

Soil Footprint of Olive Cultivation: A Tool for Sustainable Land Management

Master’s in Environmental Hydraulics

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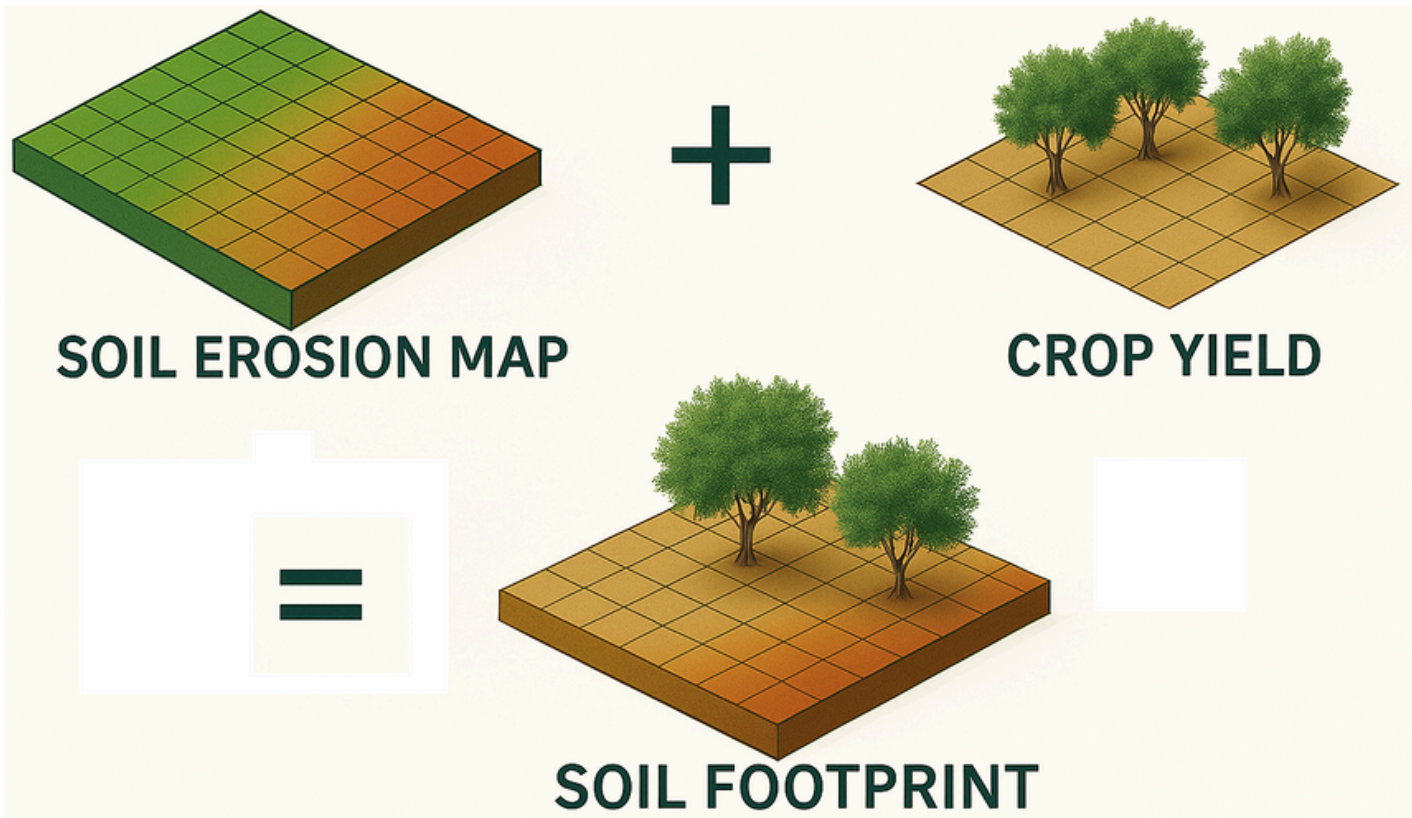
1 Introduction

Soil erosion is a major threat to agricultural sustainability in the Mediterranean. Olive orchards, often grown on steep slopes with low vegetation cover, are particularly vulnerable.

At the same time, olives are a culturally and economically vital crop.

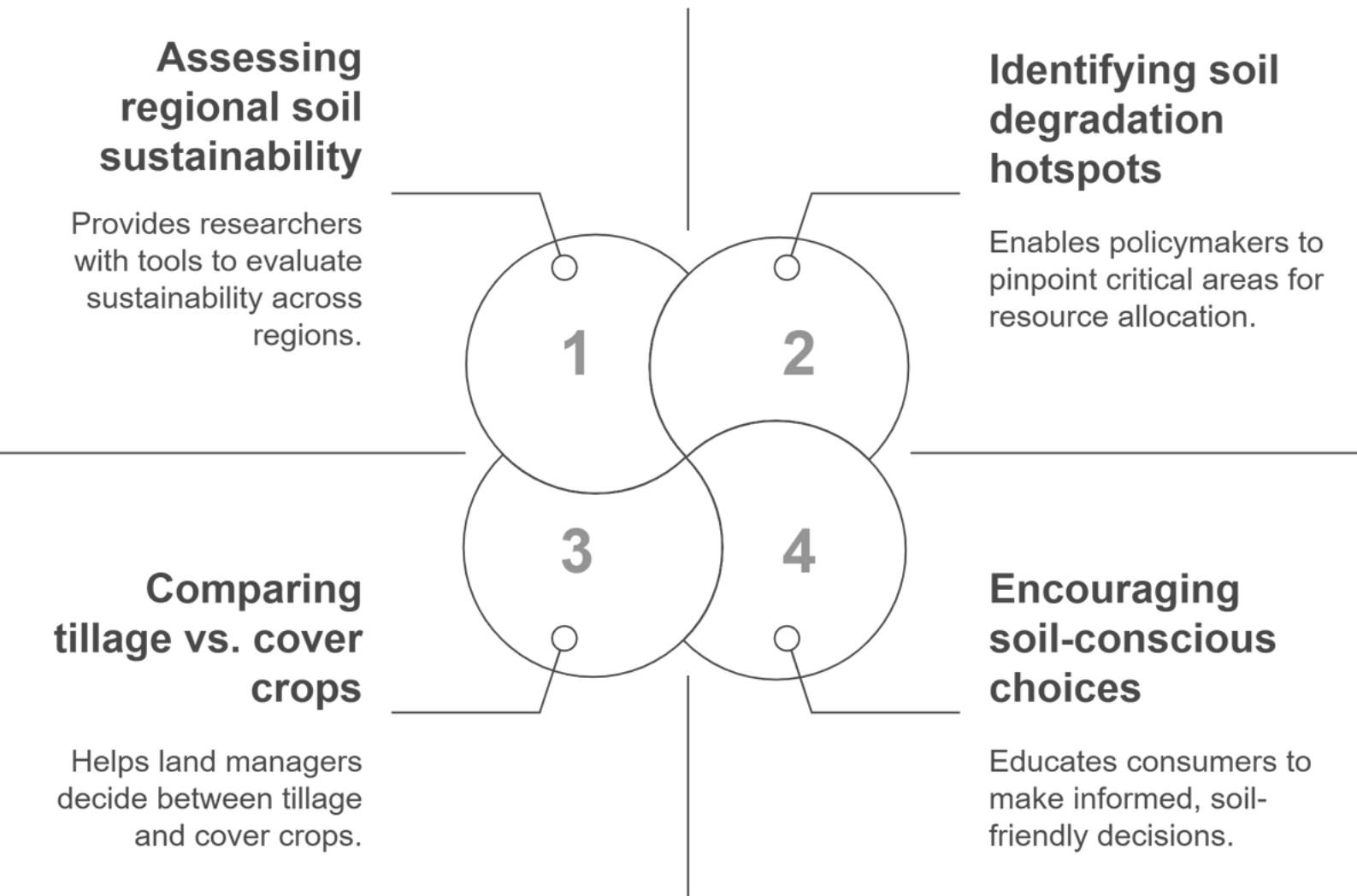
Key Question: *How much soil do we lose to produce 1 ton of olives?*

To address this, we use the concept of the Soil Footprint (García-Gamero et al., 2024)



4 Why It Matters

The Soil Footprint is a powerful indicator that brings soil science into real-world decision-making.



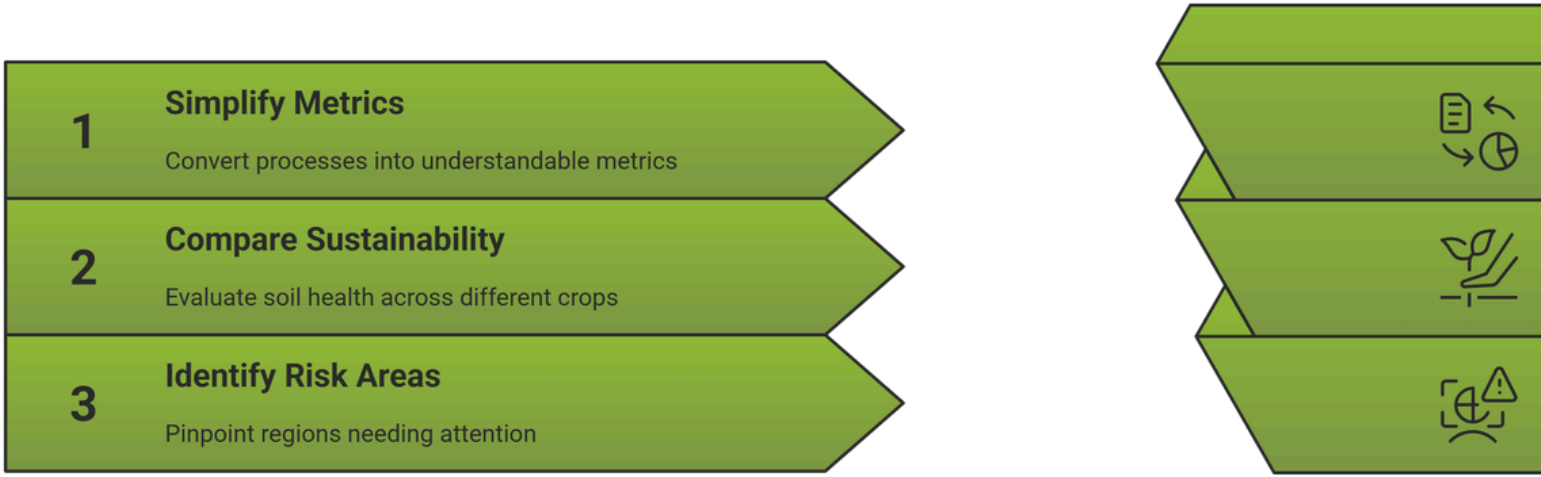
2 What Is the Soil Footprint?

Definition:

$$\text{Soil Footprint (t/t)} = \text{Soil Loss (t/ha/yr)} \div \text{Crop Yield (t/ha/yr)}$$

A high soil footprint means that large amounts of soil are being eroded for relatively low crop output a clear sign of unsustainable land management.

Purpose:



3. Methodology of This Thesis

This thesis aims to evaluate the sustainability of olive cultivation in Europe and North Africa by calculating the soil footprint. The workflow integrates erosion modeling, yield analysis, and spatial mapping using GIS and Earth observation tools.



5 Conclusion

The Soil Footprint bridges science and sustainability.

It translates complex interactions of erosion, productivity, land use into a single, accessible ratio.

This approach highlights where interventions are most needed and how soil-saving practices can make agriculture more resilient.