

TREES4WATER

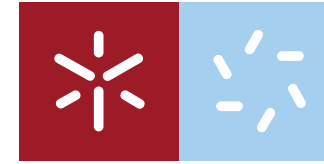
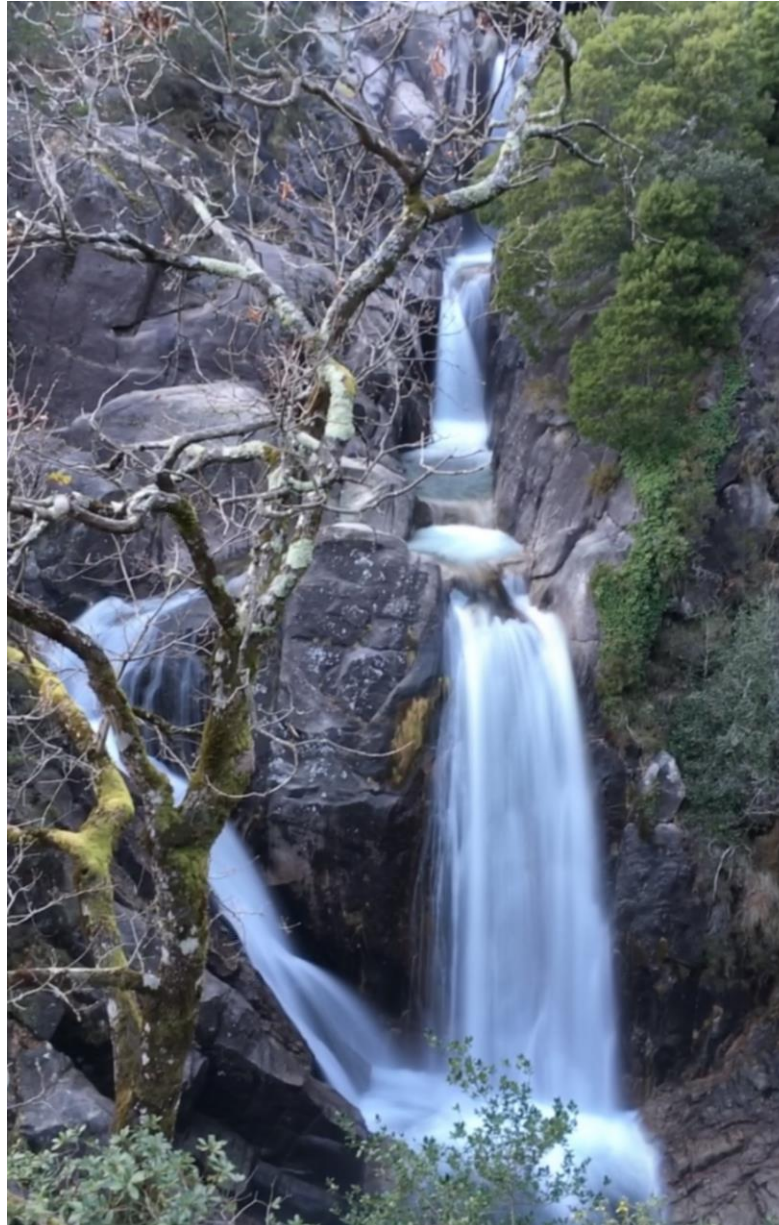
Tree-based solutions for water quality improvement

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Trees4Water

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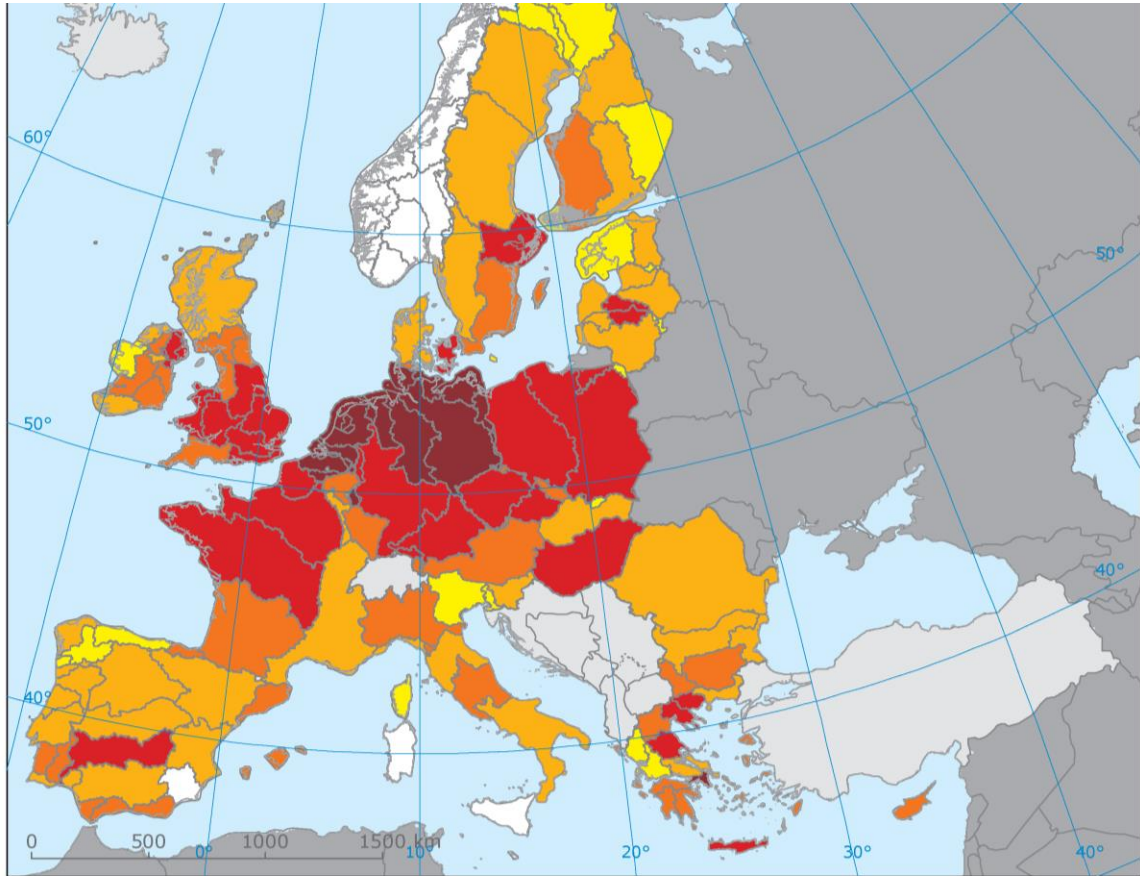
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cbma centre of molecular and environmental biology

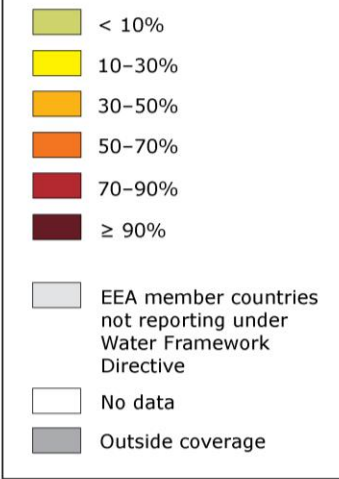
IB·S INSTITUTO DE CIÊNCIA E INOVAÇÃO PARA A BIO-SUSTENTABILIDADE

IUFRO Interconnecting Forests, Science and People IUFRO FOREST ENVIRONMENT DIV 8 CONFERENCE 2023

October 26th, 2023



(RBD) holding less than good ecological status or potential



INTRODUCTION

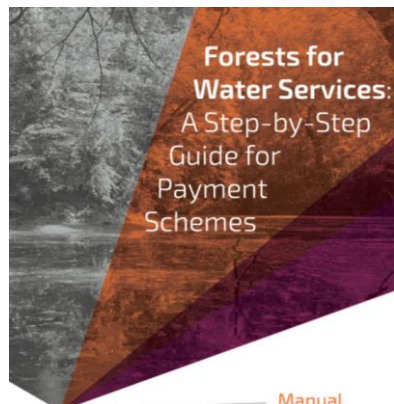
Environmental Effectiveness of schemes (based on meta-analysis)



| Buffer width | 5 m | 10 m | 20 m | 50 m | 100 m |
|--------------------|-----|------|------|------|-------|
| Nitrate-N | 20% | 30% | 40% | 80% | 90+% |
| Phosphate-P | 10% | 20% | 30% | 60% | 90+% |
| Suspended Sediment | 80% | 90+% | 90+% | 90+% | 90+% |

Table 2

Percent reduction in diffuse pollutant concentration from upslope land to watercourses achievable from a well-designed and managed woodland buffer of variable width. Interpolated from relationships derived from review by Perez-Silos (2017).



PROJECT STRUCTURE

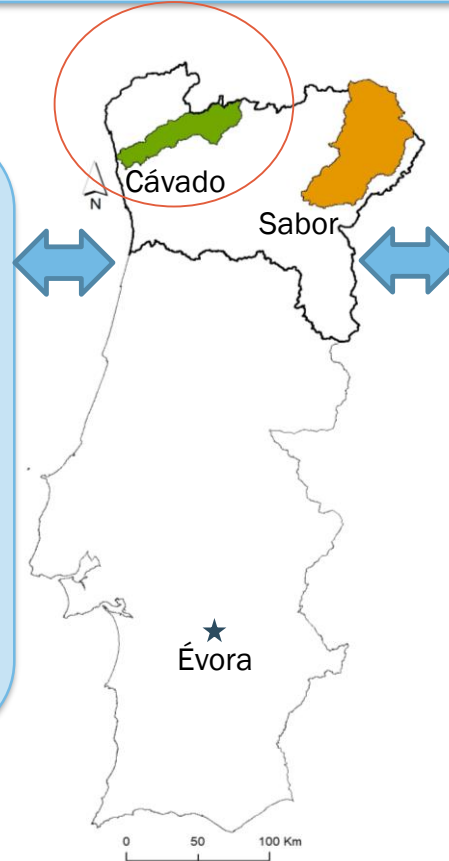
Trees4Water - Tree-based solutions for water quality improvement



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1. Tree-based solutions:
modelling (SWAT)
forestation
scenarios for water
quality improvement



2. Cost-benefit analysis (CBA) of tree-based solutions

- improvement of river's ecological status
- reduction of water treatment costs



Stakeholder involvement and co-design
Communication outreach

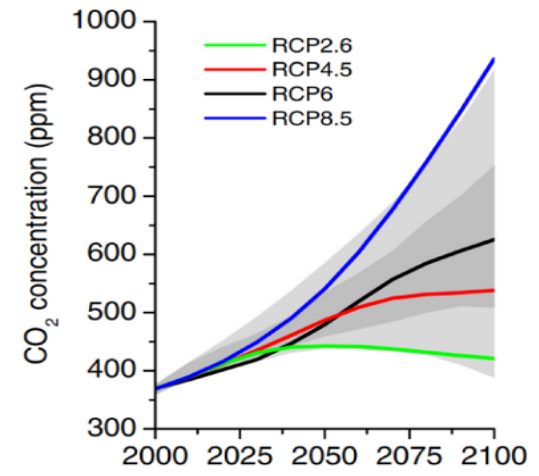
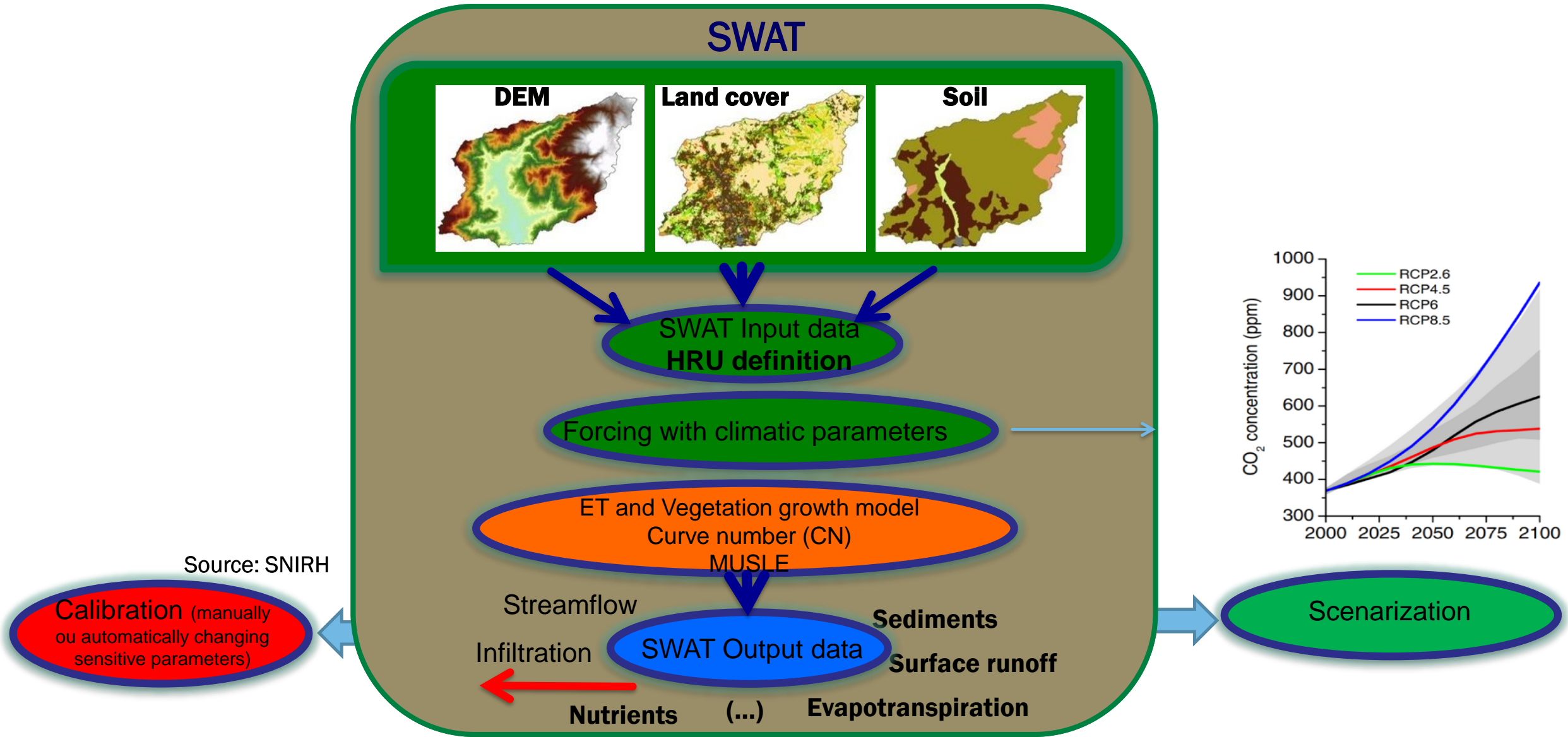


Tree-based solutions
analysis

Hydrological modelling

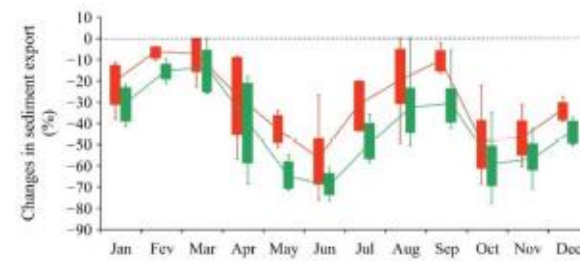
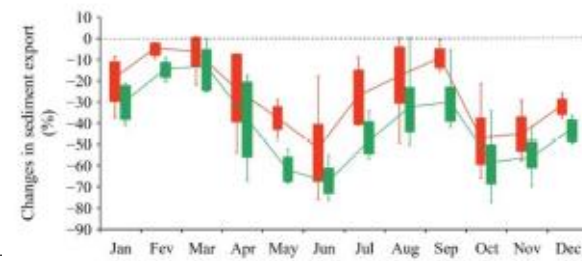
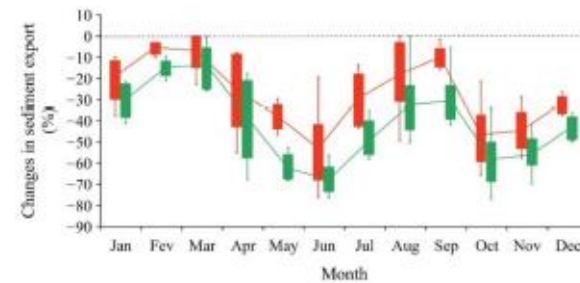
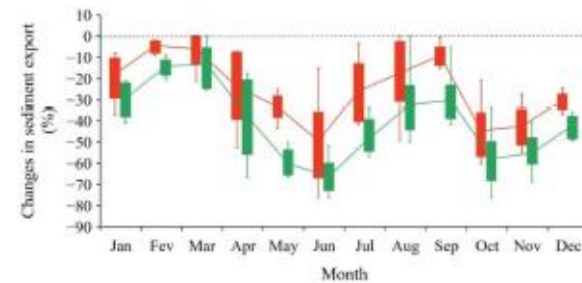
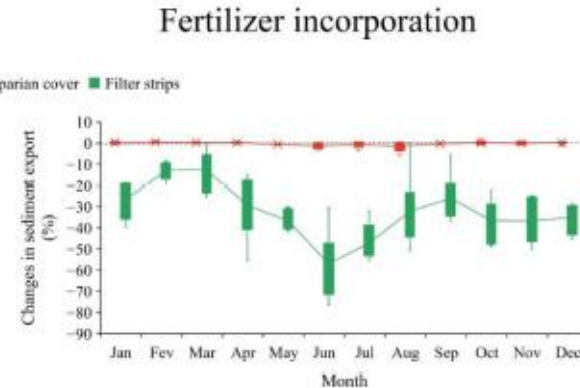
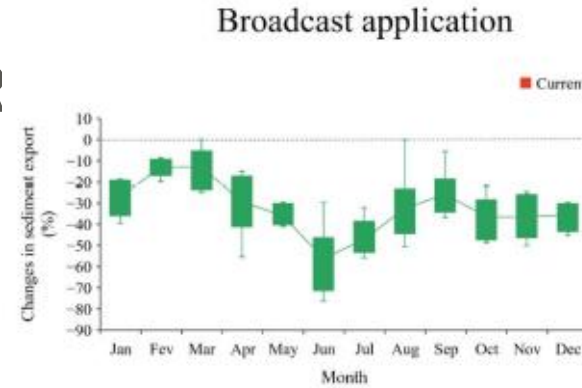
Water quality

Cost-benefit



BEST AGRICULTURAL PRACTICES ON WATER QUALITY

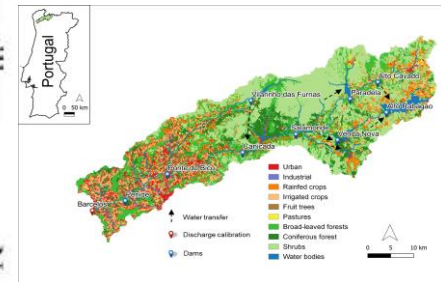
- FERTILIZER INCORPORATION, CONSERVATION TILLAGE AND FILTER STRIPS
- 25% REDUCTION IN SEDIMENTS AND NUTRIENT EXPORT



Conventional tillage



Conservation tillage



No tillage



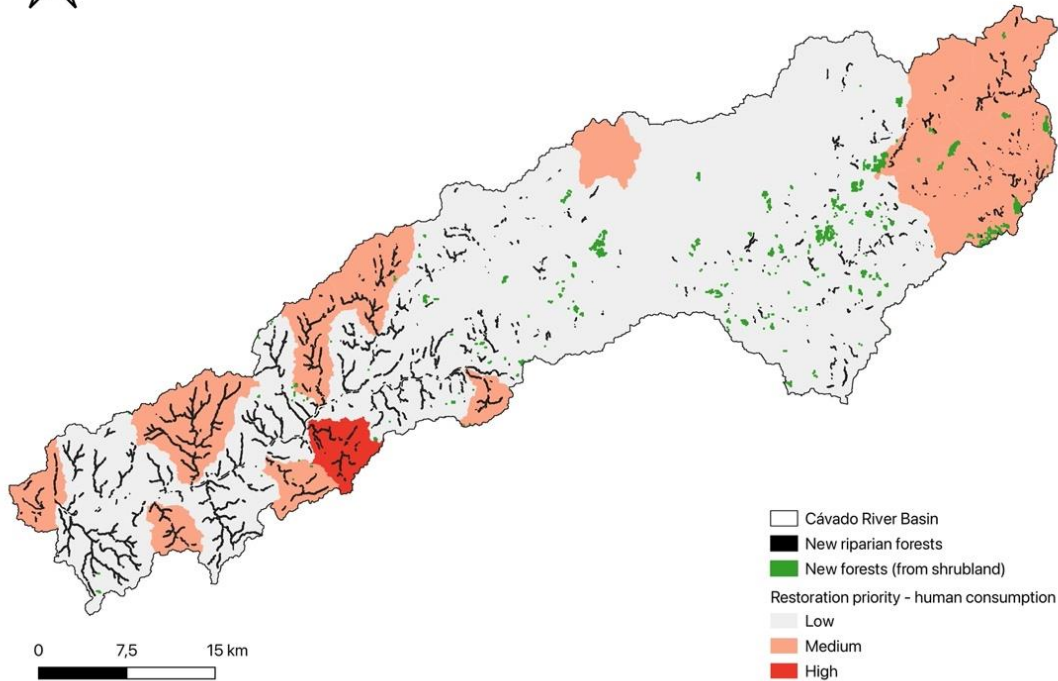
Article
Modeling the Effectiveness of Sustainable Agricultural Practices in Reducing Sediments and Nutrient Export from a River Basin

José Pedro Ramião ^{1,2,3,*}, Cláudia Carvalho-Santos ^{1,2,3}, Rute Pinto ⁴ and Cláudia Pascoal ^{1,2,3}

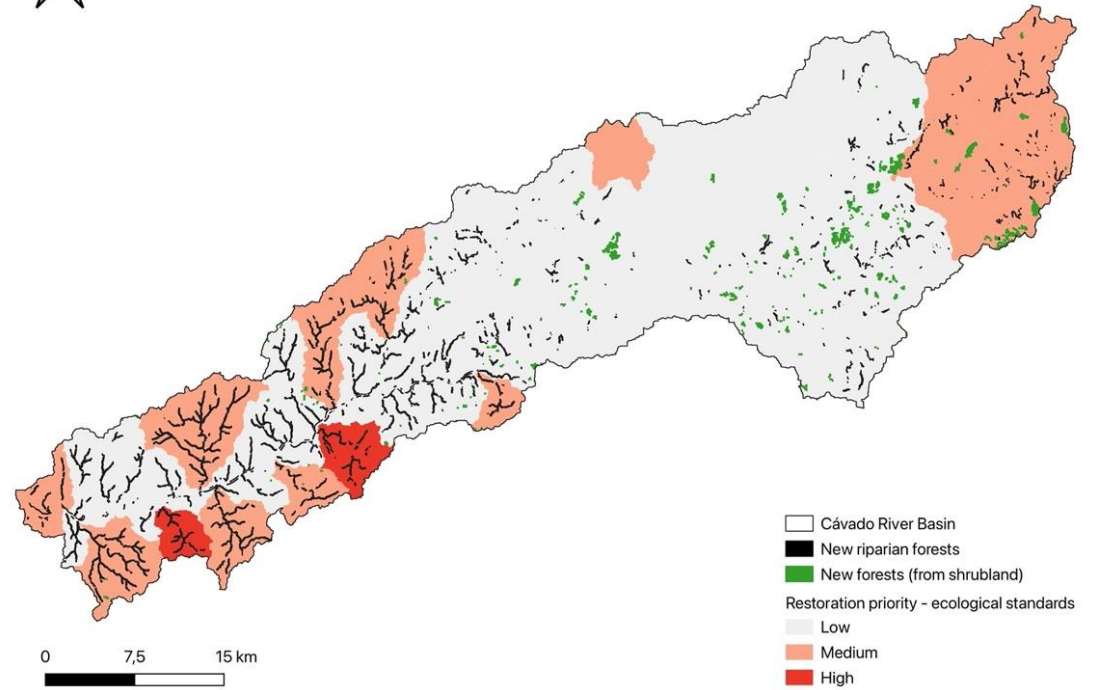
OPPORTUNITY MAPPING



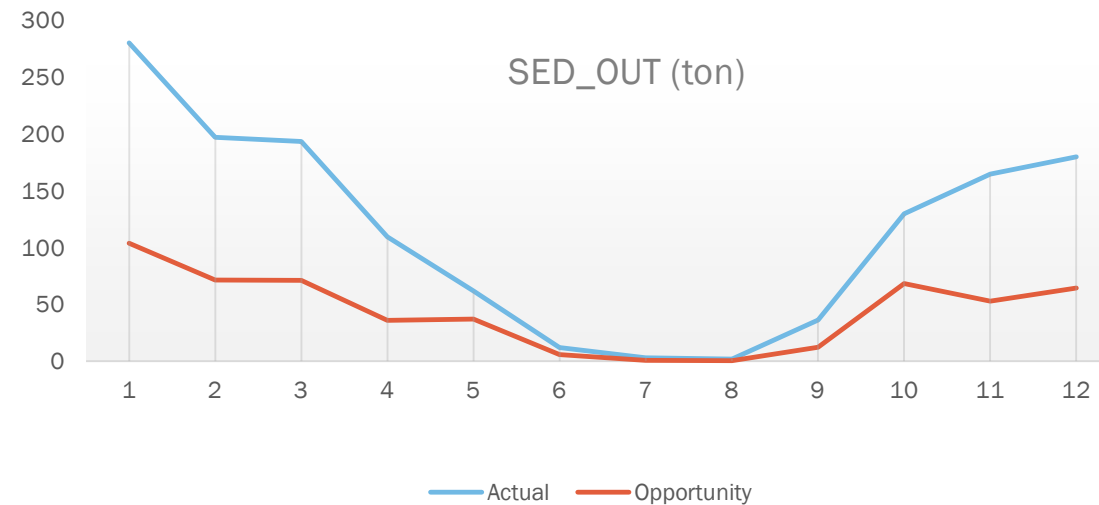
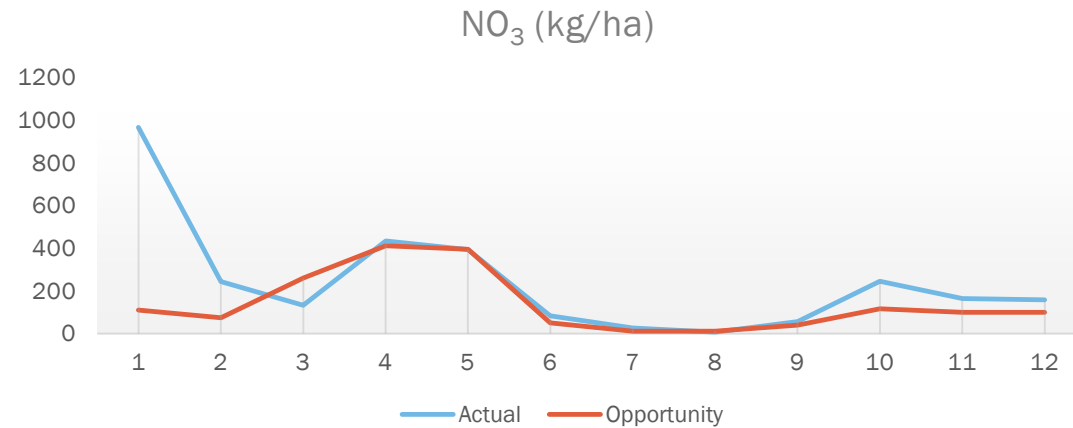
Human consumption standards



Ecological standards



SWAT APPLIED TO OPPORTUNITY MAPPING



COST-BENEFIT ANALYSIS (CBA) OF TREE-BASED SOLUTIONS

On-going

| | Costs | | Benefits |
|--------------------------|---|---|---|
| | Land acquisition | Sponsor landowners | |
| Aguas do Norte | <ul style="list-style-type: none"> - Land acquisition & converting to forest land - Forest maintenance (annual) | <ul style="list-style-type: none"> - Payment to landowners - (Enforcement costs?) | <ul style="list-style-type: none"> + Water quality improvements & associated savings + Changes in water quantity flows & associated savings (+ Carbon credits?) (+ Any financial gains from forest products?) |
| Social Planner / Society | | | + Carbon Sequestration |

TAKE-HOME MESSAGES

Best management practices in agriculture, in particular **filter strips**, reduce **25% of sediments and nutrients export**

Opportunity mapping identify target areas for forestation priorities, with **reductions of 20% in nitrates export and around 40% in sediments**

CBA calculated under the firm and society perspectives





<https://trees4waterpt.wixsite.com/trees-4-water/>



Acknowledgments:



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THANK YOU