

## WAT-E2090 Water and People in a Changing World

**Responsible teacher:** Associate professor Matti Kummu

**Target audience:** MSc and DSc students

**Credits:** 5 ECTS

**Scheduled:** 5<sup>th</sup> period, organised every year

**Description:** Food security and the overall wellbeing of human kind are threatened by the overexploitation of our water and land resources. Water scarcity is not only a threat to people, but also to many of the planet's key ecosystems. But how have we ended up in this situation, and how does the future look like?

While the amount of freshwater usable for humans has not changed notably over time, human population has made drastic changes on landscape, hydrological cycle and use of water resources. Within the past 1000 years, population in this planet has increased from 0.27 billion to nearly 8 billion and fast globalisation has changed the way we eat and live. To feed, clothe and wire that many people, over 75% of the Earth's land area has been modified to some extent.

In this course, the aim is to investigate how the world has changed over time, and how these changes have impacted on our water and land resources. Moreover, as the pressure on natural resources is expected to only grow in the future, an overview on future pathways is given.

Within the course, a student will explore and assess these changes using various spatial analyses methods of *R* ([www.r-project.org](http://www.r-project.org)), over different global datasets. Moreover, advanced graph and map making is practised with Adobe Illustrator.

**Learning objectives** – after the course a student is able to...

- analyse and assess how global water resources are distributed in relation to human population and how this has changed over time
- recognise the connection between food production and use of water
- analyse the water stress and water scarcity in various scales by using spatial datasets and estimate their impact on human society
- apply spatial analysis softwares (*R*) on global water challenges
- use different kind of spatial datasets as a part of scientific research
- recognise the basics of visual scientific communication, and create informative maps and graphs

<b>Workload:</b>	Contact teaching (lecture-exercise sessions):	24h (6x4h)
	Pre-assignment, orientation to lectures:	24h (6x4h)
	Home assignments:	48h (6x8h)
	Final presentation:	40h
	TOTAL	136h

**Grading:** Active participation in lecture-exercise sessions (1/8),  
Home assignments (5/8),  
final presentation (2/8)