

Water Economics



In brief

➤ **Course language:** English

Presentation

Learning objectives

Upon successful completion of the course, students will be able to:

- Understand the economic principles governing the allocation and management of water resources.
- Analyze water systems as complex socio-environmental systems characterized by feedback loops, nonlinearity, and uncertainty.
- Evaluate economic instruments such as water pricing, taxes, quotas, and market-based mechanisms.
- Assess the economic impacts of water scarcity, pollution, and climate change.
- Apply systems thinking and basic modeling approaches to water resource management problems.
- Compare alternative adaptation and investment strategies using economic and multicriteria analysis.
- Formulate policy recommendations for sustainable and resilient water management.

Description of the programme

Economic Analysis of Complex Water Systems

Water resources management is increasingly challenged by climate change, population growth, competing demands, environmental degradation, and growing uncertainty. These challenges arise from the interactions between natural processes, technical infrastructures, economic activities, institutions, and human behavior, making water systems a typical example of complex socio-environmental systems.

This course introduces students to the economic analysis of complex systems through the study of water resources. It provides the conceptual and analytical tools needed to understand how economic incentives, governance structures, technological choices, and environmental constraints shape the dynamics of water systems. Attention is given to the interactions and feedback mechanisms that link hydrological, ecological, social, and economic components.

Students will learn how to evaluate water allocation strategies, pricing policies, pollution control measures, and adaptation options under conditions of scarcity and uncertainty. The course also introduces systems thinking, socio-hydrological modeling, and decision-support methods for sustainable water management.

Through real-world case studies—including drought management, agricultural water use, water pricing reforms, desalination projects, wastewater reuse, and transboundary water conflicts, students will explore how economic reasoning can support decision-making in complex environmental systems.

The course combines lectures, quantitative exercises, case studies, and project-based learning. By the end of the course, students will be able to analyze water-related challenges using an integrated systems perspective and develop economically sound and environmentally sustainable management strategies.

Introduction

Session 1 – Water systems as complex socio-technical systems

PART I – Economics of water supply systems

Session 2 – Water resources, scarcity and uncertainty

Session 3 – Infrastructure, water supply systems and energy-water-nexus

PART II – Economics of water demand systems

Session 4 – Understanding water demand

Session 5 – Water pricing and demand management

PART III – Governance and management of complex water systems

Session 6 – Water allocation and Economic instruments

Session 7 – Governance of complex water systems

Conclusion

Session 8 – Reintegrating complexity: managing water systems under multiple interdependencies

How knowledge is tested

- Case study assignments
- Group project

Teaching team

Agnès Tomini (CNRS - Aix-Marseille School of Economics)

Total des heures

CM	Master class	24h
TD	Directed work	16h
		8h

Useful info

Name responsible for EU

Lead Instructor

Agnès Tomini

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