# AGRI13009 *Resource Smart Food Production: More With Less*
## Term 2 - 2023

All details in this unit profile for AGRI13009 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## General Information

### Overview

Current conventional agricultural approaches have caused a number of serious environmental issues requiring proposals for mitigation. In this unit you will be introduced to the sustainability challenges of current food production systems in relation to the availability and use efficiency of resources (water, nutrients and energy) and greenhouse gas emissions. Case studies will be drawn from a range of food production systems including crops and livestock. You will undertake an investigation into a current challenge confronting a food production system of your choice. You will explore the effects of resource availability and management actions on productivity and discuss ecological consequences.

### Details

Career Level: *Undergraduate*
Unit Level: *Level 3*
Credit Points: *6*
Student Contribution Band: *7*
Fraction of Full-Time Student Load: *0.125*

### Pre-requisites or Co-requisites

Minimum of 72 credit points
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure (Higher Education Coursework)](#).

### Offerings For Term 2 - 2023

- Bundaberg
- Emerald
- Online
- Rockhampton

### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

# Class and Assessment Overview

## Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

## Class Timetable

### Regional Campuses

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

### Metropolitan Campuses

Adelaide, Brisbane, Melbourne, Perth, Sydney

## Assessment Overview

1. **Case Study**
Weighting: 20%
2. **Online Test**
Weighting: 30%
3. **Report**
Weighting: 50%

## Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

# CQUniversity Policies

**All University policies are available on the CQUniversity Policy site.**
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

# Previous Student Feedback

## Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

### Feedback from SUTE Feedback and In Class

**Feedback**

Students reported that they enjoyed the variety of learning materials offered in this unit.

**Recommendation**

The unit should continue to offer a range of learning materials delivered through various types of resources on Moodle and in-class. These include videos, pre-reading from various sources, guest lecturers, news stories on research projects and innovations, interactive resources/maps, collaborative jamboards and weekly review questions.

### Feedback from SUTE feedback

**Feedback**

Some students indicated that the use of discussion boards from group discussions and assessment was challenging.

**Recommendation**

Students should be reminded of the importance of using and engaging with different types of communication platforms. Most students have experience with discussion boards from previous units, however they should continued to be reminded that they are free to raise concerns or the need for technical assistance with the unit coordinator.

### Feedback from In Class

**Feedback**

Enhance Problem Based Learning tutorials

**Recommendation**

All tutorial sessions should be based on problem based learning in future offerings of this unit. In Term 2 of 2022, most tutorials followed this structure and students responded well to this.

# Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**

1. Evaluate how plant and animal functioning and productivity are impacted by resource availability and management actions
2. Integrate scientific knowledge for the development of sustainable resource management solutions for the cropping or livestock industry
3. Develop solutions to complex problems in agroecosystems.

# Alignment of Learning Outcomes, Assessment and Graduate Attributes

| — | N/A Level | ○ | Introductory Level | ○ | Intermediate Level | ● | Graduate Level | ○ | Professional Level | ○ | Advanced Level |
|---|---|---|---|---|---|---|---|---|---|---|---|

## Alignment of Assessment Tasks to Learning Outcomes

| Assessment Tasks | Learning Outcomes | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| 1 - Online Test - 30% | ● | | |
| 2 - Case Study - 20% | ● | ● | |
| 3 - Report - 50% | | ● | ● |

## Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| 1 - Communication | ● | ● | ● |
| 2 - Problem Solving | | ● | ● |
| 3 - Critical Thinking | ● | ● | ● |
| 4 - Information Literacy | ● | ● | ● |
| 5 - Team Work | | ● | ● |
| 6 - Information Technology Competence | | ● | |
| 7 - Cross Cultural Competence | | | |
| 8 - Ethical practice | | | |
| 9 - Social Innovation | | | ● |
| 10 - Aboriginal and Torres Strait Islander Cultures | | | |

## Textbooks and Resources

### Textbooks

**There are no required textbooks.**

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

## Referencing Style

**All submissions for this unit must use the referencing styles below:**

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Saba Sinai** Unit Coordinator
s.sinai@cqu.edu.au

## Schedule

### Week 1: Introduction to Resource Smart Agriculture - 10 Jul 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Introduction to Resource Smart Agriculture | Eisenstein, M. (2020). Natural solutions for agricultural productivity. Nature 588, S58-S59. doi: https://doi.org/10.1038/d41586-020-03445-4 The State of Food Security and Nutrition in the World, 2022 - FAO, IFAD, UNICEF, WFP and WHO | |

### Week 2: Water - A Global Perspective - 17 Jul 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Water - A Global Perspective and Local Perspective | M.E. Qureshi, M.A. Hanjra, J. Ward. Impact of water scarcity in Australia on global food security in an era of climate change. Food Pol., 38 (2013), pp. 136-145 Tong, L.A., Ulubaşoğlu, M.A. and Guven, C. (2022), Growing more Rice with less water: the System of Rice Intensification and water productivity in Vietnam*. Aust J Agric Resour Econ. https://doi.org/10.1111/1467-8489.12477 | **Assessment 1: Circular Economy Solutions:** Discussion Board for Part B opens Monday of Week 2. |

### Week 3: Soils - 24 Jul 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | | |

| Soils | Clarke C. J. , George R. J. , Bell R. W. Hatton T. J. (2002) Dryland salinity in south-western Australia: its origins, remedies, and future research directions. Soil Research 40, 93-113. | |

### Week 4: Greenhouse Gas Emissions - 31 Jul 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |
| Greenhouse Gas Emissions | T.N. Maraseni, D. Anh, K. Reardon-Smith, S. Mushtaq. Carbon smart agriculture: an integrated regional approach offers significant potential to increase profit and resource use efficiency, and reduce emissions J. Clean. Prod. (2021), p. 124555 | **Assessment 1: Circular Economy Solutions** Due: Week 4 Wednesday (2 Aug 2023) 11:45 pm AEST |

### Week 5: Energy Efficiency - 07 Aug 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |
| Energy Efficiency | Australian Pork Limited: Reducing Energy Costs in Piggeries W. Powell, J.M. Welsh, D. Pannell, R. Kingwell. Can applying renewable energy for Australian sugarcane irrigation reduce energy cost and environmental impacts? A case study approach. Journal of Cleaner Production, 240 (10) (2019), p. 118177, 10.1016/j.jclepro.2019.118177 | |

### Vacation Week - 14 Aug 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |

### Week 6: Plant Nutrients - 21 Aug 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |
| Soils and Plant Nutrition | Erdal Elkoca, Faik Kantar & Fikrettin Sahin (2007) Influence of Nitrogen Fixing and Phosphorus Solubilizing Bacteria on the Nodulation, Plant Growth, and Yield of Chickpea, Journal of Plant Nutrition, 31:1, 157-171, DOI: 10.1080/01904160701742097 Bakach Dikand Kadiata & Kabamba Lumpungu (2003) Differential Phosphorus Uptake and Use Efficiency Among Selected Nitrogen-Fixing Tree Legumes over Time, Journal of Plant Nutrition, 26:5, 1009-1022, DOI: 10.1081/PLN-120020072 | |

### Week 7: Animal Nutrition - 28 Aug 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |

| Animal Nutrition | Pomar C, Andretta I and Remus A (2021) Feeding Strategies to Reduce Nutrient Losses and Improve the Sustainability of Growing Pigs. Front. Vet. Sci. 8:742220. doi: 10.3389/fvets.2021.742220<br>Silva TACC, Quigley SP, Kidd LJ, Anderson ST, McLennan SR, et al. (2022) Growth and reproductive performance responses to post-weaning supplementation of early and normally-weaned Brahman crossbred heifers raised in tropical rangelands. PLOS ONE 17(2): e0263786. https://doi.org/10.1371/journal.pone.0263786<br>Anene, D., Akter, Y., Thomson, P., Groves, P., Liu, S., O'shea, C. (2021). Hens that exhibit poorer feed efficiency produce eggs with lower albumen quality and are prone to being overweight. Animals, 11(10), 2986 | |

## Week 8: Chemical Controls in Agriculture - 04 Sep 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |
| Chemical Controls in Agriculture | Ervin, Breshears, Frisvold, Hurley, Dentzman, Gunsolus, Jussaume, Owen, Norsworthy, Al Mamun, and Everman. "Farmer Attitudes Toward Cooperative Approaches to Herbicide Resistance Management: A Common Pool Ecosystem Service Challenge." Ecological Economics 157 (2019): 237-45.<br>Doidge C, Ruston A, Lovatt F, Hudson C, King L and Kaler J (2020) Farmers' Perceptions of Preventing Antibiotic Resistance on Sheep and Beef Farms: Risk, Responsibility, and Action. Front. Vet. Sci. 7:524. doi: 10.3389/fvets.2020.00524 | **Assessment 2: Online Test:** The online test will open at 9AM on Monday of Week 8 (September 4, 2023) and close by 5PM on Friday of Week 8 (September 8, 2023). You will have two hours to complete the test. You will be allowed one attempt at this assessment. |

## Week 9: Food Security, Food Waste and Post-Harvest Losses - 11 Sep 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |
| Food Security, Food Waste and Post-Harvest Losses | Fernando, I., Fei, J., Stanley, R., Enshaei, H. and Eyles, A. (2019), "Quality deterioration of bananas in the post-harvest supply chain- an empirical study", Modern Supply Chain Research and Applications, Vol. 1 No. 2, pp. 135-154. https://doi.org/10.1108/MSCRA-05-2019-0012<br>Hogan, L 2018, Food demand in Australia: Trends and issues 2018, ABARES Research Report 18. | |

## Week 10: Animal and Plant Nutrition in LMICs - 18 Sep 2023

| Module/Topic | Chapter | Events and Submissions/Topic |
| --- | --- | --- |

| Animal and Plant Nutrition in Low- and Middle-Income Countries | Miguel Mellado, Francisco G. Véliz, Ulises Macías-Cruz, Leonel Avendaño-Reyes, José E. García, Cesar A. Rosales-Nieto. (2022) Effect of breed and management practices on reproductive and milking performance of rangeland goats. Tropical Animal Health and Production 54:3. Adarsh Thapa, Partha Choudhuri, Sangay Golay & Suman Golay (2023) Intercropping for nutrient retention, profitability, and quality bulb production of garlic (Allium sativum L.) under eastern Himalayan foothills region, Journal of Plant Nutrition, 46:12, 2905-2911, DOI: 10.1080/01904167.2022.2160760 | |

**Week 11: Case Study in Regenerative Agriculture - 25 Sep 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Case Study in Regenerative Agriculture | Newton, P., Civita, N., Frankel-Goldwater, L., Bartel, K., & Johns, C. (2020). What is regenerative agriculture? A review of scholar and practitioner definitions based on processes and outcomes. *Frontiers in Sustainable Food Systems*, 194. | |

**Week 12: Money, People and Roads - 02 Oct 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Money, People and Roads: Financial Resources, Labour, Transport, Infrastructure and Supply Chain Efficiency | Omobitan O, Khanal AR. Examining Farm Financial Management: How Do Small US Farms Meet Their Agricultural Expenses? Journal of Risk and Financial Management. 2022; 15(3):133. https://doi.org/10.3390/jrfm15030133 Segal, M. How automation is changing work (2018). Nature 563, S132-S135. doi: https://doi.org/10.1038/d41586-018-07501-y Nicolas Denis, Valerio Dilda, Rami Kalouche, and Ruben Sabah (2020) Agriculture supply-chain optimization and value creation. McKinsey & Co. Sinai, S. (2021) Agriculture can drive infrastructure development in northern Australia via https://www.aspistrategist.org.au/ | **Assessment 3: Resource Challenge Report** Due: Week 12 Friday (6 Oct 2023) 11:45 pm AEST |

**Review/Exam Week - 09 Oct 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

**Exam Week - 16 Oct 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

# Assessment Tasks

## 1 Assessment 1: Circular Economy Solutions

**Assessment Type**
Case Study

**Task Description**
Assessment 1: Agricultural Resources Case Studies has two parts. Part A is a group task and Part B is an individual task. In Part A (worth 15/20) your group of three to four students will select one Australian food or fibre industry from a list to

be provided on Moodle. Your group will produce a report describing circular economy strategies currently used within that industry to reduce waste, reduce costs, reduce reliance on external inputs and/or shorten supply chains. Your group will then propose at least two novel circular economy strategies that can be used in your selected industry to optimise resource utilisation and reduce wastage. Groups will be allocated by the Unit Coordinator through a random group generator, and announced through Moodle. The word count for Part A is 2000 words (+/- 10%) and your group report should be structured as follows:

- A description of the selected industry in Australia
- A description of the circular economy concept as it relates to agriculture and your industry in particular
- Circular economy solutions currently implemented in your selected industry, and their benefits
- Suggestions of novel circular economy solutions that can be applied to your industry, and a description of the benefits they would confer on the industry

Part A is due on Friday of Week 3 (July 28, 2023) at 11:45PM.
In Part B you will be required to participate in a whole-of-class discussion board on Moodle. Here you will be required to discuss how circular economy strategies enhance resource smart food production in Australia's food production system. As part of your discussion, you will be required to post at least one 300-500 word response in the discussion board, which will open on Monday of Week 2. More details will be available on Moodle. You should conclude your contributions by Friday of Week 4 (August 4, 2023) at 11:45PM.

**Assessment Due Date**
Week 4 Wednesday (2 Aug 2023) 11:45 pm AEST

**Return Date to Students**

Feedback for both items will be returned by Wednesday in Week 6

**Weighting**
20%

**Minimum mark or grade**
50%

**Assessment Criteria**
For Part A you will be assessed on:

- Your understanding of agricultural production requirements
- Your research skills and critical analysis of the literature
- Your understanding of circular economy concepts
- Your ability to draw on information to develop or suggest novel circular economy solutions
- Your written communication

For Part B you will be assessed on:

- Your ability to resolve complex challenges with insightful use of evidence
- Your creative approach to complex problems
- Your written communication

**Referencing Style**

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

**Submission**
Online Group

**Submission Instructions**
Part A is to be submitted through Moodle by one member of your group. Part B is to be submitted through the assigned discussion board and is an individual task.

**Learning Outcomes Assessed**

- Evaluate how plant and animal functioning and productivity are impacted by resource availability and management actions
- Integrate scientific knowledge for the development of sustainable resource management solutions for the cropping or livestock industry

# 2 Assessment 2: Online Test

**Assessment Type**
Online Test

**Task Description**
Assessment 2: Online Test will assess your understanding of the topics in Weeks 1 - 7. It will be administered as a test through Moodle in Week 8. The Online Test will open at 9AM on Monday of Week 8 (September 4, 2023) and close by 5PM on Friday of Week 8 (September 8, 2023). You will have two hours to complete the test. You will be allowed one attempt at this assessment. There are 15 short answer questions each worth two (2) marks.

**Assessment Due Date**

The Online Test will open at 9AM on Monday of Week 8 (September 4, 2023) and can be accessed at any time. It must be completed before 5PM on Friday of Week 8 (September 8, 2023).

**Return Date to Students**

Results of the online test will be returned within 10 working days after the test has closed

**Weighting**
30%

**Minimum mark or grade**
50%

**Assessment Criteria**
You will be assessed on your knowledge of concepts covered in Weeks 1 - 7, as reflected by correct responses in the Online Test.

**Referencing Style**

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

**Submission**
Online

**Submission Instructions**
The Online Test will be administered through Moodle

**Learning Outcomes Assessed**

- Evaluate how plant and animal functioning and productivity are impacted by resource availability and management actions

# 3 Assessment 3: Resource Challenge Report

**Assessment Type**
Report

**Task Description**
In Assessment 3: Resource Challenge Report you will select one from a list of emerging, expanding, or potential production systems and outline strategies for overcoming resource challenges. In this assessment, you are required to conduct a desktop review of the academic literature to identify and describe the resource challenges that limit commercial production in the relevant growing setting. Your report must explore the effects of resource availability and management actions on productivity, being sure to discuss ecological consequences also. Your report will then describe viable and practical solutions to the resource challenges you have identified.
In Assessment 3 you will select from one of the following production systems and related settings:

- Sheep meat production in northern Australia
- Date palm production in southwest New South Wales
- Beef production in Zambia
- Rice production in Laos
- Saffron production in New Zealand's South Island

The word count for Assessment 3 is 3000 words (+/- 10%), not including headings, subheadings, references, tables, figure legends and appendices. Your report should be structured as follows (suggested word count for each section is indicated within parentheses):
Introduction (400 words)

- Overview of the report
- Introduction to the food production system
- Introduction to the resource challenges facing your selected system

Resource challenges (1200 words)

- Here you should outline in detail what the major resource challenges facing your production system are. You should be sure to identify each of them and describe how these challenges impact commercial production of your selected food product. Here you must demonstrate an advanced understanding of the role of the relevant resources on the production and commercial viability of your selected food product.

Solutions (1100 words)

- In this section you must outline practical solutions to overcoming the selected resource challenges. These solutions must be appropriately justified, and you should demonstrate your critical analysis of the peer-reviewed literature in your development of appropriate solutions.

Conclusion (300 words)

References (at least 20)

**Assessment Due Date**
Week 12 Friday (6 Oct 2023) 11:45 pm AEST

**Return Date to Students**
Exam Week Friday (20 Oct 2023)

**Weighting**
50%

**Minimum mark or grade**
50

**Assessment Criteria**
For Assessment 3 you will be assessed on:

- Your description of the relevant food production system
- Your ability to outline resource challenges in emerging food production systems
- Your analysis of innovations and options for addressing resource challenges in food production systems
- Your development of viable solutions to overcome the relevant resource challenges
- Your use of reputable sources of evidence to support your report
- Your written communication and formatting.

A marking rubric will be available on Moodle.

**Referencing Style**

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

**Submission**
Online

**Learning Outcomes Assessed**

- Integrate scientific knowledge for the development of sustainable resource management solutions for the cropping or livestock industry
- Develop solutions to complex problems in agroecosystems.

# Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

**What is a breach of academic integrity?**
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

**Why is academic integrity important?**
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

**Where can I get assistance?**
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

**What can you do to act with integrity?**



**Be Honest**
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



**Seek Help**
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



**Produce Original Work**
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem