

Workshop on data analytics methods and tools to assess cropping system sustainability and soil ecosystem services

ROME ITALY - CREA-AA
September, 25-29 2023



ORGANIZERS



The “Data analytics methods and tools to assess cropping system sustainability and soil ecosystem services” is a 5-days face-to-face workshop to transfer knowledge and tools about meta-analysis, process-based modeling, and trade-off evaluation.

Topics: The workshop will consist of three modules:

1. **Module 1:** Research synthesis and meta-analysis (1.5-day; 25-26 September)
2. **Module 2:** Trade-off analysis to identify best agroecological practices considering Cseq, N₂O emissions, NO₃ leaching and yield (1.5-day; 26-27 September).
3. **Module 3:** Process-based modeling with ARMOSA to simulate the effect of agroecological practices on cropping systems performance (2-days; 28-29 September)

The workshop is organized into theoretical lessons and hands-on sessions with applications and case studies. The workshop is mainly dedicated to EJP SOIL ARTEMIS participants, but also welcomes participants involved in other EJP SOIL projects, such as SOMMIT, TRACE-soils, CarboSeq, SIMPLE, AgroecoseqC, MIXROOT-C.

Contact information:

ejpsoil.artemis.events@gmail.com

Workshop on data analytics methods and tools to assess cropping system

WORKSHOP DIRECTORS

Claudia Di Bene

Senior Researcher, CREA (Italy)

Elena Valkama

Senior Researcher, Luke (Finland)

Rosanna Epifani

Researcher, CREA (Italy)

Valentina Baratella

Researcher, CREA (Italy)

SPEAKERS

Marco Acutis

Full Professor, UNIMI (Italy)

Marco Botta

Researcher, UNIMI (Italy)

Simone Ugo Maria Bregaglio

Senior Researcher, CREA (Italy)

Roberta Calone

Researcher, CREA (Italy)

Julia Fohrafellner

PhD student, BOKU (Austria)

Alessia Perego

Associate Professor, UNIMI (Italy)

Elena Valkama

Senior Researcher, Luke (Finland)

General information

General information: The workshop runs from 25 to 29 September 2023 (daily timetable: 09.00-12.00 and 13.30-16.30). You may choose one, two or all three modules to participate. Interested participants are requested to compile the application form within **July 15th 2023** at the link

<https://forms.gle/7xoAAxRcnsmRpq9QA>

Costs and requirements: The course includes lunches and coffee breaks. Transfer and accommodation are on participants expenses. The course is limited to 25 participants. Admission will be subject to evaluation of application form.

The selected participants will be informed on **July 25th 2023** and the registration form will be sent with practical information. Participants have to use their own laptop.

Credits: Attendees will receive a workshop certificate (30 hours). However, it is up to the participant's institution to recognize the workshop as official course credit.

Location: CREA - Research Centre for Agriculture and Environment, via della Navicella 2/4, 00184 Rome Italy.

Program (1)

Monday 25 September 2023 - **Introduction to the Course and training objectives (workshop directors). Participants self presentation.**

Research synthesis and meta-analysis in agro-environmental science (Dr. Elena Valkama and PhD student Julia Fohrafellner)

First class: what is meta-analysis, its application, question formulation, literature search and data extraction, dealing with missing data, database creation

Second class: Effect size, summarizing results across studies, weighting, analyzing moderators (or driving forces), meta-regression, quality criteria for meta-analysis

Practical: Q&A, exercises

Tuesday 26 September 2023 - **Meta-analysis and trade-off evaluation** (Dr. Elena Valkama and Dr. Simone Ugo Maria Bregaglio)

First class: Running meta-analysis with MetaWin

Second class: How to use meta-analysis to perform trade-off evaluation

Practical: Dataset generation and cluster analysis for identifying patterns in trade-off components

Wednesday 27 September 2023 - How to use simulation models for trade-off evaluation (Dr. Simone Ugo Maria Bregaglio and Dr. Roberta Calone)

First class: Introduction to fuzzy logic for trade-off component analysis

Program (2)

Second class: generation of membership functions and development of fuzzy rules.

Practical: Generate fuzzy sustainability index in R studio from ARMOSA model outputs

Thursday 28 September 2023 - **The ARMOSA model - Theory and first application** (Prof. Marco Acutis and Prof. Alessia Perego)

First class: Introduction to process-based models. Sensitivity analysis, calibration and validation

Second class: Overview of ARMOSA: Yield, water N and C dynamics simulation.

Practical: Practical activity of data extraction and data preparation for using in ARMOSA First run of the model.

Friday 29 September 2023 - **The ARMOSA model - the agroecosystem simulation and analysis** (Prof. Alessia Perego and Dr. Marco Botta)

First class: real case studies simulated with ARMOSA: input preparation

Second class: Output management of ARMOSA. Validation and comparison of management alternatives

Practical: Analysis of participants' case studies and Questions & Answers