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Improving agro-ecosystem functions by efficient soil and land management

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Soil is a fundamental and essentially non-renewable natural resource but is threatened by erosion, decline in organic matter, local and diffuse contamination, covering and sealing, compaction, salinisation, flooding and landslides. This lecture will be divided in five parts: soil functions, properties and quality; useful tools in soil survey; soils and agro-ecosystems; agricultural land resources evaluation with the case of Coastal Croatia.

This lecture will be helpful for better understanding of the land and soil degradation situation and current state information about this topic in Croatia. It will give insight on main issues in agriculture in Mediterranean region.



Marija Romić, Ph.D., is a Professor teaching Soil and water management for sustainable agriculture, Laboratory analysis and data handling and Biogeochemistry at Faculty of Agriculture, University of Zagreb. She is a head of the analytical laboratory just taking the accreditation according the international standard ISO 17025 and the president of TC190/PO2 Soil Quality – Chemical methods of the Croatian Agency of Normization. She is a leader of national research project, collaborator on EU project (FP 7) and the main field of the scientific interest is metal mobility in soils; contamination and protection of soils: methodological aspects of soil and water analysis; soil inventories and monitoring; heavy metals: extractability of metals from soils; spatial and temporal variability of soil properties/geostatistics and GIS.

Agricultural water management in the Mediterranean to mitigate soil desertification

Marina Bubalo Kovačić
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Water pollution is a major concern in water management in most of the world's agricultural areas. Farming activities and other land uses have degraded the quality of aquifers by introducing large quantities of nutrients. In Europe, the Nitrate Directive 91/676/EC, Water Framework Directive 2000/60/EC and Groundwater Directive 2006/118/EC consider nitrate contamination as one of the main threats to groundwater quality, requiring urgent and intensive monitoring and a strong policy.

This lecture has a focus on water use in Mediterranean region for agricultural purposes and, hence, the impact of land use and agricultural production on water quality and pollution.



Marina Bubalo Kovačić, Ph.D., is a postdoctoral researcher at the Department of Soil Amelioration at Faculty of Agriculture, University of Zagreb. She got her Ph.D. degree in 2016 in Civil Engineering, Hydraulics from Faculty of Civil Engineering, University of Zagreb. Her main research interest are water use and protection, water quality, soil and water pollution. She actively participates in on-going projects in the domain of water use and quality.

Land degradation as a consequence of salinisation process

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The most frequently occurring land degradation type in arid and semiarid regions is soil salinization. The salt-affected soils cannot support vegetation owing to salt-induced water deficit, ion toxicity, nutrient imbalance, yield volatility and yield reduction. Extensive seawater intrusions in karst and alluvial coastal aquifers around the Mediterranean basin induce an increasing risk for soil salinisation in coastal river valleys. Moreover, it is expected that in the future more frequent and severe droughts, irregular precipitations and changes in sea level will aggravate the salinisation processes, which in turn might lead to desertification of agricultural land in many areas of the Mediterranean basin.

The main themes of this lecture will be: effects of salinity on different soil components; spatial variability of salinity; detecting salinity hazards: past, present, and future.



Monika Zovko, Ph.D., Assistant Professor (2016). Teaching at undergraduate study programme (BSc): Agricultural amelioration; Irrigation and Graduate study programme (MSc): Laboratory methods and data handling, Use and conservation of water resources, Biogeochemistry at the Faculty of Agriculture University of Zagreb. Research topics: Assessment of soil quality with combined pedological, numerical and geostatistical approaches identification and mapping of sensitive and vulnerable areas, and of areas polluted with inorganic contaminants. Bibliography: <http://bib.irb.hr/lista-radova?autor=295353>