

AGEN 7008 WATER SUSTAINABILITY IN AGRICULTURE

Credit Points 10

Description Population growth, urbanisation and climate change have increased the competition for water and affected water available for agriculture. The growing demand for food must be obtained using existing water resources sustainably. This subject will focus on the current status, trends and challenges of agricultural water management; understanding the practical and technical aspects of crop water requirement; the allocation, distribution, governance and use of water in agriculture; water management at the farm and regional levels; crop water relations, crop yields and water productivity; irrigation, drainage, and salinity in cultivated areas; rainwater harvesting and crop water management in rainfed areas; the use of wastewater and other low quality waters in agriculture; groundwater management in agriculture and conjunctive use of groundwater and surface water; and the internet of things and digital technologies for managing water in agriculture.

School Science

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Postgraduate Coursework Level 7 subject

Restrictions

Must be enrolled in post-graduate a postgraduate program

Learning Outcomes

After successful completion of this Subject, students will be able to:

1. Critically examine the issues and challenges of agricultural water management.
2. Analyse crop water requirements and options for improving water productivity
3. Evaluate different technical innovations to improve water sustainability in agriculture.
4. Reflect on the sustainable water management principles at the farm and catchment levels.
5. Evaluate strategies for improving water and food security for and with key stakeholders including local indigenous communities and agricultural management authorities.

Subject Content

The subject comprises four main topics:

Workshop 1.Water sustainability at the farm level
Sustainable and resilient food production systems depend on sustainable and resilient water management. The topics to be covered will include on-farm irrigation management concepts; water reuse and management; Internet of Things (IoT) for managing water; and developing farm level water management plans for improving water productivity and sustainability in agriculture.

Workshop 2.Water sustainability under changing climate
Climate change, population growth, and economic development will impact the future availability of water for urban, industrial and

agricultural users and will affect differently in different regions. The demand for and the water supply for various uses will be influenced not only by changing hydrological regimes - through changes in precipitation, potential and actual evaporation, and runoff at the watershed and river basin scales - but also by increases in future competition among different uses. Students will cover how climate change will influence water availability in different regions, how the changes in water availability will impact economic, ecosystem services and community well-being and what options and strategies are available to adapt to the changing climate.

Workshop 3.Groundwater management in agriculture
Groundwater irrigation plays an important role in sustainable agricultural development and in many parts of the world, more than 50% of water crop production comes from groundwater sources. Groundwater is also important for providing irrigation during droughts and dry spells and intensifying and diversifying of the cropping system.

Students will cover basic concepts of groundwater hydrology; challenges of groundwater management; managed aquifer recharge; participatory groundwater monitoring and management; the role of groundwater users in sustainable management of groundwater; groundwater governance; and strategies for sustaining groundwater use at the local, watershed and aquifer levels.

Workshop 4.Water, Energy and Food Nexus
Water, food and energy form a nexus at the heart of water sustainability and sustainable development. Agriculture is the largest user of the world's freshwater resources, and the water use is connected energy use and food produced. Demand for all three is increasing rapidly. To withstand current and future pressures, we need integrated and sustainable management of water, food and energy to balance the needs of people, nature and the economy. Students will cover introduction to the nexus: what is it and modelling and assessment approaches; water scarcity, virtual water and water footprint; dealing with water and energy challenges and opportunities; and nexus case studies.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Portfolio	3000 words or equivalent content	40	N	Individual
Poster	1000 Words and 15min interview	30	N	Individual
Critical Review	2000 words	30	N	Individual

Teaching Periods

Spring (2024)

Hawkesbury

On-site Subject Contact

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=AGEN7008_24-SPR_HW_1#subjects)