

Topics in Water Management

COURSE IDENTIFICATION

| CODE | SEM | HT | HP | HA | SCT | PREREQUISITES | COURSE LEVEL OR CATEGORY | RESPONSABLE UNIT |
|----------|--------|----|----|-----|-----|--------------------------|--------------------------|---------------------|
| AG040516 | Spring | 1 | 0 | 3.4 | 3 | Postgraduate inscription | Elective | Postgraduate School |

One SCT credit point is equivalent to 25 student learning hours.

COURSE DESCRIPTION

This course presents an overview of major water management topics in different countries, considering issues such as increasing water scarcity and pollution, and innovative tools such as water footprinting, hydrological modelling, remote sensing and geographical information system to help improve water management. Depending on invited lectures the course will focus on a particular country.

LEARNING STRATEGIES

Lectures, group discussion.

COURSE COMPETENCIES (Type: B=Basic, G=Generic, E=Specific)

At the conclusion of this class, students will be able to:

- Recognize and understand a broad overview of water management issues at global scale (E).
- Integrate knowledge about the water dynamics in agricultural systems (G).
- Understand new concepts and technologies and their potential applications to solve agricultural water management problems (G).

LEARNING RESOURCES

Lectures. Case studies. Student debates.

COURSE OUTLINE

| Chapter | Content |
|---|---|
| Increasing global water scarcity and pollution. | This topic will focus on global water availability and its use, and will examine and describe hidden links between human consumption and water use leading to increasing global water scarcity and pollution. |
| Overview of major water quantity and quality issues in New Zealand. | This topic gives an overview of New Zealand's freshwater resources, their distribution and use, and then presents and discusses major issues related with water quality and quantity in New Zealand. |
| Water quality management: New Zealand framework. | This topic presents and discusses concepts and tools used for freshwater quality management in New Zealand, followed by a briefly introduction to emerging concepts and tools, nationally and internationally, for water quality management. |
| Water footprinting and its potential application. | This topic introduces and discusses an innovative approach of water footprinting to account for both direct and in-direct use of all freshwater components (green, blue and grey water) to assist with decision making for efficient, equitable and sustainable water use and its management. |

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| Modelling tools and precision irrigation systems | This topic introduces role of hydrological modeling, remote sensing and geographical information tools to assist with analysis and improved of water productivity and sustainability of irrigation systems. |
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Reading Materials

- Entering an Era of Water Scarcity: The Challenges Ahead, published by Sandra L. Postel in Ecological Applications, Volume 10, 2000, pp. 941–948.
- The Demise of the Aral Sea – An Environmental Disaster, published by Tony Waltham and Ishan Sholji in Geology Today, Vol. 17(6), 2001, pp. 218-224.
- Water scarcity: Fact or fiction? by Rijsberman, F.R. (2006) in Agricultural Water Management 80, 5-22.
- Falling Water Tables and Shrinking Harvests, Chapter 2 in the 'World on the Edge: How to Prevent Environmental and Economic Collapse' by Lester R. Brown © 2011 Earth Policy Institute. This is available as an E-book on the Earth Policy Institute, [here is the link](#).
- Diffuse pollution and freshwater degradation: New Zealand perspectives, published by Howard-William et al., (2010), in the selected papers from the 14th International Conference of the IWA Diffuse Pollution Specialist Group, DIPCON 2010. http://www.landcareresearch.co.nz/publications/researchpubs/Howard_williams_2013_Diffuse_pollution_and_freshwater_degradation.pdf
- Water quality in New Zealand: Understanding the science, published by Parliamentary Commissioner of Environment (March 2012), NZ, 93 p. <http://www.pce.parliament.nz/media/1278/pce-water-quality-in-new-zealand.pdf>
- Water footprint accounting, published by Hoekstra (2012) in Water accounting: International approaches to policy and decision-making, Edward Elgar, Cheltenham, UK, pp. 58-75. <http://www.waterfootprint.org/Reports/Hoekstra-2012-WaterFootprintAccounting.pdf>
- Water footprinting of agricultural products: a hydrological assessment for the water footprint of New Zealand's wines, published by Hearth et al (2013) in Journal of Cleaner Production 41, 232-243.
- Water footprints and irrigated agricultural sustainability – the case of Chile, published by Donoso et al. (2015) in International Journal of Water Resources Development
- Distributed ecohydrological modelling to evaluate irrigation system performance in Sirsa district, India II. Impact of viable water management scenarios, published by Singh et al (2006) in Journal of Hydrology 329, 714-723.

INSTRUCTORS (List non-exclusive)

| <i>Instructor</i> | <i>Department</i> | <i>Area or major field</i> |
|-------------------|--|--|
| Ranvir Singh | School of Agriculture & Environment, Massey University | Environmental Hydrology and Soil Science |
| Oswaldo Salazar | Soil and Engineering, University of Chile | Sustainable soil and water management |

GRADING (under review every term)

| <i>Activity</i> | <i>Percentage (%)</i> |
|-------------------------|-----------------------|
| Case study presentation | 50 |
| Literature review | 50 |