



AWESOME

WATER-ECOSYSTEM-FOOD

SUMMER SCHOOL on the Water, Energy, Food, and Ecosystems Nexus

28th – 31st of August 2023

Online



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Preliminary program

Day 1

Module 1: General introduction on the WEF Nexus: definition of the Nexus, resources, drivers, and problems contextualisation. The WEF Nexus in the light of the complexity of the Agenda 2030 and Sustainable Development. Context of the AWESOME project, structure, goals, progresses (roadmap).

Speaker: Andrea **Castelletti** (POLIMI)

Module 2: Physical description of the Nile river system, challenges and opportunities; Policy perspective; Governance perspective: history and over-view of various aspects of public international laws and treaties; A closer look at the demo site. Results from the pilot project.

Speakers: Demet **Cekin** (RWTH), Mostafa **Hassanen** (ZG)

Module 3: Future scenarios: demographic and climate change projections

Introduction to the construction of future scenarios according to global demographic and climatic projections. After providing an overview of state-of-the-art scenarios relying on Shared Socioeconomic Pathways and Representative Concentration Pathways, they will illustrate the different models supporting the scenario generation as well as discuss scenario-related uncertainties.

Speakers: Matteo **Giuliani** (POLIMI), Georgios **Papayiannis** (AUEB), Athanasios **Yannacopoulos** (AUEB)

Day 2

Keynote speech 1 – to be defined

Module 4.a: Stakeholder engagement.

Intro to participatory approaches for SH engagement in natural resources management, from a WEF perspective. Defining the WEF approach and the relevant SHs; Methods from SH identification and analysis, to co-creation, Live case study from the AWESOME project - Overview of the models developed within the MAWs: a) WEF mental maps, their findings and the resulting policy suggestions. b) participatory storylines on the future of the case study area.

Speakers: Lydia **Stergiopoulou** (AUEB)

Module 4.b: Future scenarios: food and energy components

Food: Overview of the current agricultural production in the Nile Basin and exposition of potential alternative strategies to enhance crop productivity while minimizing blue water consumption. Different allocation scenarios including climate change and diet shifts are discussed in relation to the availability of water and suitable land for crop production.

Energy: Exploration of different pathways of future energy scenarios for the spatial domain useful for the AWESOME project (i.e. including Egypt, Ethiopia, and Sudan), in terms of energy demand and infrastructure evolution and their economic and environmental impacts. The future sectoral energy demand scenarios are developed based on the Socio-economic Pathways (SSPs) and the outcomes the demographic projections, using a multi-sectoral optimal resource allocation economic model.

Speakers: Davide Danilo **Chiarelli** (POLIMI), Martina **Sardo** (POLIMI), Matteo Vincenzo **Rocco** (POLIMI), Yassin Rady (American University in Cairo)

Day 3

Keynote speech 2 – to be defined

Module 5.a: Overview on the use of macroeconomic models in the field of the WEFE nexus, presenting a list of selected scientific publications by theme, main results and contribution. Focus on the most studied topics, how they are combined, and through which macroeconomic model these are studied.

Speakers: Ilenia Gaia **Romani** (FEEM), Camilla **Gusperti** (FEEM)

Module 5.b: Integrated assessment modelling of climate, economy and agricultural nexus for the Mediterranean Region.

Introduction to the RICE-MED model, i.e. a framework where the global externality of climate change is incorporated, allowing the study of its impacts on the socio-economic environment; policy implementation; focus on the impacts of climate change on the Mediterranean countries and the agricultural sector; the role of uncertainty; overview of the results.

Speakers: Camilla **Gusperti** (FEEM), Marta **Castellini** (FEEM), Veronica **Lupi** (FEEM)

Day 4

Module 6.a: Introduction to the decision-analytic platform, i.e. strategic river basin model coupled with optimisation methods, to analyse many-objective water planning and management problems and to explore synergies and trade-off among the components of the WEF Nexus.

Speaker: Matteo **Giuliani** (POLIMI)

Module 6.b: Global Computable general equilibrium (CGE) model with alternative water sources for WEF nexus analysis

Computable general equilibrium (CGE) models are a powerful economic modeling tool that uses actual economic data. CGE models are structured to estimate the impacts of external shocks on an economy while considering interrelations between the various economic sectors and international trade. Within the WEF nexus, CGE contributes to the overall economic component by directing the impact through interlinks of the economy. The module will introduce the results of YVC&UH teams to analyze the macroeconomic effects of Climate Change, focusing on the WEF nexus in the Mediterranean countries while explicitly incorporating alternative water sources in CGE. The role of novel technologies of controlled-environment agriculture (e.g., hydroponics) that save water and land at the cost of higher energy intensity compared to traditional practices will be discussed.

Speaker: Ruslana **Palatnik** (YVC and UH)