WATR7800 - Water, Agricultural Landscapes and Food Security (2 units)

Integration module (Specialisation stream #3: Water, land and people)

Module description

Population growth, urbanisation, changing food consumption patterns and the effects of climate change on water availability and quality are global challenges that have major impacts on agriculture and agricultural water use.

Participants in this module will be introduced to some of the main challenges and opportunities for water and agricultural landscapes. They will develop the capacity to think broadly about and assess the positive and negative ecological, social and economic impacts of agricultural water use, and will be introduced to some tools and critical thinking that can help harmonise agricultural systems. Participants will develop new knowledge and skills to help them converse with agriculturalists as informed water managers.

The module methodology departs from the experience and expectations of each student participant, 'back-casting' from their individual objectives and building a learning progress process along the Module that supports the participant to understand, filter and incorporate each learning activity into his/her own learning objectives. It is expected that participants will contribute substantially to discussions and workshops, proactively adding their own experiences to support peer learning, enthusiastically absorbing the experiences of others, and actively seeking to connect what they hear, see and do with their own Personal Learning Objectives.

Module introduction

Participants will be introduced to both dryland and irrigated agriculture, and will develop an understanding of how land use relates to the water cycle with examples of agricultural systems in both developed and developing country contexts. Principles of sustainable management at a range of scales, from soil profiles to global systems, will be discussed. Efficient water use in irrigation and conservation of water in dryland systems and saline agriculture will be emphasised.

This unit will address the issues of intensification of land use that has led to degradation of affected ecosystems, and will introduce participants to remediation techniques to counter land and water degradation through better management. Alternative water use and urban encroachment on agricultural land will also be examined.

An understanding of agricultural water management and methods of environmental protection will prepare participants for problem-based learning (PBL) work. Risk-based decision making in water management will be embedded into the module, with an emphasis on linking management to governance.

Mannum, South Australia

Module delivery

- **Full-time** (on-campus) students, including international students, are required to enrol in this module in the summer semester. They are required to attend an eight day, Perth-based teaching block, including two days of field work. Preparation work may be undertaken beforehand online.
- **Part-time** (external) students are required to attend the same eight day, Perth-based teaching block including two days of field work. Preparation work may be undertaken beforehand online.

Assumed background

This is a postgraduate course in general water science offered as part of the International WaterCentre Masters of Integrated Water Management, and one of two specialist courses for those participants following the 'Water, Land and People' stream. Participants are expected to have basic background knowledge through undergraduate science or engineering programs, however this is not essential. It is anticipated that the student group will have diverse range and depth of professional experience, including some participants with no postgraduate work experience. Participants must have successfully completed the Masters foundation modules: 'New perspectives project management', 'Science of water', 'Water, sustainability and development', and 'Water governance and policy'.

Learning objectives

After successfully completing this module participants are able to:

- Have an understanding of global trends for population growth, climate change, water demand and food security;
- Understand key directions in water resource management for sustainable agriculture;
- Understand the different modes of agricultural production for rain-fed and irrigated systems and their impacts on land management, water resources, ecosystems and community;
- Have an overview of innovative solutions for efficient and effective use of water and land resources for different agricultural systems;
- Understand the context of water redistribution in landscapes of different climate regions and its impact on agricultural practices and ecosystems;
- Achieve a comprehensive view of the harmonisation of economic, social and ecological dimensions of agriculture;
- Have an understanding of the integrative components of land and water management in an agricultural context.

Teaching staff

Module coordinators and lecturers for this module are from The University of Western Australia, with guest lecturers from UWA, government agencies, industry and non-government organisations.

Module Coordinators and Lead Lecturers: A/Prof Susana Neto

and A/Prof Jeff Camkin

Lecturer: A/Prof Mark Rivers

Lecturer: A/Prof Ed Barrett-Lennard

Lecturer: A/Prof Edward Hauck

Guest lecturers: from government agencies, industry and NGOs

Problem-Based Learning (PBL) projects

Parallel PBL projects and field trips run through the semester, comprising roughly 50% of the assessment weight. Full-time students complete two PBL projects per semester, while part-time students complete one PBL per semester.

PBL projects for the Integration semester comprise:

- **PBL3:** Integrated catchment management – developing strategies for change *(Individual project)*
- **PBL4:** Learning lessons from integrated water management in practice *(Individual project)*

Field trips

As part of this module (Water and agricultural landscapes), both full-time and part-time students also undertake:

- A one-day field trip to the Peel-Harvey Catchment and Harvey Irrigation Area, and
- A one-day field trip to Gnangara mound, or
- A one-day field trip to the Wheat Belt

These two day trips are part of an eight-day teaching block in Perth, undertaken during the summer semester.

For a complete list of field trips that participants undertake during the program, please refer back to "Field trips" on page 7 of this syllabus or visit the IWC website.