Fakulta agrobiologie, potravinových a přírodních zdrojů

DOKTORSKÝ STUDIJNÍ PROGRAM/*DOCTORAL STUDY PROGRAM*

VYPSÁNÍ TÉMATU/*LISTING OF TOPIC*

Studijní program/*Study Program*: **Exploitation and Protection of Natural Resources**

Studijní obor/*Branch of Study*:Zvolit/Choose

Katedra/*Department of*: **Soil Science and Soil Protection**

Školitel, email/*Supervisor, email*: **Doc. Asa Gholizadeh, Ph.D. (gholizadeh@af.czu.cz)**

Konzultant, email/*Co-supervisor, email*: **Prof. Dr. Ing. Luboš Borůvka (boruvka@af.czu.cz)**

Forma studia/*Form of Study*: **Full_time**

Typ tématu/*Type of Theme*: **disposable**

Téma/*Topic*: Innovative sensing techniques for soil and plant health assessment

Hypotézy/*Hypotheses*: Innovative sensing approaches by leveraging advanced chemometric, machine learning models and automated mapping techniques can evaluate the nutritional state of soil, as well as the chemical factors that impact and potentially contaminate wheat grains.

Anotace/*Summary*: In today's rapidly changing world, we are confronted by a host of pressing issues. These include the challenges of population growth, the impacts of climate change and the concerning trends of environmental degradation. In the face of these complex challenges, safeguarding security, sustainability and food safety has risen consequently. It's critical to recognize that agricultural practices and food production processes are intricately woven into the fabric of public health, economic stability, and social well-being. Traditional approaches to these domains have often existed in isolation, limiting the comprehensive understanding of factors influencing soil quality, agricultural sustainability and food safety. To confront these challenges effectively, we must employ innovative approaches that leverage scalable and cutting-edge technologies. This thesis will operate a comprehensive digital soil monitoring system that evaluates the nutritional state of soil, as well as the chemical factors that impact and potentially contaminate wheat grains. It will focus on: 1) developing a comprehensive data acquisition and sensing ecosystem, allowing to collect a complete set of data of a desired field; 2) acquiring quality data of various stressors (chemicals) in soil contaminating wheat crops; 3) performing an efficient and automated prediction of soil health status; 4) developing a decision support system (DSS) integrating the soil and plant data and chemometrics models for recording, analysing and decision-making on soil and crop management under multiple types of stress conditions; 5) applicability of the prediction models and their calibration and validation.

Zdroj financování práce/*Funding Sources*: WHEATWATCHER: Safe WHEAT agriculture towards sustainable health: innovative sensing techniques, and holistic spectroscopy traceability for improved soil, plant health and safe wheat grain (project HORIZON-MISS-SOIL-01-03)

V/*In* Prague dne/*Date*: 31.10.2024

Podpis školitele/*Signature of the Supervisor*:

Podpis konzultanta/ *Signature of the Co-supervisor*:

Podpis vedoucího katedry/*Signature of the Head of the Department*: