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SMART FERTILIZATION STRATEGIES IN VEGETABLE POLY CULTURES USING SENSOR TECHNOLOGY

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An illustration of a globe with olive branches. The globe is dark green with a lighter green band around its center. Olive branches with small, dark green olives are draped over the top and right side of the globe. The text "Project Goals" is written in a large, white, serif font across the middle of the globe.

Project Goals

01 Develop fertilization and protection strategies

Excessive use of agrochemicals leads to soil degradation, water pollution, and loss of biodiversity.

02 Use sensors and AI for decision-making

Using sensors and AI enables precise, data-driven decisions that improve efficiency and reduce environmental impact.

03 Focus on carrots, cabbage, leeks

Carrots, cabbage, and leeks allows testing across diverse root, leaf, and stem crops, ensuring broad applicability of the technologies.

04 Build a phenology database

Phenology database helps track crop development stages, enabling better timing of interventions and AI-driven optimization.



Project Timeline



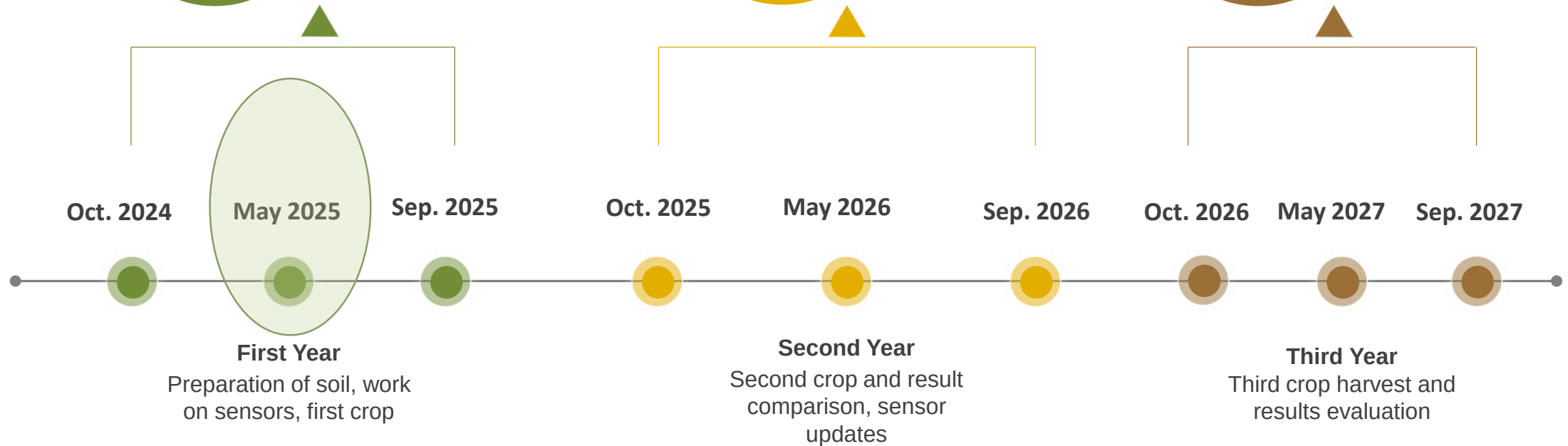
PowerPoint
Presentation
Templates



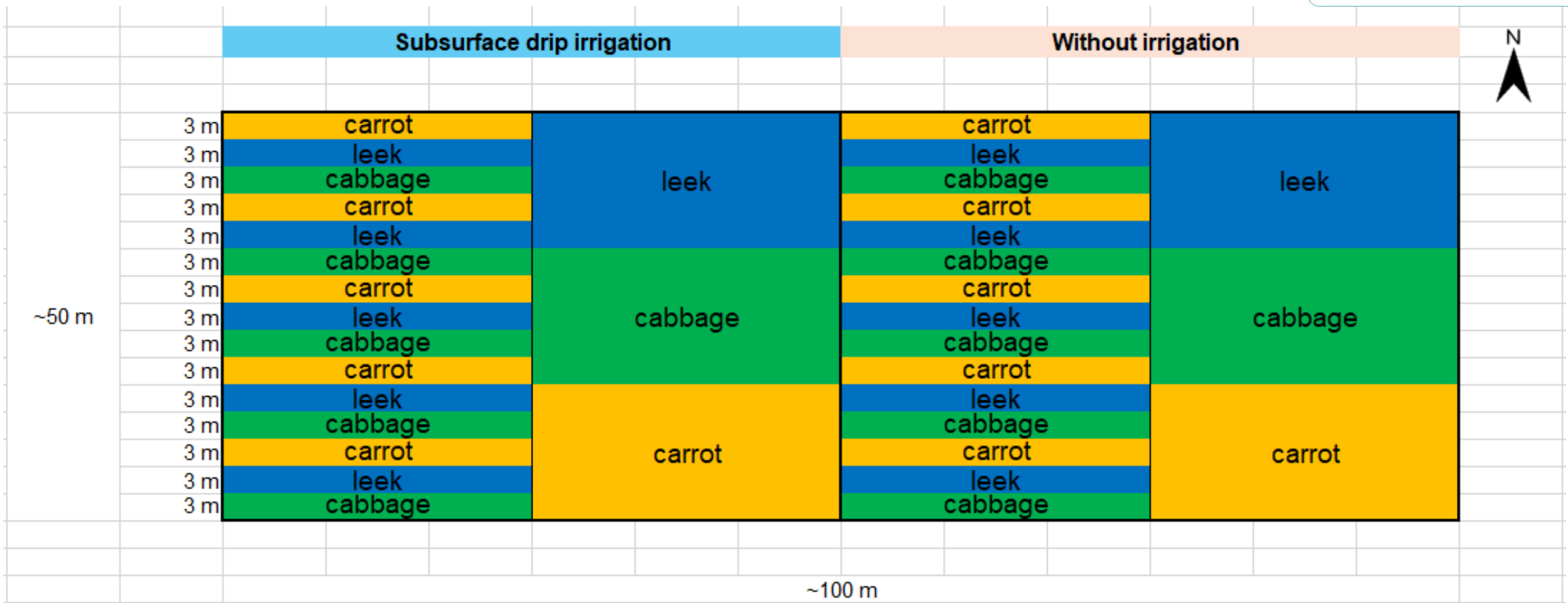
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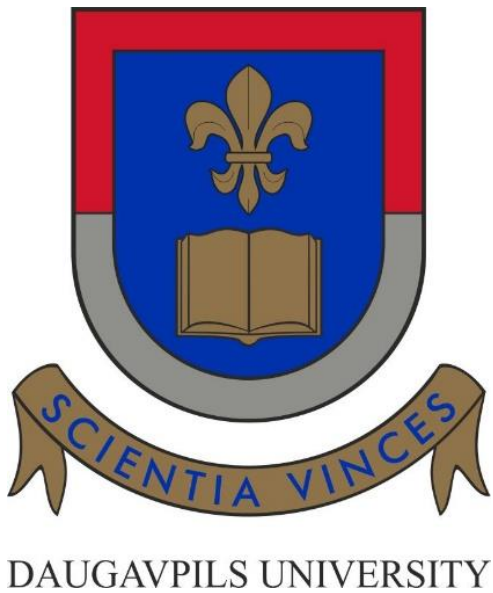


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Field map for the subsurface drip irrigation experiment at ZS Bračas, Latvia





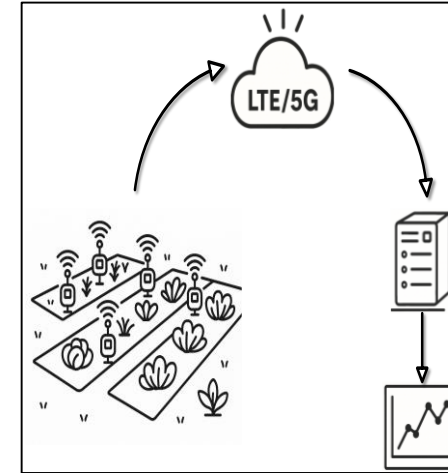
DAUGAVPILS UNIVERSITY

Sensor system

University of Daugavpils

Main research directions:

- Detection of H_2O_2 in plants
- Evaluation of stress impact on plants
- Use of nanostructures to reduce stress load



Sensor style

- Electrochemical Multisensor:
- Continuous Monitoring
- Cost-Effective
- Wireless

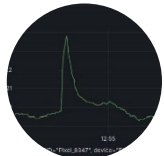
Prototype



Nucleo



SIM900



Linux, InfluxDB, Graphana



Testing

- Commercial sensors
- Prototype built
- Prototype configured



Advantages DigiDārzs

After successful implementation



**Reduced
Agrochemical
Use**



**Improved
Crop
Yield and
Quality**



**Real-Time
Monitoring**



**Lower
Production
Costs**



**Environmental
Protection**



**Data-Driven
Decision-Making**



**Enhanced
Soil Health**



**Scalability and
Open Access**



Things To Consider



Sensor Accuracy and Calibration

Ensuring the electrochemical sensors provide reliable and precise nutrient measurements under varying environmental conditions.



Data Integration and Infrastructure

Building a robust system to collect, store, and analyse sensor data using tools like InfluxDB and Grafana.



Field Adaptability

Testing sensor performance and cultivation strategies in both controlled environments and open-field conditions.



Farmer Engagement and Usability

Designing tools and technologies that are practical, cost-effective, and easy for farmers to adopt and maintain.



Unlocking the Future



Smart Farming
Solutions for a
Greener, More
Productive Future

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Where Data Drives Every Leaf

Strategic Value Beyond the Project



Scalable Smart Farming Model

Provides a blueprint for integrating sensors and AI into diverse vegetable farming systems across different regions.



Foundation for AI-Driven Agriculture

Establishes the data infrastructure and crop intelligence needed to support advanced, automated decision-making in farming



Enhanced Farmer Resilience

Equips farmers with real-time tools to adapt to climate change, reduce input costs, and maintain high yields sustainably.



Policy and Education Impact

Informs agricultural policies and strengthens education in agri-tech, supporting next-generation specialists and environmentally sound practices



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Thank You