



# Reducing Flood Risks on Food and Fibre Production: Banyula Case Study

## TEACHER GUIDE






YEAR 9

This resource has been developed by:



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PIEFA's Storm and Flood Industry Recovery Program (SFIRP) is jointly funded by the Australian and NSW Governments under the Disaster Recovery Funding Arrangements. Although funding for this product has been provided by both Australian and NSW Governments, the material contained herein does not necessarily represent the views of either Government.



## LEARNING AREAS

### Geography (Years 9)

## NSW CURRICULUM CONTENT

### ➤ STAGE 5: Sustainable Biomes

**GE5-2** Explains processes and influences that form and transform places

**GE5-5** Assess management strategies for places and environments for their sustainability

## AUSTRALIAN CURRICULUM CONTENT

Investigate the human alteration of biomes to produce food, industrial materials and fibres and the environmental effects of these alterations (**ACHGK061**)

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## ➤ LESSON OBJECTIVE

Students will identify agricultural land at risk of flooding using satellite images and mapping. They will identify solutions in relation to land use and cropping choice to ensure sustainable food and fibre production.

## ➤ LESSON OVERVIEW

**ACTIVITY 1 - Mapping of Banyula Farm (20 mins)** - Using satellite imagery and topographical maps to understand and identify flood risks

**ACTIVITY 2 - Research Farming Practices on Banyula (20 mins)** - Identifying land use areas

**ACTIVITY 3 - Regeneration of Koala Habitat (20 mins)** - Carbon farming

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## Resources and Equipment

### › ACTIVITY 1 - Mapping of Banyula Farm

1. Computer access to Google Earth (<https://earth.google.com>)
2. **Worksheet 1: Mapping Activities for Banyula Farm**

### › ACTIVITY 2 - Research Farming Practices on Banyula

1. **Worksheet 2: Farming on Banyula**
2. **Macadamia Grower's Handbook: Chapter 1**

### › ACTIVITY 3 - Regeneration of Koala Habitat

1. Access to internet and **ABC Landline video** - series 2022/Sunday 23/10 from 44.49min-49.01 min
2. Article **Going nutty: the macadamia industry**
3. Article **The Booyong Reserve Story**
4. **Worksheet 3: Farming Practices at Banyula Farm**

#### Background Information

Banyula-Saratini is a 370 ha farm outside of Clunes in Northern NSW. The farm runs a herd of 250 head of cattle. They produce macadamia nuts from 12 000 macadamia nut trees, finger limes from 2000 finger lime trees and Davidson plums from 2000 trees. The property also has mixed forestry plantings of *Eucalyptus grandis* (Flooded gum) and *Eucalyptus pilularis* (Blackbutt gum). A 25 ha Koala habitat regenerative project has been planted and the trees once mature will be used as carbon credits generating another source of income to the farm. The Wilsons River runs along some of the farm boundaries. It is here where regeneration projects connect wildlife corridors to the Booyong nature reserve protecting the riparian zone and maintaining bushland corridors.



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## Lesson Guide

### ▶ ACTIVITY 1 - Mapping of Banyula Farm (20 min)

Students will utilise their prior learning of topographical maps and Google Earth to complete this activity.

1. Introduce Google Earth to students and explain how to find places using the search function. As a class try and find your school. Hand out **Worksheet 1: Mapping Activities for Banyula Farm.**
2. Students are then to use their computers and the Google Earth website to find the satellite image of Banyula farm.
3. Students should use the search terms: Saratini farm, Stewarts Road, Clunes.
4. Under Map Style in Google Earth: Highlight the box: Everything.
5. Allow students to view both the 3D and 2D version of Google Earth, exploring the farm. Students will need to zoom in to 300m to read road names.
6. Students are to use the information from Google Earth to answer questions from **Worksheet 1: Mapping Activities for Banyula Farm.**
7. Check answers with class.

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## ▶ ACTIVITY 2 - Research Farming Practices on Banyula (20 min)

1. Hand out **Worksheet 2: Farming on Banyula**.
2. Students will use the Banyula-Saratini/Morrowlands Farm map to identify the different areas of farm production.
3. Students will then read the provided resource on **Macadamia Nut Production** to explain the nut orchard locations (paying attention to pages 1, 2, 6 and 7).
4. Students complete **Worksheet 2: Farming on Banyula**.
5. Work through the answers with students.

## ▶ ACTIVITY 3 - Regeneration of Koala Habitat (20 min)

### Background information

Please refer the **Carbon farming** page for background information on Carbon Farming.

1. Watch the **Landline** video-series 2022/Sunday 23/10 from 44.49 min to 49.01 min with the class.
2. After watching the video, have a class discussion that answers the following questions:
  - How did agriculture change the landscape in the early 1900s?
  - Why is the land along the Wilsons River suited to Koala regeneration habitat?
  - How does planting the Koala habitat benefit the farm?
3. Hand out **Worksheet 3: Farming Practices at Banyula Farm**. Students should consider the class discussion and the following articles: **Going nutty: the macadamia industry** and **The Booyong Reserve Story** to help them answer the worksheet.

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**WORKSHEET 1:**

# Mapping Activities for Banyula Farm

## Exercise 1: Google Earth

Use Google Earth to find the location of Banyula-Saratini Farm.

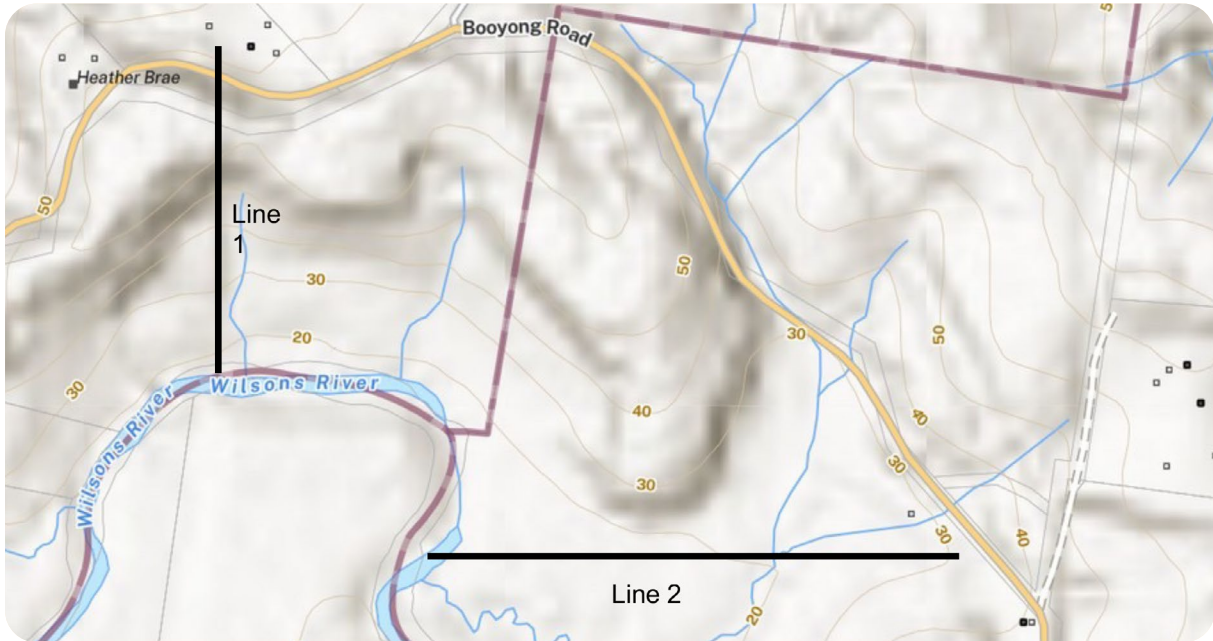
Use: Saratini farm; Stewarts Road; Clunes as your search term in Google Earth.  
Under the tab map layers turn on: Everything.

1. What is the name of the road you turn off to drive through the farm?
2. Find Stewarts Road (near Smart Rain Water Solutions) and follow Stewarts Road until it meets Booyong Road. Take the right fork of Booyong Road and follow the road until you find Booyong Nature Reserve. What is the name of the river you cross?
3. What is growing along the river banks?
4. Compare the tree plantings in the orchards to that along the river banks. What do you notice and can you explain why there is a difference?

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Map 1: Topographical Map of Banyula Farms showing boundary with Wilsons River



**Exercise 2: Mapping**

- 5. Using the topographical map above draw a cross section provided along line 1 and line 2 in the space provided. (River height 10 m)

A large empty rounded rectangular box for drawing a cross-section along Line 1 and Line 2. A small green pencil icon is in the bottom right corner.

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6. Compare the two cross sections and explain what would happen at each site if the Wilsons River flooded.

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 **WORKSHEET 2:**

## Farming on Banyula

### Background Information

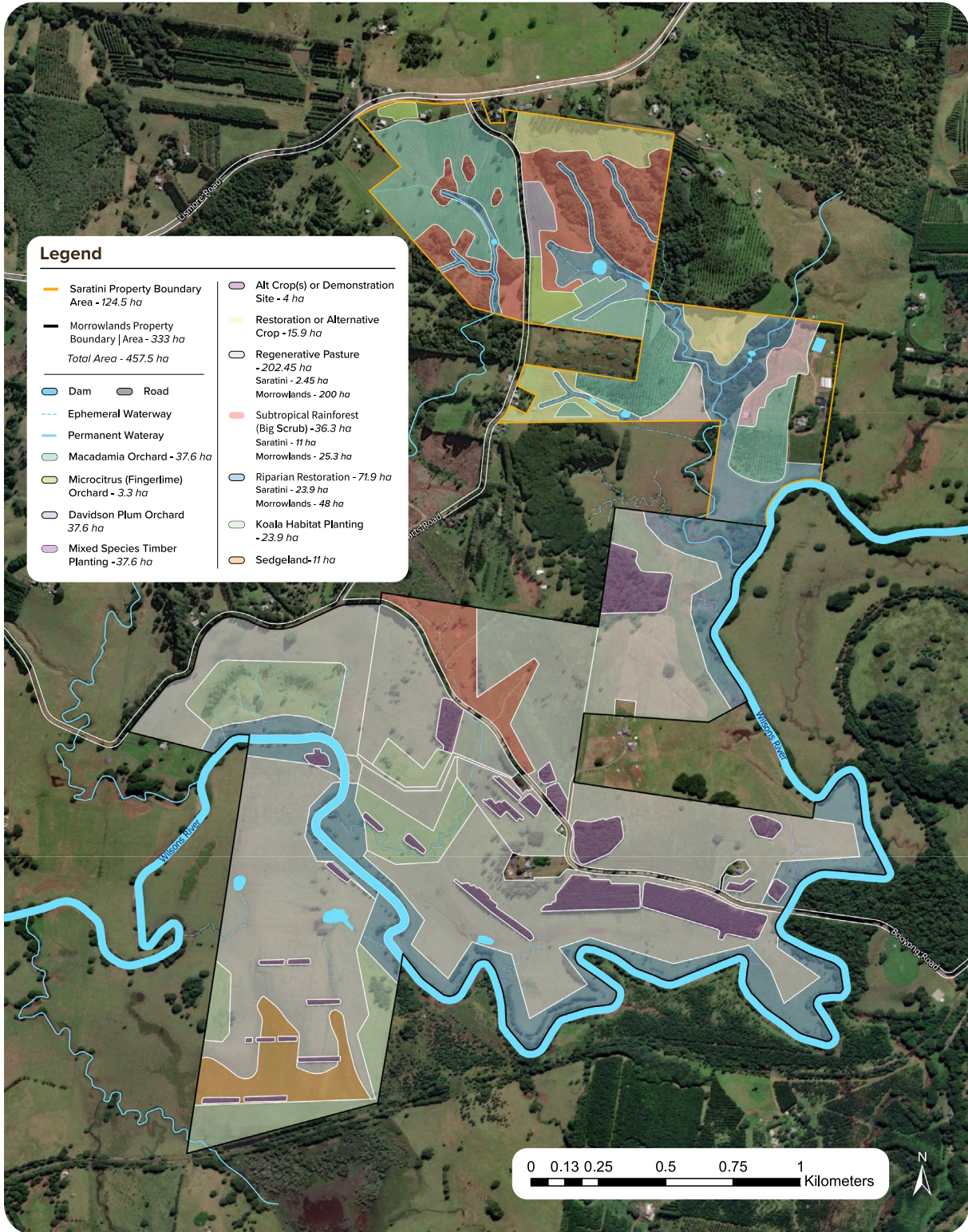
Banyula-Saratini is a 370 ha farm outside of Clunes in Northern NSW. The farm runs a herd of 250 head of cattle. They produce macadamia nuts from 12 000 macadamia nut trees, finger limes from 2000 finger lime trees and Davidson plums from 2000 trees. The property also has mixed forestry plantings of *Eucalyptus grandis* (Flooded gum) and *Eucalyptus pilularis* (Blackbutt gum). A 25 ha Koala habitat regenerative project has been planted and the trees once mature will be used as carbon credits generating another source of income to the farm. The Wilsons River runs along some of the farm boundaries. It is here where river regeneration projects (riparian restoration) connect wildlife corridors to the Booyong nature reserve protecting the riparian zone and maintaining bushland corridors.

1. Using Overview map Banyula-Saratini/Morrowlands Farms on the following page, identify where the following areas are located and clearly highlight them on the map.
  - a. macadamia orchards
  - b. Koala habitat planting
  - c. riparian restoration
2. Read the following article on **Macadamia Nut Production**, exploring page 1-2 and 6-7.
3. Using the information from this article, explain and provide three reasons for the current location of the macadamia nut orchards. Also explain why there are no orchards along the river banks.

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## Banyula-Saratini Farms - Production & Ecological Restoration Project

### Overview Map - Banyula-Saratini/Morrowlands Farms



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➤ WORKSHEET 3:

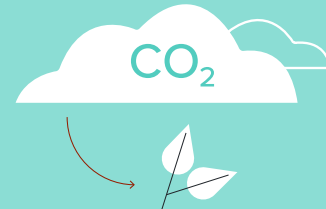
## Farming Practices at Banyula Farm

### What is a carbon credit?

One carbon credit is equal to one tonne of carbon dioxide equivalent (CO<sub>2</sub>e) sequestered or avoided by the project.



The carbon credits generated from ERF projects are called Australian Carbon Credit Units (ACCUs) and can be sold to individuals, organisations or governments wanting to offset their carbon emissions.



# 1 tonne

of CO<sub>2</sub>e sequestered  
from the atmosphere

# = 1 ACCU

<https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/primary-industries-carbon-farming>

Explain why you think the farm at Banyula could be considered as producing sustainable food and fibre. Use information from the video and the following articles: **Going nutty: the macadamia industry** and **The Booyong Reserve Story** to guide your answers.

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## Answers

### ➤ WORKSHEET 1: Mapping Activities for Banyula Farm

1. Lismore Road
2. Wilsons River
3. Trees grow along the banks of the Wilsons River.
4. The tree plantings in the orchards on the farm are all in neat rows to enable machinery to move through the orchards. Tree plantings along the river are trying to create corridors mimicking natural conditions to allow movement of fauna and flora.
5. Students should draw cross sections at site 1 and site 2.  
Site 1 should show a steep incline from 20 m to 50 m.  
Site 2 should only be a flat line with a slight increase from 20 m to 30 m.
5. There would be flooding at site 2 because this is low lying land and forms a flood plain.  
At site 1 there would be a less likely chance of flooding as the land rises to a height of 50 m.

### ➤ WORKSHEET 2: Farming on Banyula

1. Students highlight areas on their maps
3. Considerations for orchard location - slope of the land cannot be more than 15%, trees need to be protected by wind breaks, trees require access to water, the soil must meet the requirements of the trees. Trees are not grown along river banks as nuts are harvested from the ground and the nuts could be lost during flooding events.

### ➤ WORKSHEET 3: Farming Practices at Banyula Farm

The reasons why Banyula could be considered as producing sustainable food and fibre include:

- The use of farm mapping encourages the management of the farm as a whole rather than managing each section independently, understanding that all parts of the farm impact on one another. Mapping also enhances management decisions with regards to land use, yield comparisons and flood management.
- Banyula is a mixed farming enterprise with cattle and macadamias, finger limes and Davidson plums. Mixed farming means a number of sources of income which can provide economic sustainability if prices drop such as the macadamia price on 24.5.23 at \$1.70 first grade which was \$4 in 2022.
- The farm is undertaking regeneration planting which increases biodiversity, improves habitats for Koalas and earns the farm another income stream via the ACCU carbon credits. Regeneration is occurring along the river banks which helps to stabilise the riverbanks and filter sediment and nutrients for improved water quality in native waterflows/catchments.
- The newly planted trees connect with the Booyong Nature Reserve creating biodiversity corridors which allow for the movement of fauna and flora across the landscape.

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