

Master Thesis

At the chair, in the research group Sustainable Value Chains, a final thesis on the following topic is available.

GIS-Based site selection for a Biorefinery using Agricultural residue data

■ Background and Motivation

As part of the European project BioSMART, biorefineries are being explored as a promising pathway for converting renewable biomass into higher-value products, including biofuels, aviation and maritime fuels, chemicals, and other biobased materials. Their location is crucial: agricultural residues are spatially distributed, seasonally available, and costly to transport over long distances. An unsuitable location can therefore significantly reduce the economic and environmental benefits of a biorefinery.

■ Content and Objectives

European spatial data on agricultural crops and potentially available agricultural residues are already available and will form the starting point of the thesis. These data were previously generated using Machine Learning methods. The main objective is to use GIS-based methods to identify and compare promising locations for a biorefinery based on the regional availability of agricultural residues.

The student will analyze and visualize the spatial distribution, density, and accessibility of selected biomass resources. Based on a literature review and the available data, suitable location criteria will be defined. These may include biomass availability, transport distances, access to roads and railways, land-use restrictions and protected areas, proximity to industrial infrastructure or potential product users, and possible competition for biomass.

■ Student Profile

The topic is suitable for students in industrial engineering, environmental and energy studies, economics, data science, or related disciplines. Interest in renewable resources, the bioeconomy, sustainable value chains, or spatial analysis is more important than previous specialist knowledge. Basic experience with ArcGIS/QGIS is helpful but not required.

Please apply by email with your CV and transcript of records, along with a short cover letter.

The thesis may be completed in either English or German.

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Start/duration: Immediately / 6 months

