

2022 Symposium Scientific Programme

The purpose of the symposium is

- To review recent development of nuclear, isotopic and related techniques to improve land and water management practices under changing climate and to minimize the impact of radiological emergencies on crop production;
- To provide information on the development of tools and technology packages to build soil resilience, adapt farming practices to the impact of climate change, as well as to nuclear or radiological emergencies; and
- To identify knowledge gaps, research needs and new opportunities to develop climate-smart agricultural practices to build capacities and transfer of technologies to Member States.

The symposium will cover the following scientific topics related to land and water management under climate change and radiological emergencies:

- **Plant nutrition and nutrient cycling for enhancing crop productivity and on-farm ecosystem services. –**
 - Carbon sequestration in agroecosystems: opportunities and costs
 - Fertilizer technology: new concepts and approaches to increasing efficiency
 - Novel tracing technologies applied in nutrient cycling in agroecosystems
- **Soil conservation, land management minimizing soil erosion, land degradation, improving soil health, increasing biodiversity and crop production.**
 - Latest development in soil erosion and sedimentation assessment
 - Isotopic techniques for Identifying sources and hot spot of erosion
 - Influence of climate change and agricultural practices on erosion using FRNs and stable isotopes techniques.
- **Agricultural water management for improving water use efficiency, threats/impact to agricultural water quality.**
 - Improving irrigation practices through application of nuclear and isotopic techniques
 - Isotope techniques and crop simulation modelling for enhancing water use efficiency
 - Advanced sensors and techniques for landscape soil water measurement
- **Climate change and greenhouse gas emissions.**
 - Agricultural practices: impact on greenhouse gas emission
 - Greenhouse gas assessment and mitigation in agriculture
 - State-of-the-art analytical methods and advancement for GHG (CO₂, N₂O, CH₄) measurement and calculation

- **Tracing agricultural and industrial pollutants and assessing their threats to crop production and environmental sustainability.**
 - Agricultural water pollutants: Nitrate, phosphate, and other contamination
 - Antimicrobial genes and resistance in agricultural systems
 - Microplastics in soil, water and environment

- **Advances of nuclear-based instrumental and analytical techniques applicable in soil and water research.**
 - Innovative analytical techniques for radio and stable isotopic analysis in the laboratory and in the field
 - Advanced sampling and sample preparation for radioactivity and isotope analysis
 - Software and tools for monitoring and decision making for enhancing soil, nutrient and water management

- **Integrating nuclear techniques with other advanced techniques such as digital technology in agriculture, GIS, machine learning and modelling techniques.**
 - Linking digital innovation, remote sensing with advanced nuclear technology for climate-smart agriculture
 - Current and future role of advanced mathematical modelling in soil and water management
 - Innovation and development for monitoring effectiveness of climate change adaptation and mitigation measures