

# Curriculum design for development of interdisciplinary environmental and agricultural education

---

## **Prof. Romić Marija, PhD**

Faculty of Agriculture University of Zagreb

Department of Amelioration

Svetošimunska c. 25, 10000 Zagreb, Croatia

E-mail: [mromic@agr.hr](mailto:mromic@agr.hr)

<http://www.agr.hr>

## University of Zagreb established in 1669 Faculty of agriculture since 1919

Surrounds the complex of main lecture rooms and laboratories of the FAZ and is utilized for the breeding and production of grain and vegetable crops and of industrial and ornamental plants.



# 1. STARTING POINTS

- The Republic of Croatia joined the Bologna Process in May 2001
- At the University of Zagreb, therewith at the Faculty of Agriculture as its organizational unit, implementation of Bologna process has started in academic year 2005/06 (**bachelor's** and **master's degree**).
- The new stage of implementation of the Bologna process started in 2006/2007, oriented toward the development of the **postgraduate programs**.

# 1. STARTING POINTS

- One of the **main goals** of the reform was to render the higher education more responsive to the needs of the labour market and, therefore, enhance graduate employability and returns to education.
- it's particularly important to offer study programs focused on **specific contents** which are interesting both from the regional and global aspects.
- teaching in English **enables an equal participation** in programs on the international level, but also leaves field for the faster information transfer, improving and updating of the curricula, collaboration with the foreign partners and building of capacities in teaching and research.

## 2. Challenges driving research and teaching in life and environmental science

- Overarching challenge: **Climate change and variability**
- Other challenges:
  - Water availability (in quantity and quality)
  - Maintaining soil quality (prevention of soil sealing org. C losses, compaction, contamination ...)
  - Maintaining (or increasing if possible) biodiversity
  - Overuse of renewable resources, bioenergy and waste management

### 3. Agri-environmental education

- **European rural areas** have great resources in the shape of natural assets and landscapes, which is an excellent basis for the economic development and rural employment
- **Integrated land and water resources management** is an issue of high significance
- One of the main goals of the EU CAP → to establish an **agriculture harmonized with the natural resources** of a region and the needs of the wider community that constitute the all-encompassing rural landscape.
- **Agriculture** → many roles, from preservation of landscape beauty to meeting the increasingly more demanding requirements for food quality and safety.

Both agricultural and environmental problems are of high national interest in Croatia



## Croatia

**Area:**  
56,594 km<sup>2</sup>

**Population:**  
4.5 million

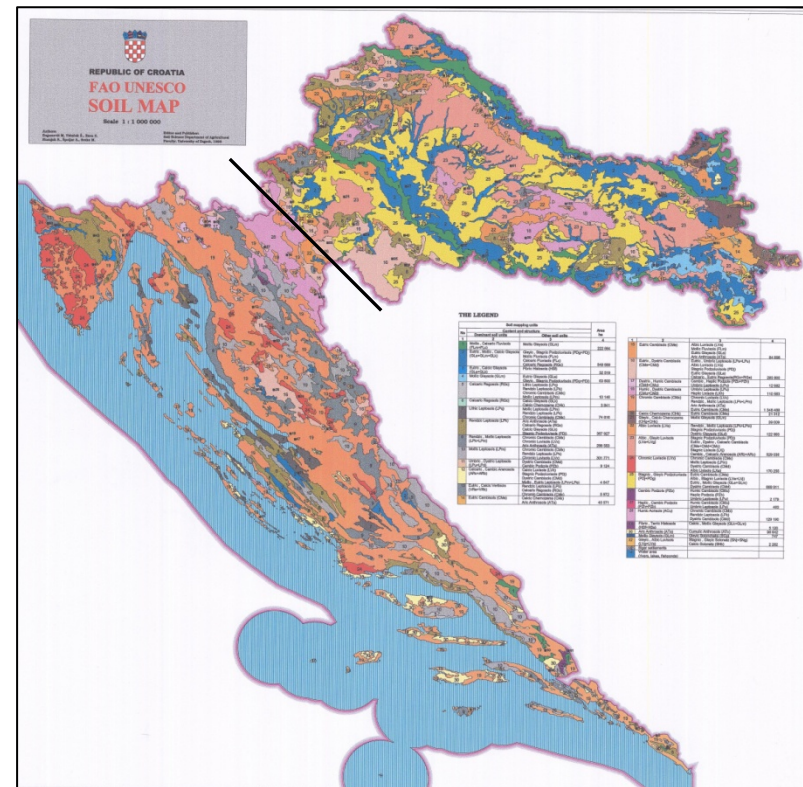
**Water:**  
1.09%



## Regional differences – specific problems

- We have to manage highly sensitive karst and coastal environment in the **Mediterranean** and share the **Danube River Basin**.
- Both of these regions face with the specific problems of sustainable management that certainly have got wider regional and even global character.
- standard environmental study programs have to be upgraded with **specific issues** for guiding future activities important for both national and international community.

- Two different geotectonic units:
  - **Pannonian** and **Dinaric-Coastal** region
  - Regions greatly differ on geological structure and soil types





## Pannonian region – activities on the EU strategy for the Danube Region

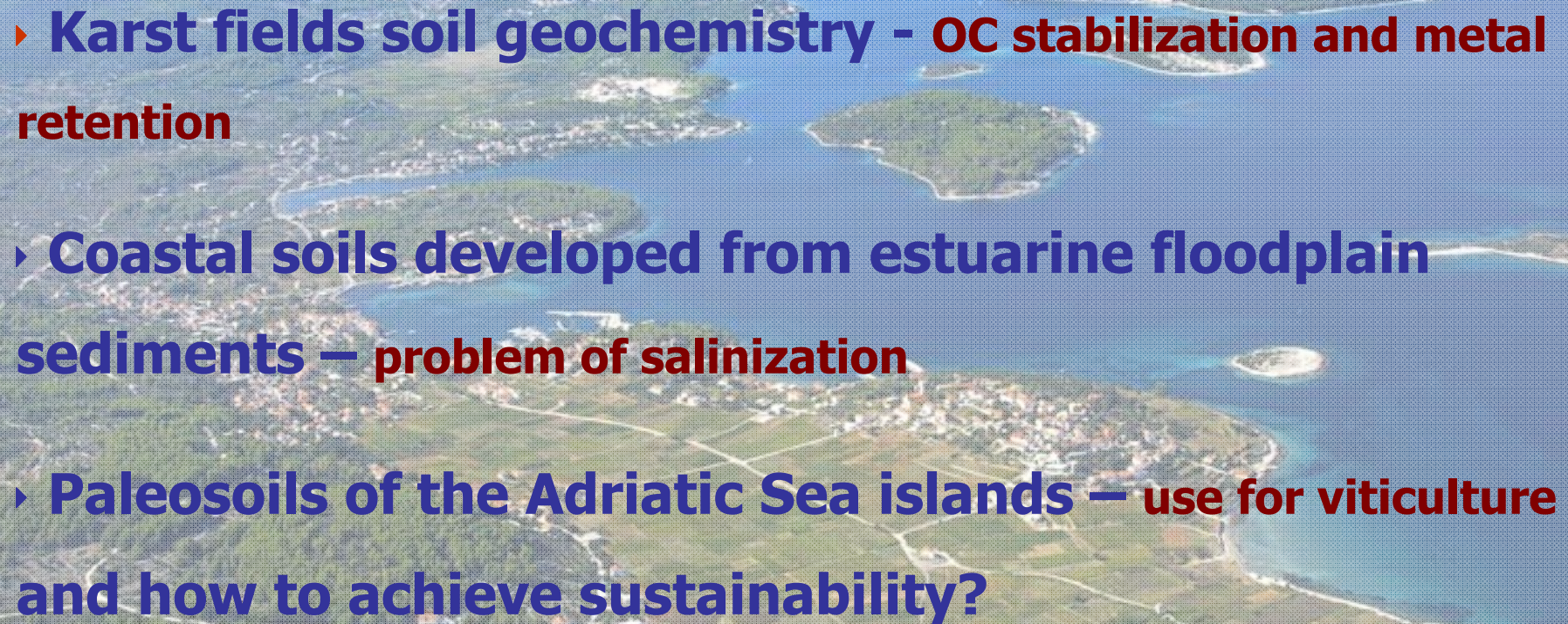
### Main issues:

→ Mapping agricultural soil pollution, preventing soil degradation and preserving its functions

→ Identification of pressures from agriculture to water quality



# Soil and water management in Croatian Mediterranean region

- 
- ▶ **Karst fields soil geochemistry - OC stabilization and metal retention**
  - ▶ **Coastal soils developed from estuarine floodplain sediments – problem of salinization**
  - ▶ **Paleosoils of the Adriatic Sea islands – use for viticulture and how to achieve sustainability?**

## Master's Degree Program INTER-ENAGRO

- University of Zagreb Faculty of Agriculture (UZFA) (Croatia) has launched international **Master's Degree Program INTER-ENAGRO**
- Program delivers theoretical and applied knowledge focusing on
  - the **sustainable use and management of natural resources**, such as soil and water,
  - positive and negative **impacts of agriculture on these resources**.
- The program is designed as a follow up to BSc undergraduate studies and enables further studying on PhD level.
- Expected benefits of international interaction in such programs are
  - **consideration and comprehension of the regional diversities** and
  - **multidisciplinary approach** which gives a holistic perspective and understanding to these contents.

## Learning outcomes and competency

**Learning outcomes** are expressed in terms of three main core competencies:

1. **knowledge/understanding in basic scientific field** – agronomy, environmental and other related natural, technical and biotechnical sciences;
2. **development of the intellectual skills** in basic and applied scientific areas;
3. **gain of practical skills and competencies** related to the agro-ecosystem management.

## Teaching structure and module content

- The program is comprised of modules that provide a total of **120 ECTS** and it is designed so that a student can complete the program in
- **2 years or 4 semesters** each with a work load of **30 ECTS**.

**Students are expected to gain quantitative and interdisciplinary understanding of agri-environmental science and management appropriate to the requirements of current and developing user needs**

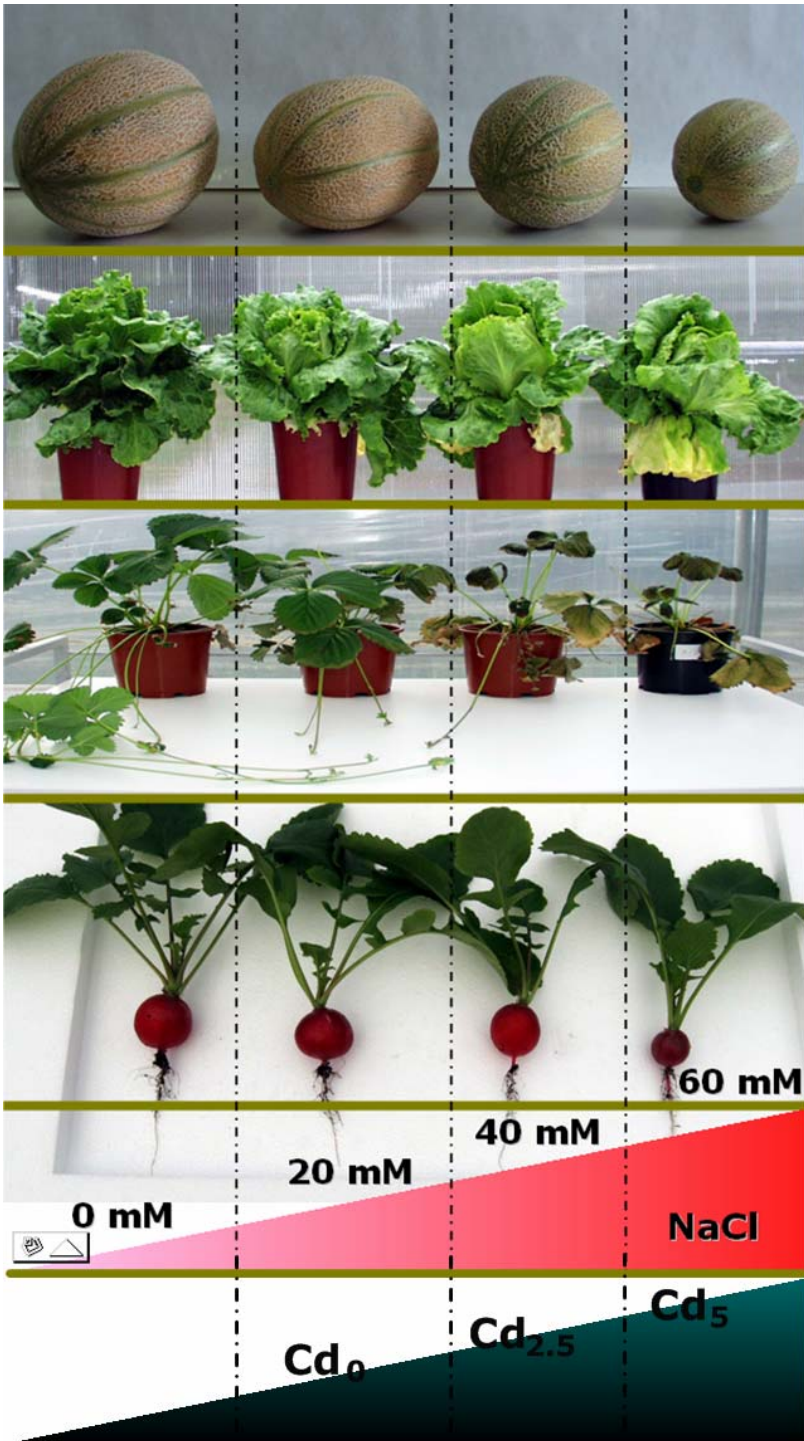
## Curriculum composition

- composed of six main components:
  - **Introduction courses** to gain core scientific skills in statistics, analytical chemistry and agroclimatology;
  - **Natural resources and the environment** – hydrology incl. water resources and modelling, environmental geology and soil science including management of contaminated sites, aquatic ecosystems and biodiversity, and agri-environmental law and policy;
  - **Soil-water-plant continuum** – rhizosphere ecology, beneficial associations of plants and microorganisms, applied plant nutrition, agricultural water use and protection;
  - **Agriculture and environmental management** – livestock production and environ., field crop manag., plant protection, and environmental risk analysis and management;
  - **Soil and land survey and evaluation** – geomorphology and landscape ecology, GIS, spatial analysis and remote sensing in agri-environmental management;

## Master's Thesis that may come from the courses:

“Application of segmented flow technique in analysis of water and soil extracts ionic composition”;





“(I)mmobilisation of trace elements in soil-plant continuum by irrigation water management”



## **Natural resources and the environment:**

"The effect of organic fertilizer application on semi-natural grassland productivity"

"Use of habitat models in water resources management"

„Phytotoxicity of neonicotinoids“;

## **Soil-water-plant continuum:**

"Transferring nutrients from floodplain soils to adjacent aquatic ecosystems";

## **Soil and land survey and evaluation**

“Integrating of pedogeochemistry, GIS and RS in viticultural terroir evaluation”

“Soil CO<sub>2</sub> efflux measurements in (wheat/maize/oilseed rape/soybean) vegetation in field experiment with different (fertilization/tillage systems)”.

**Optional modules, laboratory and desk studies and individual projects** provide further specialisation and training in research.

Students will develop key transferable skills through adopting both individual and team approaches to agri-environmental problems, practice in the design and execution of projects, the quantitative assessment and processing of data, and finally, the reporting of information suitable to support decision making.



CEI University Network Joint  
Programme



CASEE Fund for Incentives 2012



University of Zagreb  
Faculty of Agriculture

## **International Summer School "CLIMATE CHANGE AND NATURAL RESOURCE MANAGEMENT"**

**University of Zagreb Faculty of Agriculture, Zagreb, Croatia  
June 18 - 23, 2012**

**Thank you for your attention!**

