

# AGEN 7009 WATER SUSTAINABILITY IN CATCHMENTS

**Credit Points** 10

**Coordinator** Ricky Spencer ([https://directory.westernsydney.edu.au/search/name/Ricky Spencer/](https://directory.westernsydney.edu.au/search/name/Ricky%20Spencer/))

**Description** With global climate change and other extreme weather conditions, water catchments have never been under more pressure than ever. Professionals with training in catchment management are in high demand. This subject will cover four interconnected themes: (i) Water sustainability in the natural catchments; (ii) Water sustainability in urban catchments; (iii) Water sustainability in peri-urban catchments; and (iv) Sustainability through integrated water resources management. These themes will focus on how key hydrologic processes and anthropogenic activities shape water availability. They will examine the complexity of managing water supplies and river systems in different catchments to address a multitude of challenges and issues to achieve water security and sustainable living. In particular, the subject will enable insight into various natural, environmental and socio-economic parameters affecting water sustainability and achieving catchment-level water sustainability.

**School** Science

**Discipline** Agriculture, Environmental and Related Studies, Not Elsewhere Classified.

**Student Contribution Band** HECS Band 2 10cp

Check your fees via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Postgraduate Coursework Level 7 subject

**Restrictions**

Must be enrolled in a post-graduate program.

## Learning Outcomes

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

1. Articulate water cycle issues, challenges and options in different catchments, and understand the unique characteristics of water resources throughout the hydrological cycle and at all relevant scales.
2. Develop critical perspectives necessary to understand cross-cultural interactions with important hydrologic processes.
3. Reflect on the allocation of water between various competing demands related to social and economic development.
4. Evaluate the concept of ecosystem services, and consider water's unique characteristics within and across ecosystem services.
5. Critically analyse options and strategies to sustainably manage water quantity and quality, wetlands and river health for key stakeholders including indigenous communities
6. Integrate different perspectives for planning, designing and sustainably managing water different catchments.

## Subject Content

The subject comprises of four major topic areas:

### 1. Water sustainability in the natural catchments

Water in natural catchments, especially in rivers, creeks and wetlands, acts as the lifeblood of the local environment. It makes nearby towns more liveable and provides a place to relax, unwind and reconnect with nature. Healthy water bodies in the catchment are essential to spiritual, cultural and physical well-being. Water is vital in the natural catchment to sustain plants, animals and humans.

Students will focus on how the key hydrologic processes shape the natural world and our daily lives and explore how different hydrologic processes influence the physical and ecological structure of natural environments and the communities, cultures, and people within these environments. The framework is structured around the global water cycle and students will examine major water cycle components and explore selected case studies to understand how different cultures and communities interact with each hydrologic component.

They will also investigate the ecology of aquatic ecosystems, their structure, processes, and biodiversity, as well as water requirements for ecosystem conservation. Further, students will explore the complex relationship between water resources, the natural environment and the economy, and the growing problem of water scarcity.

### 2. Water sustainability in urban catchments

Water is vital to the sustainability and liveability of cities and urban catchments. Sustainable water management in urban catchments plays a critical role in water supply for domestic use, commerce, industry and the urban environment. Therefore, water in these urban catchments must be appropriately used and managed, especially under the pressure of urbanisation.

Students will examine the complexity of managing water supplies and river systems in these catchments to address many challenges and issues to achieve water security and sustainable living. Topics will focus on water-sensitive urban design; approaches to managing urban stormwater quantity and quality through integrating green/blue and grey infrastructures; climate change impact assessments; and wastewater reuse. Overall, the theme will develop the fundamental understanding to guide the design of sustainable urban water supplies, leading to water-smart, liveable and sustainable cities.

### 3. Water sustainability in peri-urban catchments

There are growing concerns about water and food security to meet increases in population in urban areas. For cities to be liveable and sustainable in the future, there is a need to maintain the natural resource base and the ecosystem services in the peri-urban areas surrounding cities.

Students will examine various natural, environmental and socio-economic parameters that affect water sustainability in peri-urban catchments and explore the changes within these catchments that significantly impact agricultural uses and productivity, environmental amenity and natural habitat, water supply and quality, and energy consumption. They will develop insights into how these changes affect the peri-urban areas and their associated urban and rural environments. Further, students will discuss how the population growth and expansion of urban centres are increasing pressure on potable water supplies, energy and food supplies and the ecosystem services on which the community and the liveability of cities depend.

### 4. Integrated water resources management

Water is essential to the planet's survival, and managing it is critical as a limited global resource. Complexity is forefront when considering the sharing of water resources between national priorities and multiplied when the resource must be managed between multiple countries.

Managing this essential resource in the local and regional context requires understanding what is technically feasible and environmentally and socially viable.

Students will examine different concepts, options and strategies for managing and sustaining water infrastructure development and use at the local, regional and national. Students will explore the evolution of Integrated water resources management (IWRM) theory and practice, principles and frameworks that guide IWRM and understand the complexity associated with sustainable water management. They will also explore why integration and systems approaches are required to deal with the complexity and challenges of implementing IWRM for achieving sustainable water use and development.

## 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 Mandatory	
Portfolio	3000 words or equivalent content	40	N	Individual	N
Debate	15 min per group	30	N	Group	N
Critical Review	600 words	10	N	Individual	N
Report	2000 words	20	N	Individual	N