

# Freshwater eutrophication from forest management: the case of eucalypt in Portugal

**Daniele Costa, Paula Quinteiro, Ana Cláudia Dias**

Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning, University of Aveiro, Aveiro, Portugal

E-mail contact: danielle.costa@ua.pt

## Introduction

Eucalypt forest requires several interventions to improve wood quality and production yield, including several fertilization operations along the production cycle [1]. The application of fertilizers releases nutrients (including phosphorus - P) to the freshwater bodies that contribute to eutrophication, i.e. an increased primary production that can result in an undesirable disturbance to the balance of organisms and impair water quality.

## Goal

**To present a framework to derive spatially differentiated midpoint characterization factors (CFs) for freshwater eutrophication in Portuguese eucalypt catchments.**

## Framework

The framework follows the principles of Helmes et al. [2] to derive the midpoint CFs. Two stages are considered in the development of the midpoint CFs:

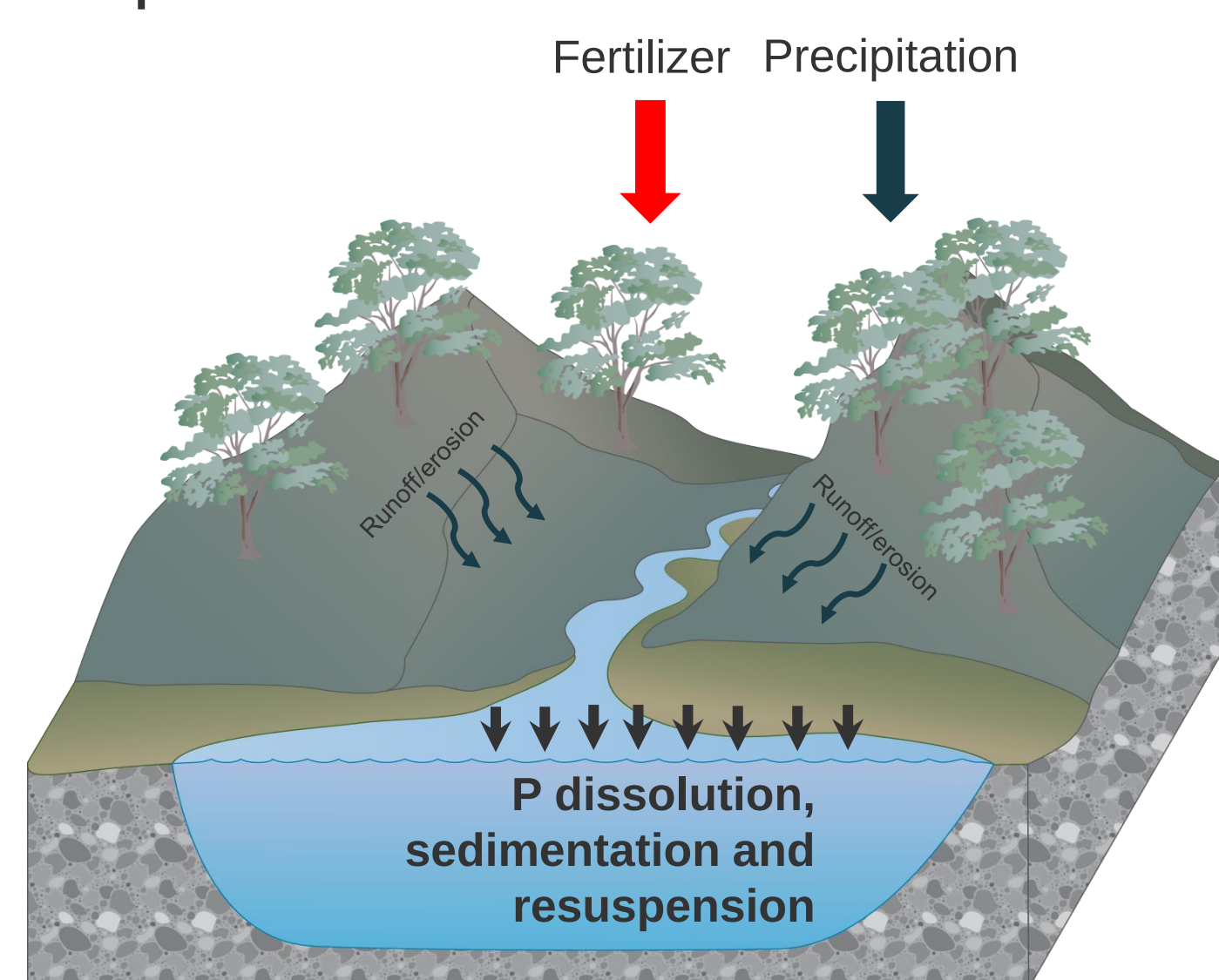


Figure 1: Life Cycle Inventory of P emissions in eucalypt forests.

- **First stage:** Modelling the Life Cycle Inventory of P emissions (Figure 1), based on data monitored in four Portuguese eucalypt forest catchments with different edaphoclimatic conditions. P transportation mechanisms is simulated by the Soil and Water Assessment Tool (SWAT) [3].
- **Second stage:** Developing midpoint fate CFs according to different eucalypt forest management scenarios, considering the following mechanisms: advection, retention, and water use [2]. The environmental impact pathways of P from fertilizers applied to eucalypt stands are shown in Figure 2.

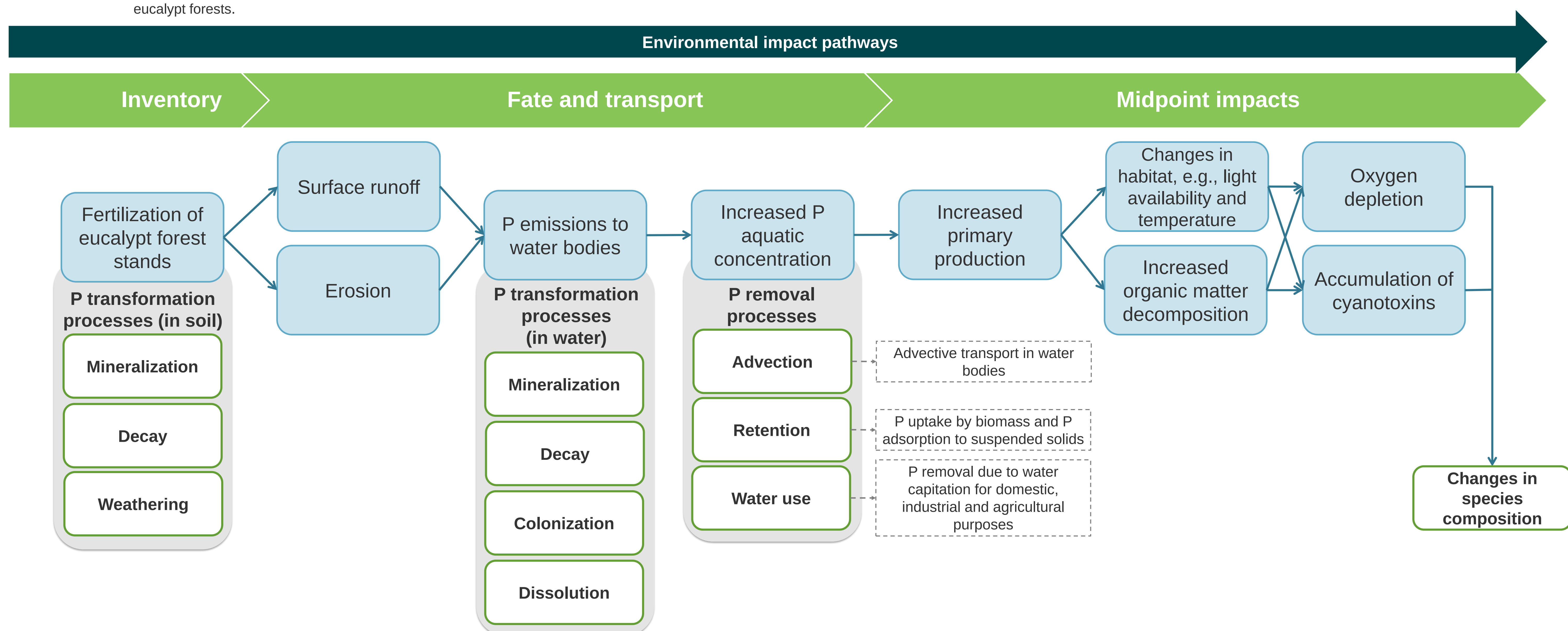


Figure 2: Environmental impact pathways for eutrophication at a eucalypt catchment scale. Source: adapted from Morelli et al. [4] and Payen et al. [5].

## Conclusions

This work presents a framework to support the development of spatially differentiated midpoint CFs for the assessment of eutrophication impacts in Portuguese eucalypt forests. The framework aims to provide improvements in water quality degradation methods to support decision-making towards the reduction of the vulnerability to eutrophication.

## References

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