

Title: “Exploring Agroforestry Dynamics: An In-depth Study of the ExpertN Model in Simulating Agroforestry Systems at Heidfeldhof and Freiburg”

The study employs advanced crop modeling to analyze and compare the simulated performance of agroforestry systems, considering site-specific characteristics and environmental conditions. Case studies in two regions provide valuable insights into the potential of the ExpertN model for optimizing agroforestry practices and enhancing sustainability.

Objectives:

1. Set up ExpertN model to simulate agroforestry systems in Heidfeldhof and Freiburg.
2. Assess the model performance in predicting key agroforestry parameters, including crop growth, and nutrient utilization.
3. Compare the simulated results of agroforestry systems in Heidfeldhof and Freiburg to identify region-specific differences, particularly in hedge line tree type and orientation.
4. Investigate the influence of local environmental factors on the simulated performance of agroforestry systems.

Methodology:

1. collecting site-specific data for Heidfeldhof and Freiburg, including soil properties and climatic conditions.
2. Set-up and calibration of the ExpertN model using climate and site-specific data to ensure the accuracy of the simulation of agroforestry systems.
3. Carrying out simulations for agroforestry scenarios at both case study sites, taking into variations in crops, tree density, species composition, and spatial arrangement.
4. Analyze the predictions of the model for plant growth, nutrient cycling, and microclimate in Heidfeldhof and Freiburg.
5. Compare the simulated results at the two locations and determine the factors that contribute to the regional differences.

Expected Outcomes:

1. Evaluation of the ExpertN model performance in simulating agroforestry systems in distinct geographical locations.
2. Identification of region-specific influences on agroforestry parameters in Heidfeldhof and Freiburg.
3. Understanding how the ExpertN model can contribute to optimizing agroforestry and decision-making.
4. Recommendations for tailored agroforestry practices based on the simulation results.