ARIMNet2 Young Researchers Seminar

“How to better involve end-users throughout the research process to foster innovation-driven research for a sustainable Mediterranean agriculture at the farm and local scales.”

30 May - 3 June 2016, Institut Agronomique Méditerranéen de Montpellier (IAMM), France

Use of Tunisian Constructed Wetland By-Products for Agricultural Purposes

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CONTEXT & CHALLENGES

Context

- In arid/semi-arid regions: scarcity of water resources
- Crop production increase causes soil impoverishment
- Constructed wetlands (CW): wastewater (WW) phyto-treatment (rural socio-economic and ecological contexts)
- In Tunisia: CW efficient in removing WW contaminants according to WW irrigation standards
- In Tunisia: 30-43% treated WW (TWW) exploited in irrigation (landscape, agricultural crops, trees)

Challenges

- Alternative water resources for water scarcity mitigation and agricultural irrigation
- Low-cost, efficient, ecological, sustainable sources for irrigation and fertilization
OBJECTIVE & HYPOTHESES

Objective

- Use of by-products: TWW and macrophyte biomass (MB) generated by a Tunisian CW system, as valuable and viable products for agricultural purposes

Hypotheses

- TWW from CW could be used as an alternative water resource for the irrigation of certain tree varieties (Ex. olive trees)
- MB is biologically transformed to compost used for fertilization of impoverished agricultural soils
METHODOLOGY

Olive cultivation
- Use of TWW to irrigate olive trees in experimental systems
- Application to a pilot farm land
- Monitoring of growth and productivity
- Monitoring of photosynthesis and GHGs emission (mainly CO$_2$)
- Evaluating quality of produced olives and oil

Soil quality
- Monitoring of soil quality ($C_{org}$, NPK, microbial biomass)
- Investigating carbon sequestration in soil

INVolVEMENT OF STakeholders

- Ministry of Agriculture
- Ministry of Public Health
- Ministry of Environment
EXPECTED RESULTS & IMPACTS

Impact on olive cultivation
- Increase of trees’ growth and productivity
- Production of safe olives and oil

Impact on soil quality
- Increase of carbon ($C_{\text{org}}$) stock in the soil
- Nutrient enrichment of the soil (NPK)
- Increase of biological activity

Impact on environment
- Reduction of CO$_2$ emission by soil and/or biomass
PROPOSED PARTNERSHIP

National Partners
- CERTE
- CITET (socio-economic)
- Farmers (private, end-users)

Mediterranean Partners
- Research Institute from France
- Research Centre from Egypt