balance calculations

4.3.1 Albufera Lake

4.3.2 Rice field clusters

4.3.3 Irrigation ditches

5 Exposure

5.1 Overview

5.2 Pesticide applications

This should describe how chemical applications are simulated.

5.3 Pesticide dispersion

5.3.1 Diagram of physical processes

Roughly the content of this [vignette](#).

5.3.2 Evolution Equations

5.3.3 Semi-numerical approach

6 Risk assessment

6.1 Overview

6.2 Calculation of risk using SSDs

Part II

User Manual

7 The ERAHUMED DSS User Interface

This chapter should explain how to run ERAHUMED simulations using the Shiny app. It may contain screenshots taken from the app to exemplify the various points.

7.0.1 How to run the DSS?

Describe various options available (which at the moment of writing may as well be “download the package” only - and perhaps a basic deployment on shinyapps.io).

7.0.2 The “Output” tab

7.0.3 The “Input” tab

8 The `{erahumed}` R package

This should not be an exhaustive description of the R package, but rather mention its existence and giving basic instructions for its installation and refer to the package vignette's and documentation for more details.

References

Martínez-Megías, Claudia, Alba Arenas-Sánchez, Diana Manjarrés-López, Sandra Pérez, Yolanda Soriano, Yolanda Picó, and Andreu Rico. 2024. “Pharmaceutical and Pesticide Mixtures in a Mediterranean Coastal Wetland: Comparison of Sampling Methods, Ecological Risks, and Removal by a Constructed Wetland.” *Environmental Science and Pollution Research* 31 (10): 14593–609.

A Input Data

A.1 Hydrological data

A.2 Meteorological data

A.3 Albufera Rice Paddies Management

A.4 Storage curve and P-ETP function

A.5 Definition of rice clusters