

Proposal master thesis

Topic:

“Evaluating the impact of soil biodiversity loss on farming productivity: Empirical evidence from EU countries”

Background:

Soil biodiversity plays a crucial role in maintaining the health and sustainability of agricultural systems. It enhances nutrient cycling, improves soil structure, and supports plant growth, making it vital for both eco-efficiency and productivity in farming. However, agricultural intensification, chemical inputs, and land-use changes have led to a significant decline in soil biodiversity across Europe. This loss threatens ecosystem services critical for crop production, leading to potential reductions in agricultural yields and a rise in environmental impacts. In the context of European agriculture, where food production must balance high yields with environmental sustainability, understanding the link between soil biodiversity and productivity is becoming increasingly important. The aim of this MSc topic is to explore the extent to which biodiversity loss affects agricultural efficiency and productivity across different European countries, focusing on the heterogeneity between nations.

Proposed tasks and methods:

The following questions are to be answered in the thesis:

- How does soil biodiversity loss affect eco-efficiency and productivity in agriculture across different European countries (e.g., Germany, Italy, France)?
- What factors may influence the relationship between soil biodiversity and agricultural outcomes?
- What lessons can be learned for European-wide policy implementation?

This thesis will utilize data from the Farm Accountancy Data Network (FADN), a comprehensive EU dataset that provides detailed economic and production information across European countries. Additionally, relevant data on soil biodiversity and soil degradation will be sourced from the European Soil Data Center, which offers extensive information on soil conditions across the regions. The methodology applied in this thesis will focus on productivity and efficiency analysis, combined with econometrics-based regression analysis.

https://agriculture.ec.europa.eu/data-and-analysis/farm-structures-and-economics/fadn_en

<https://esdac.jrc.ec.europa.eu/resource-type/soil-threats-data>

<https://esdac.jrc.ec.europa.eu/themes/indicators-soil-erosion>

Literature:

Ait Sidhoum, A., Canessa, C., & Sauer, J. (2023). Effects of agri-environment schemes on farm-level eco-efficiency measures: Empirical evidence from EU countries. *Journal of Agricultural Economics*, 74(2), 551-569.

Coelli, T. J., Rao, D. S. P., O'donnell, C. J., & Battese, G. E. (2005). *An introduction to efficiency and productivity analysis*. Springer Science & Business Media.

Omer, A., Pascual, U., & Russell, N. P. (2007). Biodiversity conservation and productivity in intensive agricultural systems. *Journal of Agricultural Economics*, 58(2), 308-329.

Panagos, P., Ballabio, C., Poesen, J., Lugato, E., Scarpa, S., Montanarella, L., & Borrelli, P. (2020). A soil erosion indicator for supporting agricultural, environmental and climate policies in the European Union. *Remote Sensing*, 12(9), 1365.

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