

Proposal master thesis

Topic:

“Reducing Pesticide Treatments in Root Crop Production in Germany: Alternative Strategies and their Economic and Agronomic Impacts”

Background:

Crop protection is crucial to ensuring global food security and the economic viability of farming. The use of pesticides in agriculture has long been a common practice in agriculture to protect crops from pests and diseases. However, growing concerns about the environmental and health impacts of pesticide use have led to ambitious reduction targets at national and international level. Despite these targets, pesticide use remains high and there is a considerable lack of strategies to achieve these reduction targets while maintaining crop production levels and the economic viability of farming. The reduction targets are particularly ambitious in root crop production, which is characterized by high pesticide use to ensure quality and yield. In Germany, potatoes and sugar beet are among the arable crops most frequently treated with chemical pesticides. Several alternative strategies can help to reduce dependence on chemical pesticides. These include technological innovations (e.g. weeding robots), changes in cultural practices (e.g. crop rotation, resistant varieties) or the use of organic farming practices. However, these methods have different impacts on farm management and are associated with several advantages and drawbacks. A more in-depth investigation of these approaches is necessary to evaluate the suitability of these strategies to reduce pesticide dependence in root crop production and to assess the associated economic and agronomic impacts. This master thesis will investigate alternative strategies for reducing pesticide treatments in German root crop production and assess their agronomic and economic effects.

Proposed methods:

The study will begin with a comprehensive literature review focused on identifying pests and diseases having major impact on yield and quality in German root crop production (e.g., in potato and sugar beet production). This review will also explore potential alternative strategies for pest management, examining the associated costs and effectiveness of these approaches.

Following the literature review, the next step will involve assessing the identified strategies for their suitability and investigating potential agronomic and economic impacts. A bioeconomic farm model will be employed to quantify these impacts. This model allows for a systematic analysis of changes in management decisions and associated economic effects, providing valuable insights into the potential benefits and trade-offs associated with reducing pesticide use in root crop production.

Contact:

The master thesis will be supervised by the chair group of “Production Economics”.

For further information please contact Dr. Julia Freytag (Julia.freytag@uni-bonn.de) or Prof. Dr. Niklas Möhring (mohring@uni-bonn.de).